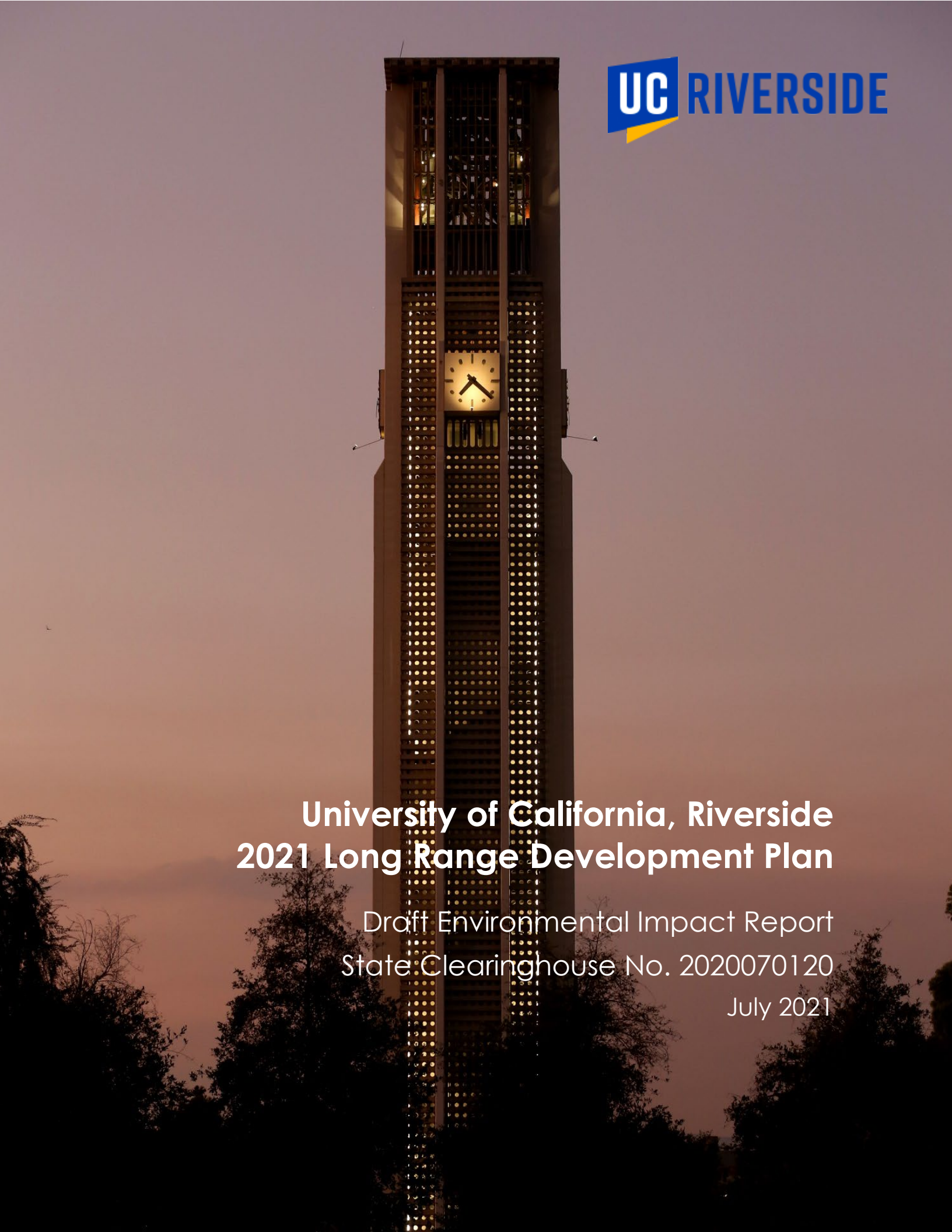

University of California, Riverside
2021 Long Range Development Plan

Draft Environmental Impact Report

State Clearinghouse No. 2020070120

July 2021

University of California, Riverside
2021 Long Range Development Plan

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July 2021

UC RIVERSIDE

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Executive Summary

This Executive Summary is provided pursuant to the California Environmental Quality Act (CEQA) Guidelines Section 15123 and contains an overview of the analysis of the potential environmental effects of the University of California, Riverside (UCR) proposed 2021 Long Range Development Plan (proposed 2021 LRDP).

Project Synopsis

This Environmental Impact Report (EIR) has been prepared to examine the potential environmental effects of the proposed 2021 LRDP. The following is a summary of the full project description, which can be found in Section 2, *Project Description*.

Project Location

The UCR main campus (campus) is located at 900 University Avenue in the City of Riverside (City), California. The approximately 1,108-acre campus[1] is in the eastern portion of the City, just west of the Box Springs Mountains. The campus is approximately 3 miles east of downtown Riverside and approximately 2.2 miles northwest of the city of Moreno Valley. Riverside is in Riverside County and lies in a larger geographic area commonly known as Inland Southern California. Inland Southern California includes western Riverside, southwestern San Bernardino counties, and portions of the Pomona Valley in easternmost Los Angeles County. The campus is generally bounded by Blaine Street to the north, Watkins Drive to the east, Le Conte Drive to the south, and Chicago Avenue to the west. The campus is diagonally bisected by the Interstate 215/State Route 60 (I-215/SR 60) freeway, resulting in two areas referred to as East Campus and West Campus. The two resulting areas of campus are described below.

East Campus

East Campus comprises approximately 604 acres and contains most of the University's built space. Nearly all the academic, research, and support facilities are in the Academic Center, which is circumscribed by Campus Drive and many original campus buildings. The northern half of East Campus is devoted to student housing and recreation. The UCR Bell Tower marks the heart of the campus, at the center of the Carillon Mall. The UCR Botanic Gardens is in the southeastern area of East Campus. The terrain steepens to the south and east of East Campus surrounding the UCR Botanic Gardens; these areas are largely unbuilt.

West Campus

West Campus comprises approximately 504 acres and is largely used as agricultural research fields and teaching managed by the Agricultural Operations unit of the College of Natural and Agricultural Sciences. Several University facilities are also on West Campus: Parking Lot 30, University Extension, and International Village – a housing complex intended for visiting international students. The University Substation, jointly owned by the City and UCR, is at the northern edge of Parking Lot 30. A California Department of Transportation (Caltrans) service yard is situated on an approximately 4.4-acre triangular parcel directly west of the I-215/SR 60 freeway, at the eastern terminus of

[1] The UCR Palm Desert Center, UCR Natural Reserves, all other Regents-owned properties, and all off-campus leased spaces are excluded.

Everton Place. The Gage Canal irrigation facility traverses the area north to south, with portions running underground.

Background

Under the California Master Plan for Higher Education, the University of California (UC) system guarantees access to the top 12.5 percent of California's public high school graduates and qualified transfer students from California Community Colleges.

UCR is one of 10 campuses in the UC system. UC policy requires all campuses to maintain Long Range Development Plans, known as LRDPs. An LRDP is defined by statute as a "physical development and land use plan to meet the academic and institutional objectives for a particular campus or medical center of public higher education" (Public Resources Code (PRC) Section 21080.09). The LRDP is a comprehensive document that guides a campus's physical development through planning objectives and policies and addresses land use, the location of new facilities, distribution of open space, and circulation strategies. An LRDP identifies the physical development needed to achieve academic goals and is a valuable reference document for the university and community.

Campus LRDPs are driven by the academic programming goals and the projections of both enrollment and service populations to achieve goals by an established horizon year. Each LRDP specifies how a campus will accommodate the projected student population along with the faculty and staff required to support that student population.

The Regents approved the first UCR LRDP in 1964 and approved subsequent revisions in 1990 and 2005. UCR adopted five amendments to the 2005 LRDP. The 2005 LRDP projected an enrollment of 25,000 undergraduate, transfer, and graduate students by Fall 2015; however, those student growth projections proved to be conservative (UCR 2005). As of the 2018/2019 academic year, UCR had reached student enrollment of approximately 24,000 (UCR 2021a). Additional information on enrollment is presented in Section 3, *Environmental Setting.*

2021 LRDP EIR Objectives

The proposed 2021 LRDP is broad in its scope and intends to achieve overarching goals established by the State, the UC system, and UCR. Statement objectives of the proposed 2021 LRDP EIR include the following:

- Serve as good stewards of limited campus lands and natural resources as UCR continues to grow and accommodate enrollment projections of approximately 35,000 students
- Develop approximately 5.5 million gross square feet (gsf) of net new building space needed to accommodate student housing as well as academic and research facilities
- Maintain existing land-based research operations on West Campus, while supporting facility modernization, research support facilities growth, and strategic partnerships and initiatives
- Activate and enliven the East Campus through strategic mixed-use development, improved public spaces, expanded campus services, and additional on-campus housing to facilitate a living-learning campus environment
- Accommodate approximately 40 percent of eligible students with on-campus housing, and replace aging low-density student housing units while considering demand, affordability, financial feasibility, and physical site constraints

- Locate future growth generally adjacent to and outside of the campus loop road, thereby maintaining the character of the Mid-Century Modern Core
- Incorporate efficient planning and design practices in support of minimizing the effects of climate change

Project Characteristics

The proposed 2021 LRDP identifies the physical resources required to achieve UCR's academic goals and to accommodate UCR's reasonably foreseeable projected growth. Project characteristics are discussed in detail in Section 2, *Project Description*. With directives from the UC system-wide initiatives and UCR Strategic Plan, the proposed 2021 LRDP contains an updated campus land use plan and planning principles for guiding future campus development under the plan. The UC Office of the President (UCOP) Facilities Manual recommends LRDPs address the following four primary elements: land use, open space, mobility, and infrastructure and sustainability.

The proposed 2021 LRDP would provide UCR with a framework to guide future growth and would serve as a guide for campus planners, faculty, and administrators through academic year 2035/2036. The proposed 2021 LRDP supports a projected enrollment growth to 35,000 students and 7,545 faculty and staff by Fall 2035 (a total campus population of 42,545). This projection is based on current student enrollment, regional growth trends, and agreements between the UC and the State regarding resident student and transfer student enrollment objectives. Additional information on these growth projections is included in Appendix B.

Development under the 2021 LRDP would primarily be infill development or expansion of already developed areas on the north portions of East Campus. A new interpretive center is programmatically assumed in the UCR Botanic Gardens designation on East Campus, but no new development is anticipated in the Open Space Reserve in East Campus. New development on West Campus would primarily occur within infill sites designated in the LRDP as Agricultural/Campus Research, Student Neighborhood, Campus Support, and University Avenue Gateway (refer to Figure 2-1).

UCR is considering the long-term (through 2035) demolition and potential redevelopment opportunities on-campus. For purposes of the EIR analysis, the areas of campus that UCR considers for demolition and potential redevelopment include, but are not limited to, the following: Boyden Labs; Fawcett Laboratory, Stored Product Insecticide Building; Lathhouses #1, #4, and #8; campus facilities along South Campus Drive (e.g., Genomics shed, Bio Control Building, Plant Drying Building, Herbarium, Botany Screenhouse, Storage Shed #6, Headhouse Storage Building, Growth Chamber Building, Glasshouse #51, Facilities Services Annex A, and College Building North and South), campus facilities east/west of East Campus Drive (e.g., Fawcett Laboratory, University Office Building, Campbell Hall, Facilities Services Annex B, Greenhouses #7-14, Greenhouses #18-21, Computing & Communications Center, and associated accessory structures), the Health Services Building, Bannockburn Village, the Plaza Apartments, Oban Apartments, Falkirk Apartments, the Corporation Yard, the softball and soccer fields, Advanced Neuroimaging Building (formerly FMRI), Costo Hall, and the Police Facility. Buildings considered for repurposing include Chapman Hall, Spieth Hall, Life Sciences, and Watkins Hall. Programs in these buildings would need to be relocated before any building is repurposed or demolished. The specific locations of these buildings within the UCR campus can be seen in Figure 3-4 and reviewed through the UCR Campus Map available at: https://campusmap.ucr.edu/.

Section 2, *Project Description*, provides a detailed description of the proposed 2021 LRDP, including the project location and setting, major project components, project objectives, and approvals that may be necessary during implementation of the proposed 2021 LRDP. Once certified, the 2021 LRDP EIR can be used to tier[2] subsequent environmental analyses for future UCR development projects that are programmatically consistent with the 2021 LRDP. A copy of the proposed 2021 LRDP is available at https://pdc.ucr.edu/environmental-planning-ceqa

Alternatives

CEQA Guidelines Section 15126.6, as amended, mandates that all EIRs include a comparative evaluation of the proposed plan with alternatives to the plan that can attain most of the plan's basic objectives but would avoid or substantially lessen any of the significant effects of the plan. CEQA requires an evaluation of a "range of reasonable" alternatives, including the "no project" alternative. The following provides brief descriptions of the alternatives evaluated in this EIR. See Section 6, *Alternatives*, for full details.

- Alternative 1: No Project
- Alternative 2: Reduced Development Program
- Alternative 3: Increased Student Housing
- Alternative 4: No Agricultural Land Development

Alternative 1 - No Project Alternative. The CEQA-required No Project Alternative would continue implementation of the 2005 LRDP per the CEQA Guidelines Section 15126.6(e)(3)(A). Planned development as expressed in the 2005 LRDP, primarily new academic/administrative space, would continue up to its planned capacity. This alternative would assume the same student enrollment growth (e.g., 10,000 new students) as projected in the proposed 2021 LRDP. Therefore, like with the proposed project, the 2035/2036 student body would still grow to approximately 35,000 students. This alternative would assume the same net new faculty and staff projections of approximately 2,800 new employees as projected in the proposed 2021 LRDP. Therefore, the 2035/2036 faculty and staff count would be approximately 7,545 employees. Under Alternative 1, the campus population in academic year 2035/2036 would be approximately 42,545. This alternative assumes a bed count of up to 12,500 beds.

Additionally, the assumed maximum development would remain at approximately 14.9 million gross square feet (gsf), as permitted under the 2005 LRDP. In academic year 2018/2019, UCR had approximately 6.8 million gsf of development. Therefore, Alternative 1 would allow for an increase of approximately 8 million gsf of additional academic buildings, student housing, and support space development by the year 2035/2036.

Summary of Alternative 1 - No Project Alternative. This alternative would result in similar impacts to aesthetics, cultural resources, geology and soils, hydrology and water quality, recreation, utilities and service systems, and wildfire compared to the proposed 2021 LRDP. However, this alternative would result in slightly greater/greater impacts to multiple environmental areas of concern, including agricultural resources, air quality, biological resources, energy consumption, GHG emissions, hazards and hazardous materials, noise, population and housing, public services, transportation, and TCR compared to the proposed 2021 LRDP.

[2] Tiering may include but may not be limited to a finding of exemption from further environmental review, an addendum, a supplemental EIR, or a subsequent EIR. In rare instances, a standalone CEQA document may be appropriate for future projects.

This alternative would not consolidate or densify new development generally adjacent to and outside of the campus loop road, nor would it definitively incorporate efficient planning and design practices in support of minimizing the effects of climate change.

Alternative 2 - Reduced Development Program Alternative. The Reduced Development Program Alternative would reduce net new campus population and net new development by 50 percent. The net increase in development would be approximately 1.85 million asf (approximately 2.75 million gsf) of additional academic buildings and support facilities rather than 3.7 million asf and 5.5 million gsf, respectively. Therefore, under Alternative 2, there would be a maximum of approximately 6.65 million asf (approximately 9.75 million gsf) of total academic, research, student housing, recreational facilities, and support space development by the year 2035/2036. It is reasonable to assume that less recreational facilities would be developed under this alternative since UCR would be limited in its development potential compared to the proposed 2021 LRDP.

Net new student enrollment for academic year 2035/2036 would be planned for 5,000 new students rather than 10,000. Therefore, the 2035/2036 student body would be approximately 30,000 students. Net new faculty and staff projections for academic year 2035/2036 would be planned for approximately 1,400 new employees rather than 2,800. Therefore, the 2035/2036 faculty and staff count would be approximately 6,200 employees. Under Alternative 2, the campus population in academic year 2035/2036 would be approximately 36,200 rather than 42,545. However, reducing the UCR student population under Alternative 2 would not reduce overall demand for higher education, and would simply relocate students to other campuses.

Summary of Alternative 2 – Reduced Development Program Alternative. The Reduced Development Program Alternative would limit future enrollment growth on the campus as well as developed academic square footage, compared to the proposed 2021 LRDP. For this reason, it would only partially achieve the underlying purpose of the proposed 2021 LRDP to support a projected enrollment growth based on current student enrollment, regional growth trends, and agreements between the UC and the State regarding resident student and transfer student enrollment objectives.

This alternative would result in slightly less/less impacts to multiple environmental areas of concern, including biological resources, energy consumption, GHG emissions, noise, transportation, and utilities and service systems compared to the proposed 2021 LRDP. Impacts to aesthetics, agricultural resources, air quality, cultural resources, energy consumption, geology and soils, GHG emissions, hazards and hazardous materials, hydrology and water quality, population and housing, public services, recreation, transportation, TCR, and wildfire would be similar compared to the proposed LRDP. Impacts to recreation could be slightly greater than compared to the proposed 2021 LRDP.

This alternative would not develop the net new building space needed to accommodate projected student housing or academic and research facilities needs projections based on current student enrollment, regional growth trends, and agreements between the UC and the State of California regarding resident student and transfer student enrollment objectives. Furthermore, it is logical to assume the restriction of student and facility growth at UCR would result in required growth at other UC and university/college campuses throughout California, which could result in regional or localized impacts at those campuses.

Alternative 3 - Increased Student Housing Alternative. This alternative would not alter the components of the proposed 2021 LRDP, but rather would increase the student bed capacity to provide housing for 60 percent of the eligible student body capacity rather than 40 percent under

the proposed 2021 LRDP. This would result in a doubling of the proposed new campus beds, which would represent a new increase of approximately 14,978 new campus beds, rather than 7,489 under the proposed 2021 LRDP. Under Alternative 3, the campus bed count in academic year 2035/2036 would be approximately 21,500 rather than 14,000 under the proposed 2021 LRDP.

Under Alternative 3, net new development would still total up to 3.7 million asf (5.5 million gsf), with a maximum buildout of approximately 8.5 million asf (approximately 12.7 million gsf). It is reasonable to assume that more of the developable square footage would be used for student housing under this alternative rather than student support, academic, or recreation space. The net new student enrollment for academic year 2035/2036 would be planned for 10,000 new students (35,000 total students). Net new faculty and staff projections for academic year 2035/2036 would be approximately 2,800 new employees (7,545 total employees). Under Alternative 3, the campus population in academic year 2035/2036 would be approximately 42,545.

Summary of Alternative 3 – Increased Student Housing Alternative. The Increased Student Housing Alternative would increase the student bed capacity to provide housing for 60 percent of the eligible student body capacity rather than 40 percent compared to the proposed 2021 LRDP. Net new campus population and square footage under this alternative would be the same as the proposed 2021 LRDP.

This alternative would result in less impacts to air quality, fuel consumption, GHG emissions from Scope 3 sources, population and housing, and transportation compared to the proposed 2021 LRDP. Impacts to aesthetics, agricultural resources, biological resources, cultural resources, energy consumption, geology and soils, GHG emissions from Scope 1 and Scope 2 sources, hazards and hazardous materials, hydrology and water quality, public services, recreation, TCR, and wildfire would be similar compared to the proposed LRDP. Impacts to noise and utilities and service systems could be greater than compared to the proposed 2021 LRDP.

Alternative 4 - No Agricultural Land Development Alternative. This alternative would maintain prime agricultural lands for land-based research. Under the proposed 2021 LRDP, there are nearly 394 acres of prime agricultural lands (i.e., State-designated Prime Farmland, Unique Farmland, or Farmland of Statewide Importance) located on West Campus in areas designated as Agricultural/Campus Research or Land-based Research. There are approximately 12.2 acres of prime agricultural land on East Campus concentrated near the eastern campus boundary at the USDA Salinity Laboratory. Under Alternative 4, all prime agricultural lands on West Campus and East Campus would be designated for land-based research opportunities with no secondary uses allowed, or remain as open space. More specifically, the 2021 LRDP designations for Agricultural/Campus Research, Student Neighborhood, and the agricultural portions of the “Campus Support” would be designated with “Land-based Research” designations.

Under Alternative 4, net new development would still total up to 3.7 million asf (5.5 million gsf), with a maximum buildout of approximately 8.5 million asf (approximately 12.7 million gsf), and the net new student enrollment for academic year 2035/2036 would be planned for 10,000 new students (35,000 total students). Net new faculty and staff projections for academic year 2035/2036 would be approximately 2,800 new employees (7,545 total employees). Under Alternative 3, the campus population in academic year 2035/2036 would be approximately 42,545.

Summary of Alternative 4 – No Agricultural Land Development Alternative. The No Agricultural Land Development Alternative would result in the same net new campus population and square footage as the proposed 2021 LRDP. This alternative would maintain approximately 406 acres of prime agricultural lands for land-based research or open space.

This alternative would result in less impacts to agricultural resources compared to the proposed 2021 LRDP. Impacts to aesthetics, air quality, biological resources, cultural resources, energy consumption, geology and soils, GHG emissions, hazards and hazardous materials, hydrology and water quality, population and housing, public services, recreation, transportation, TCR, utilities and service systems and wildfire would be similar compared to the proposed LRDP. Impacts related to noise could be slightly greater than compared to the proposed 2021 LRDP.

Environmentally Superior Alternative

Based on the analysis discussed in Section 6, *Alternatives,* Alternative 1 (No Project Alternative) would not be considered the environmentally superior alternative as it would not reduce any of the significant adverse impacts, and it would result in greater impacts related agricultural resources, air quality, biological resources, energy, GHG emissions, hazards and hazardous materials, noise, population and housing, public services, transportation, and TCR. All other impacts areas would be similar to those under the proposed 2021 LRDP.

There are different tradeoffs for each alternative (e.g. local versus regional impacts), which are dependent upon the specific resource areas. Individuals and the decision-makers may weigh these resource areas differently. Alternative 3 would result in fewer impacts to areas found to be significant and unavoidable under the proposed 2021 LRDP – air quality and transportation, and while impacts related to noise would be greater under this alternative due to the increase in students living on-campus (i.e. increase number of sensitive receptors), the decrease in the other areas of concern (fuel consumption, GHG emissions for Scope 3 sources, and population and housing) are found to be of greater local and regional value. Furthermore, although impacts related to utilities and service systems under this alternative would be greater than the proposed 2021 LRDP, they would remain less than significant, as was concluded for proposed 2021 LRDP. Therefore, the Increase Student Housing Alternative, is considered the environmentally superior alternative.

Areas of Known Controversy/Issues to be Resolved

UCR circulated a Notice of Preparation (NOP) of the EIR for a 30-day public review period starting on July 7, 2020 and ending on August 6, 2020. UCR distributed the NOP to the State Clearinghouse, responsible agencies, and other interested parties. UCR held a virtual EIR Public Scoping Meeting on July 29, 2020 to provide information about the proposed 2021 LRDP and the CEQA process to members of public agencies, interested stakeholders, and residents/community members.

UCR received comments during the Public Scoping Meeting, via email, and by letter, from five public agencies, one Native American tribe, and one individual. Appendix A of this EIR presents the NOP and all comments received during the 30-day review period. Table ES-1 summarizes the comments received during the public scoping period.

Table ES-1 NOP Comments

Commenter	Comment/Request
Federal/State Agency Comments	
Native American Heritage Commission	States that the proposed project is subject to the requirements and provisions under Assembly Bill (AB) 52 for tribal cultural resources
Rincon Band of Luiseño Indians	Reiterates their engagement in government-to-government consultation
	States concern regarding impacts to tangible tribal cultural resources

Commenter	Comment/Request
Regional/Local Agency Comments	
City of Riverside Planning Division	The City recommends an analysis of impacts to agricultural lands under Agricultural and Forestry Resources criterion (b)
	States that per Section 21048.1 and 15064.5(a)(2) of CEQA structures need to be analyzed for local listing as well as national and state
	States that most of the campus in located in Zone E of the March Air Reserve Base/Inland Port Airport Land Use Compatibility Plan
	States concerns regarding the need for off-campus housing due to increased campus population
City of Riverside, Public Works Department	Requests that the City's Traffic Engineering Division be given the opportunity to review the Traffic Impact Analysis and that it adheres to the City's Traffic Impact Analysis guidelines
Riverside Public Utilities Department (RPU)	RPU/Water initially advised that a Water Supply Assessment would be needed. However, subsequent correspondence from RPU dated April 16, 2021 removed this suggestion, after UCR noted that it is not a "City or county" under Water Code Section 10910.
	RPU/Electric acknowledges anticipated impacts to City electrical services.
Parks, Recreation, and Community Services Department	Requests that the Gage Canal Trail project through UCR campus be included in the 2021 LRDP and EIR at a programmatic level and further states that inclusion of the Gage Canal Trail in the 2021 LRDP would assist the City in leveraging grants
Fire Prevention	Acknowledges working closely with the UCR Fire Marshal since 2016 and indicates that concerns have been expressed related to current and new development
	States that the City of Riverside Fire Prevention Division have been involved with all new project submittals by the UCR Fire Marshal (since 2016) and realizes that the campus will continue to grow with more students and additional buildings
	Requests that the City of Riverside Fire Department management team and the [lead agency] have another discussion regarding placing a new fire station on or near the UCR campus as part of the LRDP, to ensure public safety is always a priority so [the City of Riverside Fire Department] can continue to support any future development near or on the campus at all times
Riverside County Flood Control and Water Conservation District	States the 2021 LRDP would not be impacted by District Master Drainage Plan facilities, nor are other facilities of regional interest proposed
	States an encroachment permit shall be obtained for any construction related activities occurring within its right-of-way or facilities, namely, Box Springs Storm Drain or University Wash Spruce Street Storm Drain
	States, generally, that [projects under the 2021 LRDP] may require a National Pollutant Discharge Elimination System permit(s) from the State Water Resources Control Board
	States, generally, that if [projects under the 2021 LRDP] involve a Federal Emergency Management Agency mapped floodplain, then the [lead agency] should require all studies, calculations, plans, and other information required to meet Federal Emergency Management Agency requirements and should further require the obtainment of a Conditional Letter of Map Revision prior to grading, recordation, or other final approval of the project(s) and a Letter of Map Revision prior to occupancy

Commenter	Comment/Request
	States, generally, that if a natural watercourse or mapped floodplain is impacted by [projects under the 2021 LRDP], the [lead agency] should require obtainment of a Section 1602 Agreement for the California Department of Fish and Wildlife and a Clean Water Act Section 404 Permit from the U.S. Army Corps of Engineers, or written correspondence from these agencies indicating the project is exempt from these requirements and a Clean Water Act Section 401 Water Quality Certification may be required from the local California Regional Water Control Board prior to issuance of the Corps 404 permit
Riverside Transit Agency	Acknowledges receipt and review of the NOP and states they have no comments
South Coast Air Quality Management District	Recommends use of CEQA Air Quality Handbook for guidance in preparing air quality analysis and use CalEEMod for analysis
	Requests construction-related and operation-related air quality analysis, including impacts from indirect sources
	Requests calculation of regional and localized air quality impacts and comparison to SCAQMD thresholds
	Requests mitigation measures to minimize or eliminate significant adverse impacts to air quality
Public Comments	
Kevin Dawson	Concerns related to the aesthetic impacts, primarily lighting, as well as concerns related to the public safety at parking structures and other tall buildings, primarily related to suicide prevention measures

The issues raised in the NOP comments were considered in preparing the scope and content of the Draft EIR. The Regents will also need to decide whether to approve or deny the proposed 2021 LRDP, an alternative, or a variation thereof, and decide whether to adopt the mitigation measures as proposed.

Summary of Impacts and Mitigation Measures

Table ES-2 lists the environmental impacts of the proposed 2021 LRDP, mitigation measures, and residual impacts (the impact after application of mitigation, if required). Impacts are categorized as follows:

- **Significant and Unavoidable.** An impact that cannot be reduced to below the threshold level given reasonably available and feasible mitigation measures. Such an impact requires a Statement of Overriding Considerations to be issued if the proposed 2021 LRDP is approved, per Section 15093 of the CEQA Guidelines.
- **Less than Significant with Mitigation Incorporated.** An impact that can be reduced to below the identified impact threshold level if proposed mitigation measures are adopted. If proposed mitigation measures are not adopted, such impacts would be significant and unavoidable. Such an impact requires findings under Section 15091 of the CEQA Guidelines.
- **Less than Significant.** An impact that may be adverse but does not exceed the established identified threshold level and does not require mitigation measures is less than significant.
- **No Impact.** The proposed 2021 LRDP would have no effect on environmental conditions or would reduce existing environmental problems or hazards.

Table ES-2 Summary of Environmental Impacts, Mitigation Measures, and Residual Impacts

Impacts	Mitigation Measure (s)	Residual Impacts
Aesthetics		
Impact AES-1. Development under the proposed 2021 LRDP could block or impede views of scenic vistas, namely views of the Box Springs Mountains. Impacts would be significant and unavoidable.	No feasible mitigation measure	Significant and unavoidable
Impact AES-2. Development under the proposed 2021 LRDP would include construction of new facilities and green space on the UCR campus and renovations of existing structures. Physical changes would not degrade the visual character of the campus or surrounding areas. Impacts would be less than significant. No mitigation measures are required.	None required	Less than significant
Impact AES-3. Implementation of the proposed 2021 LRDP would lead to more intensive development on the campus and new sources of nighttime illumination at adjacent sensitive receptors. Future development would be required to comply with UCR Campus Construction and Design Standards and California policies and standards specifically designed to reduce lighting impacts. Adherence to these policies and standards as well as incorporation of mitigation measures would reduce light and glare impacts to a less-than-significant level.	**MM AES-1.** UCR shall incorporate site-specific consideration of the orientation of the building, use of landscaping materials, lighting design, and choice of primary façade materials to minimize potential off-site spillover of lighting and glare from new development. As part of this measure and prior to project approval, UCR shall require the incorporation of site- and project-specific design considerations (to be included in the lighting plans) to minimize light and glare, including, but not limited to, the following: ▪ New outdoor lighting adjacent to on-campus residences and adjacent off-campus sensitive uses shall utilize directional lighting methods with full cutoff type light fixtures (and shielding as applicable) to minimize glare and light spillover. ▪ All elevated light fixtures such as in parking lots, parking structures, and athletic fields shall be shielded to reduce glare. ▪ Provide landscaped buffers where on-campus student housing, uses identified as Open Space Reserve and UCR Botanic Gardens, and off-campus residential neighborhoods might experience noise or light from UCR activities.	Less than significant with mitigation incorporated

Impacts	Mitigation Measure (s)	Residual Impacts
	▪ All lighting shall be consistent with the Illuminating Engineering Society of North America (IESNA) Lighting Handbook. ▪ The UCR Planning, Design, & Construction staff shall review all exterior lighting design for conformance with the Campus Design and Construction Standards. Verification of inclusion in project design shall be provided at the time of design review and lighting plans shall be reviewed and approved prior to project-specific design and construction document approval.	
	MM AES-2. Ingress and egress from new parking areas and parking structures shall be designed and situated to direct vehicular headlights away from adjacent residential uses, as necessary. Walls, landscaping, or other light barriers and shielding will be provided where appropriate. Site plans shall be reviewed and approved as part of project-specific design and construction document approval.	Less than significant with mitigation incorporated
Agricultural Resources		
Impact AG-1. Implementation of the proposed 2021 LRDP would result in the conversion of Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland) to non-agricultural use. No mitigation is sufficient to substantially reduce impact. Therefore, impacts would be significant and unavoidable.	UCR has already implemented an agricultural conservation easement program (CVARS). There are no additional feasible mitigation measures.	Significant and unavoidable
Air Quality		
Impact AQ-1. Implementation of the proposed 2021 LRDP would not generate population, housing, or employment growth exceeding forecasts in the 2016 AQMP. Therefore, impacts would be less than significant.	None required	Less than significant

Impacts	Mitigation Measure (s)	Residual Impacts
Impact AQ-2. Construction of the proposed 2021 LRDP would generate ROG and NO_X in quantities that exceed SCAQMD significance thresholds. Operation would exceed SCAQMD thresholds for ROG, NO_X, and PM_{10}. Following mitigation, this impact would be significant and unavoidable.	See **MM GHG-1**	Significant and unavoidable
Impact AQ-3. Implementation of the proposed 2021 LRDP would not expose sensitive receptors to substantial pollutant concentrations from CO hotspots or TACs. impacts would be less than significant. No mitigation would be required.	None required	Less than significant
Biological Resources		
Impact BIO-1. Implementation of the 2021 LRDP would result in direct or indirect impacts to special-status species. Mitigation measures MM BIO-1a through MM BIO-8, including preconstruction surveys, avoidance measures, and project design standards, would reduce impacts to less than significant.	**MM BIO-1A Burrowing Owl Preconstruction Survey.** Prior to construction activities, preconstruction presence/absence surveys for burrowing owls shall be conducted in the project survey area where suitable habitat is present prior to ground disturbance in new areas. Preconstruction surveys shall be conducted by a qualified biologist no more than 30 days prior to grading or other significant site disturbance. Surveys shall include the development footprint and consider up to a 500-foot buffer of adjacent areas to the extent feasible (e.g. a visual survey of adjacent areas will suffice for off-site areas not accessible). The surveys shall be conducted in accordance with the MSHCP burrowing owl survey guidelines. A burrow shall be considered occupied when there is confirmed use by burrowing owls based on observations made by a qualified biologist. If owls are not found to be occupying habitat in the survey area during the preconstruction survey, the proposed disturbance activities may proceed. Take of active nests shall be avoided.	Less than significant with mitigation incorporated

Impacts	Mitigation Measure (s)	Residual Impacts
	MM BIO-1B Burrowing Owl Avoidance Measures. If owls are discovered on and/or within 500 feet of the proposed project site, avoidance measures shall be developed by the qualified biologist in compliance with the MSHCP and in coordination with the CDFW and/or RCA. Such measures will include, but not limited to, the following: ▪ Burrowing owls shall not be disturbed on-site and/or within a 500-foot buffer or as determined by a biologist between February 1 and August 31 to avoid impacting nesting. ▪ Prior to any ground disturbance, all limits of project construction shall be delineated and marked to be clearly visible to personnel on foot and in heavy equipment. All construction-related activities shall occur inside the limits of construction and designated staging areas. Construction staging and equipment storage shall be situated outside of any occupied burrowing owl burrow locations. All construction-related movement shall be restricted to the limits of construction and staging areas. ▪ Avoidance measures shall include passive relocation by a qualified biologist to remove the owls between September 1 and January 31, which is outside of the typical nesting season.	Less than significant with mitigation incorporated
	MM BIO-2 Nesting Bird Avoidance. Prior to issuance of grading permits, the following measures shall be implemented: ▪ To avoid disturbance of nesting and special-status bird species protected by the MBTA and California Fish and Game Code, activities related to the project, including but not limited to, vegetation removal, ground disturbance, and construction and demolition shall occur outside of the bird breeding season (February 15 through August 31). If construction must be initiated during the peak nesting season, vegetation removal and/or tree	Less than significant with mitigation incorporated

Impacts	Mitigation Measure (s)	Residual Impacts
	removal should be planned to occur outside the nesting season (September 1 to February 14), and a preconstruction nesting bird survey shall be conducted no more than 3 days prior to initiation of construction activities. The nesting bird preconstruction survey shall be conducted on foot inside the project site disturbance areas. If an active avian nest is discovered during the preconstruction clearance survey, construction activities shall stay outside of a 50- to 200-foot buffer for common nesting birds around the active nest, as determined by a biologist. For listed and raptor species, this buffer shall be expanded to 500 feet or as determined by a biologist. ▪ Inaccessible areas shall be surveyed from afar using binoculars to the extent practical. The survey shall be conducted by a qualified biologist familiar with the identification of avian species known to occur in western Riverside County. If nests are found, an appropriate avoidance buffer shall be determined by a qualified biologist and demarcated by a qualified biologist with bright orange construction fencing, flagging, construction lathe, or other means to mark the boundary. Effective buffer distances are highly variable and based on specific project stage, bird species, stage of nesting cycle, work type, and the tolerance of a particular bird pair. The buffer may be up to 500 feet in diameter, depending on the species of nesting bird found and the biologist's observations. ▪ If nesting birds are located adjacent to the project site with the potential to be affected by construction activity noise above 60 dBA Leq (see Section 4.11, *Noise*, for definitions and discussion of noise levels), a temporary noise barrier shall be erected consisting of large panels designed specifically to be deployed on construction sites for reducing noise levels at sensitive receptors. If 60 dBA Leq is exceeded, an acoustician would require	

Impacts	Mitigation Measure (s)	Residual Impacts
	the construction contractor to make operational and barrier changes to reduce noise levels to 60 dBA during the breeding season (February 15 through August 31). Noise monitoring shall occur during operational changes and installation of barriers to ensure their effectiveness. All construction personnel shall be notified as to the existence of the buffer zone and to avoid entering the buffer zone during the nesting season. No parking, storage of materials, or construction activities shall occur within this buffer until the avian biologist has confirmed that breeding/nesting is completed, and the young have fledged the nest. Encroachment into the buffer shall occur only at the discretion of the qualified biologist, if it is determined such encroachment will not adversely impact the nesting birds.	
	MM BIO-3 Bird Strike Avoidance. To reduce bird strike mortality and injury of special-status bird species from collisions with clear and reflective sheet glass and plastic, construction of glass-fronted buildings or other structures using exposed glass (e.g., glass-topped walls) shall incorporate measures to minimize the risk of bird strikes. This may include: (1) the use of opaque or uniformly textured/patterned/etched glass, (2) angling of glass downward so that the ground instead of the surrounding habitat or sky is reflected, (3) installation of one-way film that results in opaque or translucent covering when viewed from either side of the glass, (4) installation of a uniformly dense dot pattern created as ceramic frit on both sides of the glass, and/or (5) installation of a striped or grid pattern of clear ultraviolet-reflecting and ultraviolet-absorbing film applied to both sides of the glass. It should be noted that single decals (e.g., falcon silhouettes or large eye patterns) are ineffective and are not recommended	Less than significant with mitigation incorporated

Impacts	Mitigation Measure (s)	Residual Impacts
	unless the entire glass surface is uniformly covered with the objects or patterns.	
	MM BIO-4 Bat Preconstruction Survey. To avoid disturbance of special-status bat species during maternity season (approximately March-September), a preconstruction roosting bat survey shall be conducted by a qualified bat biologist on potential roost structures identified by the bat biologist and mature vegetation no more than 30 days prior to initiation of construction activities if construction activities must occur during the roosting season. If future projects would impact rocky outcrops, mature vegetation, existing buildings, or other structures that could be used for roosting, a passive acoustic survey shall identify the species using the area for day/night roosting. If special-status roosting bats are present and their roosts would be impacted, a qualified bat biologist should prepare a plan to identify the proper exclusionary methods. Removal of mature trees should be monitored by a qualified bat biologist and occur by pushing down the entire tree (without trimming or limb removal) using heavy equipment and leaving the felled tree on the ground untrimmed and undisturbed for a period of at least 24 hours. To exclude bats from buildings/structures or rocky outcrops, exclusion measures should be installed on crevices by placing one-way exclusionary devices that allow bats to exit but not enter the crevice.	Less than significant with mitigation incorporated
	MM BIO-5 Special-Status Species Preconstruction Survey. Focused surveys for special-status plants and wildlife species with potential to occur in or around the project site shall be conducted prior to impacts on areas of suitable habitat for each respective species, including special-status plant species, Riverside fairy shrimp, burrowing owl, coastal California gnatcatcher, and least Bell's vireo. Surveys shall be performed by a qualified	Less than significant with mitigation incorporated

Impacts	Mitigation Measure (s)	Residual Impacts
	biologist with the appropriate federal/State permits, if necessary, and follow approved survey protocol, which includes appropriate timing of surveys. If listed species are observed and habitat areas cannot be avoided, then consultation/permitting would be required to obtain take authorization. Appropriate avoidance, minimization, and compensatory mitigation shall be required for each listed species that could be impacted.	
	MM BIO-6A Sensitive Communities Indirect Impact Avoidance – Construction. The following measure shall be required for construction activities that are proposed adjacent to the Open Space Reserve or lands supporting sensitive vegetation communities and/or biological resources: ▪ Prior to commencement of clearing or grading activities, fencing (e.g., silt fencing, orange construction fencing, and/or chain-link fencing as determined by campus planning) shall be installed around the approved limits of disturbance to prevent errant disturbance of sensitive biological resources by construction vehicles or personnel. All movement of construction contractors, including ingress and egress of equipment and personnel, shall be limited to designated construction zones. This fencing shall be removed upon completion of all construction activities. ▪ No temporary storage or stockpiling of construction materials shall be allowed in Open Space Reserve lands, and all staging areas for equipment and materials shall be located at least 50 feet where space permits on the site, or less as determined appropriate by a qualified biologist from the edge of these areas. This prohibition shall not be applied to facilities that are planned to traverse Open Space Reserve lands (e.g., trails and utilities). Staging areas and construction sites in proximity to the Open Space Reserve lands shall be kept free of trash,	Less than significant with mitigation incorporated

Impacts	Mitigation Measure (s)	Residual Impacts
	refuse, and other waste; no waste dirt, rubble, or trash shall be deposited in these areas. ▪ Appropriate setbacks or barriers (e.g., fencing) shall be implemented to minimize human activity impacts. Buffer areas shall be vegetated with native species to help screen these indirect effects. ▪ Active construction areas shall be sprayed with water periodically to minimize dust. ▪ Equipment to extinguish small brush fires (e.g., from trucks or other vehicles) shall be present on-site during all phases of project construction activities, along with personnel trained in the use of such equipment. Smoking shall be prohibited in construction areas adjacent to flammable vegetation. ▪ Temporary night lighting shall not be used during construction unless determined to be absolutely necessary (e.g., time sensitive construction activities). If night lighting is necessary, lights shall be directed away from sensitive vegetation communities and lands designated as Open Space Reserve and shielded to minimize temporary lighting of the surrounding habitat.	
	MM BIO-6B Sensitive Communities Indirect Impact Avoidance – Operation. The following measure shall be required for operation activities adjacent to the Open Space Reserve or lands supporting sensitive vegetation communities and/or biological resources: ▪ Landscaping adjacent to Open Space Reserve lands shall comply with the following requirements to prevent the introduction of invasive species: ▫ Appropriate landscaping shall be selected based on the vegetation communities in the portion of the Open Space Reserve adjacent to the project. In areas supporting native (or disturbed native)	Less than significant with mitigation incorporated

Impacts	Mitigation Measure (s)	Residual Impacts
	vegetation communities, revegetation of impacted slopes shall be with appropriate native plant materials. ▪ Permanent lighting in or adjacent to Open Space Reserve lands shall be selectively placed, shielded, and directed to minimize potential impacts to sensitive species. In addition, lighting from buildings or parking lots/structures abutting Open Space Reserve lands shall be shielded and/or screened by vegetation to the extent feasible. ▪ The following best management practices shall be implemented in Open Space Reserve lands and in areas that interface with Open Space Reserve lands to address runoff/water quality impacts from landscaping: ▫ Integrated Pest Management principles (UC Integrated Pest Management Program) shall be implemented to the extent practicable for chemical pesticides, herbicides, and fertilizers. Examples of such measures may include, but are not limited to, alternative weed/pest control measures (e.g., removal by hand) and proper application techniques (e.g., conformance to manufacturer specifications and legal requirements). ▫ Irrigation for project landscaping shall be minimized and controlled through efforts such as designing irrigation systems to match landscaping water needs, using sensor devices to prevent irrigation during and after precipitation, and using automatic flow reducers/shut-off valves that are triggered by a decrease in water pressure from broken sprinkler heads or pipes. ▪ Barriers (e.g., fencing or walls) and/or signage directing people away from sensitive vegetation communities and habitat shall be installed on	

Impacts	Mitigation Measure (s)	Residual Impacts
	designated pathways and trails in and adjacent to Open Space Reserve lands to minimize unauthorized human activity. Barriers (e.g., fencing or walls) shall consist of an approximately 3-foot-high wooden barrier. Chain-link fencing shall not be used for barrier. ▪ Projects adjacent to Open Space Reserve lands shall install signage along the boundary of the Open Space Reserve lands, indicating the presence of lands supporting sensitive habitat. ▪ Projects adjacent to Open Space Reserve lands shall install fencing or other visual/physical barriers (such as appropriate landscaping) to discourage human encroachment into the Open Space Reserve lands in areas where trespass is likely to occur (gradual slopes; areas of low, open vegetation; areas of previous disturbance, etc.).	
	MM BIO-7 Sensitive Vegetation Communities Mitigation. Impacts on sensitive vegetation communities shall be avoided to the extent practicable. If an avoidance alternative is not feasible and a practicable alternative is selected instead, a Determination of Biologically Equivalent or Superior Preservation shall be prepared to ensure replacement of any lost functions and values of habitat as it relates to MSHCP Covered Species. If a future project would result in removal of sensitive vegetation, then compensatory mitigation would be required depending on the amount of vegetation impacted. Mitigation shall ensure no net loss of habitat following implementation of a future project. This mitigation may be in the form of habitat preservation, restoration, enhancement, and/or establishment (i.e., creation). Compensatory mitigation shall be in the form of permittee-responsible mitigation, in which the permittee maintains liability for the construction and	Less than significant with mitigation incorporated

Impacts	Mitigation Measure (s)	Residual Impacts
	long-term success of the mitigation site, or through mitigation banking or an in-lieu fee program, where liability for project success is transferred to a third party (i.e., a mitigation bank or an in-lieu fee sponsor). For permittee responsible mitigation, preparation of a Habitat Mitigation Monitoring Plan may be required.	
	MM BIO-8 MSHCP Conservation Area Construction Noise Reduction. The following measures shall be followed during construction of projects adjacent to MSHCP conservation areas (i.e., Criteria Cell 634): ▪ *Staging Area*. Provide staging areas on-site to minimize off-site transportation of heavy construction equipment. These areas shall be located to maximize the distance between activity and MSHCP conservation areas. This should reduce noise levels associated with most types of idling construction equipment. ▪ *Avoid Operating Equipment Simultaneously*. Whenever possible, ensure that construction activities are scheduled to avoid operating several pieces of equipment simultaneously, which causes high noise levels. ▪ *Inspections*. The contractor shall inspect construction equipment to ensure that such equipment is in proper operating condition and fitted with standard factory silencing features. Construction equipment shall utilize all standard factory silencing features, such as equipment mufflers, enclosures, and barriers. ▪ *Newest Power Construction Equipment*. The newest available power construction equipment with standard recommended noise shielding and muffling devices shall be used. ▪ *Mufflers*. During project grading and construction, all equipment, fixed or mobile, shall be operated with closed engine doors and shall be equipped	Less than significant with mitigation incorporated

Impacts	Mitigation Measure (s)	Residual Impacts
	with properly operating and maintained mufflers consistent with manufacturers' standards. Use of manufacturer-certified mufflers associated with construction equipment has been shown to reduce noise levels by 8 to 10 dBA. ▪ *Smart Back-up Alarms*. Mobile construction equipment shall have smart back-up alarms that automatically adjust the sound level of the alarm in response to ambient noise levels. Alternatively, back-up alarms should be disabled and replaced with human spotters to ensure safety when mobile construction equipment is moving the reverse direction. ▪ *Idling*. All construction vehicles, such as bulldozers and haul trucks, shall be prohibited from idling in excess of 5 minutes, which is consistent with recommended strategies to reduce and/or eliminate diesel idling.	
Impact BIO-2. Construction and operation of projects developed under the proposed 2021 LRDP would potentially have substantial adverse effects on riparian habitat or other sensitive natural community. Implementation of Mitigation Measures MM BIO-6A, MM BIO-6B, and MM BIO-7 would reduce impacts to less than significant.	See: **MM BIO-6A Sensitive Communities Indirect Impact Avoidance – Construction** **MM BIO-6B Sensitive Communities Indirect Impact Avoidance – Operation** **MM BIO-7 Sensitive Vegetation Communities Mitigation**	Less than significant with mitigation incorporated
Impact BIO-3. The proposed 2021 LRDP may result in significant adverse effects on State- and federally-protected wetlands. Mitigation Measure MM BIO-9 would require a jurisdictional delineation, and consultation and permitting with appropriate State and federal agencies, which would reduce impacts to less than significant.	**MM BIO-9 Jurisdictional Delineation of Waters and Wetlands.** During the project planning process, if a project has vegetation mapped as potential wetlands or the project site contains or is located immediately adjacent to a natural drainage course, a qualified biologist shall conduct a jurisdictional delineation. The jurisdictional delineation shall use current regulatory guidance to identify the presence of potential regulated waters and wetlands in the project vicinity. If there is potential for the project to adversely affect wetlands or waters, UCR	Less than significant with mitigation incorporated

Impacts	Mitigation Measure (s)	Residual Impacts
	shall conduct a pre-application meeting with appropriate agencies (USACE, the RWQCB, and/or the CDFW) prior to submittal of permit applications to discuss existing conditions, to confirm the agency's jurisdiction over water resources in the survey area, to discuss impacts to these resources that would result from the project, and to discuss the regulatory permitting process. Following the pre-application meeting, UCR shall prepare and process appropriate permits, which may include a Section 404 Permit, a Section 401 Water Quality Certification, a Report of Waste Discharge, and/or a CDFW Section 1602 Notification of Lake or Streambed Alteration. If there is potential for the project to adversely affect wetlands or waters, impacts shall be avoided and minimized during the project design process, to the extent practicable, and unavoidable impacts shall be mitigated as discussed with each regulatory agency on a project-by-project basis and pursuant to applicable wetland permit conditions. Compensatory mitigation may include restoration (i.e., re-establishment or rehabilitation), establishment (i.e., creation), enhancement, and/or preservation of jurisdictional resources. Compensatory mitigation may occur through permittee-responsible mitigation, payment to an in-lieu fee program, or purchase of compensatory mitigation credits from an approved mitigation bank. Mitigation ratios (i.e., the amount of mitigation acreage compared to the amount of impacted habitat) shall be negotiated with each regulatory agency on a project-by-project basis.	
Impact BIO-4. The proposed 2021 LRDP would not locate substantial development near MSHCP conservation areas with potential for wildlife movement or native nursery sites, and impacts would be less than significant.	None required	Less than significant

Impacts	Mitigation Measure (s)	Residual Impacts
Cultural Resources		
Impact CUL-1. The proposed 2021 LRDP would adversely affect historical resources through the full and partial demolition of historical resources, renovation/rehabilitation of historical resources, and new construction adjacent to historical resources. This impact would be significant and unavoidable. Following mitigation, impacts would still be significant and unavoidable.	**MM CUL-1 Protection of Historical Resources.** For purposes of MM CUL-1, "major exterior alterations" indicates a significant alteration/change to the exterior character-defining features or setting of a building or structure. Such projects might include, but not be limited to, additions, partial or complete demolition, relocation, window frame replacement different from existing, modifications to wall sheathing materials, changes to the roof shape, pitch, eaves, and other features, installment of wheelchair access ramps, and/or changes to the overall design configuration and composition of the building and the spatial relationships that define it. Major exterior alterations would require consultation to determine if these alterations noted above constitutes a major exterior alteration requiring further review from an architectural historian or whether the proposed alterations would qualify as a minor exterior alteration. For purposes of MM CUL-1, "minor exterior alterations" indicates a minor alteration/change to the exterior of a building or structure and its setting that would not be likely to significantly alter its appearance. Such projects might include, but not be limited to, repainting, in-kind landscaping or hardscaping replacement, window pane replacement, reversible installation of HVAC units that does not obstruct or destroy character-defining features, installation of fencing, signage, or artwork that does not obstruct or destroy character-defining features. Minor exterior alterations are exempt from further review from an architectural historian. During project-specific environmental review of development under the proposed 2021 LRDP, UCR shall define the project's area of effect for historic buildings and structures as early as possible. UCR shall implement the following procedures:	Significant and unavoidable

Impacts	Mitigation Measure (s)	Residual Impacts
	▪ Conduct project-specific surveys for buildings or structures (e.g., proposed for demolition, major exterior alterations, additions) that are 50 years of age or older that have (1) not been subject to an evaluation within the past 5 years, or (2) were not previously evaluated in the UCR Historic Resources Survey Report. ▫ UCR shall retain a qualified architectural historian to record the property at professional standards and assess its significance under CEQA Guidelines Section 15064.4. The evaluation process shall include the historic context framework included in the UCR Historic Resources Survey Report as well as the development of additional background research as needed in order to assess the significance of the building, structure, district, or cultural landscape in the history of the UC system, the campus, and the region. For historic buildings, structures or features that do not meet the CEQA criteria as a historical resource, no further mitigation is required, and the impact would be less than significant. ▫ The assessment of the potential historical resource and its character-defining features shall be documented on the appropriate California Department of Parks and Recreation (DPR) 523 forms by a qualified architectural historian meeting the Secretary of the Interior's Professional Qualifications Standards (as codified in 36 CFR Part 61). ▪ For projects affecting any eligible historic buildings identified in the UCR Historic Resources Survey Report or determined to be eligible during the project-specific surveys, for a building or structure that qualifies for listing on the NRHP and/or CRHR, UCR shall implement the following procedures:	

Impacts	Mitigation Measure (s)	Residual Impacts
	▫ For major exterior repairs (different from that of existing), alterations, or building additions of buildings that are eligible historic resources, UCR shall retain a qualified architectural historian meeting the Secretary of the Interior's Professional Qualifications Standards (as codified in 36 CFR Part 61) to conduct Character-Defining Features and Impacts Screening in coordination with the design team to consider project design features and/or measures that would enable the project to avoid direct or indirect impacts to the building or structure. Conclusion of the screening consultation process shall be documented in a memorandum, including a statement of compliance with the Secretary's Standards. The purpose of the memorandum shall document avoidance/reduction of significant adverse impacts to historical resources, where feasible, through (1) identifying and documenting character-defining features, noncontributing elements/additions, and (2) providing historic preservation project review and preliminary impacts analysis screening to UCR as early as possible in the design process. The memorandum shall review preliminary and/or conceptual project objectives early in the design process and describe various project options capable of reducing and/or avoiding significant adverse direct or indirect impacts through compliance with the Secretary's Standards and/or application of the State Historic Building Code or any subsequent design guidelines prepared by UCR for the treatment of historic resources. If major modifications, renovations, or relocation of a determined historic resource is proposed and the project is unable to comply with the Secretary's	

Impacts	Mitigation Measure (s)	Residual Impacts
	Standards or when a historic resource is to be demolished, then UCR shall ensure that documentation shall be carried out by a qualified architectural historian, as follows: ▪ UCR shall commission the preparation of HABS-like documentation of the building, structure, district, feature, and its associated landscaping and setting prior to construction activities. The HABS-like package will document in photographs and descriptive and historic narrative the historical resources slated for modification/demolition. Documentation prepared for the package will draw upon primary- and secondary-source research and available studies previously prepared for the project. ▪ The specifications for the HABS-like package follow: ▫ Photographs: Photographic documentation will focus on the historical resources/features slated for demolition, with overview and context photographs for the campus and adjacent setting. Photographs will be taken of the building using a professional-quality single lens reflex (SLR) digital camera with a minimum resolution of 10 megapixels. Photographs will include context views, elevations/exteriors, architectural details, overall interiors, and interior details (if warranted). Digital photographs will be provided in electronic format. ▫ Descriptive and Historic Narrative: The architectural historian will prepare descriptive and historic narrative of the historical resources/features slated for demolition. Physical descriptions will detail each resource, elevation by elevation, with accompanying photographs, and information on how the resource fits within the broader campus during its period of significance. The historic narrative	

Impacts	Mitigation Measure (s)	Residual Impacts
	will include available information on the campus design, history, architect/contractor/designer as appropriate, area history, and historic context. In addition, the narrative will include a methodology section specifying the name of researcher, date of research, and sources/archives visited, as well as a bibliography. Within the written history, statements shall be footnoted as to their sources, where appropriate. ▫ Historic Documentation Package Submittal: The electronic package will be assembled by the architectural historian and submitted to UCR for review and comment. ▪ A copy of the HABS-like package shall be offered to the Special Collections and University Archives at the Tomás Rivera Library and the California Historical Resources Information System. The record shall be accompanied by a report containing site-specific history and appropriate contextual information. This information shall be gathered through site-specific and comparative archival research, and oral history collection as appropriate. ▪ If preservation and reuse at the site are not feasible, the historical building shall be documented as described above. For new infill construction within the Mid-Century Modern Core Historic District that does not involve building demolition: ▪ Infill projects outside of the Mid-Century Modern Core Historic District would not need review by an architectural historian. ▪ Infill projects within the Mid-Century Modern Core Historic District will require review by an architectural historian for elements such as form, massing, and scale, to ensure visual compatibility with the historic district, and the review shall be conducted in compliance with the Secretary of the	

Impacts	Mitigation Measure (s)	Residual Impacts
	Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings (Weeks and Grimmer 1995).	
Impact CUL-2. Implementation of the proposed 2021 LRDP has the potential to cause a significant impact on archaeological resources, including those that qualify as historical resources. This impact would be less than significant with the implementation of mitigation.	**MM CUL-2 Tribal Cultural Resources/Archaeological Monitoring.** Prior to commencement of ground disturbing activities into an area with a medium or high potential to encounter undisturbed native soils including Holocene alluvium soils, as determined by UCR, UCR shall hire a qualified archaeological monitor meeting the Secretary of the Interior's Professional Qualification Standards for archaeology (National Park Service 1983) to identify archaeological resources and cultural resources of potential Native American origin. Where development occurs in the southeastern quadrant of campus, and in areas containing Val Verde Pluton geologic features considered highly sensitive to prehistoric archaeological resources, UCR shall hire a qualified archaeologist and a Native American monitor to reduce impacts to potential archaeological and/or tribal cultural resources. The monitor(s) shall be on-site during any construction activities that involve ground disturbance. The on-site monitoring shall end when project-related ground disturbing activities are completed, or, in consultation with the lead agency and tribes as appropriate and based on observed conditions, monitoring may be reduced or eliminated prior to completion of ground-disturbing activities, when the monitor(s) has indicated that the project site has a low potential to encounter tribal cultural resources (TCR)/archaeological resources. Consolidated monitoring efforts (e.g., archaeological monitoring/tribal cultural/paleontological monitoring) may occur if the individual monitor meets the applicable qualifications, except for development in the southeastern quadrant as detailed above.	Less than significant with mitigation incorporated

Impacts	Mitigation Measure (s)	Residual Impacts
	MM CUL-3 Construction Worker Training. For projects requiring TCR/archaeological monitoring, the monitor shall provide preconstruction training for all earthmoving construction personnel prior to the start of any ground disturbing activities, regarding how to recognize the types of TCRs and/or archaeological resources that may be encountered and to instruct personnel about actions to be taken in the event of a discovery. UCR Planning, Design & Construction Project Manager/contractor shall retain documentation showing when training of personnel was completed.	Less than significant with mitigation incorporated
	MM CUL-4 Unanticipated Discovery of Tribal Cultural Resources/Archaeological Resources. If previously undiscovered TCRs and/or archaeological resources are identified during construction, all ground disturbing activities within 100 feet of the resource shall halt, UCR Planning, Design & Construction staff shall be notified, and the find shall be evaluated by a qualified archaeologist meeting the Secretary of the Interior standards to determine whether it is a unique archaeological resource, as defined by CEQA. If the discovery appears to be Native American in origin, a tribal representative will be contacted within 24 hours of discovery to determine whether it is a TCR, as defined by CEQA. If the find is neither a unique archaeological resource nor a TCR, work may resume. If the find is determined to be a unique archaeological resource or TCR, the archaeologist and the tribal representative, as appropriate, shall make recommendations to UCR Planning, Design & Construction staff on the measures that will be implemented, including, but not limited to, preservation in place, excavation, relocation, and further evaluation of the discoveries pursuant to CEQA. Preservation in place (i.e., avoidance) is the preferred method of mitigation for impacts to TCRs/archaeological resources. If UCR determines that preservation in place is not feasible, the archaeologist	Less than significant with mitigation incorporated

Impacts	Mitigation Measure (s)	Residual Impacts
	shall design and implement a treatment plan, prepare a report, and salvage the material, as appropriate. Any important artifacts recovered during monitoring shall be cleaned, catalogued, and analyzed, with the results presented in a report of findings that meets professional standards. Work on-site may commence upon completion of any fieldwork components of the treatment plan.	
Impact CUL-3. Ground disturbance associated with development facilitated by the proposed 2021 LRDP has a low potential to disturb or damage known or unknown human remains. This impact would be less than significant with adherence to existing regulations.	None required	Less than significant
Energy		
Impact E-1. The proposed 2021 LRDP would consume electricity, natural gas, and fuel during construction and operation that would exceed the UCR 2018 per capita energy use and annualized regional 2018 per capita energy use threshold. Impacts would be less than significant with the implementation of mitigation.	See **MM GHG-1 Implement On-Campus GHG Emissions Reduction Measures (Measures EN-3 and EN-5)**	Less than significant with mitigation incorporated
Impact E-2. The construction and operation of new and renovated buildings under the proposed 2021 LRDP are required to comply with applicable State and UC energy policies and regulations. Accordingly, the 2021 LRDP would comply with CBC Title 24, SB 100, and the UC Sustainable Practices Policy and would not conflict with or obstruct applicable plans related to renewable energy and energy efficiency. Impacts would be less than significant. No mitigation is required.	None required	Less than significant

Impacts	Mitigation Measure (s)	Residual Impacts
Geology and Soils		
Impact GEO-1. The campus is not located in an Alquist-Priolo Fault Zone and no fault lines traverse directly under the campus. However, there is potential for both earthquakes and ground shaking in the campus area, as well as associated ground failure and landslides. Projects under the proposed 2021 LRDP would be required to comply with CBC building requirements as well as the UC Seismic safety policy and UC Facilities Manual Seismic Program Guidelines. Impacts would be less than significant. No mitigation measures are required.	None required	Less than significant
Impact GEO-2. UCR is underlain by soils with low potential for liquefaction or other soil-related hazards. Furthermore, the older alluvium and bedrock that underlies large portions of the campus are non-liquefiable regardless of groundwater depth. Projects developed under the proposed 2021 LRDP would be required to comply with CBC building requirements as well as the UC Seismic safety policy. Impacts would be less than significant. No mitigation measures are required.	None required	Less than significant
Impact GEO-3. Reasonably foreseeable development under the 2021 LRDP could cause a substantial adverse change in or disturb known or unknown paleontological resources as defined in CEQA Guidelines Section 15064.5. However, Mitigation Measures MM GEO-1 and MM GEO-2 would minimize potential impacts during excavation activities. Impacts to paleontological resources would be less than significant with mitigation incorporated.	**MM GEO-1 Inadvertent Discovery of Paleontological Resources.** If any paleontological resources are encountered during ground-disturbing activities, the contractor shall ensure that activities in the immediate area of the find are halted and that UCR is informed. UCR shall retain a qualified paleontologist to evaluate the discovery and recommend appropriate treatment options pursuant to guidelines developed by the Society of Vertebrate Paleontology, including development and implementation of a paleontological resource impact mitigation program by a qualified paleontologist for treatment of the particular resource, if applicable. These measures may include, but not limited to, the following:	Less than significant with mitigation incorporated

Impacts	Mitigation Measure (s)	Residual Impacts
	▪ Salvage of unearthed fossil remains and/or traces (e.g., tracks, trails, burrows) ▪ Washing of screen to recover small specimens ▪ Preparation of salvaged fossils to a point of being ready for curation (e.g., removal of enclosing matrix, stabilization and repair of specimens, and construction of reinforced support cradles) ▪ Identification, cataloging, curation, and provisions for repository storage of prepared fossil specimens	
	MM GEO-2 Paleontological Resources Monitoring. UCR shall implement the following measures if projects are proposing earth-moving activities exceeding 5 feet below previously undisturbed alluvial-fan soils within "high paleontological sensitivity" (i.e., Qof and Qvof): ▪ Retain a qualified professional paleontologist to prepare and implement a Paleontological Resources Impact Mitigation Plan for the project. A qualified paleontologist is an individual who meets the education and professional experience standards as established by the SVP (2010), which recommends the paleontologist shall have at least a master's degree or equivalent work experience in paleontology, shall have knowledge of the local paleontology, and shall be familiar with paleontological procedures and techniques. The Paleontological Resources Impact Mitigation Plan shall describe mitigation recommendations in detail, including paleontological monitoring procedures; communication protocols to be followed in the event that an unanticipated fossil discovery is made during project development; and preparation, curation, and reporting requirements. Consolidated monitoring efforts (e.g., archaeological monitoring/tribal cultural/paleontological monitoring) may occur if	Less than significant with mitigation incorporated

Impacts	Mitigation Measure (s)	Residual Impacts
	the individual monitor has the applicable qualifications. ▪ Prior to the commencement of ground disturbing activities, the qualified paleontologist or their designee, shall conduct training for grading and excavation personnel regarding the appearance of fossils and the procedures for notifying paleontological staff if unanticipated fossils are discovered by construction staff. The Paleontological Worker Environmental Awareness Program shall be fulfilled at the time of a pre-construction meeting. In the event a fossil is discovered by construction personnel anywhere in the project area, all work in the immediate vicinity of the find shall cease and a qualified paleontologist shall be contacted to evaluate the find before re-starting work in the area. If it is determined that the fossil(s) is (are) scientifically significant, the qualified paleontologist shall complete the mitigation outlined below to mitigate impacts to significant fossil resources ▪ If paleontological resources are encountered during ground-disturbing activities, MM GEO-1 shall apply.	
Greenhouse Gas Emissions		
Impact GHG-1. The proposed 2021 LRDP would generate GHG emissions, either directly or indirectly, that would have a significant impact on the environment. Impacts would be less than significant with the implementation of mitigation measures.	**MM GHG-1 Implement On-Campus GHG Emissions Reduction Measures.** UCR shall implement the following GHG emissions reduction measures by scope emissions category: ***Scope 1 (Stationary Fuel Combustion, Refrigerant Use, Fleet Fossil Fuel Combustion)*** *Energy (EN)* ▪ Measure EN1: In order to meet 100 percent electrification of all new campus buildings and structures, UCR shall prioritize construction of all-electric building design for new campus buildings and structures and discourage the construction and connection of new fossil fuel combustion	Less than significant with mitigation incorporated

Impacts	Mitigation Measure (s)	Residual Impacts
	infrastructure on campus. In addition, UCR shall focus on energy optimization through the Central Plant control systems by automating manual processes and initiating an engineering study focused on transitioning away from natural gas use at the Central Plant. ▪ Measure EN2: In order to address on-campus natural gas combustion, starting in 2025 and continuing through 2035, UCR shall purchase biogas for at least 40 percent of the total on-campus natural gas usage. *Global Warming Potential (GWP)* ▪ Measure GWP1: In order to reduce emissions from refrigerants used on campus, UCR shall phase out of high global warming potential chemical refrigerants on campus to achieve 100 percent relative carbon neutrality by 2045. This may include the replacement of chemical refrigerants with lower global warming potential in the interim of full phase out while an alternative technology is determined. Furthermore, UCR shall prohibit the use of equipment in new buildings or construction projects that do not utilize low global warming potential or Significant New Alternatives Policy Program accepted refrigerants. *Fuel (FL)* ▪ Measure FL1: In order to decarbonize the campus vehicle fleet, UCR shall reduce emissions from the campus vehicle fleet by 25 percent by 2025, by 50 percent by 2030, and by 75 percent by 2035 through replacement of fleet vehicles with electric vehicles or low-emission alternative vehicles. ***Scope 2 (Electricity Consumption and Generation)*** *Energy (EN)* ▪ Measure EN3: UCR shall work to obtain 100 percent clean-sourced electricity through either Riverside Public Utilities (RPU) and/or through the installation	

Impacts	Mitigation Measure (s)	Residual Impacts
	of on-site clean-sourced electricity sources for all new buildings by 2025. In addition, UCR shall establish annual budgets that include funding to purchase 100 percent clean-sourced energy. Furthermore, all newly constructed building projects, other than wet lab research laboratories, shall be designed, constructed, and commissioned to outperform the California Building Code (Title 24 portion of the California Code of Regulations) energy efficiency standards by at least 20 percent. Finally, UCR shall incorporate solar PV as feasibly possible for newly constructed and majorly-renovated buildings with the maximum system size, highest solar panel efficiency, and greatest system performance.[3] ▪ Measure EN4: In order to obtain electricity from 100 percent renewable source(s) for all existing buildings by 2045, UCR shall renegotiate its contractual agreement with RPU to establish a schedule and specific goals for obtaining 100 percent renewable electricity for the campus. In addition, UCR shall conduct an evaluation of existing buildings for structural suitability in terms of accommodating a solar photovoltaic system capacity with highest energy generation yield and for installing energy storage technology on campus and then installing such systems on identified buildings and facilities. ▪ Measure EN5 (Parts A, B, C): In order to prioritize energy efficiency and green building initiatives for building/facility upgrades and new construction as well as reduced energy use, UCR shall identify aging equipment throughout the campus such as equipment associated with the Central Plant, electrical distribution system, and building HVAC systems and develop a strategy and schedule to upgrade such equipment with high-energy	

[3] The EIR GHG modeling efforts assume that clean energy is in line with California-defined renewable sources.

Impacts	Mitigation Measure (s)	Residual Impacts
	efficiency systems and optimize HVAC systems through heat zoning, high-efficiency filters, and shut-down times expansion. The strategy shall include an evaluation and cost analysis related to upgrading/retrofitting equipment versus retirement of equipment if no longer needed with future initiatives (i.e., Central Plant boiler retirement). The schedule and upgrade strategy must meet a 2 percent energy efficiency improvement annually through 2035. In addition, UCR shall require new buildings to incorporate occupancy sensors and controls such that lighting of shared spaces is on occupancy sensors, building temperature set points are widened and aligned with occupancy schedules, and ventilation systems are converted from constant volume to variable so ventilation rates are occupancy-based. Furthermore, UCR shall develop a plan to identify existing buildings and projects that could undergo upgrades to the control systems and establish a schedule for upgrade incorporation. Finally, UCR shall develop a tracking program to monitor and share campus energy efficiency activities and progress towards increased energy efficiency. ***Scope 3 (Waste Generation, Business Air Travel, On-site Transportation, Water Consumption, Carbon Sequestration, and Construction)*** *Waste Generation (WG)* ▪ Measure WG1: UCR shall implement and enforce SB 1383 organics and recycling requirements to specifically reduce landfilled organics waste to 75 percent by 2025. ▪ Measure WG2: UCR shall reduce campus waste sent to landfills 90 percent by 2025 and 100 percent by 2035. In addition, UCR shall reduce waste generation at campus events 25 percent by 2025 and 50 percent by 2035, with goals of being zero waste and plastic free events. Furthermore, UCR	

Impacts	Mitigation Measure (s)	Residual Impacts
	shall establish purchasing and procurement policies and guidelines prioritizing vendors that limit packaging waste and purchase reusable and compostable goods. *Transportation (TR)* ▪ Measure TR1: In order to reduce GHG Emissions related to business air travel, UCR shall provide incentives to faculty for emission-reducing behaviors and utilizing travel options that are less carbon intensive, promote the use of virtual meetings, and encourage alternative forms of travel other than air travel. ▪ Measure TR2: UCR shall update the Transportation Demand Management (TDM) program for the campus to decrease single occupancy vehicle VMT 5 percent by 2025 and 20 percent by 2035. In addition, UCR shall evaluate trends of current programs to expand on existing programs and establish new initiatives that utilize proven successful strategies. ▪ Measure TR3: UCR shall develop and implement a Campus Active Transportation Plan to shift 2 percent of baseline (2018) passenger vehicle VMT to active transportation by 2025 and 8 percent by 2035. In addition, UCR shall update the Campus Bicycle and Pedestrian Network Map every five years, including routes from off campus to on campus. ▪ Measure TR4: UCR shall reduce GHG emissions associated with campus commuting 10 percent by 2025 and 25 percent by 2035. *Water Consumption (WC)* ▪ Measure WC1: UCR shall reduce per-capita water consumption 20 percent by 2025 and 35 percent by 2035 compared to academic year 2018/2019 per capita consumption.	

Impacts	Mitigation Measure (s)	Residual Impacts
	Carbon Sequestration (CS) ▪ Measure CS1: UCR shall increase carbon sequestration through increasing tree planting and green space 5 percent by 2025 and 15 percent by 2035. *Construction (CR)* ▪ Measure CR1: UCR shall reduce construction-related GHG emissions on campus 10 percent by 2025 and 25 percent by 2035 through emission reduction controls and/or electric equipment requirements in line with contract obligations. Specifically, UCR shall require off-road diesel-powered construction equipment greater than 50 horsepower to meet the Tier 4 emission standards as well as construction equipment to be outfitted with BACT devices certified by CARB and emissions control devices that are no less than what could be achieved by a Level 3 diesel emissions control strategy for a similar-sized engine. In addition, UCR shall develop zero waste procurement guidelines and processes for campus construction projects and integrate into purchasing RFP language as part of campus procurement. The UCR Office of Sustainability, Facilities Services, Environmental Health & Safety (EH&S), Transportation and Parking Services (TAPS), and/or Planning, Design & Construction (PD&C) shall annually monitor, track, and verify implementation of these GHG emissions reduction measures.	
	MM GHG-2 Purchase Carbon Offsets to Achieve GHG Emissions Reduction Balance. In order to achieve the necessary GHG emissions reduction balance after implementation of Mitigation Measure MM GHG-1 and in order to meet the UC Policy on Sustainable Practices and State targets, UCR shall annually track and purchase carbon offsets for the balance of GHG emissions after on-site reductions per	

Impacts	Mitigation Measure (s)	Residual Impacts
	Mitigation Measure MM GHG-1 that still meet or exceed the UCR emissions targets by year. UCR shall sequester funds for carbon offset purchases into a restricted account such that any/all uses shall directly reduce carbon emissions and address UCR goals. Prior to the purchase of carbon offsets, UCR shall research and purchase carbon offsets that are real, permanent, quantifiable, verifiable, enforceable, supported by substantial evidence, and additional to any GHG emission reduction otherwise required by law or regulation and any other GHG emission reduction that otherwise would occur under Mitigation Measure MM GHG-1. If any changes occur with regard to implementation of on-campus GHG reduction measures as part of Mitigation Measure MM GHG-1, UCR shall adjust the purchase of carbon offsets accordingly and keep respective accounting records. UCR Office of Sustainability, Facilities Services, EH&S, and PD&C shall annually monitor, track, and verify purchase of the required carbon offsets. As part of this mitigation measure, UCR shall make the following separate, though overlapping, GHG emission reduction commitment including maintaining compliance with carbon offset accreditation requirements under the CARB Cap-and-Trade Program. Any carbon credits obtained for the purpose of compliance with CARB's Cap-and-Trade Program shall be purchased from an accredited carbon credit market. Based on the current program as of 2021, such offset credits (or California Carbon Offsets) shall be registered with, and retired by an Offset Project Registry, as defined in 17 California Code of Regulations Section 95802(a), that is approved by CARB, such as, but not limited to, Climate Action Reserve (CAR), American Carbon Registry, and Verra (formerly Verified Carbon Standard), that is recognized by The Climate Registry, a	

Impacts	Mitigation Measure (s)	Residual Impacts
	non-profit organization governed by U.S. states and Canadian provinces and territories.	
Impact GHG-2. The proposed 2021 LRDP GHG emissions during construction and operation are projected to exceed the State and UC-derived GHG emission thresholds. Therefore, the proposed 2021 LRDP would conflict with the goals of an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases. However, this impact would be less than significant with the implementation of mitigation measures.	See: **MM GHG-1 Implement On-Campus GHG Emissions Reduction Measures** **GHG-2 Purchase Carbon Offsets to Achieve GHG Emissions Reduction Balance**	Less than significant with mitigation incorporated
Hazards and Hazardous Materials		
Impact HAZ-1. The proposed 2021 LRDP could result in an increased use, transport, or disposal of hazardous materials during facility operations, which would be subject to federal, State, County, and UCR policies designed to minimize risk of endangerment to the campus population, the public, and the environment. Therefore, the routine use, transport, or disposal of hazardous materials would not create a significant hazard to the public or the environment and impacts would be less than significant.	None required	Less than significant
Impact HAZ-2. Operation of facilities and materials would be subject to federal, State, County, and UCR policies designed to minimize upset and accident conditions and would result in less than significant impacts related to significant hazards to the public or the environment. Facility construction and renovation under the proposed 2021 LRDP could disturb or emit hazardous material from impacted soil, soil vapor, or groundwater, which could emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste during reasonably foreseeable upset and accident conditions. Impacts would be less than significant with the implementation of mitigation and mandatory compliance with existing regulations	**MM HAZ 1 Property Assessment – Phase I and II ESAs.** During the pre-planning stage of campus projects on previously developed sites or on agricultural lands (current or historic), and in coordination with EH&S, UCR shall obtain documentation from EH&S or prepare a Phase I Environmental Site Assessment (ESA) assessing the land use history of the proposed project site and identify potential hazardous materials concerns, including, but not limited to, fuel tanks, chemical storage, presence of elemental mercury, elevator pistons and associated hydraulic oil reservoirs and piping, heating-oil USTs, or agricultural uses. If the Phase I ESAs, or similar documentation, identify recognized environmental conditions or potential concern areas, a Phase II ESA would be conducted in	Less than significant with mitigation incorporated

Impacts	Mitigation Measure (s)	Residual Impacts
pertaining to the identification, handling, and disposing of hazardous materials.	coordination with EH&S to determine whether the soil, groundwater, and/or soil vapor has been impacted at concentrations exceeding regulatory screening levels for residential or commercial/industrial type land uses (as applicable). If the Phase II ESA concludes that the site is or may be impacted and could affect the planned development, assessment, remediation, or corrective action (e.g., removal of contaminated soil, in-situ treatment, capping, engineering controls) would be conducted prior to or during construction under the oversight of federal, State, and/or local agencies (e.g., US EPA, DTSC, RWQCB, RFD, RCDEH) and in full compliance with current and applicable federal and State laws and regulations. Additionally, Voluntary Cleanup Agreements may be used for parcels where remediation or long-term monitoring is necessary.	
	MM HAZ-2 Regulatory Agency UST Involvement. Because the UCR campus includes abandoned in-place USTs and the potential for other unidentified hazardous material features to be present, UCR shall notify the RCDEH and RFD if the following situations occur: ▪ Soil disturbance, grading, or excavation are planned for areas where current USTs are present or former USTs were present, including: ▫ One 6,000-gallon UST operated by Fleet Services located east of the Fleet Services office ▫ One 6,000-gallon diesel, one 1,500-gallon gasoline, and one 300-gallon former USTs at the Ag Ops facility at 1060 Martin Luther King Boulevard ▫ Four 6,000-gallon gasoline and one 550-gallon waste oil former USTs at the former Atlantic Richfield Oil Company service station at 1160 University Avenue ▫ Five 20,000-gallon former diesel USTs at UCR Parking Lot #6	Less than significant with mitigation incorporated

Impacts	Mitigation Measure (s)	Residual Impacts
	▫ Two 7,000-gallon gasoline, one 3,000-gallon gasoline, and one 550 waste oil former USTs at the former Chevron service station at 1011 University Avenue ▫ Four former 10,000-gallon #6 heating-oil USTs at 3401 Watkins Drive – Abandoned in place in October 1998 ▫ One 10,000-gallon gasoline, one 6,000-gallon gasoline, and one 500-waste oil former USTs at the UCR Fleet Service facility at 3401 Watkins Drive ▫ UCR Fleet Services – RCDEH Permitted UST - 3401 Watkins Drive ▫ UCR Steam Plant – RCDEH Closed Leaking UST - 3401 Watkins Drive ▫ Agricultural research support operations areas on the West Campus (e.g., fuel storage and dispensing, maintenance oils, and hazardous waste) ▫ Corporation Yard located north of West Linden Street on the East Campus ▫ UST, previously located at the Grounds Maintenance Facility along East Campus Drive ▫ 3.25-acre site on the UCR campus at 1060 Martin Luther King Boulevard, listed as a DTSC Certified Operations and Maintenance Land Use Restrictions site as of December 15, 2010 ▫ 1060 Martin Luther King Boulevard, a site listed as a closed Riverside County LOP case for three leaking USTs ▪ Identification of additional underground storage tanks and associated piping, or other underground features such as railroad spurs or ties, elevator pistons, stained or odorous soils, unknown piping, cisterns, wells, waste/burn pits, etc., if encountered	

Impacts	Mitigation Measure (s)	Residual Impacts
	Additionally, all UST removals and associated assessment work shall be completed under the direction of RCDEH and RFD. Upon identification of stained soil, odorous soil, USTs, or other underground features onsite, RCDEH or RFD could require actions such as: development of removal action workplans, obtaining permits for removal of USTs or other underground features, soil excavation and offsite disposal, assessment of soil and/or groundwater beneath the excavation, and/or completion of UST removal reports or case closure documents.	
	MM HAZ-3 Regulatory Agency Subsurface Involvement – DTSC. Because UCR includes one DTSC Certified Land Use Restrictions case on-site (Envirostor, Site ID 33890001, 2020), DTSC shall be notified of redevelopment or soil disturbance work that is planned in the Land Use Covenant area involving excavation of 4 feet or more below ground surface. Additionally, UCR shall notify the DTSC if the following situations occur: ▪ LRDP is modified to include soil disturbance in the Land Use Covenant area. ▪ Stained or odorous soils, chemical substances, or debris from an unidentified source are identified during excavation of 4 feet or more below ground surface and/or within 100 feet of the Land Use Restriction area. Upon notification of the information above, DTSC could require actions such as: development of subsurface investigation workplans, completion of soil, soil vapor, and/or groundwater subsurface investigations, installation of soil vapor or groundwater monitoring wells, soil excavation and off-site disposal, completion of human health risk assessments, and/or completion of remediation reports or case closure documents.	Less than significant with mitigation incorporated

Impacts	Mitigation Measure (s)	Residual Impacts
	MM HAZ-4 Construction Site Management Plan. If impacted soils are identified pursuant to activities conducted through Mitigation Measures MM HAZ-1, MM HAZ-2, or MM HAZ-3; or encountered during construction (soil disturbance), UCR shall prepare a Construction Site Management Plan (SMP) for the proposed redevelopment project area to address potential issues that may be encountered during redevelopment activities involving subsurface work. The Construction SMP objectives shall include: ▪ Communicating information to proposed project construction workers about environmental conditions ▪ Presenting measures to mitigate potential risks to the environment, construction workers, and other nearby receptors from potential exposure to hazardous substances that may be associated with unknown conditions or unexpected underground structures ▪ Presenting protocols for management of known contaminated soil or groundwater encountered during construction activities The Construction SMP shall identify the proposed project contacts, responsibilities, and notification requirements and outline the procedures for health and safety, soil management, contingency measures for discovery of unexpected underground structures, erosion, dust, and odor management, groundwater management, waste management, stormwater management, and written records and reporting. The Construction SMP shall be reviewed and approved by UCR prior to issuance of grading permits.	Less than significant with mitigation incorporated
Impact HAZ-3. Operation of facilities and materials would be subject to federal, State, County, and UCR policies designed to minimize hazardous emissions and spills and would result in less than significant impacts related to significant hazards to the public or the	See: **MM HAZ 1 Property Assessment – Phase I and II ESAs** **MM HAZ-2 Regulatory Agency UST Involvement** **MM HAZ-3 Regulatory Agency Subsurface Involvement – DTSC**	Less than significant with mitigation incorporated

Impacts	Mitigation Measure (s)	Residual Impacts
environment. Facility construction and renovation under the proposed 2021 LRDP could disturb or emit hazardous material from impacted soil, soil vapor, or groundwater, which could emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within 0.25 mile of an existing or proposed school. Impacts would be less than significant with the implementation of mitigation measures and mandatory compliance with existing regulations pertaining to hazardous wastes and materials.	**MM HAZ-4 Construction Site Management Plan**	
Impact HAZ-4. The UCR campus includes several closed UST release sites (listed) and is located adjacent to a site with a restricted land use covenant. As a result, soil, soil vapor, and/or groundwater disturbance during construction could create a significant hazard to the public or the environment. Given the opportunity for contaminated soils to occur on the project site, project construction would potentially create a significant hazard to the public or the environment. Impacts would be less than significant with the implementation of mitigation measures.	See: **MM HAZ 1 Property Assessment – Phase I and II ESAs** **MM HAZ-2 Regulatory Agency UST Involvement** **MM HAZ-3 Regulatory Agency Subsurface Involvement – DTSC** **MM HAZ-4 Construction Site Management Plan**	Less than significant with mitigation incorporated
Impact HAZ-5. The UCR campus is in the March Air Reserve Base/Inland Port ALUCP influence area, although in an area with low levels of noise and safety risk. Therefore, the proposed 2021 LRDP would not result in airport-related safety hazards and excessive noise impacts to people residing or working on the UCR campus, and impacts would be less than significant.	None required	Less than significant
Hydrology and Water Quality		
Impact HWQ-1. Construction and operation of the proposed 2021 LRDP would occur in compliance with applicable water quality standards and waste discharge requirements. In accordance with regulations and policies, a SWPPP would be implemented during construction activities and a SWMP would be implemented during operations, to provide on-site construction and post-construction prevention,	None required	Less than significant

Impacts	Mitigation Measure (s)	Residual Impacts
capture, and treatment of stormwater runoff, such that potential water quality impacts would be less than significant. No mitigation is required.		
Impact HWQ-2. Potential impacts to groundwater supplies and recharge would be less than significant. No mitigation is required.	None required	Less than significant
Impact HWQ-3. Construction and operation of the proposed 2021 LRDP would not alter the course of a stream or river and would not alter regional stormwater drainage patterns. Compliance with applicable regulations and policies, including implementation of a SWPPP during construction and a SWMP during operation, would provide sufficient on-site construction and post-construction prevention, capture, and treatment of stormwater runoff, and would minimize or avoid potentially adverse impacts such that they would be less than significant. No mitigation is required.	None required	Less than significant
Impact HWQ-4. The proposed 2021 LRDP would implement water quality BMPs in accordance with applicable requirements, reducing potential downstream water quality impacts to ensure that the proposed 2021 LRDP would not conflict with or obstruct implementation of the water quality control plan or a sustainable groundwater management plan. This impact would be less than significant. No mitigation is required.	None required	Less than significant

Impacts	Mitigation Measure (s)	Residual Impacts
Noise		
Impact N-1. Construction equipment used during construction and mechanical equipment used during operation of the proposed 2021 LRDP would result in noise level increases that would exceed applicable noise thresholds, result in a significant impact. Mitigation measure MM N-1 would reduce construction noise levels to the extent feasible, but impacts would remain significant and unavoidable. Mitigation Measure MM N-2 would reduce operational noise levels to less than significant.	**MM N-1 Construction Noise Reduction Measures.** To reduce construction noise levels to on-campus and off-campus noise sensitive receivers, UCR shall implement the following measures: ▪ Hours of exterior construction activities shall be limited to 7:00 a.m. to 9:00 p.m. Monday through Friday and 8:00 a.m. to 6:00 p.m. on Saturday, as feasible, except under circumstances where such time limits are infeasible (e.g., for time sensitive construction work such as concrete pouring, excessive heat warnings/temperatures during the summer, operational emergencies). No exterior construction activities shall occur on federal holidays. ▪ Construction traffic shall follow routes so as to minimize the noise impact of this traffic on the surrounding community, to the greatest extent feasible. ▪ Contract specifications shall require that construction equipment be muffled or otherwise shielded. Contracts shall specify that engine-driven equipment be fitted with appropriate noise mufflers. ▪ Where available and feasible, construction equipment with back-up alarms shall be equipped with either audible self-adjusting backup alarms or alarms that only sound when an object is detected. Self-adjusting backup alarms shall automatically adjust to 10 dBA over the surrounding background levels. All non-self-adjusting backup alarms shall be set to the lowest setting required to be audible above the surrounding noise levels. ▪ Stationary construction equipment material and vehicle staging shall be placed to direct noise away	Significant and unavoidable for construction noise Less than significant for operational noise

Impacts	Mitigation Measure (s)	Residual Impacts
	from sensitive receivers to the greatest extent feasible. ▪ Meetings shall be conducted, as needed, with on-campus constituents to provide advance notice of construction activities to coordinate these activities with the academic calendar, scheduled events, and other situations, as appropriate. ▪ Communication would be provided, as needed, with constituents that are affected by campus construction to provide advance notice of construction activities and ensure that the mutual needs of the particular construction project and of those impacted by construction noise are met, to the extent feasible. ▪ A sign shall be provided at the construction site entrance, or other conspicuous location, that includes a 24-hour telephone number for project information, and to report complaints. An inquiry and corrective action will be taken if necessary, in a timely manner. ▪ Where deemed necessary and feasible, installation of temporary sound barriers/blankets to break the line-of-sight between the construction equipment and exterior use areas of noise-sensitive receivers. The temporary barriers/blankets shall be of sufficient height to break the line-of-sight between the construction equipment and noise-sensitive receivers.	
	MM N-2 HVAC Noise Reduction Measures. The campus shall reduce HVAC equipment noise levels located in close proximity to noise-sensitive buildings and uses through noise control measures such as, but not limited to: ▪ Mechanical equipment screening (e.g., parapet walls) ▪ Equipment setbacks ▪ Silencers	Less than significant with mitigation incorporated

Impacts	Mitigation Measure (s)	Residual Impacts
	▪ Acoustical louvers ▪ And other sound attenuation devices as made available If a method other than mechanical equipment screening (e.g., parapet walls) is chosen, a project-specific design plan demonstrating that the noise level from operation of HVAC units does not generate noise levels that exceed 5 dBA above ambient at noise-sensitive receivers shall be completed.	
	MM N-3 Loading Dock Noise Reduction Measures. The campus shall reduce loading dock noise levels through measures such as, but not limited to: ▪ Noise levels from loading docks at noise-sensitive receivers shall not exceed 5 dBA over ambient noise levels, the effectiveness of which shall be determined on a project-level basis by an acoustical professional. ▪ As feasible, design and build sound barriers near loading docks and delivery areas that block the line of sight between truck activity areas and noise-sensitive receivers. Sound barriers may consist of a wall, earthen berm, or combination thereof.	Less than significant with mitigation incorporated
	MM N-4 Relocated Corporation Yard Noise Reduction Measures. If and when the campus Corporation Yard is relocated, the campus shall reduce Corporation Yard noise levels through measures such as, but not limited to: ▪ Noise levels from the Corporation Yard at noise-sensitive receivers shall not exceed 5 dBA over ambient noise levels, the effectiveness of which shall be determined on a project-level basis by an acoustical professional. ▪ As feasible, design and build sound barriers near the Corporation Yard that block the line of sight between truck activity areas and noise-sensitive	Less than significant with mitigation incorporated

Impacts	Mitigation Measure (s)	Residual Impacts
	receivers. Sound barriers may consist of a wall, earthen berm, or combination thereof.	
Impact N-2. Vibration from proposed 2021 LRDP construction may exceed applicable standards. This is a potentially significant impact that would be reduced to less than significant with mitigation.	**MM N-5 Construction Vibration Reduction Measures.** If construction equipment were to be operated within the specified distances listed in Table 4.11 13 of the Draft EIR, the campus shall reduce construction vibration levels through the following noise control measures: ▪ All academic and residential facilities within the listed distances shall be notified if the listed equipment is to be used during construction activities so that the occupants and/or researchers can take necessary precautionary measures to avoid negative effects to their activities and/or research. ▪ In addition, one of the following measures shall be implemented: ▫ Use of the equipment shall not occur within the specified distances in Table 4.11 13 in Section 4.11, *Noise*, or ▫ A project-specific vibration impact analysis shall be conducted that shall consider the type of equipment used and potential vibration levels at structures within the specified distances. If, after consideration of the type of equipment used and other factors of the environment, vibration levels do not exceed the applicable criteria, construction may proceed without additional measures. If, after consideration of the type of equipment used and other factors of the environment, vibration levels exceed the applicable criteria, additional measures shall be implemented to reduce vibration levels below threshold, if feasible. These measures may include, but not limited to, use of different equipment	Less than significant with mitigation incorporated

Impacts	Mitigation Measure (s)	Residual Impacts
	that results in an acceptable vibration level as listed in Table 4.11 13 in Section 4.11, *Noise*.	
Impact N-3. The proposed 2021 would not expose people residing or working in the project area to excessive noise levels within 2 miles of an airport or airport influence area. Impacts would be less than significant. No mitigation is required.	None required	Less than significant
Population and Housing		
Impact PH-1. The proposed 2021 LRDP would accommodate the anticipated regional population forecasts. Furthermore, the proposed 2021 LRDP does not include installation or extension of significant roads or infrastructure that would result in further population growth or housing needs. Direct and indirect impacts related to unplanned population growth would be less than significant. No mitigation measures are required.	None required	Less than significant
Impact PH-2. The proposed 2021 LRDP would not displace substantial numbers of existing people or housing, necessitating the construction of replacement housing. Impacts would be less than significant. No mitigation measures are required.	None required	Less than significant
Public Services		
Impact PS-1. The proposed 2021 LRDP would not increase demand to a level that would require new fire protection facilities or substantial alterations to existing facilities. Impacts would be less than significant. No mitigation measures are required.	None required	Less than significant
Impact PS-2. Implementation of the proposed 2021 LRDP would incrementally increase the enrollment of students in regional public schools by an estimated 2,575 students, which would be accommodated by the existing and planned capacity of local school districts. Therefore, the proposed 2021 LRDP would not result in the need for the provision of new or physically altered schools. Impacts would be less than significant. No mitigation measures are required.	None required	Less than significant

Impacts	Mitigation Measure (s)	Residual Impacts
Recreation		
Impact REC-1. The proposed 2021 LRDP would include most of the recreational facilities and parkland on the UCR campus and incrementally develop new recreation facilities and open spaces that would adequately serve the campus population. The proposed 2021 LRDP would not increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of those facilities would occur or be accelerated. Impacts related to increased use of parks and recreational facilities would be less than significant. No mitigation measures are required.	None required	Less than significant
Impact REC-2. The proposed 2021 LRDP would incrementally develop new on-campus recreational facilities and open spaces, the construction of which may have an adverse physical effect on the environment. Environmental impacts would be less than significant without additional mitigation.	The impact from construction and operation of these new recreational facilities have been analyzed as part of the proposed 2021 LRDP buildout in this Draft EIR, and no additional mitigation is required.	Less than significant
Transportation		
Impact T-1. Implementation of the proposed 2021 LRDP would increase bicycle and pedestrian travel, but it would not physically disrupt an existing pedestrian or bicycle facility or interfere with implementation of a planned pedestrian or bicycle facility. Implementation of the proposed 2021 LRDP would not conflict with any existing programs, plans, ordinances, or policies that address the circulation systems. Impacts would be less than significant. No mitigation measures are required.	None required	Less than significant
Impact T-2. Implementation of the proposed 2021 LRDP would result in additional vehicular travel associated with increased population on the campus, but VMT would continue to be below regional thresholds. Multi-use development implemented under the proposed 2021 LRDP combined with increased use of alternative modes of travel would result in lower VMT generated by the campus over time. Project-	None required	Less than significant

Impacts	Mitigation Measure (s)	Residual Impacts
generated VMT per service population would be below the WRCOG 15 percent threshold. impacts would be less than significant. No mitigation measures are required.		
Impact T-3. Development under the proposed 2021 LRDP would be constructed in such a way that changes would remain consistent to surrounding geometric design features and any redesign or construction of on-campus circulation paths would be designed and constructed to meet the Campus Construction and Design Standards. However, the increase in campus population under Cumulative Plus Project conditions would result in an impact related to queuing at the I-215/SR 60 Freeway Southbound Ramps at Martin Luther King Boulevard. Impacts would be significant and unavoidable. Mitigation measure T-1 has been proposed for adoption to another agency (Caltrans), but its implementation is uncertain at this time.	**MM T-1 Intersection Queueing.** Improvements to the intersection of I-215/SR-60 freeway southbound ramps at Martin Luther King Boulevard shall consist of reconfiguring the southbound approach from one left-turn lane and one shared through/right-turn lane to one shared left/through/right-turn lane and one right-turn lane. Optimizing the signal-timings with the geometric improvements shall also be required.	Significant and unavoidable UCR recommends that Caltrans approve MM T-1. If Caltrans approves MM T-1, based on the Transportation Impact Analysis included as Appendix J to this EIR, impacts would be reduced to less than significant.
Impact T-4. Development under the proposed 2021 LRDP would not include major changes to existing access points or on-campus circulation paths that would result in inadequate emergency access. All projects under the proposed 2021 LRDP would adhere to Campus Construction and Design Standards. They would undergo review and approval by the State Fire Marshal prior to implementation and use. Impacts would be less than significant. No mitigation measures are required.	None required However, UCR has proposed continuing best practices (CBP) as conditions of individual project approval that would ensure, to the extent feasible, that at least one unobstructed lane in both directions on campus roadways are maintained specifically in the event of a wildfire emergency (**CBP WF-1**) and that the Campus Fire Marshal discloses roadway closures to the City of Riverside Fire Department and identify alternative travel routes, if necessary (**CBP WF-2**). See Continuing Best Practices discussed below.	Less than significant
Tribal Cultural Resources		
Impact TCR-1. Development facilitated by the proposed 2021 LRDP has the potential to impact tribal cultural resources. Impacts would be less than significant with mitigation.	See: **MM CUL-2 Tribal Cultural Resources/Archaeological Monitoring.** **MM CUL-3 Construction Working Training.** **MM CUL-4 Unanticipated Discovery of Tribal Cultural Resources/Archaeological Resources.**	Less than significant with mitigation incorporated

Impacts	Mitigation Measure (s)	Residual Impacts
Utilities and Service Systems		
Impact U-1. The proposed 2021 LRDP may require the relocation or construction of new or expanded water, wastewater treatment or stormwater drainage, electric power, natural gas, or telecommunications facilities on the UCR Campus. Such relocation and construction would not result in significant environmental effects and impacts would be less than significant. No mitigation measures are required.	None required	Less than significant
Impact U-2. Implementation of the proposed 2021 LRDP would result in a net increase in water demand on the UCR campus of approximately 579 AFY through year 2035/2036. This increase is accounted for in the RPU's 2015 UWMP, and there is sufficient water supply available under all drought scenarios. Impacts would be less than significant. No mitigation measures are required.	None required	Less than significant
Impact U-3. Wastewater generated by development under the proposed 2021 LRDP would be treated at the Riverside Water Quality Control Plant. The plant would have adequate capacity to serve the proposed 2021 LRDP's anticipated wastewater generation in addition to its existing wastewater treatment commitments. Impacts would be less than significant. No mitigation measures are required.	None required	Less than significant
Impact U-4. The proposed 2021 LRDP would not generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure. The proposed 2021 LRDP would not impair the attainment of solid waste reduction goals and would comply with federal, State, and applicable local statutes and regulations related to solid waste. Impacts would be less than significant. No mitigation measures are required.	None required	Less than significant

Impacts	Mitigation Measure (s)	Residual Impacts
Wildfire		
Impact WF-1. Implementation of the proposed 2021 LRDP would not result in a significant impact associated with construction activities. Operation of new facilities would not substantially impair an adopted emergency response or evacuation plan. Impacts would be less than significant .	None required However, UCR has proposed continuing best practices (CBP) as conditions of individual project approval that would ensure, to the extent feasible, that at least one unobstructed lane in both directions on campus roadways are maintained specifically in the event of a wildfire emergency (**CBP WF-1**) and that the Campus Fire Marshal discloses roadway closures to the City of Riverside Fire Department and identify alternative travel routes, if necessary (**CBP WF-2**). See Continuing Best Practices discussed below.	Less than significant
Impact WF-2. Implementation of the proposed 2021 LRDP would increase the density of development on campus, with new buildings and infrastructure constructed according to the latest fire code and safety standards. New construction would be located in areas within 2 miles of Very High FHSZs. People living, working, and attending class in these areas could be exposed to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire. Impact risk would be significant with compliance with the most current Building and Fire codes.	None required	Less than significant
Impact WF-3. New or updated infrastructure would be concentrated in previously developed portions of campus, and utilities would be installed underground and would not contribute to increased fire risk. Impacts would be less than significant.	None required	Less than significant

Impacts	Mitigation Measure (s)	Residual Impacts
Impact WF-4. Development projects would be sited on parts of campus that are away from steep slopes (25 percent or greater) that may become post-fire hazard zones. Impacts would be less than significant with mitigation.	**MM WF-1 Implement Post-Fire Erosion Control Plan and Application.** UCR shall incorporate into its Emergency Operations and Response Plan erosion control measures to be deployed in the event of a catastrophic wildfire. Erosion control measures shall be implemented as soon as possible after the event and shall include one or more of the following, as applicable: 1. Install mulch to cover the soil and reduce rain drop impact, overland flow, and soil particle movement. This can be certified weed-free straw, slash, and geotextile fabrics and should be installed as quickly as possible after the fire event. 2. Apply hydro-mulch mixture of water, fiber mulch, and tackifier on burned slopes to prevent soil erosion and foster revegetation. Seed, fertilizer, or soil stabilizing polymers can also be applied with the hydro-mulch. 3. Implement aerial seeing of grasses or legumes with a layer of straw mulch over seeded grasses. Ensure the mix of seed includes native grasses and plants with value for local wildlife.	Less than significant

Continuing Best Practices

In support of its standard practice of required construction management plans for individual projects, UCR has proposed Continuing Best Practices (CBP) as conditions of individual project approval that would ensure, to the extent feasible, that at least one unobstructed lane in both directions on campus roadways are maintained specifically in the event of a wildfire emergency and that the Campus Fire Marshal discloses roadway closures to the City of Riverside Fire Department and identify alternative travel routes, if necessary. As such, evacuation routes, if present within the specific roadway segment that would require temporary closure as noted above, would be similarly rerouted. See Section 4.18, *Wildfire*, for additional detail.

CBP WF-1 Construction – Traffic Control

To the extent feasible, the campus shall maintain at least one unobstructed lane in both directions on campus roadways. At any time only a single lane is available, the campus shall provide a temporary traffic signal, signal carriers (i.e., flagpersons), or other appropriate traffic controls to allow travel in both directions. If construction activities require the complete closure of a roadway segment, the campus shall provide alternate routes and appropriate signage.

CBP WF-2 Construction – Alternative Travel Routes

Prior to campus construction activities and/or roadway closures, the Campus Fire Marshal, as delegated by the State Fire Marshal, and in cooperation with the City of Riverside Fire Department shall ensure that adequate access for emergency vehicles is provided or identify alternative travel routes.

References

University of California Riverside (UCR). 2005. University of California Riverside 2005 Long Range Development Plan. http://rplan.ucr.acsitefactory.com/sites/g/files/rcwecm1811/files/2018-10/LRDP%20-%20FInal.pdf.

_____. 2021a. Enrollment: UCR – Fall Headcount (Unduplicated). https://ir.ucr.edu/stats/enroll/overall.

1 Introduction

This Environmental Impact Report (EIR) evaluates impacts associated with the proposed 2021 Long Range Development Plan (proposed 2021 LRDP) for the University of California, Riverside (UCR). This EIR has been prepared under the direction of University of California (UC) Board of Regents (Regents) pursuant to the requirements of the California Environmental Quality Act (CEQA) (Public Resources Code [PRC] Sections 21000 et seq.) and the CEQA Guidelines (Title 14, California Code of Regulations, Sections 15000 et seq.).

1.1 Project Overview

The following is a synopsis of the project characteristics. For additional information on the proposed 2021 LRDP, see Section 2, *Project Description*.

A long-range development plan (LRDP) is defined by statute (PRC Section 21080.09) as a "physical development and land use plan to meet the academic and institutional objectives for a particular campus or medical center of public higher education." UCR last approved an LRDP in 2005 and has adopted amendments since then. The original 2005 LRDP planned for a student enrollment of 25,000 by 2015, which it is close to achieving. UCR has grown to support a student population of nearly 24,000 students and approximately 4,700 faculty and staff.

The number of students applying to UCR generally increased between 2010 and 2019. Freshman applications increased by approximately 87 percent (from 26,480 students to 49,516 students) and transfer student applications increased by approximately 97 percent (from 6,372 students to 12,543 students). UCR identified an enrollment-planning target of approximately 35,000 Fall quarter headcount by the academic year 2035/2036. The proposed 2021 LRDP provides a framework for managing future campus growth and needs.

The proposed 2021 LRDP is intended to guide development on the main UCR campus for the next 15 years. Development under the proposed 2021 LRDP is designed to accommodate a total projected enrollment of approximately 35,000 students (Fall quarter headcount) by the academic year 2035/2036. The proposed 2021 LRDP would guide long-range land use development, open space preservation and improvements, multi-modal mobility planning, and infrastructure sustainability and resiliency efforts. Through gradual phased development, the goal of the proposed 2021 LRDP is to accommodate the enrollment growth and meet program needs in an efficient and sustainable manner.

To accommodate the anticipated increase of approximately 11,078 students (7,419 undergraduate and 3,659 graduate) and 2,806 faculty and staff by academic year 2035/2036, the proposed 2021 LRDP proposes a net increase in development of approximately 3.7 million assignable square feet (asf) (approximately 5.5 million gross square feet (gsf)) of additional academic buildings, support facilities, and student housing. The proposed 2021 LRDP would provide on-campus or campus-controlled student housing for approximately 40 percent of eligible students (or approximately 68 percent of the increase in student population), equal to approximately 7,489 new on-campus beds. The proposed 2021 LRDP proposes the following land use designations: Academics & Research, Campus Support, Land-based Research, Open Space Reserve, Recreation & Athletics, Student Neighborhood, Agricultural/Campus Research, UCR Botanic Gardens, Canyon Crest Gateway, and University Avenue Gateway.

The proposed 2021 LRDP is a plan to guide development, but it is not an implementation plan. Adoption of the proposed 2021 LRDP does not constitute a commitment to any specific project. Rather, development under the proposed 2021 LRDP would occur over time, based on campus needs and funding availability. The Regents and/or its delegated authorities must approve each development proposal, as appropriate. At the campus level, the review of campus development proposals is informed by a process that involves input from staff, faculty, and students (and the local community as appropriate). A copy of the proposed 2021 LRDP is available at: https://pdc.ucr.edu/environmental-planning-ceqa.

1.2 Purpose and Legal Authority

The proposed 2021 LRDP requires the approval of the Regents. The proposed 2021 LRDP is subject to the environmental review requirements of CEQA. According to CEQA, preparation of an EIR is required whenever it can be fairly argued, based on substantial evidence, that a proposed project may result in a significant environmental impact. An EIR is an informational document used to inform public-agency decision makers and the public of significant environmental impacts of a project, identify possible ways to minimize the impacts, and describe reasonable alternatives to the project that could feasibly attain most of the basic objectives of the project while substantially lessening or avoiding any of the significant environmental impacts. Public agencies are required to consider the information presented in the EIR when determining whether to approve a project. This Draft EIR has been prepared to meet the requirements of a program EIR as defined by Section 15168 of the CEQA Guidelines. As described in CEQA Guidelines Section 15168(a), a program EIR may be prepared for a series of actions that can be characterized as one large project and are related either:

(1) Geographically
(2) As logical parts in the chain of contemplated actions
(3) In connection with the issuance of rules, regulations, plans, or other general criteria to govern the conduct of a continuing program
(4) As individual activities carried out under the same authorizing statutory or regulatory authority and having generally similar environmental impacts, which can be mitigated in similar ways

A program EIR can be used as the basic, general environmental assessment for an overall program of projects developed over a multi-year planning horizon and therefore is an appropriate review document for the proposed 2021 LRDP. A program EIR has several advantages. For example, it provides a basic reference document to avoid unnecessary repetition of facts or analysis in subsequent project-specific assessments. It also allows the lead agency to consider the broad, regional impacts of a program of actions before its adoption.

1.3 Scope of this EIR

An Initial Study was prepared in accordance with CEQA and CEQA Guidelines to narrow the environmental issues and identify potential environmental impacts addressed in the EIR. (CEQA Guidelines Sections 15063(c)(3)(A) and 15128.) Based on the Initial Study prepared for the proposed 2021 LRDP, this EIR will address the following 18 environmental issue areas as well as other CEQA

mandated issues (i.e., cumulative impacts, growth-inducing impacts, significant unavoidable impacts, alternatives):

- Aesthetics
- Agricultural Resources
- Air Quality
- Biological Resources
- Cultural Resources
- Energy
- Geology and Soils
- Greenhouse Gas Emissions
- Hazards and Hazardous Materials
- Hydrology and Water Quality
- Noise
- Population and Housing
- Public Services
- Recreation
- Transportation
- Tribal Cultural Resources
- Utilities and Service Systems
- Wildfire

The Initial Study determined that implementation of the proposed 2021 LRDP would result in no impacts or less-than-significant impacts related to the following resources (Appendix A); therefore, these environmental issues are not discussed further in this Draft EIR:

- Land Use and Planning
- Mineral Resources

Individual significance criteria in other resource sections were also screened out from further review; please see Appendix A and the individual resource chapters for additional information.

The alternatives section of the EIR (Section 6) was prepared pursuant to Section 15126.6 of the CEQA Guidelines and focuses on alternatives that are capable of eliminating or reducing significant adverse effects associated with the project while feasibly attaining most of the basic project objectives. In addition, the alternatives section identifies the "environmentally superior" alternative among the alternatives assessed. The alternatives evaluated include the CEQA-required "No Project" alternative, plus three alternative development scenarios for the project area.

The level of detail contained throughout this EIR is consistent with the requirements of CEQA and applicable court decisions. Section 15151 of the CEQA Guidelines provides the standard of adequacy on which this document is based:

> An EIR should be prepared with a sufficient degree of analysis to provide decision makers with information which enables them to make a decision which intelligently takes account of environmental consequences. An evaluation of the environmental effects of the proposed project need not be exhaustive, but the sufficiency of an EIR is to be reviewed in light of what is reasonably feasible. Disagreement among experts does not make an EIR inadequate, but the EIR should summarize the main points of disagreement among the experts. The courts have looked not for perfection but for adequacy, completeness, and a good faith effort at full disclosure.

Similarly, Section 15204(a) explains:

> [T]he adequacy of an EIR is determined in terms of what is reasonably feasible, in light of factors such as the magnitude of the project at issue, the severity of its likely environmental impacts, and the geographic scope of the project. CEQA does not require a lead agency to conduct every test or perform all research, study, and experimentation recommended or demanded by commentors.

In preparing the EIR, use was made of pertinent UC and UCR policies and guidelines, certified EIRs and adopted CEQA documents, and other background documents. A full reference list is contained in Section 7, *References* and at the end of the individual resource sections.

1.4 Environmental Review Process

The environmental impact review process, as required under CEQA, is summarized below. The steps are presented in sequential order.

1. **Notice of Preparation (NOP) and Initial Study.** Pursuant to the provision of Section 15082 of the CEQA Guidelines, the Regents (as lead agency) issued an NOP for public review and comment (see Appendix A of this EIR). As provided by CEQA Guidelines Section 15375, an NOP is a brief document sent by the lead agency to notify the responsible agencies, trustee agencies, the Governor's Office of Planning and Research (OPR), and other involved agencies that the lead agency plans to prepare an EIR for a project. The purpose of the notice is to solicit guidance from those agencies as to the scope and content of the environmental information to be included in the EIR and to solicit recommendations and develop information regarding the scope, focus, and content of the EIR. The public review and scoping period for the proposed 2021 LRDP was announced in the NOP that was circulated from July 7, 2020 to August 6, 2020, pursuant to Section 15082 of the CEQA Guidelines. During this period, UCR staff held a scoping meeting on July 29, 2020 to provide the public an opportunity to receive more information on the proposed 2021 LRDP and to solicit comments and suggestions on the scope of the EIR. Comments on the scope and content of the EIR were received and written comments are included in Appendix A of this EIR.
2. **Notice of Availability (NOA) and Completion.** The provisions of Sections 15085(a) and 15087(a)(1) of the CEQA Guidelines require that at such time that the Draft EIR is completed, the lead agency must file a Notice of Completion (NOC) with the California Office of Planning and Research and that a public NOA be provided. The Regents, serving as the lead agency, provided the NOC to OPR and circulated an NOA of the Draft EIR to campus organizations, in addition to public agencies, special districts, tribal representatives, organizations, and individuals that commented on the NOP and/or requested to be kept informed of the proposed 2021 LRDP. In addition, UCR placed a public notice in the Press Enterprise, the recognized local paper of general circulation in the project vicinity.
3. **Release of the Draft EIR.** Concurrent with the publication of the NOA/NOC, UCR released the proposed 2021 LRDP Draft EIR for review for at least 45-days. Additional information and details regarding the review process are included in the NOA. This EIR, appendices, and related materials can be found at the UCR Planning, Design & Construction website (https://pdc.ucr.edu/environmental-planning-ceqa). Written comments should be submitted by mail or email, with appropriate contact information, to the following:

   Stephanie Tang
   Campus Environmental Planner
   Planning, Design & Construction
   University of California, Riverside
   1223 University Avenue, Suite 240
   Riverside, California 92507
   ceqa@ucr.edu

Any agency, organization, or members of the public desiring to comment on the EIR must submit their comments prior to the end of the public comment period identified in the NOA.

4. **Final EIR.** A Final EIR consists of the Draft EIR; revisions to the Draft EIR; a list of persons, organizations, and public agencies commenting on the Draft EIR, comments received during the comment period, responses to comments addressing significant environmental concerns, and any other information added by the lead agency. After the Final EIR is completed, and at least 10 days prior to its certification, a copy of the response to written comments received on the Draft EIR will be provided or made available to all commenting parties.
5. **Certification of Final EIR.** Prior to making a decision on the proposed 2021 LRDP, the lead agency must certify that: (1) the Final EIR has been completed in compliance with CEQA, (2) the Final EIR was presented to the decision-making body of the lead agency and that the decision-making body reviewed and considered the information in the Final EIR prior to approving the project, and (3) the Final EIR reflects the lead agency's independent judgment and analysis (CEQA Guidelines Section 15090).
6. **Lead Agency Project Decision.** The lead agency will also need to decide whether to approve or deny the proposed 2021 LRDP, an alternative, or a variation thereof, and decide whether to adopt the mitigation measures as proposed, or to implement conditions of approval. If an option involves significant environmental effects, CEQA findings and Statement of Overriding Considerations may be required pursuant to CEQA Guidelines Sections 15042 and 15043.
7. **Mitigation Monitoring and Reporting Program (MMRP).** According to PRC Section 21081.6, for projects in which significant impacts would be minimized by adopted mitigation measures, the lead agency must prepare an MMRP. The purpose of an MMRP is to ensure compliance with required mitigation measures during implementation of the project.
8. **Findings/Statement of Overriding Considerations**. For each significant impact of the proposed 2021 LRDP identified in the Final EIR, the lead agency must find, based on substantial evidence, that either: (1) the proposed 2021 LRDP has been changed to avoid or substantially reduce the magnitude of the impact, (2) changes are within another agency's jurisdiction and such changes have or should be adopted, or (3) specific economic, social, or other considerations make the mitigation measures or project alternatives infeasible (CEQA Guidelines Section 15091). If an agency approves a project with unavoidable significant environmental effects, it must prepare a written Statement of Overriding Considerations that balances, as applicable, the economic, legal, social, technological, or other benefits, including regionwide or statewide environmental benefits of a proposed project, against its unavoidable environmental risks.
9. **Notice of Determination (NOD).** The lead agency must file an NOD after deciding to approve a project for which an EIR is prepared (CEQA Guidelines Section 15094). The NOD must be posted for 30 days and sent to anyone previously requesting notice. Posting of the NOD starts a 30-day statute of limitations on CEQA legal challenges (PRC Section 21167[c]).

1.5 Draft EIR Content

This Draft EIR is organized in two volumes (Volumes I and II). Volume I presents the potential project-level environmental impacts of the proposed project, and Volume II provides technical appendices. The contents of Volume I include the following:

- **Executive Summary** – presents a brief synopsis of the proposed project, including project objectives, and an overview of project alternatives. This section also provides areas of

controversy/issues to be resolved, a table summarizing project environmental impacts, mitigation measures, and the level of significance of impacts after mitigation.

- **Section 1, Introduction** – provides an overview of the 2021 LRDP, the EIR process, the intended uses of the EIR, and an overview of the format and contents of the EIR.
- **Section 2, Project Description** – provides a description of the proposed 2021 LRDP, including its location, background information, objectives, and physical characteristics.
- **Section 3, Environmental Setting** – provides a general overview of the environmental setting for the proposed 2021 LRDP, including the regional and campus setting.
- **Section 4, Environmental Impact Analysis** – presents the general format of the environmental analysis, an analysis of environmental impacts for each resource area. Each subsection contains a description of the environmental setting (or existing conditions/baseline). The regulatory setting identifies the significance criteria and methodology used to determine whether impacts would be significant or less than significant, discusses the impacts, describes potential mitigation measures to reduce significant environmental impacts, describes cumulative impacts, and provides references.
- **Section 5, Other CEQA Considerations** – summarizes impacts that would result from the proposed 2021 LRDP, including significant environmental effects, significant and unavoidable environmental effects, irreversible changes to the environment, and growth-inducing impacts.
- **Section 6, Alternatives** – describes potentially feasible alternatives to the proposed 2021 LRDP that may attain most of the basic project objectives while avoiding or substantially lessening any of its significant effects. The analysis evaluates the environmental effects resulting from each alternative, compares these effects to those resulting from the proposed project, and describes the relationship of each alternative to the project objectives.
- **Section 7, References** – lists the documents and materials referenced in the text of the document.

1.6 List of Abbreviations

AB	Assembly Bill
ACM	asbestos containing materials
ADA	Americans with Disabilities
ADU	accessory dwelling unit
AF	acre-feet
AFY	acre-feet per year
Ag Ops	Agricultural Operations
ALUCP	Airport Land Use Compatibility Plan
APCD	Air Pollution Control District
AQMP	Air Quality Management Plan
ARB	Air Resources Board
asf	assignable square feet
AST	above-ground storage tanks

AV	automated vehicles
AVR	Average Vehicle Ridership
BCE	Before Common Era
bgs	Belowground Surface
BLS	Bureau of Labor Statistics
BMP	best management practices
BTU	British thermal units
CA POST	Police Officer Standards and Training
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
CAFE	Corporate Average Fuel Economy
CAL FIRE	California Department of Forestry and Fire Protection
Cal/EPA	California Environmental Protection Agency
CalEEMod	California Emissions Estimator Model
Caltrans	California Department of Transportation
CARB	California Air Resources Board
CBC	California Building Code
CCR	California Code of Regulation
CDC	Center for Disease Control
CDFW	California Department of Fish and Wildlife
CDPH	California Department of Public Health
CDPR	California Department of Parks and Recreation
CE	Common Era
CEC	California Energy Commission
CE-CERT	College of Engineering's Center for Environmental Research and Technology
CEQA	California Environmental Quality Act
CERT	Community Emergency Response Team
CESA	California Endangered Species Act
CFC	chlorofluorocarbons
CFGC	California Fish and Game Code
CFR	Code of Federal Regulations
CGP	Construction General Permit
CGS	California Geological Survey

CH_4	methane
CIP	Capital Improvement Program
City	City of Riverside
CNAS	College of Natural and Agricultural Sciences
CNEL	Community Noise Equivalent Level
CNG	compressed natural gas
CNPS	California Native Plant Society
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalents
COVID-19	Coronavirus Disease[1]
CPAC	Capital Program Advisory Committee
CPUC	California Public Utilities Commission
CRC-AES	Citrus Research Center and Agricultural Experiment Station
CRHR	California Register of Historical Resources
CRPR	California Rare Plant Ranks
CUPA	Certified Unified Program Agency
CVARS	Coachella Valley Agricultural Research Station
CWA	Clean Water Act
DAMP	Drainage Area Management Plan
dB	Decibels
dBA	A-weighted decibels
DCFM	Designated Campus Fire Marshal
DOC	California Department of Conservation
DOF	California Department of Finance
DWR	Department of Water Resources
EAP	Emergency Action Plan
EDD	California Employment Development Department
EH&S	Environmental Health & Safety
EIR	Environmental Impact Report
EMFAC	Emission FACtors

[1] https://www.who.int/emergencies/diseases/novel-coronavirus-2019/technical-guidance/naming-the-coronavirus-disease-(covid-2019)-and-the-virus-that-causes-it

EOP	Emergency Operations Plan
ESA	Endangered Species Act
EUI	Energy Use Intensity
EV	electric vehicle
FEMA	Federal Emergency Management Agency
FESA	Federal Endangered Species Act
FHSZ	Fire Hazard Severity Zones
FHWA	Federal Highway Administration
FMMP	Farmland Mapping and Monitoring Program
FRA	Federal Responsibility Areas
FTA	Federal Transit Administration
FTE	full-time equivalent
GC	Government Code
GHG	Greenhouse Gas
GSA	Groundwater Sustainability Act
gsf	gross square feet
GSP	Groundwater Sustainability Plan
GWh	gigawatt-hours
GWP	Global warming potential
HCP	Habitat Conservation Plan
HFCs	hydrofluorocarbons
HMBP	Hazardous Materials Business Plans
HOV	high-occupancy vehicle
HRA	Health Risk Assessment
HSWA	Hazardous and Solid Waste Amendments Act
HUB	Highland Union Building
HVAC	heating, ventilation, and air conditioning
HWCL	Hazardous Waste Control Law
Hz	Hertz
I-215	Interstate 215
IBC	Institutional Biosafety Committee
IIPP	Injury Illness Prevention Program
in./sec.	inches per second

IOU	Investor-owned Utilities
IPCC	Intergovernmental Panel on Climate Change
IRWMP	Integrated Regional Water Management Plan
kV	kilovolt
KVP	Key Viewpoints
kW	kilowatts
kWh	kilowatt hour
LBP	lead-based paint
Lbs/hour	pounds per hour
LCFS	Low Carbon Fuel Standard
Ldn	Day-Night Average Level
LED	Light Emitting Diode
LEED	Leadership in Energy and Environmental Design
Leq	Equivalent noise level
LID	Low Impact Development
Lmax	highest root-mean-square
Lmin	lowest root-mean-square
LOP	Local Oversight Program
LOS	Level of Service
LRA	Local Responsibility Areas
LRDP	Long Range Development Plan
LST	Localized Significance Thresholds
M	Magnitude
MBTA	Migratory Bird Treaty Act
MCLG	Maximum Contaminant Level Goal
MEIR	Maximum exposed individual residents
MEIW	Maximum exposed individual workers
MEP	Maximum Extent Practicable
MGD	million gallons per day
mg/L	milligrams per liter
MMAA	Master Mutual Aid Agreement
MMRP	Mitigation Monitoring and Reporting Program
MMT	million metric tons

MOU	Memorandum of Understanding
Mph	miles per hour
MS4	Municipal Separate Storm Sewer System
MSHCP	Multiple Species Habitat Conservation Plan
MT	metric tons
MW	megawatts
MWh	Megawatt-hours
NAAQS	National Ambient Air Quality Standards
NAHC	Native American Heritage Commission
NCAA	National Collegiate Athletic Association
NFIP	National Flood Insurance Program
NHTSA	National Highway Traffic Safety Administration
NIH	National Institutes of Health
N_2O	nitrous oxide
NO	nitric oxide
NO_2	nitrogen dioxide
NO_x	nitrogen oxides
NOA	Notice of Availability
NOC	Notice of Completion
NOD	Notice of Determination
NOP	Notice of Preparation
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory
O_3	ozone
OEM	Office of Emergency Management
OES	Office of Emergency Services
OPR	Office of Planning and Research
OSFM	Office of the State Fire Marshal
OSHA	Occupational Safety and Health Administration
PCB	polychlorinated biphenyls
pCi/L	picocuries per liter
PD&C	Planning, Design & Construction

PF	Public Facilities/Institutional
PFCs	perfluorocarbons
PGEF	Plant Growth Environments Facility
PM	particulate matter
PM_{10}	particulate matter 10 micrometers in diameter or less
$PM_{2.5}$	fine particulate matter 2.5 micrometers in diameter or less
Pb	lead
Ppb	parts per billion
Ppm	parts per million
PPV	Peak Particle Velocity
PRC	Public Resources Code
PSE	Participating Special Entity
PV	photovoltaic
Qa	Holocene alluvial deposits
RCA	Regional Conservation Authority
RCDEH	Riverside County Department of Environmental Health
RCFCWCD	Riverside County Flood Control and Water Conservation District
RCFD	Riverside County Fire Department
RCHCA	Riverside County Habitat Conservation Agency
RCNM	Roadway Construction Noise Model
RCRA	Resource Conservation and Recovery Act
RCRCD	Riverside-Corona Resource Conservation District
RCSCD	Riverside County Sheriff-Coroner Department
RCTC	Riverside County Transportation Commission
Regents	Board of Regents
RFD	Riverside Fire Department
RHNA	Regional Housing Needs Assessment
RivTAM	Riverside Traffic Analysis Model
RMC	Riverside municipal Code
RMP	Risk Management Plan
RMS	root-mean-square
ROG	reactive organic gases
RPD	Riverside Police Department

RPL	Riverside Public Library
RPOSD	Riverside County Regional Park and Open Space District
RPU	Riverside Public Utilities
RTA	Riverside Transit Agency
RTP	Regional Transportation Plan
RUSD	Riverside Unified School District
RWQCB	Regional Water Quality Control Board
RWQCP	Riverside Water Quality Control Plant
SARWQCB	Santa Ana Regional Water Quality Control Board
SB	Senate Bill
SBBA	San Bernardino Basin Area
SCAB	South Coast Air Basin
SCAG	Southern California Association of Governments
SCAQMD	South Coast Air Quality Management District
SF_6	sulfur hexafluoride
SCG	Southern California Gas
SCRRA	Southern California Regional Rail Authority
SCS	Sustainable Communities Strategy
SDC	Seismic Design Category
SDWA	Safe Drinking Water Act
SEMS	Standardized Emergency Management System
Sf	square feet
SF_6	sulfur hexafluoride
SGMA	Sustainable Groundwater Management Act
SHMP	State Multi-Hazard Mitigation Plan
SHMP	State Multi-Hazard Mitigation Plan
SO_2	Sulfur dioxide
SPCC	Spill Prevention, Control & Countermeasures
SR 60	State Route 60
SRA	State Responsibility Areas
SRC	Student Recreation Center
SSC	Species of Special Concern
SSMP	Sanitary Sewer Management Plan

State	State of California
STEAM	Science, Technology, Engineering, Arts, and Mathematics
SVP	Society of Vertebrate Paleontology
SWMP	Stormwater Management Program
SWP	State Water Project
SWPPP	Stormwater Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TAC	Toxic air contaminant
TAPS	Transportation & Parking Services
TCR	Tribal Cultural Resources
TDM	Transportation Demand Management
TES	Thermal Energy Storage
TIA	Transportation Impact Analysis
TMDL	Total maximum daily load
TNW	Traditional Navigable Water
U.S.	United States
UC	University of California
UCOP	UC Office of the President
UCPD	University of California Police Department
UCR	University of California, Riverside
UFC	Uniform Fire Code
UNET	University Neighborhood Enhancement Team
UPASS	University PASS (subsidized bus pass for UCR-affiliated students, faculty, and staff)
U.S.	United States
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USDOE	U.S. Department of Energy
USDOT	U.S. Department of Transportation
US EPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife
USGBC	U.S. Green Building Council
USGS	U.S. Geological Survey
UST	underground storage tanks

UV	Ultra-violet
UWMP	Urban Water Management Plan
VdB	Vibration decibel
VHFHSZ	Very High Fire Hazard Severity Zone
VMT	Vehicle Miles Traveled
WEAP	Worker Environmental Awareness Program
WMWD	Western Municipal Water District
WOUS	Waters of the U.S.
WQMP	Water Quality Management Plan
ZEV	zero-emission vehicles
°C	Celsius
°F	Fahrenheit
µg/L	micrograms per liter
µg/m^3	micrograms per cubic meter

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2 Project Description

The project analyzed in this EIR is the proposed 2021 LRDP for UCR, also known as "2021 LRDP" or the "proposed project." This section of the EIR describes the key characteristics of the 2021 LRDP, including the geographic extent of the plan area, project objectives, required approvals, and the reasonably foreseeable growth and development projected under the 2021 LRDP. A copy of the proposed 2021 LRDP is available at: https://pdc.ucr.edu/environmental-planning-ceqa.

2.1 Project Background

UCR is one of 10 campuses in the UC system. UC policy requires all campuses to maintain LRDPs. An LRDP is defined by statute as a "physical development and land use plan to meet the academic and institutional objectives for a particular campus or medical center of public higher education" (Public Resources Code (PRC) Section 21080.09). The LRDP is a comprehensive document that guides a campus' physical development through planning objectives and policies and addresses land use, the location of new facilities, distribution of open space, and circulation strategies. An LRDP identifies the physical development needed to achieve academic goals and is a valuable reference document for the university and community.

Campus LRDPs are driven by academic programming goals and projections of both enrollment and service populations to achieve goals by an established horizon year. Each LRDP specifies how a campus will accommodate the projected student population along with the faculty and staff required to support that student population. The Regents must certify an EIR that evaluates the physical impacts of the proposed development pursuant to CEQA and ultimately approve each LRDP (University of California Office of the President [UCOP] n.d.a).

The Regents approved the first UCR LRDP in 1964 and approved subsequent revisions in 1990 and 2005. UCR adopted five amendments to the 2005 LRDP. The 2005 LRDP projected an enrollment of 25,000 undergraduate, transfer, and graduate students by Fall 2015; however, those student growth projections proved to be conservative (UCR 2005). As of the 2018/2019 academic year, UCR had reached student enrollment of approximately 24,000 (UCR 2021a). See Draft EIR Section 3, *Environmental Setting,* for additional information.

The proposed 2021 LRDP establishes a land use framework and identifies facility development anticipated to support a projected enrollment growth to 35,000 students and 7,545 faculty and staff by Fall 2035 (a total campus population of 42,545). This projection is based on current student enrollment, regional growth trends, and agreements between the UC and the State of California (State) regarding resident student and transfer student enrollment objectives. For additional information on these growth projections see Appendix B. Once certified, the 2021 LRDP EIR will be used to tier subsequent environmental analyses for future UCR development projects (see Section 2.4.2 for further detail).[1]

[1] Tiering may include but may not be limited to a finding of exemption from further environmental review, an addendum, a supplemental EIR, or a subsequent EIR. In rare instances, a standalone CEQA document may be appropriate for future projects.

This section provides a detailed description of the proposed 2021 LRDP, including major project components, project objectives, and approvals that may be necessary during implementation of the 2021 LRDP. Project location and existing setting details can be found in Section 3, *Environmental Setting*, of this EIR.

2.2 Campus Population

Systemwide Growth and Enrollment Policy

UCR campus enrollment is affected by several factors, such as demographics and policies related to the mission and goals of the UC system. Under the California Master Plan for Higher Education, the UC system guarantees access to the top 12.5 percent of California's public high school graduates and qualified transfer students from California Community Colleges (UCOP n.d.b).

As specified in Education Code Sections 66202 and 66730, the University of California is expected to plan for adequate spaces to accommodate all California resident students who are eligible and likely to apply to attend an appropriate place within the system. Similarly, Education Code Section 66011(a) provides that all resident applicants to California institutions of public higher education who are determined to be qualified by law or by admission standards established by the respective governing boards should be admitted to either a district of the California Community Colleges, in accordance with Section 76000, the California State University, or the University of California. Section 66741 of the California Education Code requires acceptance of qualified transfer students at the advanced standing level.

Across UC's nine undergraduate campuses, total undergraduate enrollment stands at 226,125 students, an increase of 3,632 students or 1.6 percent from 2018. Systemwide enrollment of graduate students climbed for the seventh consecutive year to 58,941, up 2.1 percent from 57,710 from 2018. UC projects approximately 200,000 graduate degrees by 2030, on top of the one million undergraduate degrees UC projects to award between 2015 and 2030 (UCOP 2020a).

UCR Existing and Projected Growth

The proposed 2021 LRDP would provide a blueprint for project development that would be necessary to accommodate campus growth projected through the planning horizon year consistent with the goals set forth in the UCR Strategic Plan and other UC enrollment and housing initiatives. The UCR campus population consists of students, academic faculty and staff, and other non-academic staff (including general administrative and healthcare staff). Students make up the largest group, followed by staff and faculty. In academic year 2018/2019, the total campus population was 28,661, including 23,922 students (Fall 2018 headcount) and 4,739 faculty and staff.

The 2021 LRDP provides planning for a population projection of approximately 42,545, including enrollment of approximately 35,000 students (Fall quarter headcount) by the academic year 2035/2036. It is anticipated that approximately 7,600 faculty and staff would be needed to support academic year 2035/2036 student enrollment. Table 2-1 provides a net increase comparison of the projected campus population between the 2018/2019 academic year (baseline) and the 2035/2036 academic year (see 2021 LRDP). See Appendix B for additional information related to campus projections.

Table 2-1 Baseline (2018/2019) and 2021 LRDP (2035/2036) Campus Population

Campus Population[1]	Baseline (2018/2019)	2021 LRDP (2035/2036)	Net 2021 LRDP Increase from Baseline
Undergraduate Student Population	20,581	28,000	7,419
Graduate Student Population	3,341	7,000	3,659
Total Student Population	**23,922**	**35,000**	**11,078**
Academic Faculty and Staff	1,702	2,545	843
Non-Academic Staff	3,037	5,000	1,963
Total Faculty/Staff Population	**4,739**	**7,545**	**2,806**
Total Campus Population	**28,661**	**42,545**	**13,884**

[1]Fall quarter headcount

Source: UCR 2021 LRDP Draft Program Model

LRDP = Long Range Development Plan

2.3 2021 LRDP Overview

2.3.1 2021 LRDP Planning Context

The proposed 2021 LRDP identifies the physical resources required to achieve UCR's academic goals and to accommodate UCR's reasonably foreseeable projected growth. With directives from the UC system-wide initiatives and UCR Strategic Plan discussed in Section 2.3.7, the proposed 2021 LRDP contains an updated campus land use plan and planning principles for guiding future campus development under the plan. The UCOP Facilities Manual recommends LRDPs address the following four primary elements: land use, open space, mobility, and infrastructure and sustainability.

The proposed 2021 LRDP would provide UCR with a framework to guide future growth and would serve as a guide for campus planners, faculty, and administrators through academic year 2035/2036. Future projects would be evaluated for consistency with the 2021 LRDP, the UCR Physical Design Framework, Campus Construction and Design Standards, and Capital Financial Plan. Approval of future projects would also be subject to project-specific CEQA review, as needed.

2.3.2 2021 LRDP EIR Objectives

The proposed 2021 LRDP is broad in its scope and intends to achieve overarching goals established by the State, the UC system, and UCR. The objectives of the proposed 2021 LRDP EIR include:

- Serve as good stewards of limited campus lands and natural resources as UCR continues to grow and accommodate enrollment projections of approximately 35,000 students
- Develop approximately 5.5 million gross square feet of net new building space needed to accommodate student housing as well as academic and research facilities
- Maintain existing land-based research operations on West Campus, while supporting facility modernization, research support facilities growth, and strategic partnerships and initiatives
- Activate and enliven the East Campus through strategic mixed-use development, improved public spaces, expanded campus services, and additional on-campus housing to facilitate a living-learning campus environment

- Accommodate approximately 40 percent of eligible students with on-campus housing and replace aging low-density student housing units while considering demand, affordability, financial feasibility, and physical site constraints
- Locate future growth generally adjacent to and outside of the campus loop road, thereby maintaining the character of the Mid-Century Modern Core
- Incorporate efficient planning and design practices in support of minimizing the effects of climate change

2.3.3 Facility Growth, Location, and Redevelopment/Demolition

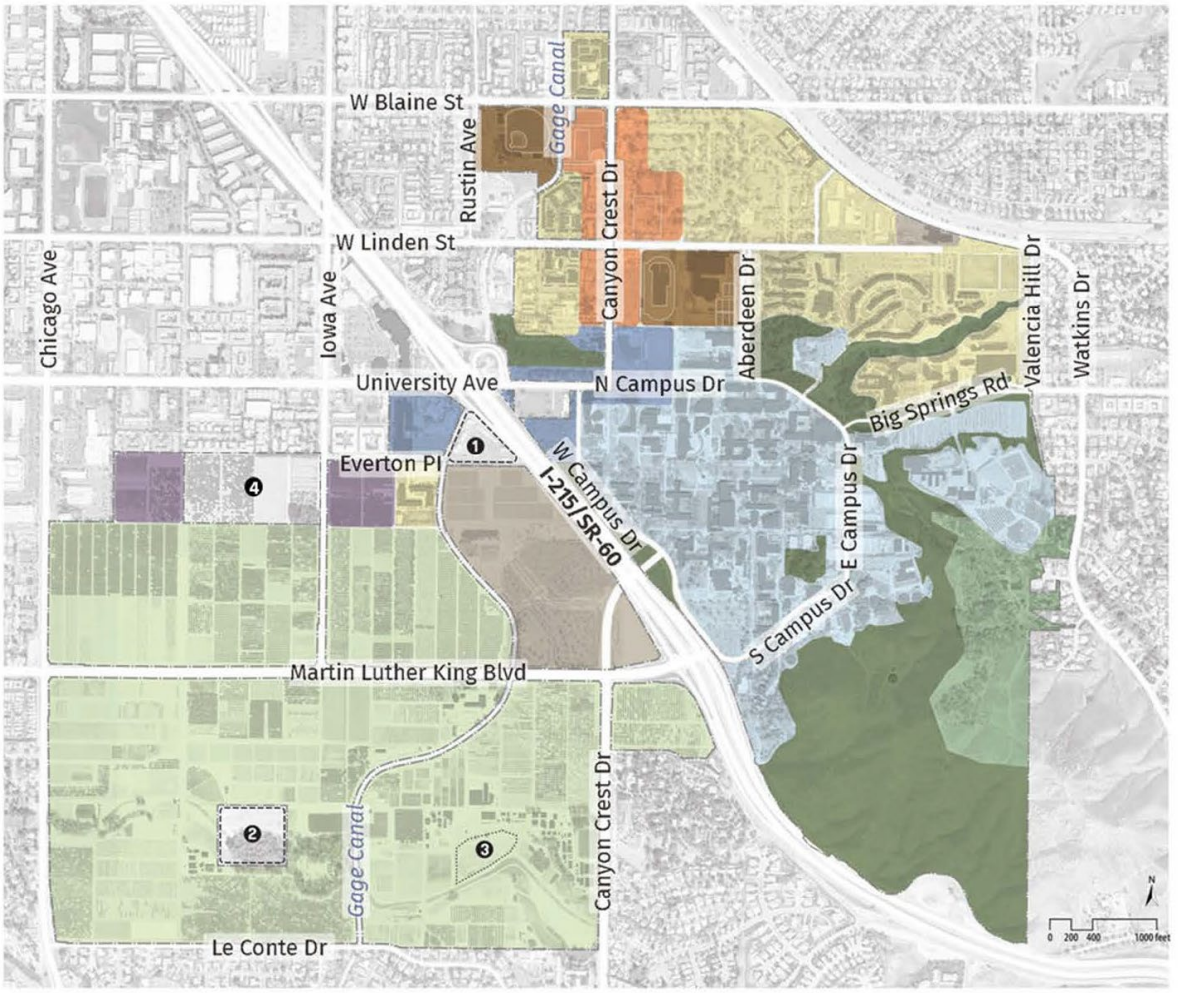
To sustain and advance its world-class academics and global research impacts, and continue to provide a robust set of undergraduate, graduate, and professional degree programs, the proposed 2021 LRDP provides policies for the renovation and expansion of existing academic, research, academic support, student life, and other support functions that will need to be complemented with appropriate growth in funding. UCR seeks to significantly increase its funded research, which is reflected in the projected space needs of the proposed 2021 LRDP. The research expansion goal has implications that are both programmatic and facilities driven. Expansion in the number of research laboratories and renovations of existing poor-quality research laboratories will be necessary to attract and retain new UCR researchers.

The 2021 LRDP proposes a net increase in development of approximately 3.7 million assignable square feet (asf) [approximately 5.5 million gross square feet (gsf)] of additional academic buildings and support facilities. Therefore, the 2021 LRDP proposes a maximum total of approximately 8.5 million asf (approximately 12.7 million gsf) of total academic, research, and support space development by the year 2035/2036 to accommodate the enrollment growth and meet program needs. For additional details regarding existing and projected development please see Table 2-3.

The proposed 2021 LRDP includes general types of campus development and land uses to support projected campus population growth and to enable expanded and new program initiatives. Campus development would be related to academic, research, academic support, student life, and other support functions and would include various levels of ground disturbance. As currently envisioned, development under the proposed 2021 LRDP would occur primarily within previously disturbed areas, adjacent to previously developed areas, surface parking areas, generally along North/South/East/West Campus Drive, and generally along University Avenue, Canyon Crest Drive, Big Springs Road, Aberdeen Drive, and West Linden Street.

Development under the 2021 LRDP would primarily be infill development or expansion of already developed areas on the north portions of East Campus. A new interpretive center is programmatically assumed in the UCR Botanic Gardens designation on East Campus, but no new development is anticipated in the Open Space Reserve in East Campus. New development on West Campus would primarily occur within infill sites designated in the LRDP as Agricultural/Campus Research, Student Neighborhood, Campus Support, and University Avenue Gateway (see Figure 2-1 below).

Figure 2-1 Proposed 2021 LRDP Land Use Map



Source: UCR 2021

UCR is considering the long-term (through 2035) demolition and potential redevelopment opportunities on-campus. For purposes of the EIR analysis, the areas of campus that UCR considers for demolition and potential redevelopment include, but are not limited to, the following: Boyden Labs; Fawcett Laboratory, Stored Product Insecticide Building; Lathhouses #1, #4, and #8; campus facilities along South Campus Drive (e.g., Genomics shed, Bio Control Building, Plant Drying Building, Herbarium, Botany Screenhouse, Storage Shed #6, Headhouse Storage Building, Growth Chamber Building, Glasshouse #51, Facilities Services Annex A, and College Building North and South), campus facilities east/west of East Campus Drive (e.g., Fawcett Laboratory, University Office Building, Campbell Hall, Facilities Services Annex B, Greenhouses #7-14, Greenhouses #18-21, Computing & Communications Center, and associated accessory structures), the Health Services Building; Bannockburn Village, the Plaza Apartments, Oban Apartments, Falkirk Apartments, the Corporation Yard, the softball and soccer fields, Advanced Neuroimaging Building (formerly FMRI), Costo Hall, and the Police Facility.

Buildings considered for repurposing include Chapman Hall, Spieth Hall, Life Sciences, and Watkins Hall. Programs in these buildings would need to be relocated before any building is repurposed or demolished.

The specific locations of these buildings within the UCR Campus can be reviewed through the UCR Campus Map available at: https://campusmap.ucr.edu/.

2.3.4 Proposed 2021 LRDP Campus Land Use Designations

The proposed 2021 LRDP includes a framework of land use categories that designate the general allowable uses in a certain area. Predominant land uses are the primary facilities, programs, and/or activities in a given land use category to achieve specific planning objectives. Table 2-2 presents a comparison between land uses in the 2005 LRDP and those of the proposed 2021 LRDP. A description of each land use designation follows the table. Figure 2-1 shows the general location of the proposed land uses.

Table 2-2 2005 LRDP versus 2021 LRDP Land Uses

	2005 LRDP (acres)		2021 LRDP (acres)	
Land Use Designations	**West Campus**	**East Campus**	**West Campus**	**East Campus**
Academics & Research	54.3	132.2	0.0	184.4
Campus Support	9.1	11.0	51.0	3.0
Land-based Research	294.9	0.0	419.3	0.0
Open Space Reserve	0.0	130.5	0.0	154.7
Recreation & Athletics	14.1	53.4	0.0	28.7
Student Neighborhood	68.5	100.1	5.4	136.4
2021 LRDP-Specific Land Use Designations[1]				
Agricultural/Campus Research	Not Applicable	Not Applicable	19.4	0.0
UCR Botanic Gardens	Not Applicable	Not Applicable	0.0	43.7
Canyon Crest Gateway	Not Applicable	Not Applicable	0.0	31.9
University Avenue Gateway	Not Applicable	Not Applicable	8.3	21.3
Non-UCR Land of Interest	Not Applicable	Not Applicable	12.8[3]	0.0
2005 LRDP-Specific Land Use Designations[2]				
Open Space	25.2	144.2	Not Applicable	Not Applicable
Campus Reserve	37.3	0.0	Not Applicable	Not Applicable
Non-Institutional Agencies	0.0	12.3	Not Applicable	Not Applicable
Parking	7.9	17.1	Not Applicable	Not Applicable
Totals				
Total Acres by Campus	511.3	600.8	503.4	604.1
Total Acres (Rounded)[4]		1,112		1,108

[1] These land use designations are new to the 2021 LRDP and were not used as land use categories under the 2005 LRDP.

[2] The acreage from the 2005 LRDP Land Use Designations no longer in use have been incorporated into the proposed 2021 LRDP Land Use Designations as appropriate, e.g. 25 acres of parking lots has been allocated among the new land use areas throughout campus based on location.

[3] Non-UCR Land of Interest is not included in the total acreage under the 2021 LRDP.

[4] The difference in the acreage between the 2005 LRDP and 2021 LRDP is related to more precise GIS mapping, the acquisition of Oban and Falkirk Apartments and the acquisition of several properties in Frost Court and one on Watkins Avenue next to the Chancellor's residence. Additionally, approximately 18 acres of land on the West Campus was also sold to the California Air Resources Board (CARB) in 2019 to construct and operate air quality testing and research facility (CARB Consolidation Project), and is nearing completion at the time of publication of this EIR.

Source: UCR GIS database

LRDP = Long Range Development Plan

Academics & Research (~184.4 acres)

The Academics & Research land use areas are in or adjacent to the core of East Campus, primarily bounded by the campus loop road. This land use designation consists of facilities dedicated to undergraduate and graduate learning and research environments and daytime student life activities such as the student union or food services.

The predominant Academics & Research uses may include classrooms; instructional and research laboratories and greenhouses; undergraduate, graduate, and professional schools and associated programs; libraries; advanced scientific research facilities; federal research partnerships; performance and cultural facilities; clinical facilities; and ancillary support facilities, such as general

administrative offices, conference rooms, and meeting spaces. Additional uses support core campus student life activities and food services, such as the Highland Union Building (HUB) and The Barn. Secondary permissible uses include parking, utility infrastructure, and other campus support services.

Campus Support (~54.0 acres)

The Campus Support land areas would be primarily located on the eastern portion of West Campus with a small land use area located in the northeast portion of East Campus. Predominant uses may include general campus support services, such as administrative and institutional support functions, including facilities services, public safety, parking and transportation, service yards, maintenance facilities, trade shops, materials handling and storage inclusive of hazardous materials, shipping and receiving, utility plants and systems, fleet storage, parking, and other support functions.

Land-based Research (~419.3 acres)

The Land-based Research land use areas are located on West Campus and retain the existing agricultural land-based teaching and research fields. The predominant Land-based Research uses may include agricultural field research, instructional and research laboratories, greenhouses, and uses supporting agricultural research. Secondary permissible uses may include parking, storage, utility infrastructure, and related support services/facilities.

Open Space Reserve (~154.7 acres)

The Open Space Reserve land use designation would recognize, protect, and enhance areas that have ecological or aesthetic value to campus, including those subject to special development constraints due to native or endangered species habitats, steep or unique terrain such as arroyos and riparian corridors, or other natural features.

The predominant Open Space Reserve uses may include designated hillsides, stormwater management infrastructure, habitat restoration and management activities, trails, and minor amenities such as seating and viewing areas, and other features compatible with natural open spaces. Secondary permissible uses may include facilities that support campus open space resources such as maintenance roads, storage structures, and incidental field research facilities. These secondary uses are included to allow for the continuation of existing facilities within the Open Space Reserve, which currently include dirt/paved access roads/trails, storage structures and incidental research facilities. There are no proposals to develop new facilities in this area at this time.

Recreation & Athletics (~28.7 acres)

The Recreation & Athletics land uses are concentrated in two areas in the northern portion of East Campus and include the Student Recreation Center (SRC), the track facility, tennis courts, and the UCR Baseball Complex (Riverside Sports Complex) on Blaine Street. Additional neighborhood-scale facilities would be interspersed in student neighborhoods, as indicated in the Student Neighborhood land use, to improve student access and create a more dynamic student experience into the evenings and on weekends.

The predominant Recreation & Athletics uses may include facilities to accommodate intercollegiate athletics and campus recreation, such as large-scale indoor and outdoor athletic and recreation facilities, playfields, and courts. Secondary permissible uses may include parking, food service, administrative areas, office and meeting space, and other supporting uses.

Student Neighborhood (~141.8 acres)

The Student Neighborhood land use areas are generally located in the northern portions of East Campus and encompass primarily non-academic uses that facilitate vibrant undergraduate and graduate student learning experiences outside of the classroom environment.

Student Neighborhood land uses are meant to accommodate a diverse array of uses to ensure that student needs are met in an interactive, mixed-use environment. Predominant uses may include student residences for undergraduate and graduate students, students with families, student services, meeting and instructional space, food service and retail, and appropriately scaled recreation and athletic facilities. Secondary permissible uses may include childcare and pre-schools proximate to family housing, parking primarily for students, and other residential support services, such as facilities services and public safety.

Agricultural/Campus Research (~19.4 acres)

The Agricultural/Campus Research land use is established to enhance and expand external engagement of UCR's research, education, and public service mission by providing a principal place for facilities and activities that support the University and city aspirations to make and showcase UCR as a recognized center for innovation in agricultural sciences and technology.

The predominant Agricultural/Campus Research uses may include facilities for interdisciplinary research and education, support of land-based research activities, external research partnerships, and public-private innovation partnerships. Secondary permissible uses include parking, open space, utility infrastructure, and other support uses.

UCR Botanic Gardens (~43.7 acres)

The UCR Botanic Gardens is in the easternmost portion of East Campus, at the foothills of the Box Springs Mountains, and serves a unique role as a venue for a wide array of teaching, research, and demonstration activities. Approximately one-third of the UCR Botanic Gardens land remains natural, featuring the native habitat of the region.

The predominant UCR Botanic Gardens uses may include demonstration gardens, habitat restoration and management areas, and incidental facilities such as interpretive centers, seating and viewing areas, and other amenities typically compatible with a botanic garden program. Secondary permissible uses may include support facilities for the UCR Botanic Gardens and parking.

Canyon Crest Gateway (~31.9 acres)

The Canyon Crest Gateway land use designation is in the northern portion of East Campus, generally bordering Canyon Crest Drive, between Blaine Street to the north and half a block south of West Linden Street. The Canyon Crest Gateway is envisioned as a high-density, horizontal and vertical mixed-use gateway environment that will serve as a campus "Main Street" for the campus population to experience on a regular basis. It would accommodate a variety of student housing needs above an array of student and commercial services that would meet the needs of the campus and the local community. This corridor will continue to serve as a multi-modal arterial but with increased focus on pedestrian-oriented uses at the lower levels of mid-rise structures. Parking would be carefully integrated into this area to allow for safe and convenient access from adjacent side streets that supports the desired pedestrian experience along the main street.

The predominant Canyon Crest Gateway uses may include student housing, recreation and athletics facilities, university-oriented services, administrative and support service offices, neighborhood-serving commercial and retail space such as banks, pharmacies, grocery outlets, etc., and restaurants. It would also feature professional services space inclusive of outpatient medical facilities, hotel and conference center(s), alumni center, public safety, and other complementary uses, including affiliated and non-affiliated educational facilities. Such land uses could include a Science, Technology, Engineering, and Math (STEM) Education Center; however, specific decisions regarding such a development would be made independently and would undergo their own subsequent entitlement and approval process, including a project specific environmental review. Secondary permissible uses may include parking, academic uses, open space, and other support uses, as well as multi-modal transportation support facilities.

University Avenue Gateway (~29.6 acres)

The University Avenue Gateway land use designation begins on the northern portion of West Campus and continues east under the Interstate 215/State Route 60 (I-215/SR 60) freeway along University Avenue into the core of East Campus. The University Avenue Gateway is envisioned as the campus' primary entryway, connecting the campus to Downtown Riverside and the broader Riverside community. The area is intended to encourage activities that express a welcoming and identifiable approach to campus, create identity and that are active during the day, evening, and weekends with an emphasis on street-oriented interaction and engagement. The University Avenue Gateway is envisioned to include a dense and diverse mix of uses that provide opportunities for greater campus-community interaction and that collectively reinforce the importance of the area as the terminus of the University Avenue corridor, which connects campus with Downtown Riverside. The predominant University Avenue Gateway uses may include academic instruction and research facilities, outpatient medical facilities, hotel/conference center(s), large lecture halls or assembly and exhibition spaces, a visitor's center, food services and cafes, student services, multi-modal transportation support facilities, and other compatible non-UCR uses. Secondary permissible uses also include parking, open space, and other support uses.

Non-UCR Land of Interest (~12.8 acres)

The proposed 2021 LRDP identifies two properties as potential opportunity areas for University-related uses that are not currently owned by UCR but may become available for University use in the future. These are the existing Caltrans Yard at the east end of Everton Place and the City-owned land that is landlocked within West Campus. However, there are currently no specific proposals for these properties.

2.3.5 Facilities Development

The proposed 2021 LRDP is a strategy for accommodating growth and change through academic year 2035/2036. It presents a guideline for future campus development, including new construction, facility renovations, and site development projects. These activities would be carried out throughout the life of the proposed 2021 LRDP. The final design of each site and facility project would occur as projects are funded and moved through the design and approval process. The timing of project implementation would depend on several considerations, including priority of need, availability of surge space to accommodate the temporary relocation of programs, infrastructure considerations, and the availability of funding.

To accommodate enrollment growth, renovation and expansion of existing academic, research, academic support, student life, and other support functions will be necessary that must also be complemented with appropriate growth in operational funding. The proposed 2021 LRDP assumes that renovations, redevelopment, and expansions will generally occur within the existing campus footprint, on acquisitions of interest, and through University partnerships in City-owned districts by means of increased development density. Table 2-3 shows the existing and proposed building space.

Table 2-3 Existing and Proposed Campus Building Space

Facilities	2018 Baseline Existing Space (asf/gsf)	2035 Proposed Space (asf/gsf)	Difference (asf/gsf)
Academics & Research			
Classroom & Service	113,282/169,923	290,252/435,378	176,970/265,455
Seats	6,947	12,978	6,031
Teaching Lab & Service	102,729/154,094	165,800/248,700	63,071/94,606
Open Lab & Service	116,743/175,115	129,500/194,250	12,757/19,135
Research Lab & Service	887,529/1,331,294	1,115,300/1,672,950	227,771/341,656
Total Academics & Research	**1,220,283/1,830,425**	**1,700,852/2,551,277**	**480,569/720,852**
Academic Support			
Offices and Services	996,834/1,495,251	1,583,415/2,375,123	586,581/879,872
Library & Collaborative Learning Space	337,551/506,327	514,789/772,184	177,238/265,857
Assembly & Exhibit	54,988/82,482	117,000/175,500	62,012/93,018
Other Department Space	69,602/104,403	140,000/210,000	70,398/105,597
Total Academic Support	**1,458,975/2,188,463**	**2,355,204/3,532,806**	**896,229/1,344,343**
Student Life			
Residential	1,525,647/2,288,471	3,643,620/5,465,430	2,117,973/3,176,959
Beds	6,511	14,000	7,489
Residential Dining	55,802/83,703	94,527/141,791	38,725/58,088
Seats	1,172	1,929	757
Student Health	14,117/21,176	24,500/36,750	10,383/15,574
Student Union	97,122/145,683	187,422/281,133	90,300/135,450
Recreation (Indoor)	140,707/211,061	205,867/308,801	65,160/97,740
Recreation (Outdoor) (fields)	7	11	4
Athletics	42,568/63,852	42,568/63,852	0
Total Student Life	**1,875,963/2,813,945**	**4,198,504/6,297,756**	**2,322,541/3,483,811**
Other Facilities			
Corporation Yard	248,279/372,419	248,279/372,419	0
Total Other Facilities	**248,279/372,419**	**248,279/372,419**	**0**
Total Campus Space	**4,803,500/7,205,252**	**8,502,839/12,754,258**	**3,699,338/5,549,006**

asf = assignable square feet, defined as the area measured within the interior walls of a room that can be assigned to a program and does not include circulation, mechanical, restrooms, or building service spaces

gsf—gross square feet

Source: Appendix B

Note: Numbers may not add up precisely due to rounding.

Interim projects are those that have either been constructed since academic year 2018/2019 (baseline) or approved but not yet constructed (i.e., to be completed in the near future), as shown in Table 2-4. The environmental impacts of these projects were analyzed under a stand-alone EIR, or an addendum to the 2005 LRDP EIR as amended, or tiered Initial Study/Mitigated Negative Declaration from the 2005 LRDP EIR, as amended, or assessed through a CEQA categorical exemption. These projects are included as part of the cumulative projects list for the 2021 LRDP EIR (see Section 4, *Environmental Impact Analysis*).

Table 2-4 Interim Projects

Project	Estimated Construction Completion Date
Dundee Glasgow	Completed Fall 2020
The Barn	Completed Spring 2020
Pierce Hall Renovation	Summer 2021
Plant Growth Environments Facility	Early 2021
Parking Structure 1	Summer 2021
Student Health & Counseling Center	Summer 2023
North District Phase 1	Summer 2021
Student Success Center	Summer/Fall 2021
School of Medicine Building 2	Summer 2023
Batchelor Hall Renovation	Fall 2023
North District Future Phases	To be determined

The following provides an overview of the campus space types included in the space program model in the proposed 2021 LRDP.

2.3.5.1 Academics and Research

Academics and Research – Classrooms

Increasing flexibility of its classrooms to enable instructional best practices is a priority for the campus. While UCR intends to increase its offerings of online and other alternative delivery methods, the students in those courses will still require on-campus services. The University values the effectiveness of “face-to-face” classes, and therefore, future online instruction likely will be hybrid or blended courses and limited to large, lower-division, breadth courses. Since most students will receive most instruction on-campus every term, nearly all students will still create a demand for other types of campus space (e.g., parking, dining, study space, recreation, etc.).

To accommodate a 35,000-student enrollment, the 2021 LRDP proposes to double the number of classroom seats and expand the diversity of classroom types, with newer spaces ranging from lecture halls to active learning classrooms. Thus, the total new space dedicated to classrooms could double (see Table 2-3). Incrementally renovating existing classrooms to improve presentation technology and environmental quality would also remain a priority. The core teaching function of the University occurs in classrooms, and to this end, the proposed 2021 LRDP seeks to locate most of the future classroom space in the Academic Center.

Academics and Research – Teaching Laboratories

Teaching laboratories are rooms used for regularly or formally scheduled classes which require special equipment or configuration (e.g., art studios, chemistry laboratories, engineering computer laboratories). Currently, scheduling of teaching laboratories closely meets UCOP utilization guidelines. To meet the 35,000-student enrollment and maintain the variety of academic programs, the University would need to expand the space dedicated to teaching laboratories. The design and size of the new teaching laboratories would vary by discipline, but the University plans to schedule these new and modern teaching laboratories optimally to include some weekend scheduling. Existing teaching laboratories would also need to be incrementally renovated to improve functionality. Please see Table 2-3 for additional information.

Academics and Research – Open Laboratories

Like teaching labs, open laboratories are furnished with equipment that serves the needs of a particular discipline; however, open laboratories are not regularly scheduled. A modest number of additional dedicated open labs would be necessary to support a 35,000-student enrollment at a level typical of the UC system (see Table 2-3). However, more importantly, the number of open labs connotes the quality of UCR facilities. The University plans to continue to invest in and improve its existing open labs, such as the music practice rooms, language laboratories, studios, and learning laboratories, like those used for speech, hearing, psychology, and health-related professions.

Given that the core teaching function of the University occurs in teaching and open laboratories, the proposed 2021 LRDP seeks to locate nearly all teaching and open laboratories in the Academic Center.

Academics and Research – Research Laboratories

Presently, growth in research at UCR is limited by the quality of existing research laboratory space, in part impacting researcher productivity (defined as the average expenditure per principal investigator) when compared to institutional peers, and UC system institutions.

To meet its research growth goal, the University would need to enable greater researcher productivity, both by improving the quality of existing research laboratories and building new, state-of-the-art research laboratories. Assuming greater per researcher activity and expenditures, a further expansion of research space by approximately 20 percent will be necessary. The design and size of research laboratories will vary by discipline. Based on current trends, the University anticipates that research in engineering, agricultural sciences, and medical fields will lead research growth, requiring large laboratories with modern equipment.

While critical to the University's institutional goals, research is not a daily component of the undergraduate student population. Therefore, new research laboratories are planned to be constructed in the Academic Center, outside of but adjacent to the Mid-Century Modern Core fronting the Carillon Mall.

A distinguishing factor of UCR's research activity is the agricultural research on West Campus. Nearly 20 percent of the University's research expenditures occur in agricultural fields and the indoor labs that support them. As the overall research portfolio grows, so will land-based research.

2.3.5.2 Academic Support

Academic Support – Offices

As additional faculty, staff, and student workers are hired in support of increasing student enrollment, the need for office space will continue to grow. Office space currently represents 20 percent of the campus' indoor assignable space. As the number of faculty, staff, and students grow by over 50 percent, the office workspaces will need to grow correspondingly, with a modest level of discounting for space reduction strategies, such as open offices, hoteling, and telecommuting. Please see Table 2-3 for additional information.

Academic Support – Library and Study Space

UCR's library and study space have evolved beyond book storage and retrieval to include group study and maker space. The role of the library will continue to evolve, requiring renovation and expansion. Yet, group study and collaboration will continue to occur outside the formal library and will include hallways and collaboration spaces within classroom and research buildings. Combining the library's projected expansion and national guidelines for collaborative space outside of the library, the space for library and study would need to grow by 50 percent to support an enrollment of 35,000 students. Opportunities for collaborative learning and peer-to-peer instruction would also occur throughout campus and within the on-campus residential communities as living-learning environments. Please see Table 2-3 for additional information.

2.3.5.3 Student Life

Student Housing

As of Fall 2018, UCR's housing portfolio contained 6,511 beds, or approximately 27 percent of the current enrollment, and accommodated undergraduate students, graduate students, and students with families. The proposed 2021 LRDP establishes a goal of housing approximately 40 percent of all enrolled, eligible students (14,000 beds) to live in University-managed or controlled housing in proximity to the Academic Center. This equates to housing approximately 68 percent of the increase in student population in UCR controlled housing (i.e. 7,489 new beds / 11,078 increased student population).

The 40 percent benchmark is based on several factors[2] including:

- University's previously observed absorption rates for student beds
- Local students' preference to live with family to save on housing costs
- Available land area
- Financial capacity and ability to build new housing supply
- Privately-owned housing options in the neighboring community
- Projected new supply created by private developers
- Future expansion of transit options that will expand the campus' physical reach farther into the community

[2] Some of these factors are outside of UCR's control.

The majority of the campus' current student housing is located north of the Academic Center. The proposed 2021 LRDP seeks to strengthen and densify the student housing in the current student housing footprint.

The North District Plan represents redevelopment of the campus and a transformation of on-campus student life. Here, the University is building modern, higher density residence halls and apartments in a phased manner. As analyzed in the North District Development Plan Final EIR, dated May 2019 (SCH #2018061044), the North District will include 1,200 residence hall beds, over 4,000 apartment beds, dining facilities, and recreation and athletic fields. North District development is currently underway with the construction of the first phase (1,500 apartment-style beds). Once North District is fully built out as planned, the University will have over 5,500 freshmen beds and over 8,000 upperclassmen, family, and graduate beds.

Additional student housing capacity will occur through strategic infill and selective replacement of existing housing facilities in the northern half of the East Campus. Over 1,100 existing beds are located in three apartment complexes—Bannockburn, Falkirk, and Oban. These structures are in relatively poor condition. The planned transformation of Canyon Crest Drive into a higher density, mixed-use student neighborhood assumes that some of the buildings in these complexes will be redeveloped at a greater density. The extent of redevelopment will vary depending on how the North District is developed and overall demand. The number of proposed University-affiliated beds is shown in Table 2-5.

Table 2-5 Projected University-Affiliated Beds

Campus-Affiliated Beds	Baseline (2018/2019)	2021 LRDP (2035/2036)	Net 2021 LRDP Increase from Baseline
Student Beds	6,511	14,000	7,489

LRDP = Long Range Development Plan

Student Dining Facilities

The construction of the new Glasgow Dining Facility was completed in Fall 2020. In response to the plan to significantly increase on-campus housing, the North District program includes a new dining commons. Reconciling national standards, current dining demand, and the specific needs of a larger student enrollment on-campus population, two more dining venues with the capacity of up to 700 total seats would be needed in addition to the Glasgow and North District facilities.

Student Center Facilities

Merging national standards, current demand for the HUB, and the specific needs of student services to accommodate the planned growth of student enrollment and on-campus residents, the space dedicated to student center facilities would need to double to support an enrollment level of 35,000 (see Table 2-3). Under the proposed 2021 LRDP, UCR would change its current model of a single student center to a distributed model of a core facility and satellite student centers in residential neighborhoods. Additional student center facilities would be planned in the Academic Center and near new residential facilities. Expansion in the Academic Center would be possible with the redevelopment of facilities adjacent to the HUB. New student center facilities may also be located in the North District area and/or integrated into the development of the Canyon Crest Gateway.

Student Health Facilities

Like other universities, UCR is experiencing an increase in demand for psychological and health counselling, along with regular medical visits and treatments. Thus, the need for health and wellness will grow beyond the rate of student enrollment and on-campus resident growth. The University is planning a new health and wellness facility on West Linden Street to better serve student needs and the developing North District. The 2021 LRDP proposes potential satellite facilities incorporated into planned residential halls or in the Canyon Crest Gateway.

Athletic and Recreational Facilities

The SRC is the recreational hub of campus and includes the pool facility and tennis courts, and multi-activity gymnasium. The facility was expanded in 2014 with newer and updated amenities and was programmed to support a campus population of 25,000. This major hub of indoor and outdoor recreation activities is adjacent to nearly all student residential facilities. The planned increase in on-campus residents will create increased recreational demand, which can be accommodated in an addition to the SRC on the site of the outdoor ropes course.

Providing adequate outdoor recreational facilities for students is an important determinant of student retention and graduation rates. Presently, students have access to seven outdoor recreation fields. The use of the fields located north of the Glen Mor Apartments are limited from late-evening use to conform with a settlement agreement with the neighbors. The University also has a shared-use agreement with the City of Riverside through 2027 on the UCR-owned recreational fields located at the intersection of Canyon Crest Drive and Blaine Street.

The campus proposes up to 11 outdoor recreation fields. Because outdoor recreation fields have a large physical footprint and are limited in the time in which they are intensely used, the proposed 2021 LRDP underscores the need to be strategic and flexible in providing access to recreation amenities for a larger student population.

To this end, the proposed 2021 LRDP does not delineate outdoor recreation fields as a separate land use. Future campus development, including the development of the North District, and the redevelopment and densification of existing student housing complexes will incorporate outdoor recreation amenities in their planning in close coordination with Student Recreation. Additionally, to the extent feasible, the University will explore the continued possibility of sharing outdoor fields with Athletics. Athletic program growth is planned to occur in existing athletics facilities.

2.3.5.4 Other Facilities – Corporation Yard

The Corporation Yard, located on the south side of Watkins Drive, houses Facilities Services (administration, shipping and receiving, trade shops, infrastructure, and energy management), EH&S, and Transportation and Parking Services. The current Corporation Yard is located in East Campus, directly adjacent to existing and planned student residential neighborhoods.

The proposed 2021 LRDP also acknowledges that existing available land for campus development is limited and therefore plans for support functions such as Facilities Services and Transportation and Parking Services to relocate to West Campus to allow the student neighborhoods to expand. Access from West Campus to East Campus under the freeway would be maintained for Facilities Services staff, vehicles, and other equipment.

2.3.6 Open Space

The 2021 LRDP proposes a campus open space framework that represents the network of green spaces that together contribute to its unique character. This framework includes the proposed 2021 land use designations of Open Space Reserve and UCR Botanic Gardens, and the secondary overlay to land use of Primary Open Spaces, Secondary Open Spaces, and Planned Open Space. Each of these open space designations represent a distinct typology of open space, with each playing a critical role in defining the overall campus organization.

Additionally, the proposed 2021 LRDP identifies other landscapes of significance on campus including West Linden Street, lined with tall Mexican fan palms that provide continued connectivity to the region's agrarian roots and the corridors of Aberdeen Drive and West Campus Drive, designed by noted mid-century modern landscape architect Ruth Shellhorn. The proposed 2021 LRDP also directs the consideration of view corridors and portions of West Campus that provide partial views of Mount Baldy and the larger ranges of the San Gabriel Mountains and San Bernardino Mountains.

Figure 2-2 illustrates proposed on-campus open space framework.

Open Space Reserve

The Box Springs Mountains with their natural, steep hillsides embrace and define the southern portion of East Campus. The 2021 LRDP proposes that this area be preserved in its natural state and protected from future development. The area could also be used for non-intrusive ecological research, with exceptions only for required access to maintain existing facilities and infrastructure.

Arroyos are natural landscape areas that lie within the interior portions of the campus and are important for providing ecological habitat and stormwater conveyance. It also enhances campus character in areas such as Glen Mor Residence Hall and south of Aberdeen-Inverness Residence Hall. These spaces will remain in their current state and can be expanded to advance sustainability initiatives.

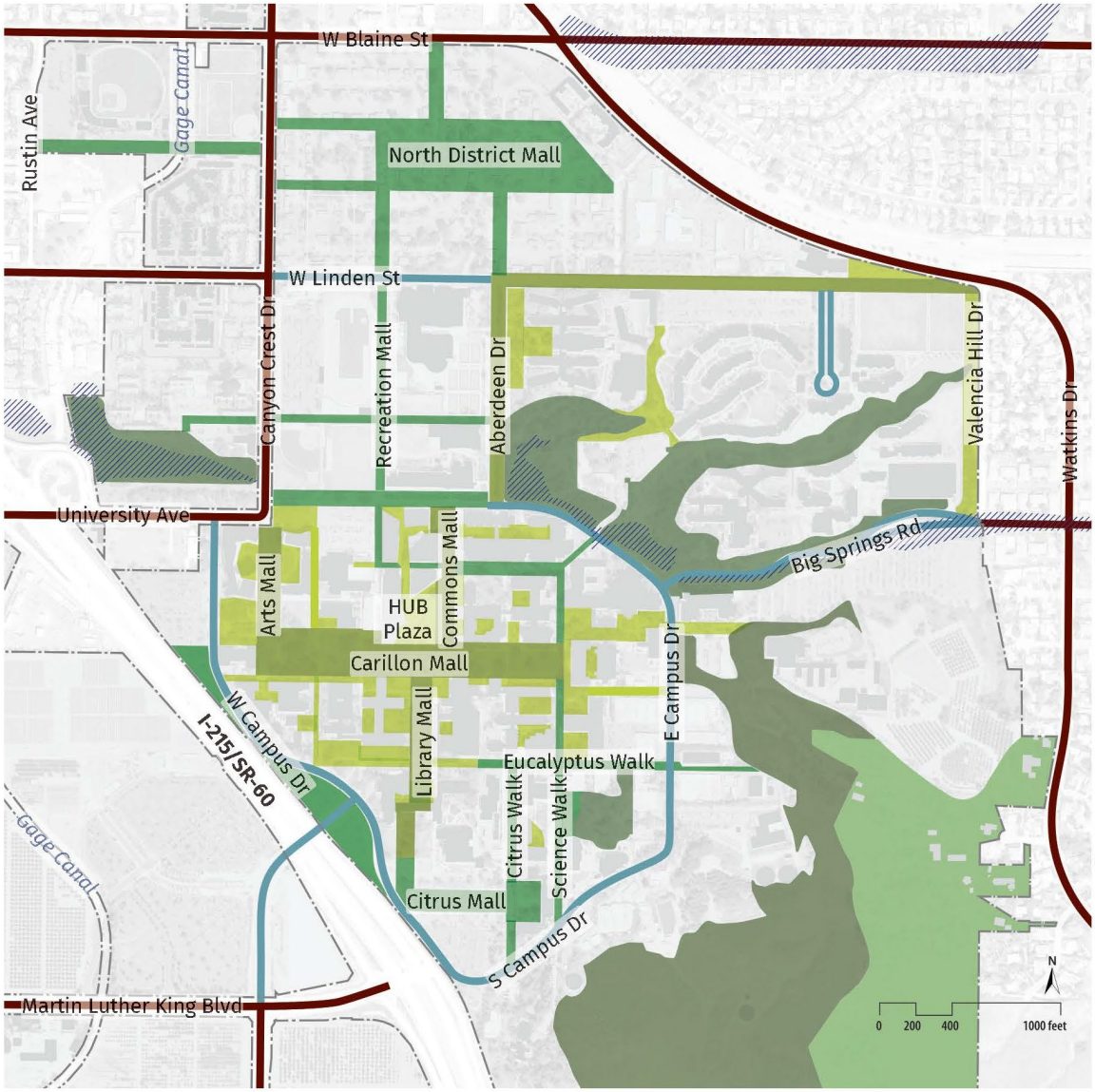
Other stormwater facilities (e.g., detention basins and bioswales) are included on campus to capture, treat, and convey stormwater.

The proposed 2021 LRDP also includes buffer landscape areas on the west edge of East Campus along the freeway. These areas are intended to provide an appropriate setback from the I-215/ SR 60 freeway to the campus, as well as to provide important stormwater and ecological functions.

UCR Botanic Gardens

Approximately one-third of the UCR Botanic Gardens remain in a naturalistic state of native plant communities. The proposed 2021 LRDP assumes the UCR Botanic Gardens will continue to operate in its current capacity in the future, with potential enhancements. An opportunity exists to broaden its presence through the addition of an interpretive center to serve students, faculty, staff, and the larger Riverside community. While no specific projects have been proposed, this has been programmatically assumed as part of the LRDP buildout projections.

Figure 2-2 Proposed Open Space Framework



F3.4 OPEN SPACE FRAMEWORK – EAST CAMPUS DETAIL

*See Figure 3.1 Land Use Plan for footnotes

- OPEN SPACE RESERVE
- UCR BOTANIC GARDENS
- PRIMARY OPEN SPACES
- SECONDARY OPEN SPACES
- PLANNED OPEN SPACE
- PUBLIC ROAD STREETSCAPES
- CAMPUS ROAD STREETSCAPES
- 100-YEAR FLOOD PLAIN

FEMA Flood Insurance Rate Map Numbers, all with effective date August 28, 2008:
06065C0727G (revised August 27, 2010; revised February 6, 2019)
06065C0728G
06065C0729G

Source: UCR 2021

Campus Malls and Campus Streets – Primary Open Spaces

Primary Open Spaces include significant campus malls, major pedestrian corridors, streetscapes, quads, and plazas. They are not defined together as a designated land use but rather exist as a secondary overlay to land use organization.

Campus Malls

To create a network of "primary open spaces," the 2021 LRDP proposes preserving and enhancing the Carillon Mall, Library Mall, Commons Mall, and the Arts Mall as iconic form-giving open spaces and the architecturally significant mid-century modern buildings that frame them. This plan also presents a future vision wherein these place-making elements extend outward towards the perimeter of the campus to connect the Academic Center to the edges of East Campus.

Carillon Mall is the primary east-west open space on East Campus. It is defined by the presence of the UCR Bell Tower and the Rivera Library arcade, two of the most iconic architectural elements on the campus. At its cross axis, Library Mall runs south and Commons Mall runs north to North Campus Drive. Together, these three malls form the crosshairs of the Mid-Century Modern Core. The Arts Mall further defines East Campus, with a prominent open space positioned north-south at the western terminus of Carillon Mall.

The proposed 2021 LRDP also includes the creation of Citrus Mall extending west from Anderson Hall to a future extension of the Library Mall through the University Theater Plaza and the Olmsted arches. It also proposes continued development and extension of Recreation Mall as the new North District neighborhood is built out. Together, these open space additions would increase landscape and pedestrian connectivity as future growth increases across East Campus.

Extending the existing malls outside of the Academic Center across Campus Drive to accommodate both northern and southern development, presents a host of opportunities for improved wayfinding, enhanced safety, and promoting multi-modal mobility.

Campus Streets

The character, quality, and functionality of campus streetscapes become increasingly important as campuses grow denser in their development patterns, and the volumes of the different modes of conveyance both to and on-campus correspondingly increase. Well-planned streets are also critical to wayfinding as the campus planning framework becomes more complex as it grows. The 2021 LRDP proposes the following campus streets be part of the primary open space framework, even as the campus expands.

Aberdeen Drive and West Linden Street, which serve as primary pathways for vehicular and pedestrian movement through East Campus, are important streetscapes that presently define the character of the campus. The character of these open spaces should be contextually extended into newer development whenever possible to enable continuity of both visual and pedestrian connectivity.

Canyon Crest Drive and University Avenue are new campus districts intended to become vibrant pedestrian environments and vehicular gateways. These corridors have the potential to provide a mix of public spaces in juxtaposition to denser buildings, with ground-level programs that engage the street and infuse activity through the week and into the weekends. Planned and implemented thoughtfully, these environments can improve safety, convenience, human comfort, character, and connection to the community.

Additionally, North, East, South, and West Campus Drive, which collectively form the campus loop road will gradually transform from defining the edge of the campus to becoming the seam that ties together the Academic Center with the expanding perimeter of instructional and research facilities, serving as a front door for new projects along its flanks. Taken together with necessary safety and circulation improvements, this street will significantly transform, with sections potentially limited to service and emergency vehicle access.

Minor Campus Malls and Corridors, Plazas, Courtyards, and Arcades – Secondary Open Spaces

Secondary, minor open spaces are primarily focused on minor pedestrian linkages that foster greater movement throughout campus, as well as smaller, more intimate, courtyard spaces or plazas. Improvements include, but are not limited to, the following corridors to create a network of "minor open spaces":

- Development of the future Science Walk corridor which will create a pedestrian-focused connection between multiple research buildings in the southeast quadrant of the campus and connect South Campus Drive and Eucalyptus Drive
- Extension of Recreation Mall and Aberdeen Drive in the North District, as well as new pathways, north-south through the development, to align building entries and activate ground-level programming in the development along these paths

The proposed 2021 LRDP would also direct the preservation and activation of existing outdoor spaces such as plazas and courtyards, integration new outdoor spaces, and provision of shaded connections in the form of tree-lined pathways or arcades integrated into buildings.

Minor Malls and Corridors

Several campus malls and corridors serve as secondary, yet increasingly important, places of identity and points of entry for campus buildings. These serve as connections that link primary open spaces (such as major malls) to smaller courtyards and plazas. In some instances, these secondary corridors support campus service and emergency circulation systems, while also holding the potential to accommodate pedestrian and bicycle routes as the campus increases its population and mobility needs and modality options diversify.

When effectively integrated, this secondary open space network provides pedestrian connectivity and interesting gathering spaces throughout campus. The existing campus open space framework benefits from both prominent, primary open spaces, as well as these more discreet secondary open spaces to create a rich tapestry of outdoor experiences for the campus population, and efficient access for service and emergency vehicles.

The North District includes opportunities to extend connections and capture additional views. These include the extension of Recreation Mall and Aberdeen Drive, as well as new pathways, north-south through the development, aligning building entries and active ground-level programming in the development along these paths. Organizing active ground-level uses to engage the street along Canyon Crest Drive will energize the northern gateway and frame northwest views toward Mount Baldy. Together, these planning proposals enhance the character of this district and connect it to the campus and its larger context.

Plazas, Courtyards, and Arcades

Student quads, plazas, courtyards, and arcades serve as gathering places that provide a more intimate level of community scale, providing areas to lunch, study, teach, or simply relax. Outdoor student gathering spaces throughout campus such as the Physics Courtyard, HUB Plaza, the courtyards in front of Orbach Library (Science Library), and the Humanities & Social Sciences Building serve as some of the prominent examples of these useful open space typologies that offer a range of both passive and active places and support different scales of activities.

Shaded, planted courtyards, and arcades can also be found within many buildings and building complexes across campus. As development continues, emphasis on preserving and activating existing spaces, integrating new outdoor spaces, and providing shaded connections in the form of tree-lined pathways or arcades integrated into buildings is proposed and will contribute to creating positive indoor-outdoor relationships.

2.3.7 Mobility

Loop Road

The campus loop road distributes vehicles to the perimeter of the Academic Center from the various gateways and provides service and emergency vehicle access to a variety of mixed-mode secondary pathways and streets in and adjacent to the Academic Center. As the campus consolidates surface parking into structures, new academic development along this perimeter will transform both the character and function of the campus loop road. The proposed 2021 LRDP plans for sections of the loop road to be improved incrementally as new buildings are built alongside the road. Existing bicycle lanes will be widened or improved, while auto travel lanes will be narrowed to slow traffic, and space for shade trees will be added to shade the sidewalk and roadway and buffer pedestrians from traffic. Additionally, traffic within sections of the campus loop road and internal campus streets including Eucalyptus Drive, Citrus Drive, and North Campus Drive will be transformed to pedestrian-priority routes and limited to service and emergency access only.

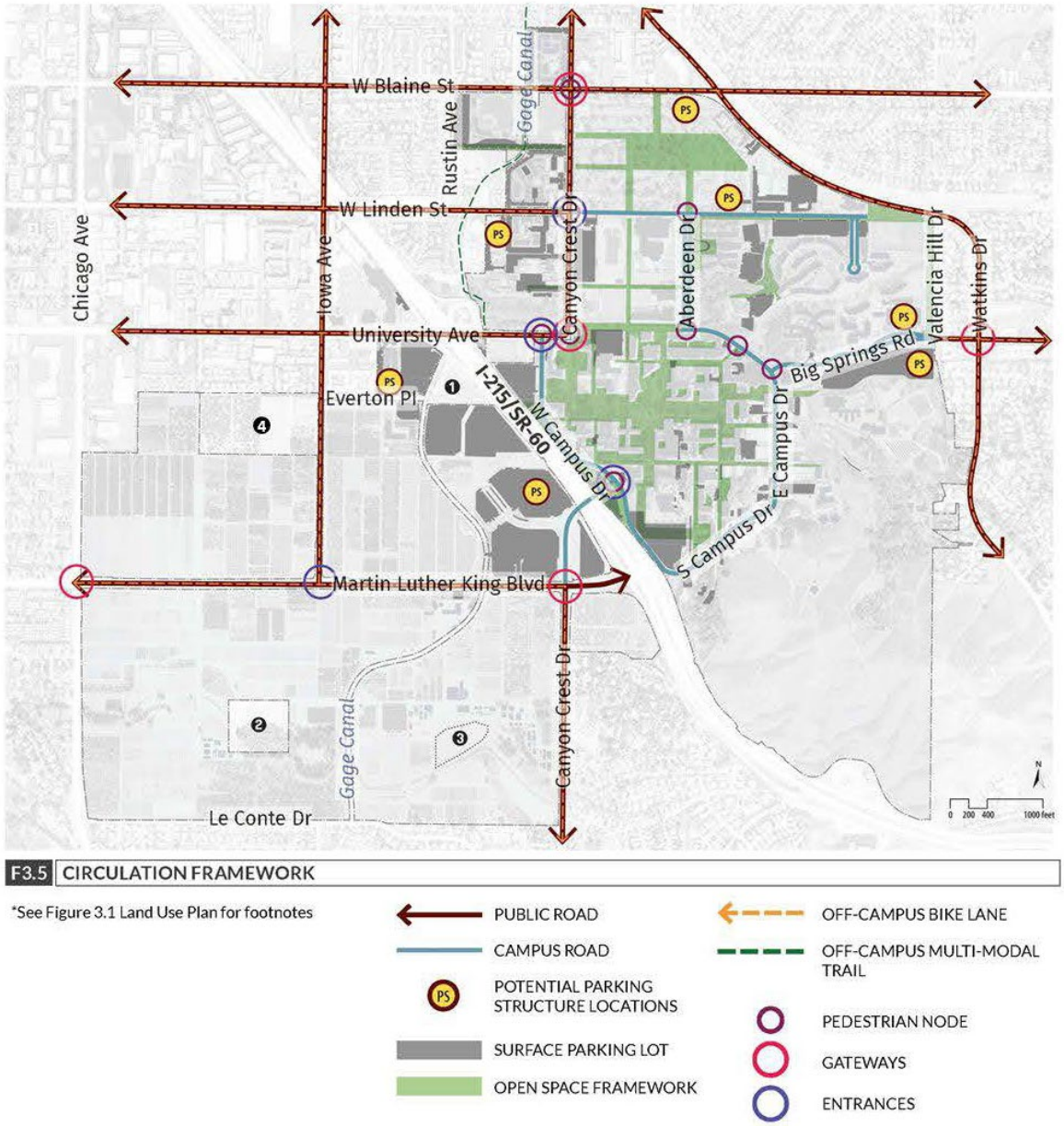
Figure 2-3 shows the proposed circulation framework.

Secondary Streets

Under the proposed 2021 LRDP, the campus network of secondary streets and access pathways would extend as the campus develops. As the opportunities present themselves, traffic in sections of the campus loop road and internal campus streets including Eucalyptus Drive, Citrus Drive, and North Campus Drive will be transformed to pedestrian-priority routes and limited to service and emergency access only. Furthermore, the proposed 2021 LRDP plans for the establishment of University policies to improve pedestrian safety in highly congested areas of the campus pedestrian circulation network.

Emergency and service pathways on campus will also need to accommodate primary daily use by pedestrians and cyclists. As such, the location and screening of service docks and trash collection areas will be carefully considered as the proposed 2021 LRDP is implemented.

Figure 2-3 Draft Circulation Framework



Note: See Figure 2-1 for footnotes.
Source: UCR 2021

Active Transportation Connections

Bicycles will continue to become a more frequently used form of mobility as student housing on campus increases. To this end, the University will continue to work with City and University advocates to improve the quality and functionality of an integrated bicycle path network that connects the campus and the wider community beyond. The City of Riverside proposes an active transportation and multi-purpose recreational trail along the Gage Canal from Palmyrita Avenue to the Hunter Metrolink Station to Blaine Street, which ends at the northwestern boundary of the East Campus.

Pedestrians will continue to be the primary users of the internal campus circulation network. The proposed 2021 LRDP promotes continued investment in improving the quality, safety, and character of the pedestrian experience and ensuring it is developed with the principle of universal access in mind. Improving pedestrian comfort in Riverside's sunny and hot climate should be achieved through arcades and shading systems associated with building projects and through careful attention to shade tree planting along major routes.

Parking

The proposed 2021 LRDP would relocate parking on East Campus from central locations to more peripheral sites as existing surface parking lots are replaced with campus buildings and support facilities. The relocation of parking to campus edges would prioritize active transportation modes in the Academic Center by increasing pedestrian access and pedestrian-oriented circulation, with the aim to reduce vehicle traffic in the campus center. However, parking needs would increase from current conditions to meet the needs of an increased campus population. The proposed 2021 LRDP projects that campus growth would create a net demand of up to 3,100 parking spaces on campus for a total projected capacity of approximately 12,700 spaces. To meet projected demand, the proposed 2021 LRDP assumes construction of four new parking structures in addition to Parking Structure 1.

Transportation Demand Management (TDM)

Under the proposed 2021 LRDP, UCR would continue its TDM Program to further encourage the use of public transit, ridesharing, vanpooling, cycling, and walking to campus. The UPASS program and others would reduce the demand for parking and vehicle trips to campus.

2.3.8 Sustainable Development and Utilities

The UC Policy on Sustainable Practices, issued in 2004 and updated in 2020, establishes goals in nine areas of sustainable practices: green building design, clean energy, transportation, climate protection, sustainable building operations, waste reduction and recycling, environmentally preferable purchasing, sustainable food service, and sustainable water systems (UCOP 2020b). The policies are directed at individual projects and facilities operations throughout the UC system. The UC Policy on Sustainable Practices is presented in greater detailed on the UC website at: https://policy.ucop.edu/doc/3100155/SustainablePractices.

As part of UCR's commitment to responsible stewardship of its physical resources, campus development under the proposed 2021 LRDP would continue to be evaluated for their environmental sustainability pursuant to the UC Policy on Sustainable Practices, as well as any future programs that are developed by the UC, or UCR specifically, during the planning period for the proposed 2021 LRDP. Several strategies focus on improving the sustainability and resilience of this infrastructure network, including the sustainable practices policies that will guide renovations, future development, infrastructure modernizations, and ongoing operations related to waste management, procurement, utility purchase contracts, on-site energy generation, and water sourcing.

The University maintains and operates a complex network of infrastructure in support of its academic and research mission and its built environment and operations. The two key elements of the infrastructure system are energy and water. Together these two elements offer the most important opportunities for resource stewardship. The University will continue to build on its commitments to conservation as it maintains, operates, and expands its infrastructure in support of

its education, research, and public service objectives. As expansion and renewal occur to support the development, energy and water systems present significant opportunities for resource conservation, reduced consumption and greenhouse gas (GHG) emissions, and restoration of the natural campus hydrology, where possible.

As the campus population grows and the physical footprint increases, there would be a greater intensity of use on the campus' infrastructure. Development of projects under the proposed 2021 LRDP would be adjacent to existing campus development and would connect to existing wastewater treatment or stormwater drainage, electric power, natural gas, or telecommunications facilities and infrastructure. The proposed project would require the installation of additional water main lines, lateral connections, and hydrants on campus to serve planned facilities. The addition of new campus facilities would require additional pipes and water lines to service water for both fire and domestic uses. The proposed project would also require stormwater management infrastructure, including project specific stormwater facilities. Additional stormwater facilities include but are not limited to (1) increasing capacity of Great Glen Basin and Glade basin, by increase depth, widening the edges, or combination of both. Subsurface storage such as gravel storage area at the bottom of the basins, (2) Future stormwater management infrastructure to treat stormwater located south of Parking Lot 1, (3) Canyon Crest Drive Linear Treatment System to modify the existing Canyon Crest Drive to include an area for stormwater treatment as part of its cross-section.

The Central Plant that runs on natural gas is an essential component to utilities and various building operations for the campus. A large-scale effort to remove this component by 2025 would not be financially or practically feasible for UCR. However, UCR is committed to not expanding natural gas use in line with the UC Sustainable Practices Policies and in support of the UCOP Carbon Neutrality Initiative. Additionally, UCR will continue to work on energy efficiency measures to reduce GHG emissions. Alternative measures for carbon reduction will be used as a supplementary mechanism to achieve carbon neutrality goals, as well as retrofits of the Central Plant over time to move towards UC sustainability goals and objectives, such as the purchase of biogas.

As part of proposed 2021 LRDP process, UCR is also drafting the Tree Preservation and Replacement Guidelines which would be applicable to new development under the 2021 LRDP. This document notes consideration should be made for the timing of tree removal and replanting activities and follow the MBTA to avoid disturbing migratory birds and their nests. Additionally, this document will include the following tree replacement requirements:

- For standard trees that are not identified as mature specimen trees, memorial trees, landmark trees, or historic trees as defined in the Tree Preservation and Replacement Guidelines, removal of standard trees shall be replaced at a minimum 1:1 ratio.
- For "trees of value" which would include mature specimen trees, memorial trees, landmark trees, or historic trees, removal of "trees of value" shall be replaced based on the diameter or breast height and canopy requirements noted in the Tree Preservation and Replacement Guidelines.

2.4 LRDP Implementation

2.4.1 Development Review Process

This EIR provides program-level analysis of the proposed 2021 LRDP and will be used by The Regents to evaluate the potential environmental impacts associated with adoption of the proposed 2021 LRDP. The proposed 2021 LRDP is a plan to guide development, but it is not an implementation plan.

Adoption of the proposed 2021 LRDP does not constitute a commitment to any specific project. Rather, the LRDP would guide long-term development based on campus needs and funding availability.

As individual 2021 LRDP projects are proposed for implementation, additional CEQA compliance review, including site- and condition-specific analysis and specific permits and/or approvals may be necessary, depending on the circumstances of the particular project and their consistency with the analysis and conclusions in this EIR. Accordingly, each campus project would be evaluated at the time it is proposed for implementation to determine the need for additional environmental review. This EIR could also be relied upon by responsible agencies when applicable, for permitting or approval authority over any project-specific action.

The Regents and/or its delegated authorities must approve each development proposal as appropriate. At the campus level, the review of campus development proposals is informed by a process that involves input from staff, faculty, students, and the local community, as appropriate. The design and construction of future projects at UCR will be subject to the campus development review process. In addition to compliance with CEQA, the development review process requires review by campus committees and administrative staff, evaluation of the proposed design and construction documents, and construction inspection and site monitoring during construction. Committees and administrative offices involved in project implementation may include project sponsors, Office of the Vice Chancellor for Planning, Budget, & Administration, and campus stakeholders, among others.

Although the LRDP is the primary governing planning document for the campus, several other supplemental guidance documents are in place to inform development at UCR, such as the *Physical Design Framework* and *Campus Construction and Design Standards*. In general, facilities on the UCR campus comply with the design guidelines set forth in these documents. These documents will be kept current with the implementation of the proposed 2021 LRDP.

2.4.2 Tiering Under CEQA

As discussed in Section 1 of this EIR, one of the purposes of the 2021 LRDP EIR is to provide a basis for tiering subsequent environmental documents that address subsequent activities pursuant to CEQA Guidelines Sections 15152 and 15168(c). CEQA Guidelines Section 15168(c) states that later activities in the program must be examined in the light of the Program EIR to determine whether an additional environmental document must be prepared. Subsequent programs that are proposed consistent with the proposed 2021 LRDP will be reviewed using an environmental checklist to determine whether they are within the scope of the Program EIR. If no new significant effects would occur, the subsequent project is considered to be within the scope of the Program EIR, and additional environmental analysis is not required.

If significant environmental impacts would occur that were not considered in the Program EIR, an additional CEQA document (subsequent or supplemental EIR or a mitigated negative declaration) would be prepared by UCR, tiering from the Program EIR and focusing on addressing those additional significant effects. This EIR analyzes the environmental effects resulting from implementation of the proposed 2021 LRDP and, therefore, addresses subsequent activities that could be associated with its implementation. Because the LRDP is a general land use plan providing a broad, coherent, and adaptable policy framework to guide the physical development of UCR, probable scenarios were developed regarding related construction activities, development locations, types of development, building design and configuration, and campus appearance.

Adoption of the proposed 2021 LRDP or certification of the EIR does not constitute a commitment to any specific enrollment level, project or activity, construction schedule, or funding priority. Furthermore, inclusion of a conceptual plan, study, or development scenario in this EIR does not constitute a commitment to that plan, study, or development scenario. Inconsistencies between future activities or projects and a conceptual plan, study, or development scenario considered in this EIR would not preclude the environmental document prepared for the subsequent activity or project from tiering off the 2021 LRDP EIR.

2.4.3 University of California Policies

The UC is governed by The Regents, which under Article IX, Section 9 of the California Constitution has "full powers of organization and governance" subject only to very specific areas of legislative control. The Regents promulgate policy for the UC overall, but certain policymaking, administrative, and operational duties are conferred on the President pursuant to the Bylaws and various policies adopted by The Regents. New Presidential policy may result from The Regents' action, changes in law, or new administrative issues within the UC itself. Presidential policies are revised or rescinded based on changes to The Regents' policy, legal or societal changes, or administrative changes. For the most part, UC policies, which apply to future developments at the UCR campus, are contained within the *UC Facilities Management and Construction Manual*. Although there are numerous policies that apply to campus development, relevant UCR policies are identified and discussed within the appropriate issue sections in Section 4 of this EIR.

2.4.4 Non-UC Policies, Laws, and Regulations

As a State entity, UCR is not subject to local land use jurisdiction or related policies, as described in Section 4 of this EIR. Federal and state laws or policies may apply, and these are described in Section 4 in the various applicable resource sections. In some cases, local land use regulations may also warrant consideration, and these are also presented in Section 4 where appropriate. UCR is responsible for project conformance with applicable policies, laws, and regulations.

2.4.5 Required Approvals

This EIR, and any environmental analysis relying on this EIR, is expected to be used to satisfy CEQA requirements of the listed responsible and/or trustee agencies and is anticipated to provide useful information to those agencies that may issue an approval or permit in support of the proposed 2021 LRDP.

The Regents is the lead agency for this EIR and has sole authority to consider and approve the proposed 2021 LRDP. Subsequent development projects regulated by the LRDP may require approvals from other agencies.

Table 2-6 lists those other Agencies who may be required to issue permits or approve components of specific development proposals during buildout of the LRDP.

Table 2-6 Anticipated Permits and Approvals for 2021 LRDP and Subsequent Implementation

Agency	Permit/Approval
Lead Agency	
University of California, Board of Regents	▪ EIR Certification ▪ Approval and adoption of the 2021 LRDP ▪ Acceptance of the Physical Design Framework ▪ Approval of conceptual plans, development agreements and schematic plans for public-private partnerships ▪ Approval of schematic plans for future facilities and improvements
Other Agencies	
Santa Ana Regional Water Quality Board (SARWQCB)	▪ Section 401 Certification ▪ Stormwater discharge permits
United States (U.S.) Fish and Wildlife Service (USFWS)	▪ Compliance with the federal Endangered Species Act for potential take of listed species (as needed)
U.S. Army Corps of Engineers (USACE)	▪ Permit related to discharge of fill material to waters of the U.S. (as needed)
State Fire Marshal	▪ Future facility fire safety review and approval
California Department of Transportation (Caltrans)	▪ Permit to provide temporary access for construction within Caltrans rights-of-way
California Department of Fish and Wildlife (CDFW)	▪ Compliance with the California Endangered Species Act for potential take of state-listed species (as needed); permit for any work in a river, stream, or lake or its tributaries (as needed)
City of Riverside Fire Department	▪ Potential access to facilities
South Coast Air Quality Management District (SCAQMD)	▪ Air quality construction and operational permits
Riverside Transit Agency (RTA)	▪ Approval of any future regional bus service improvements
City of Riverside	▪ Encroachment permits for work within city streets and rights-of-way
Division of the State Architect	▪ Accessibility Compliance

2.5 References

University of California Office of the President (UCOP). n.d.a. Long Range Development Plans. https://www.ucop.edu/construction-services/facilities-manual/volume-2/vol-2-chapter-3.html#intro. Accessed April 2021.

_____. n.d.b. Graduate, Undergraduate and Equity Affairs. https://www.ucop.edu/graduate-undergraduate-equity-affairs/. Accessed April 2021.

_____. 2020a. UC's California student enrollment climbs for fourth straight year. https://www.universityofcalifornia.edu/press-room/uc-s-california-student-enrollment-climbs-fourth-straight-year. Accessed April 2021.

_____. 2020b. Policy on Sustainable Practices. https://policy.ucop.edu/doc/3100155/SustainablePractices. Accessed April 2021.

University of California Riverside (UCR). 2005. University of California Riverside 2005 Long Range Development Plan. http://rplan.ucr.acsitefactory.com/sites/g/files/rcwecm1811/files/2018-10/LRDP%20-%20FInal.pdf. Accessed April 2021.

_____. 2021a. Enrollment: UCR – Fall Headcount (Unduplicated). https://ir.ucr.edu/stats/enroll/overall. Accessed April 2021.

3 Environmental Setting

This section provides a general overview of the environmental setting for the proposed 2021 LRDP. For a typical EIR, the environmental setting is controlled by CEQA Guidelines Section 15125, which states in part:

> An EIR must include a description of the physical environmental conditions in the vicinity of the project. This environmental setting will normally constitute the baseline physical conditions by which a lead agency determines whether an impact is significant. The description of the environmental setting shall be no longer than is necessary to provide an understanding of the significant effects of the proposed project and its alternatives. The purpose of this requirement is to give the public and decision makers the most accurate and understandable picture practically possible of the project's likely near-term and long-term impacts.
>
> (1) Generally, the lead agency should describe physical environmental conditions as they exist at the time the notice of preparation is published, or if no notice of preparation is published, at the time environmental analysis is commenced, from both a local and regional perspective. Where existing conditions change or fluctuate over time, and where necessary to provide the most accurate picture practically possible of the project's impacts, a lead agency may define existing conditions by referencing historic conditions, or conditions expected when the project becomes operational, or both, that are supported with substantial evidence. In addition, a lead agency may also use baselines consisting of both existing conditions and projected future conditions that are supported by reliable projections based on substantial evidence in the record.

CEQA Guidelines and case law recognize that the date for establishing an environmental baseline cannot be rigid. (See CEQA Guidelines Sections 15146, 15151, and 15204.) Environmental conditions may also change during the period of environmental review, and temporary lulls or spikes in operations that happen to occur during the period of review should not depress or elevate the baseline. Furthermore, environmental conditions may vary from year to year, and in some cases, it is necessary to consider conditions over a range of time periods.

In order to fulfill this requirement, and to inform the reader of the context in which the proposed 2021 LRDP would be carried out, this section generally describes current environmental conditions in and around UCR that are considered representative of the 2018/2019 academic year. UCR began planning for the proposed 2021 LRDP in 2018, with the formal kick-off in 2019. The environmental review process began in 2019 and the campus released the Notice of Preparation (NOP) in July 2020. For many resource areas, the 2018/2019 academic year was the last full year of data that was available while the EIR was being prepared. Furthermore, environmental conditions for 2020 were generally affected by the COVID-19 pandemic, which caused a lull in campus activity. More detailed descriptions of the environmental setting for each environmental issue area can be found throughout Section 4, *Environmental Impact Analysis*.

3.1 Regional Setting

The City of Riverside (City) is in Riverside County and is part of a larger geographic area popularly known as Inland Southern California (see Figure 3-1). Inland Southern California includes western Riverside and southwestern San Bernardino counties and portions of the Pomona Valley in easternmost Los Angeles County. The City is bordered by Jurupa Valley and the unincorporated community of Highgrove to the north, Moreno Valley and Box Springs Mountain Reserve to the east, the unincorporated community of Woodcrest to the south, and Norco and the unincorporated community of Home Gardens to the west.

Regional access to the City is provided via I-215/SR 60 freeway, which traverse northwest-southeast through the City, and State Route 91 which traverses northeast-southwest through the City. Local access is provided by various arterial roadways that intersect the City, including Mission Inn Avenue, Magnolia Avenue/Market Street, Central Avenue, and Main Street, among others.

The City experiences a Mediterranean semi-arid climate. Temperatures vary widely, with wintertime lows occasionally dropping below freezing, and highs in summer often exceeding 100 degrees Fahrenheit. Pleasantly warm conditions typify the area in the spring and fall. Although air quality in the area has steadily improved in recent years, the Inland Southern California region remains a nonattainment area for the federal standards for ozone and particulate matter $(PM)_{2.5}$ and the State standards for ozone, PM_{10}, and $PM_{2.5}$.

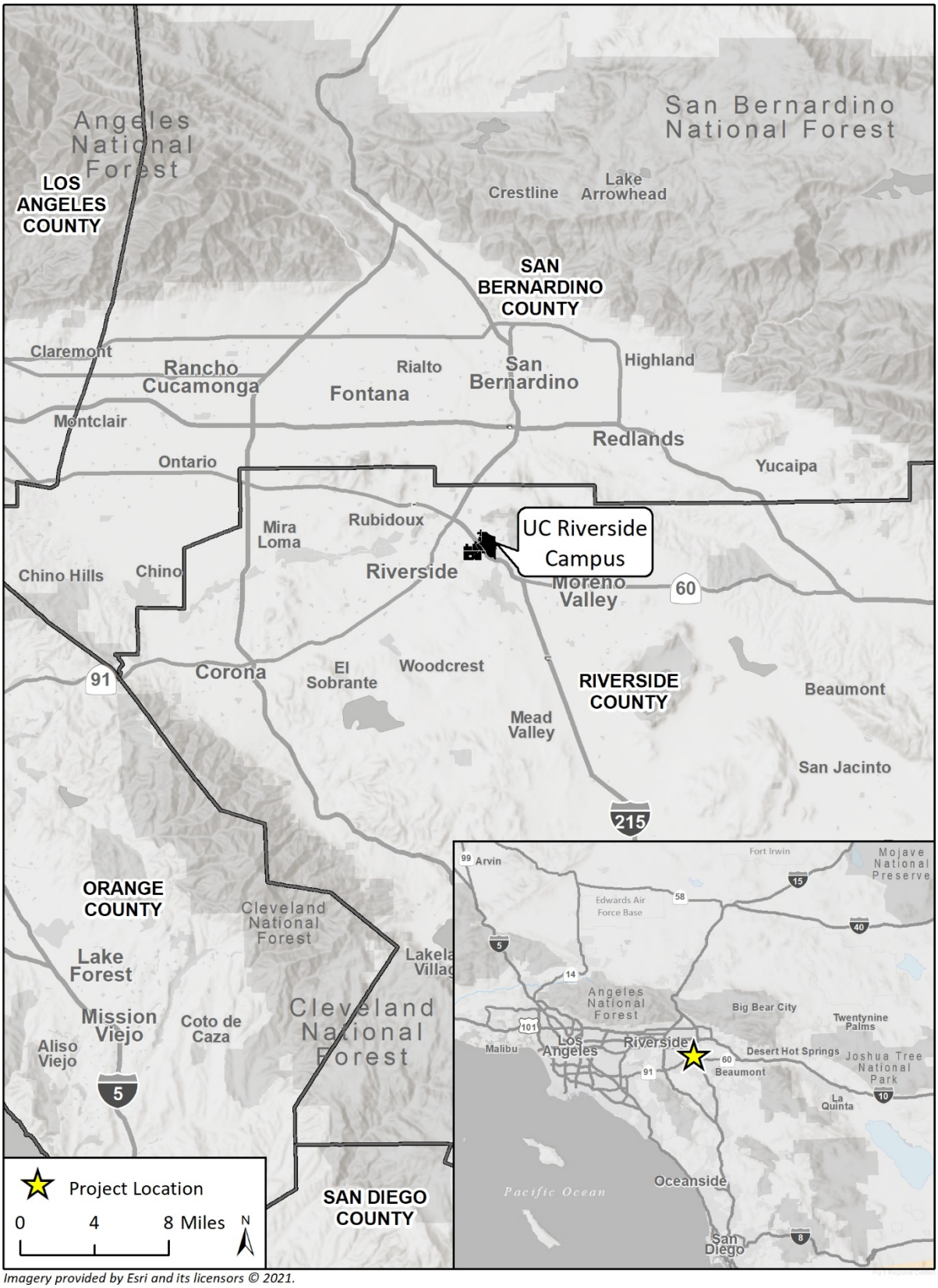
3.2 Campus Location and Setting

3.2.1 UCR Campus

The UCR main campus (campus) is located at 900 University Avenue in the City of Riverside, California. The approximately 1,108-acre campus[1] is in the eastern portion of the City, just west of the Box Springs Mountains. The campus is approximately 3 miles east of downtown Riverside and approximately 2.2 miles northwest of the city of Moreno Valley. The campus is diagonally bisected by the I-215/SR 60 freeway, resulting in two areas referred to as East Campus and West Campus. The two resulting areas of campus are described below. Figure 3-1 shows the campus location in a regional context while Figure 3-2 and Figure 3-3 show the two areas of campus in their geographic context within the City. The campus is generally bounded by Blaine Street to the north, Watkins Drive to the east, Le Conte Drive to the south, and Chicago Avenue to the west.

[1] The UCR Palm Desert Center, UCR Natural Reserves, all other Regents-owned properties, and all off-campus leased spaces are excluded.

Figure 3-1 Regional Location



Imagery provided by Esri and its licensors © 2021.

Figure 3-2 Local Setting

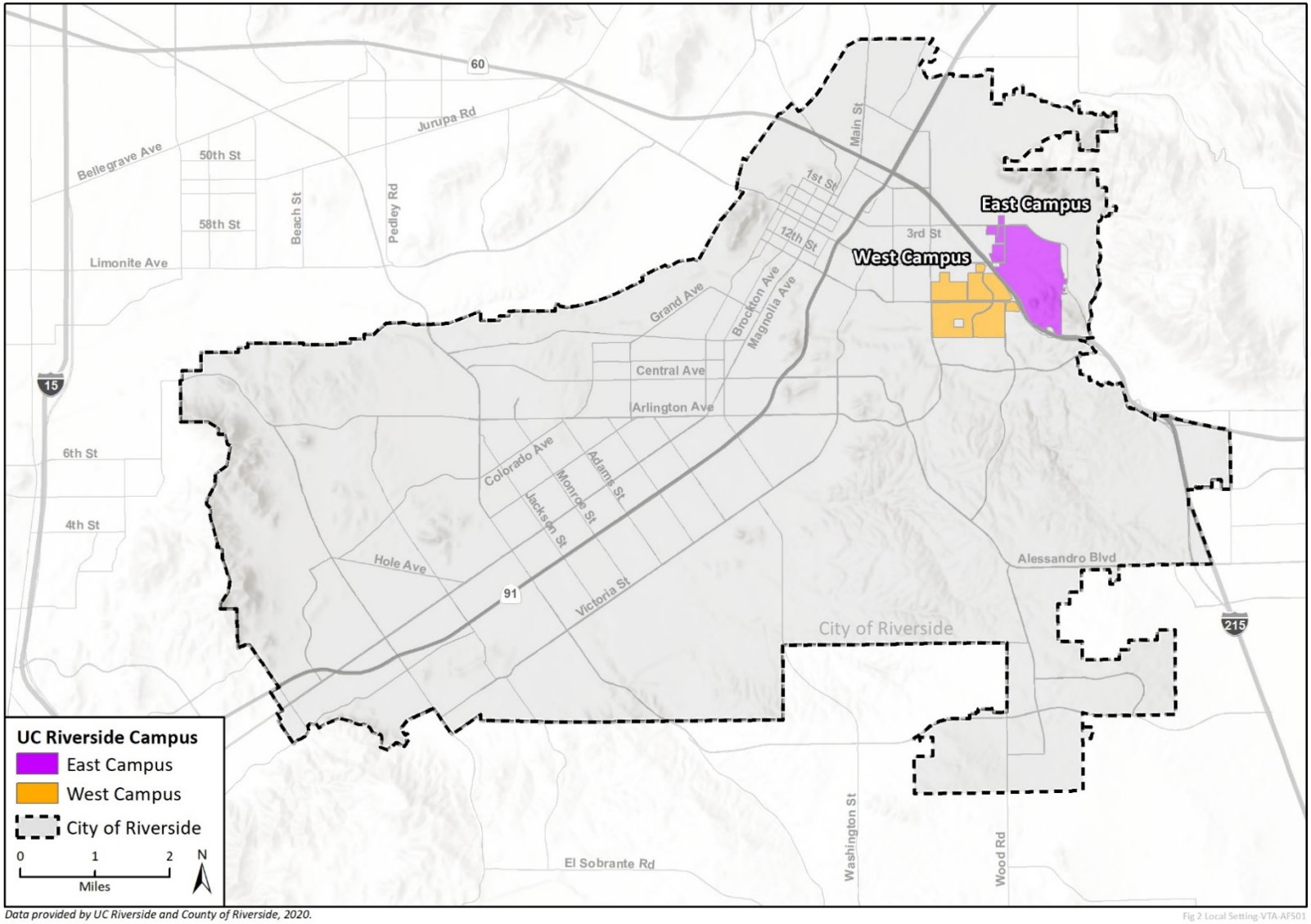
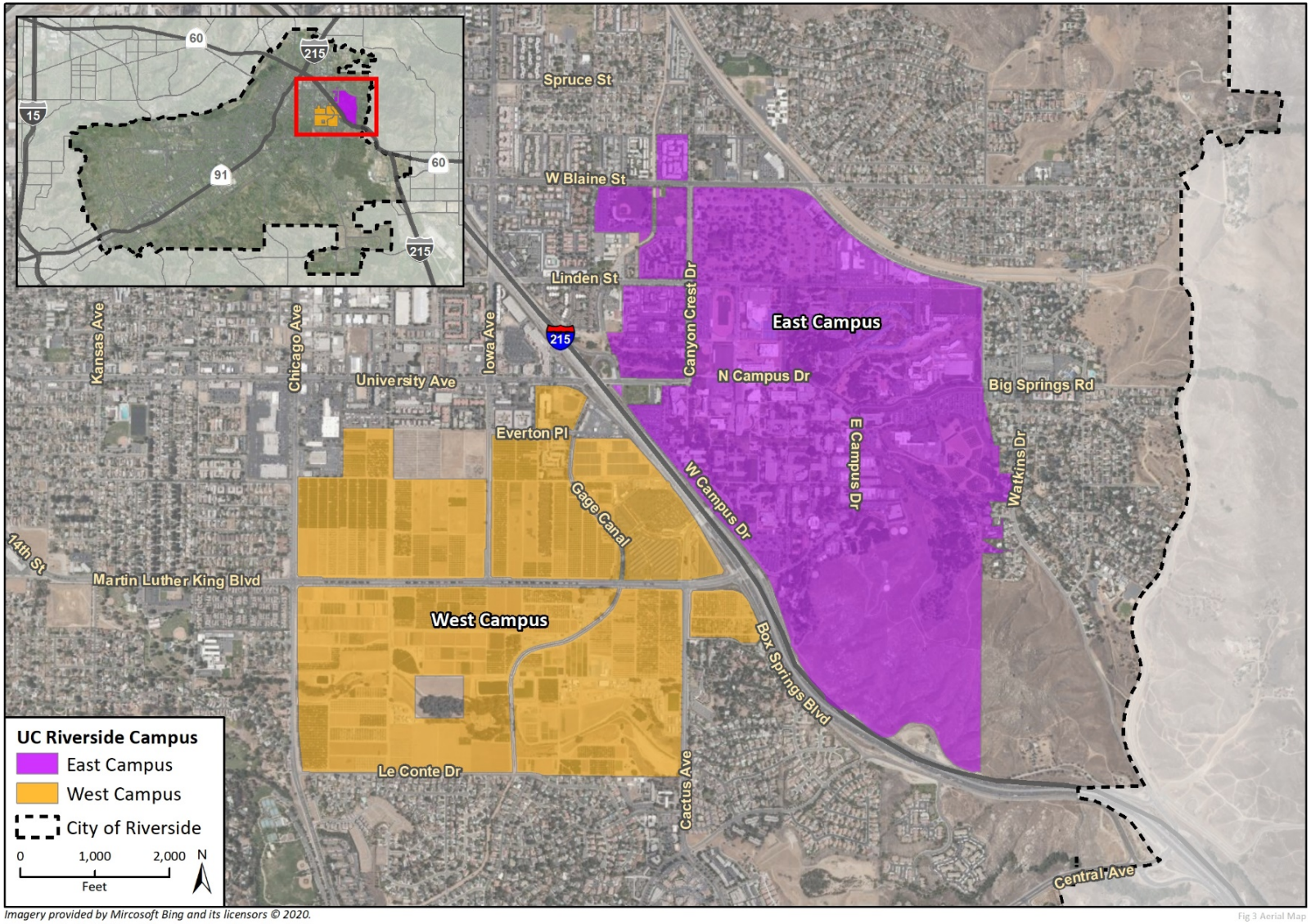


Figure 3-3 Aerial Map



East Campus

East Campus comprises approximately 604 acres and contains most of the University's built space. Nearly all the academic, research, and support facilities are in the Academic Center, circumscribed by Campus Drive, including many original campus buildings. The northern half of East Campus is devoted to student housing and recreation. The UCR Bell Tower marks the heart of the campus, at the center of the Carillon Mall. The UCR Botanic Gardens is in the southeastern area of East Campus. The terrain steepens to the south and east of East Campus, surrounding the UCR Botanic Gardens; these areas are largely unbuilt.

West Campus

West Campus comprises approximately 504 acres and is largely used as agricultural research fields and teaching and managed by the Agricultural Operations unit of the College of Natural and Agricultural Sciences. Several University facilities are also on West Campus: Parking Lot 30, University Extension, and International Village—a housing complex intended for visiting international students. The University Substation, jointly owned by the City and UCR, is at the northern edge of Parking Lot 30. A California Department of Transportation (Caltrans) service yard is situated on an approximately 4.4-acre triangular parcel directly west of the I-215/SR 60 freeway, at the eastern terminus of Everton Place. The Gage Canal irrigation facility traverses the area north to south, with portions running underground.

3.2.2 Surrounding Land Uses

Land uses surrounding the campus are primarily residential, with some commercial uses along the arterial streets. Residential uses, commercial uses, and the I-215/SR 60 freeway are located north of the campus. Residential uses, open space, and the I-215/SR 60 freeway are located south of the campus. Residential uses and open space, including the Box Springs Mountain Reserve, are located east of the campus. Residential uses and commercial uses are located west of the campus. The California Air Resources Board (CARB) Southern California headquarters facility (scheduled for completion in 2021) is located on former University land adjacent to West Campus, between Chicago Avenue, Iowa Avenue, University Avenue, and Martin Luther King Boulevard.

3.3 Existing Campus Conditions

3.3.1 UCR Development and Growth

The original UCR campus was officially dedicated in 1954, having developed from the UC Citrus Experiment Station established in 1907. In 1959, The Regents voted to make UCR a general campus (UCR 2021a). Today, UCR consists of three colleges and four professional schools: Marlan and Rosemary Bourns College of Engineering; College of Humanities, Arts, and Social Sciences; College of Natural and Agricultural Sciences; Graduate School of Education; School of Business; School of Medicine; and School of Public Policy. In 2018/2019, the campus served approximately 24,000 students (Fall quarter headcount) and approximately 4,700 faculty and staff (UCR 2021b.

The Regents established the UC Citrus Experiment Station on 23 acres of land on the eastern slope of Mt. Rubidoux. The citrus research station formally opened its doors in 1917. After its transformation into an official UC campus in 1954, the construction of the campus' early main buildings began with the Library (Rivera Library), Webber Hall, Physical Sciences Building (Geology

Building), Physical Education Building (Athletics and Dance Building), and the Social Sciences-Humanities Building (Watkins Hall). In 1961, the Citrus Experiment Station became the Citrus Research Center and Agricultural Experiment Station. The UCR Botanic Gardens was officially designated in 1963 with 37 acres, which expanded to 40 acres in 1980 (UCR 2021c).

After the designation of UCR as a "general campus" and the adoption of the 1964 LRDP, there was rapid and broad development in Fine Arts, Humanities, Sciences, and Social Sciences programs, at both the graduate and undergraduate levels, to meet the needs of a 10,000-student campus (UCR 2005). After a period of stagnation in the 1970s, enrollment began growing dramatically in the 1980s and, between Fall 1983 and 1989, almost doubled from 4,655 to 8,220 (UCR 2005).

In the 1990s, The Regents targeted UCR for an annual growth rate of 6.3 percent, the fastest in the UC system. To accommodate the growing numbers of students, UCR experienced a campus-wide building boom, including adding more than one million square feet (sf) of office, research, and teaching facilities. The 1990 LRDP proposed approximately 10,134,000 gross square feet (gsf) of building space on campus to support a total student enrollment of 18,050 students by academic year 2005/2006 (UCR 2005).

By 2000, enrollment had reached 12,703, had increased by another 3,200 students within 2 years, and was anticipated to reach almost 20,000 by 2010 (UCR 2010). The original 2005 LRDP anticipated a total of approximately 14.9 million gsf of building space to support the needs of approximately 25,000 students by 2015. The 2005 LRDP outlined a planning approach with the goal of creating a vibrant on-campus presence for student life, providing strong connections and ease of access on campus and with the surrounding community, and promoting environmental stewardship and protection of natural resources. The 2005 LRDP guided infill development in the East Campus academic core and expanded the West Campus academic zone immediately adjacent to the I-215/SR 60 freeway. It also directed development to expand and co-locate student housing and recreational and athletic facilities and fields, relocate parking from central campus locations to the periphery of the academic core and replace surface parking with structures, and maintain the teaching and research fields on West Campus south of Martin Luther King Boulevard.

The 2005 LRDP Amendment 2 allowed for the location of the School of Medicine along with other land use map changes and increased the maximum building space that could be built on campus from 11.8 million gsf to 14.9 million gsf to accommodate the increased square footage requirements for the School of Medicine. The 2005 LRDP Amendment 2 did not change the projected enrollment level of 25,000 students but projected that the enrollment level would be attained in academic year 2020/2021, 5 years later than projected in the 2005 LRDP (UCR 2011).

The number of students applying to UCR generally increased between 2010 and 2019. Freshman applications increased by approximately 87 percent (from 26,480 students to 49,516 students) and transfer student applications increased by approximately 97 percent (from 6,372 students to 12,543 students) (UC 2020). As of the 2018/2019 academic year, enrollment had reached approximately 24,000 students (Fall quarter headcount). In addition, as of the 2018/2019 academic year, the UCR campus had approximately 4.8 million assignable square feet (asf)[2] (approximately 7.2 million gsf)[3] of academic buildings and support facilities. Refer to Table 2-3 in Section 2, *Project Description* for detailed information.

[2] Asf refers to the sum of all areas on all floors of a building assigned to or available for assignment to an occupant or specific use (e.g., classrooms, labs, offices, study facilities) used to accomplish the institution's mission.
[3] Gsf refers to the sum of all areas on all floors of a building included in the outside faces of its exterior walls, including all vertical penetration areas, for circulation and shaft areas that connect one floor to another.

3.3.2 On-Campus Housing

In 2018, UCR housed approximately 27 percent of its enrolled students in University-managed or controlled housing. UCR has several campus-affiliated student residence options, including 6,511 on-campus student beds.

In East Campus, undergraduate student residence halls include Aberdeen-Inverness Residence Hall, Lothian Residence Hall, Pentland Hills Residence Hall, and Dundee Residence Hall (construction completed in 2020). On-campus apartments include Bannockburn Village, Falkirk, Glen Mor, The Plaza, and Stonehaven, which are intended to house continuing, transfer, and graduate students. Most East Campus housing is in the northern and eastern areas surrounding the Academic Center. Oban Family Housing is available on campus for students with children. The International Village in West Campus is a housing complex intended for international students but also allows for continuing, transfer, and graduate students an opportunity to reside on campus. Student housing options are further described in Section 4.12, *Population and Housing*.

3.3.3 Recreation, Entertainment, and Student Life Facilities

The 155,000-sf UCR Student Recreation Center (SRC), which opened in 1994 and was expanded in 2014, is the central hub for recreational, intramural, and club sports on campus. The complex is divided into SRC North and SRC South, both located south of West Linden Street, east of the UCR Track Facility, and northeast of the Amy S. Harrison Field and UCR Soccer Field. The SRC Tennis Courts are adjacent to SRC South. The SRC is home to an extensive intramural program for students, and the facility includes a large swimming pool and spa, tennis courts, an indoor running track, a gym with multiple courts, classroom kitchen, outdoor gear rental shop, cardio and weight space, and an indoor climbing wall (Fenex 2021). SRC also has full locker rooms and three multipurpose rooms. SRC access is included in UCR students' tuition. UCR faculty and staff may purchase quarterly memberships or day passes for admission.

The UCR Baseball Complex (Riverside Sports Complex) is in the northwest corner of East Campus just south of Blaine Street and east of Rustin Avenue. UCR's cross-country course is the Agricultural Operations (Ag Ops) Cross-Country Course in West Campus, located south of Martin Luther King Boulevard and west of Canyon Crest Drive. UCR has a National Collegiate Athletic Association (NCAA) Division I program and includes intramural sports and club sports.

The Highland Union Building (HUB) is a three-story, 142,000-sf multidisciplinary complex located in the middle of East Campus, east of Parking Lot 1 and southeast of Parking Lot 19. The HUB offers space for dining options, student organization and program space, student lounges, and conference rooms.

The 492-seat University Theatre is a proscenium theater with continental seating, a full-orchestra pit/elevator, and full-fly system (UCR 2021d).

The Barn, a 101-year-old building that began as a horse stable, is an entertainment and dining venue located in the west side of East Campus. The Barn underwent a two-year renovation and expansion, reopening in 2020. It serves as a gateway and link between East Campus and West Campus and integrates indoor and outdoor spaces to support dining and entertainment programs. The 16,425-sf facility includes the Barn building with increased seating capacity, along with a new outdoor patio for diners and a significant new live entertainment venue. It also includes a reconstructed Barn Theater, a faculty and staff dining building, and restroom building (UCR 2019a).

The 2,000-sf Alumni & Visitors Center, located west of Canyon Crest Drive in East Campus, is a premier meeting space that serves the university and local community (UCR 2021e).

3.3.4 UCR Botanic Gardens

The UCR Botanic Gardens is an approximately 40-acre "living plant museum" in the southeastern area of East Campus in the foothills of the Box Springs Mountains. It serves as a regional resource for enjoyment, relaxation, and education. Its mission is to "serve as UCR's focal point for campus and community engagement in the science of nature, gardens, and conservation." UCR Botanic Gardens became official in 1963, although the idea for a botanic garden at UCR originated in 1954 with botanist Dr. Victor Goodman. The UCR Botanic Gardens contain more than 3,500 plant species and thousands of specimens from around the world, with a focus on plants from Mediterranean climate (dry summer) and arid lands similar to California and the desert southwestern United States. About one-third of the UCR Botanic Gardens area remains unplanted and consists of native plant communities including coastal sage scrub and annual grassland. The UCR Botanic Gardens contain geographical collections and themed and horticultural collections include the Butterfly Collection, Herb Garden, Iris Garden, Lilac Lane, Rose Gardens, and Subtropical Fruit Orchard. Other features include Alder Canyon, 4 miles of trails, and a turtle pond.

The UCR Botanic Gardens houses several buildings on the site, including a Gatehouse with two small restrooms and a meeting room near the entrance. The UCR Botanic Gardens is open to the public, hosts events throughout the year, and receives over 75,000 annual visitors (UCR 2020).

3.3.5 Campus Access, Circulation, and Parking

Campus Access and Internal Circulation

Local and regional commuters approach the campus from north and south via three interchanges along the I-215/SR 60 freeway, with major east-west arterials that also connect the campus to Downtown Riverside and regional transit options. The campus road network integrates well with the City's street network.

West Campus is mainly accessed by University Avenue and Martin Luther King Boulevard from the east and west, Chicago Avenue and Iowa Avenue from the north, and Chicago Avenue from the south. Access to Parking Lot 30 is provided from Canyon Crest Drive. Everton Place provides access to the International Village and the Solar Farm.

East Campus is mainly accessed from the west by University Avenue, West Linden Street, and Blaine Street. Access from the north is mainly provided by Canyon Crest Drive. Rustin Avenue and Canyon Crest Drive provides access to the UCR Baseball Complex (Riverside Sports Complex), Watkins Drive and Blaine Street provides access to the Early Childhood Services (Child Development Center) and the Corporation Yard on the northeastern side of campus. Big Springs Road provides eastern access to East Campus by the Glen Mor student residence complex.

Internal campus streets primarily include the campus loop (West Campus Drive, North Campus Drive, South Campus Drive, and East Campus Drive), Citrus Drive, Eucalyptus Drive, Aberdeen Drive, West Linden Street, Big Springs Road, and Botanic Gardens Road.

Campus Gateways

The University Avenue interchange to the I-215/SR 60 freeway provides the most prominent and direct entry point to East Campus. University Avenue is the principal connector between downtown

Riverside and the Academic Center, which lies at its eastern terminus. Blaine Street also provides the campus community access to the I-215/SR 60 freeway on- and off-ramps.

The Martin Luther King Boulevard intersection and Canyon Crest Drive connects East and West Campus with the I-215/SR 60 freeway. Canyon Crest Drive north of University Avenue serves as a secondary gateway to campus. UCR-owned and privately-owned apartment complexes are scattered along the western and northern edges of East Campus. There are Riverside Transit Agency (RTA) bus stops immediately north of the Alumni & Visitors Center. Therefore, there is heavy vehicle, pedestrian, and bicycle traffic on Canyon Crest Drive, particularly between Blaine Street and University Avenue. Additionally, the Big Springs Road and Watkins Drive intersection affords an entrance to East Campus.

Parking

The existing campus parking supply serves students, staff, and faculty who commute to and from the campus. East Campus has been planned as a walkable university for students, staff, and faculty to and from the parking areas and campus facilities. Pedestrian paths are webbed throughout campus. There are bicycle lanes on campus streets and surrounding city streets; bike racks and additional infrastructure are provided for students to secure personal methods of transportation. Main academic and administrative functions are in the center of campus, while vehicular circulation, parking lots, and parking structures are located around the periphery.

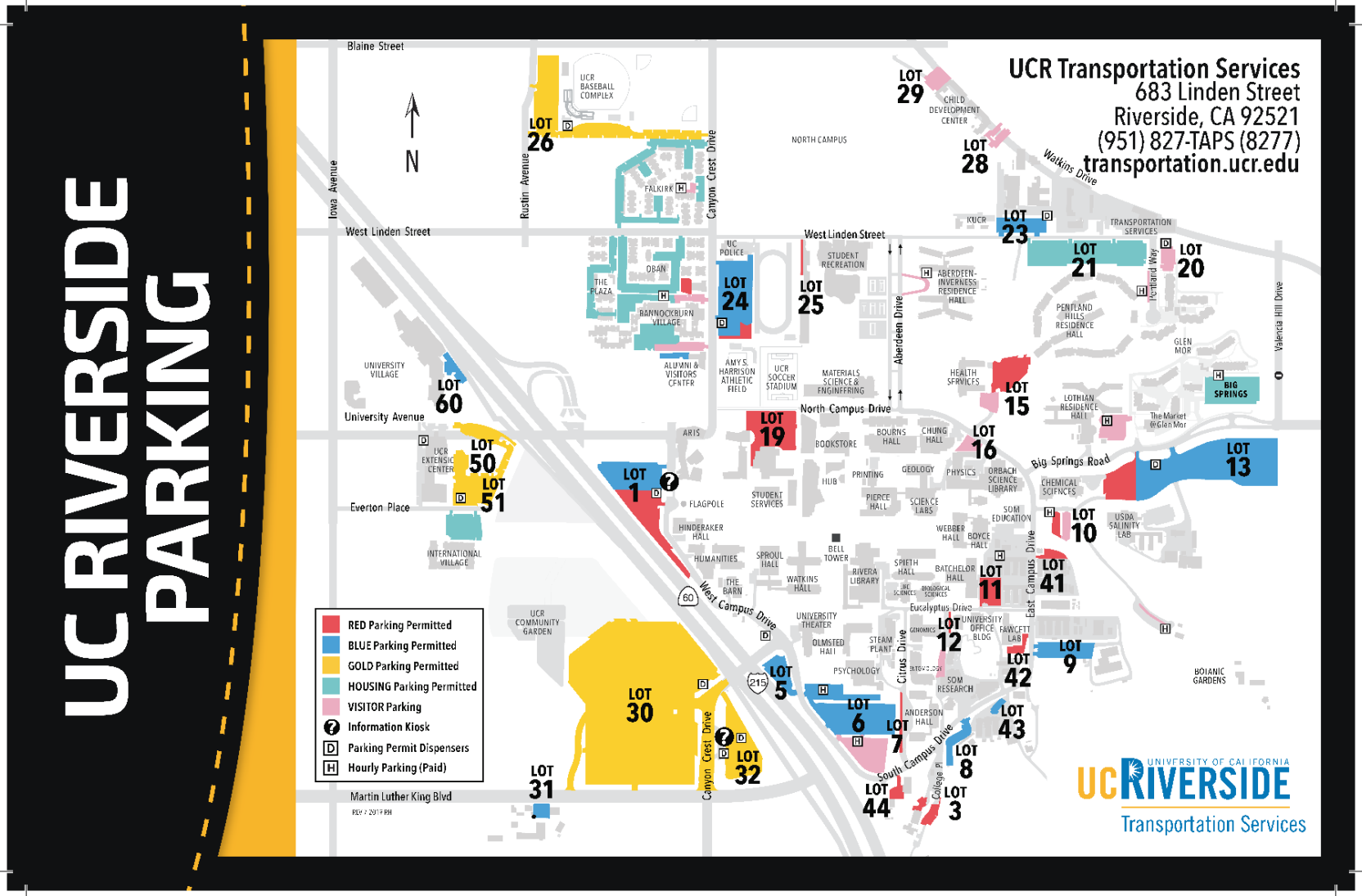
As of Fall 2018, UCR had approximately 9,600 parking spaces serving its faculty, staff, graduate students, undergraduate commuter students, on-campus residents, as well as for service and delivery vehicles and campus visitors. Most of the campus parking facilities are in surface parking lots equating to approximately 85 acres. UCR actively manages parking demand through a tiered parking permit system in which users purchase permits to access various parking facilities based on their affiliation with the campus. As a result, the increase in the number of parking spaces on campus has been minimal, even as UCR has seen growth in faculty, staff, and students.

There are 41 parking lots on campus and additional parking for student housing in East Campus in the Big Springs parking structure and Falkirk, Oban, and Bannockburn Village apartments, and in West Campus at the International Village Apartments. Most parking lots are in East Campus, although there are six parking lots in the northeastern portion of West Campus. The largest parking areas are Parking Lot 30 in West Campus accessed from Martin Luther King Boulevard, Parking Lot 13 in East Campus accessed from Big Springs Road. Parking Structure 1 will be completed in the eastern half of Parking Lot 13 in Summer 2021 and provide approximately 800 net new parking spaces (UCR 2019b). Figure 3-4 shows the locations of existing campus parking lots.

Transit Access

UCR can be accessed by several alternative methods of transportation. The UCR campus is served by bus and rail from the neighboring counties of San Bernardino, Los Angeles, and Orange. UCR has partnered with RTA to subsidize free bus use for faculty, staff, and students through the UPASS program. RTA routes that serve the UCR campus include Routes 1, 10, 14, 16, 51, 52, 204, 208, and, Gold Line. Major stops near East Campus are on University Avenue, Canyon Crest Drive, West Campus Drive, and Blaine Street. West Campus facilities are served by stops in Parking Lot 30, along University Avenue, and by stops on Iowa Avenue north of University Avenue that are in walking distance to the UCR Extension Center and International Village. In addition, UCR Police

Figure 3-4 Existing Campus Parking



Department offers a point-to-point shuttle service that takes students from North Campus at Chung Hall to their off-campus homes (UCR 2021g)[4].

Metrolink, Southern California's regional passenger rail system, provides a discount for students and an incentive program for faculty and staff who use Metrolink for their daily commute. Metrolink serves the campus with two local stations in downtown Riverside and at the Hunter Park station, approximately 2.8 miles west and 1.8 miles north of campus, respectively. RTA provides bus service from the Hunter Park station (Route 52) and the Downtown Riverside station (Route 1) to UCR. Transit ridership has increased five-fold since the UPASS program began in 2007, from 100,000 rides in the first year to approximately 600,000 rides between Fall 2018 to Fall 2019.

Transportation Demand Management

UCR's Transportation Demand Management programs include multi-pronged efforts such as marketing, incentives, expanded vanpool offerings, on- and near-campus housing amenities, parking pricing, and more. UCR encourages students to use designated bike paths to commute to and travel on campus. Registered bicyclists or walkers are eligible to receive a complimentary bicycle parking allotment and are eligible to utilize the day-use locker and shower facilities at the SRC without charge (UCR 2021h). UCR has also encouraged ride-sharing services, and the average vehicle ridership has increased from approximately 1.36 to 1.57 occupants per vehicle over the last 15 years.

3.3.6 Campus Utilities and Service Systems

Water and Wastewater

The campus has a combined fire and domestic water system. Riverside Public Utilities (RPU) provides potable water to the campus. Potable water is used both in buildings and for landscape irrigation. At the time of preparation of this LRDP, there was nominal reclaimed water use for landscape irrigation. Campus agricultural fields are irrigated with water from the Gage Canal.

UCR has a private on-campus water system that conveys water supply throughout the campus as needed. All potable water, fire water, and irrigation water supplies are distributed through the campus-wide system. UCR's water supplies (domestic, irrigation, and fire water) are conveyed to the UCR water system via a 15-inch concrete pipe connecting to a five-million gallon City reservoir, which is buried just south of University Avenue and east of the I-215/SR 60 freeway. A pumping station for the reservoir is located east of the intersection of University Avenue and Canyon Crest Drive. UCR has two domestic water storage tanks, with respective capacities of 1,000,000 gallons and 50,000 gallons each. See Section 4.17, *Utilities and Service Systems*, for more detailed information.

RPU's Sewage Systems Services Program and Treatment Services unit collects, treats, and disposes of all wastewater generated by the UCR campus. The sanitary sewer system at UCR has been in use since 1954 and comprises over 80,000 linear feet of collection pipe ranging from 4 to 15 inches in diameter. Original pipe has been replaced as upgrades or repairs have been required or new facilities have been constructed. The piping consists of a combination of vitrified clay, cast iron, polyvinyl chloride, asbestos, and cement. The campus sanitary sewer is served by three major arteries: a 15-inch main located in North Campus Drive, an 8-inch main located in Canyon Crest

[4] Service has been temporarily suspended due to COVID-19.

Drive serving the North District, and an 8-inch main branching from the 15-inch main and serving the Academic Center (UCR 2019c).

Although North Campus Drive is part of the campus, the underlying 15-inch sewer is owned by the City of Riverside. The 15-inch line serves as an interceptor for the whole campus and receives sewage effluent from the residential neighborhood upstream of the campus. The 8-inch main along Canyon Crest Drive is also owned by the City. The remaining pipes serving the campus are owned and maintained by the University. There are nine grease interceptors and one clarifier located on East Campus (UCR 2019c). There is an existing 8-inch sanitary sewer line located in Iowa Avenue near the intersection of Everton Place that serves West Campus. This line flows into the 8-inch trunk sewer located in Iowa Avenue (CARB 2020).

The East Campus is bounded on the north and east by residential neighborhoods, separated by Blaine Street and Valencia Hill Drive/Watkins Drive, respectively. The majority of stormwater runoff coming from the east is collected as surface runoff near Valencia Hill Drive and Big Springs Road by an inlet structure and is discharged to the Gage Detention Basin north of University Avenue at Canyon Crest Drive through aboveground swales, a 72-inch pipe, and, finally, a 7-foot box culvert.

The existing storm drain network serving the campus is comprised of UCR, City of Riverside, and County of Riverside drainage facilities. The campus generally drains via surface (channels, detention basins) and underground storm drain conveyances that ultimately discharge to open channel arroyos and large diameter backbone county drainage infrastructure (UCR 2016).

The municipal storm drain system ultimately discharges to the Santa Ana River. UCR is located within the Riverside County Flood Control and Water Conservation District Master Drainage Plan areas for the Box Springs and University areas. West Campus drains into the Box Springs Storm Drain system, with an east-west storm drain line along Martin Luther King Boulevard and a north-south storm drain line in the center of the western portion of West Campus. East Campus drains into the University Wash-Spruce Street Storm Drain line along Spruce Street and Watkins Drive. University area storm drain lines are proposed east of East Campus at Blaine Street from West Campus View Drive to Mount Vernon Park, west of East Campus from Rustin Avenue to the I-215/SR 60 freeway, and the University Wash Channel west of the I-215/SR 60 freeway (RCFCWCD 2020).

Solid Waste

UCR's landfill-bound waste is picked up and hauled by UCR trucks to the CR&R facility in Perris, California. There, recycle materials are sorted out of the landfill waste stream and the remainder is used for waste to energy. UCR's recycle materials are hauled to the UCR transfer station, just north of Parking Lot 30. Compost, food waste, and the commingled recycle streams are picked up from the UCR transfer station by the current contracted vendor and then recycled or composted. Green waste is currently being blended into the soil at Ag Ops.

Energy

UCR purchases electricity for campus operations from RPU and through a power purchase agreement for on-site generation from the campus' solar infrastructure which, on average, produces approximately 11.6 megawatt-hours (MWh) of electricity. The purchased electricity is used to provide power for space cooling, heating and ventilation, lighting, research activities, office equipment, refrigeration, and more, by means of an extensive distribution network. The campus is mostly served by a 12.47 kilovolt (kV) network, following the conversion of many sections of a legacy 4.16 kV network to 12.47 kV.

Eight chillers provide 12,250 tons of chilled water capacity and utilize an innovative system of three thermal energy storage (TES) tanks that hold seven million gallons of chilled water. The TES tanks allow the University to implement demand management strategies to purchase electricity during off-peak hours which may have otherwise gone to waste and to produce and store chilled water for use during daytime on-peak hours (UCR 2016).

There is an existing University substation just north of Parking Lot 30 on West Campus. RPU is currently adding 4 miles of double-circuited 69 kV transmission lines to the existing electrical network and reconfiguring connections between various substations. One transmission line segment will traverse south along Chicago Avenue to about 0.25-mile south of Martin Luther King Boulevard, then east through West Campus. A second segment approximately 600 feet north of where the first line ended was constructed; this intercepts the north-south line on UCR's property and head east across Canyon Crest Drive to the I-215/SR 60 freeway.

The campus supply of natural gas is derived from Southern California Gas (SCG) which currently delivers natural gas to campus through high pressure distribution lines. UCR privately distributes medium pressure gas throughout East and West Campus. Distribution lines exist under Iowa Avenue and Martin Luther King Boulevard and under a portion of West Campus. East Campus is served by a distribution line under Blaine Street (SCG 2016). Purchased natural gas is combusted in four steam boilers at the Central Plant to generate steam for distribution. The Central Plant can produce up to 150,000 pounds of steam per hour, which is distributed to many of the Academic Center buildings, primarily for heating. Some natural gas is also used in the residential dining hall kitchens, on-campus restaurant kitchens, and science research and teaching laboratories. No new building or major renovation that is approved shall use on-site fossil fuel combustion (e.g., natural gas) for space and water heating (except those projects connected to an existing campus central thermal infrastructure) Projects unable to meet this requirement shall document the rationale for this decision as described in Section V.A.4 of the UC Policy on Sustainable Practices (UCOP 2020).

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4 Environmental Impact Analysis

As discussed under CEQA Guidelines Section 15378(d), where a project involves the adoption of regulations, such as the 2021 LRDP, the lead agency shall describe the project as a development proposal for the purpose of environmental analysis. Consistent with that approach, this EIR analyzes the environmental effects from reasonably foreseeable growth and development projected under the proposed 2021 LRDP (See Section 2, *Project Description*). This analysis is provided for the specific resource areas identified for further analysis in the Initial Study and scoping process.

The *CEQA Guidelines* §15382 defines "significant effect on the environment" as:

> a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project including land, air, water, minerals, flora, fauna, ambient noise, and objects of historic or aesthetic significance. An economic or social change by itself shall not be considered a significant effect on the environment. A social or economic change related to a physical change may be considered in determining whether the physical change is significant.

Scope of the Environmental Impact Analysis

In July 2020, UCR conducted an Initial Study for the proposed 2021 LRDP, which determined the potentially significant impacts that may occur with implementation of the proposed 2021 LRDP. The Initial Study identified potentially significant impacts that required additional analysis in a Draft EIR. Such identified impacts are related to Aesthetics (CEQA Guidelines Appendix G Criterion a, c, and d), Agricultural Resources (Criterion a and e), Air Quality (Criterion a, b, and c), Biological Resources (Criterion a, b, c, and d), Cultural Resources (Criterion a and b), Energy (Criterion a and b), Geology and Soils (Criterion a, c, and f), Greenhouse Gas (GHG) Emissions (Criterion a and b), Hazards and Hazardous Materials (Criterion a [operational], b, c, and f), Hydrology and Water Quality (Criterion a, b, c, and e), Noise (Criterion a and b), Public Services (Criterion a, c, and d), Recreation (Criterion a and b), Transportation (Criterion a, b, c, and d), Tribal Cultural Resources (Criterion a and b), Utilities and Service Systems (Criterion a, b, c, d, and e), and Wildfire (Criterion a, b, c, and d).

The proposed 2021 LRDP's potential environmental effects are analyzed for the following environmental resource areas:

- 4.1 Aesthetics
- 4.2 Agricultural Resources
- 4.3 Air Quality
- 4.4 Biological Resources
- 4.5 Cultural Resources
- 4.6 Energy
- 4.7 Geology and Soils
- 4.8 Greenhouse Gas Emissions
- 4.9 Hazards and Hazardous Materials
- 4.10 Hydrology and Water Quality
- 4.11 Noise
- 4.12 Population and Housing

- 4.13 Public Services
- 4.14 Recreation
- 4.15 Transportation
- 4.16 Tribal Cultural Resources
- 4.17 Utilities and Service Systems
- 4.18 Wildfire

In some instances, several of the underlying significance criteria address overlapping issues and may be combined into an individual impact analysis in this EIR.

The Initial Study also determined that impacts from multiple environmental issue topics would be less than significant and would, therefore, not be addressed further in the Draft EIR consistent with CEQA Guidelines Sections 15063(c)(3)(A) and 15128. These topics included: Aesthetics (CEQA Guidelines Appendix G, Criterion b), Agricultural Resources (Criterion b, c, and d), Air Quality (Criterion d), Biological Resources (Criterion e and f), Cultural Resources (Criterion c), Geology and Soils (Criterion b, d, and e), Hazards and Hazardous Materials (Criterion a [construction], d, e, and g), Hydrology and Water Quality (Criterion d), Land Use and Planning (Criterion a and b), Mineral Resources (Criterion a and b), Noise (Criterion c), Population and Housing (Criterion a and b), and Public Services (Criterion b and e). Impacts found to be less than significant and those areas with a conclusion of no impact, would inherently also not result in cumulatively considerable impacts and no further cumulative analysis is required. Additional details on these analyses are provided in the Initial Study, included as Appendix A of this Draft EIR.

Based upon community concerns raised during the public scoping period, Hazards and Hazardous Materials (Criterion d and e) and Population and Housing (Criterion a and b) were carried forward into the EIR for additional review (See Section 4.9 and Section 4.12, respectively).

General Format of the Environmental Analysis

As provided by Section 15126.2(a) of the CEQA Guidelines, direct, indirect, short-term, on-campus, and/or off-campus impacts are addressed, as appropriate, for each environmental resource area. Sections 4.1 through 4.18 of this EIR contain a discussion of the potential environmental effects from implementation of the proposed 2021 LRDP, including information related to existing site conditions, analyses of the type and magnitude of individual and cumulative environmental impacts, policies of the proposed 2021 LRDP that relate to the environmental resource area, and mitigation measures that could reduce or avoid environmental impacts. The analysis of environmental impacts considers both the construction and operational phases associated with implementation of the proposed 2021 LRDP.

Sections 4.1 through 4.18 follow the same general format:

- **Environmental Setting.** The assessment of each issue area begins with a discussion of the Environmental Setting related to the issue. According to Section 15125 of the CEQA Guidelines, an EIR must include a description of the existing physical environmental conditions in the vicinity of the project to provide the "baseline condition" against which project-related impacts are compared. Normally, the baseline condition is the physical condition that exists when the NOP is published. As described in greater detail in Section 3, *Environmental Setting*, baseline conditions contained in this EIR are generally taken from the 2018/2019 academic year, when the draft 2021 LRDP was being prepared.

- **Regulatory Setting.** The Regulatory Setting subsection provides a summary of regulations, plans, policies, and laws that will shape the way development would occur under the LRDP. The regulatory setting may also include discussion of inconsistency with applicable plans. However, UCR is part of the University of California, a constitutionally created entity of the State, with "full powers of organization and government" (Cal. Const. Art. IX, Section 9).

  As a constitutionally-created State entity, UCR is not subject to municipal regulations of surrounding local governments, such as the City of Riverside (City) General Plan or land use ordinances, for uses on property owned or controlled by the University that are in furtherance of the University's educational purposes. Although there is no formal mechanism for joint planning or the exchange of ideas, UCR may consider, for coordination purposes, aspects of local plans and policies for the communities surrounding the UCR campus when it is appropriate and feasible, but it is not bound by those plans and policies in its planning efforts.
- **Environmental Impacts and Mitigation Measures.** The Environmental Impacts and Mitigation Measures subsection identifies the resource area "significance criteria" and analysis methodology to determine whether impacts are considered significant.

  The subsection further describes the impact of reasonably foreseeable growth and development projected under the proposed 2021 LRDP, proposed mitigation measures for significant impacts, and the level of significance after mitigation.

  Each effect under consideration for an issue area is separately listed in bold text with the discussion of the effect and its significance. Each bolded impact statement also contains a statement of the significance determination for the environmental impact as follows:

  - **Significant and Unavoidable**. The impact reaches or exceeds the defined threshold of significance and mitigation measures are therefore required if feasible. However, application of feasible mitigation measures would not reduce the impact to a less than significant level.
  - **Less than Significant with Mitigation Incorporated**. The impact reaches or exceeds the defined threshold of significance and mitigation measures. Mitigation measures if adopted, will reduce the significant impact to a less than significant level. If proposed mitigation measures are not adopted, such impacts would be significant and unavoidable.
  - **Less than Significant**. The impact does not reach or exceed the defined threshold of significance levels and mitigation measures are not required.
  - **No Impact.** No adverse effect on the environment would occur and mitigation measures are not required.

  Following each environmental impact discussion is a list of proposed mitigation measures (if feasible) and the residual effects or level of significance remaining after implementation of the mitigation measure(s). Consistent with CEQA Guidelines Section 15126.4, the EIR includes proposed mitigation measures if feasible; however, a final decision on those measures will be made until the project is considered by the Regents. Additionally, other agencies may have approval authority over some of the mitigation measures.

  In cases where the mitigation measure for an impact could have a significant environmental impact in another environmental resource area, this impact is discussed and evaluated as a secondary impact in conjunction with the mitigation measure.
- **Cumulative Impacts.** Cumulative impacts refer to two or more individual effects which, when considered together, are considerable or which compound or increase other environmental

impacts." (CEQA Guidelines, Section 15355). CEQA requires that cumulative impacts be discussed when the "project's incremental effect is cumulatively considerable… [or] … provide a basis for concluding that the incremental effect is not cumulatively considerable (CEQA Guidelines Section 15130 (a))." This section evaluates the cumulative impacts associated with the proposed 2021 LRDP in conjunction with other planned and pending developments in the area listed in Section 4.3, *Cumulative Development* below.

The geographic scope defines the geographic area in which projects may contribute to a specific cumulative impact. The geographic scope of the cumulative impact analysis varies depending upon the specific environmental issue area being analyzed. Past, present, and future reasonably foreseeable projects within the defined geographic area for a given cumulative issue must be considered. CEQA Guidelines Section 15130(b) presents two possible approaches for adequately discussing significant cumulative impacts. It indicates that either of the following could be used:

- A list of past, present, and probable future projects producing related or cumulative impacts, including, if necessary, those projects outside the control of the agency
- A summary of projections contained in an adopted general plan or related planning document, or in a prior environmental document which has been adopted or certified, which described or evaluated regional or area wide conditions contributing to the cumulative impact

Past and present projects are considered as part of the baseline when evaluating project impacts. Any exceptions are noted in the individual sections.

This Draft EIR uses both of these methods depending upon the specific resource areas. Pursuant to CEQA Guidelines Section 15130(b), Table 2-4 in Section 2, *Project Description*, lists projects that are occurring at UCR that are not dependent on the 2021 LRDP that were identified and considered in some of the cumulative impact analyses which rely on the list of projects. Table 2-4 contains interim projects on the UCR campus that were planned and approved for development under the guidance of the 2005 LRDP that incorporates environmental analysis tiered from the 2005 LRDP EIR and will be constructed prior to the adoption of the proposed 2021 LRDP.

The cumulative analysis presented in this EIR also uses a projections-based approach. Development that occurs by the planning horizon of the proposed 2021 LRDP is combined with the growth projections of applicable planning documents. The analysis utilizes different geographic scopes depending on the specific environmental resource area; additional details are provided in the individual sections.

- **References.** This section identifies sources relied upon for each environmental topic area analyzed in this document.

Cumulative Development

The cumulative analysis presented in this EIR uses a projections-based approach or list of projects approach depending upon the specific resource area. Development that occurs by the planning horizon of the proposed 2021 LRDP is combined with the growth projections of applicable planning documents. The analysis utilizes different geographic scopes depending upon the specific environmental resource area; additional details are provided in the individual sections in Section 4. Because different geographic scopes are utilized, the projections used vary from section to section.

To identify off-campus future and reasonably foreseeable projects, EIR preparers consulted the surrounding communities of the cities of Riverside and Moreno Valley, as well at the County of Riverside. A complete list of projects considered is provided as Appendix A to the Transportation Impact Analysis. The Transportation Impact Analysis is provided as Appendix J to this EIR. In addition, this Draft EIR reviewed the City's General Plan, City-adopted neighborhood plans, and relevant specific plans to assess projected development described within those plans during the lifetime of the proposed 2021 LRDP (years 2021 to 2035). The subsection on Long-Range Regional Growth describes these plans in more detail.

However, where the relevant geographic area extends beyond this boundary, Southern California Association of Governments (SCAG) forecasts, the 2016 Air Quality Management Plan, Urban Water Management Plans (UWMPs), and other area plans have also been considered. Each resource section's cumulative analysis identifies the planning documents that correspond to the relevant geographic scope of the analysis. While this EIR relies on a projections approach for cumulative impacts, in some cases specific pending projects in the vicinity of the plan area are discussed to provide additional context.

As noted in other sections of this Draft EIR, some campus facilities and development proposals are in process pursuant to the 2005 LRDP. Collectively, those campus projects are in various stages of development, including in the planning phase, design stage, or construction phase and are included in Table 4-1 as cumulative projects. Past and present operational projects are not presented in the table, as they have already been incorporated into baseline conditions.

The Cumulative Projects List is not intended to be an all-inclusive list of projects in the region, but rather, an identification of projects constructed, approved, or under review in the vicinity of the UCR campus at the time the proposed 2021 LRDP environmental analysis commenced. Off-campus projects considered near-term (e.g. will likely be developed in the foreseeable future) were selected based on location (within 5 miles of the UCR campus) and size (affecting 10 or more acres, 100 or more units, or 100,000 or more sf). This geographic area was considered due to the proximity to the UCR campus and the potential for regionwide impacts. Long-range projects are expected to be developed over the course of the proposed 2021 LRDP (i.e., through 2035), but their implementation timeline is currently unknown. Long-range projects will undergo individual environmental analysis that will include a specific assessment of cumulative impacts, at the appropriate time in their development.

Table 4-1 UCR Cumulative Projects List

Project Name	Project Type	Approximate Project Size/ Dwelling Unit Count	Project Status
On-Campus Projects			
North District Phase 1	Residential	545,000 gsf	Under construction; anticipated construction completion Summer 2021
North District Future Phases	Residential	1,300,400 gsf	To be determined
Dundee Glasgow	Residential	Residence Hall 176,400 gsf/ Dining Hall 50,600 gsf	Glasgow (Dining Hall) and Dundee (Residence Halls) construction completed
The Barn	Dining Establishment/ Entertainment Center	8,350 gsf	Construction completed

Project Name	Project Type	Approximate Project Size/ Dwelling Unit Count	Project Status
Plant Growth Environments Facility (PGEF)	Academics/Research Facility	38,000 gsf	Construction completed
Student Success Center (SSC)	Student Support	80,000 gsf	Construction completion anticipated Summer/Fall 2021
Parking Structure 1	Parking	Approximately 1,079 spaces	Construction completion anticipated Summer 2021
Pierce Hall Renovation	Academic	Interior renovation	Phase 1 completed; Phase 2 completion anticipated Summer 2021
Batchelor Hall Renovation	Academic	Interior renovation	Construction anticipated to begin early 2021; completion anticipated Fall 2023
Student Health & Counseling Center	Academic/Student Services	50,000 gsf	Construction anticipated to begin Summer 2021; completion anticipated Summer 2023
School of Medicine Building 2	Academic	120,000 gsf	Construction anticipated to begin Summer 2021; completion anticipated Summer 2023
STEM Education Center (pending)	Non-Affiliated Education Facility	95,000 gsf	Planning and Environmental Review anticipated to begin Summer 2021; construction anticipated in 2-5 years
Off-Campus Projects – City of Riverside (within 5 miles of campus, greater than 10 acres, and/or more than 100 housing units or 100,000 sf of development)			
SEC Valley Springs Parkway and Gateway Drive (APN 291-450-055)	Healthcare Campus	504,000 gsf (hospital) 280 beds 370,000 gsf (medical office)	Currently in construction; parking structure in plan check
Alessandro Boulevard and Barton Street (APN 263-060-036)	Warehouse	603,000 gsf	To be determined
The Exchange/NEC Orange Street and Vista Avenue (APN 209-060-029)	Mixed Use	482 multi-family units 44,500 gsf retail/restaurant 4000 gsf gas station 229 hotel rooms 27 RV camping spaces	Currently in grading and building permit review
750 Marlborough Avenue (APN 257-060-002)	Warehouse	346,330 gsf	Plans are in for grading plan check
3667 Placentia (APN 246-070-002)	Warehouse	308,000 gsf	In litigation in the State appeals court. Timing of hearing and determination by the courts unknown.
Northerly side of Grove Community Drive, between Trautwein Road and Worchester Lane (APN 284-390-029)	Single-Family Residential	13.5 acres/85 units	unknown

Project Name	Project Type	Approximate Project Size/ Dwelling Unit Count	Project Status
3444 Center Street (APN 246-130-001)	Mobile Home Park	104 units	Currently in construction
APN 263-091-015	Industrial Business Park	176,149 gsf	unknown
4445 Magnolia (APN 217-070-027)	Riverside Community Hospital Expansion	251,500 gsf	No recent major projects
Off-Campus Projects – City of Moreno Valley (within 5 miles of campus, greater than 10 acres, and/or more than 100 housing units or 100,000 sf of development)			
Eucalyptus Avenue at Edgemont Street	Residential	384 units	Approved and received certificate of occupancy
Box Springs Road and Clark Street	Residential	266 units	Approved and received certificate of occupancy

gsf – gross square feet

sf – square feet

Note: There are no projects in Riverside County that are also within 5 miles of campus, greater than 10 acres, and/or more than 100 housing units or 100,000 sf of development.

Long-Range Regional Growth

The City and the San Bernardino-Ontario-Riverside region is an urban environment that will continue to experience growth and development over time. Regional, long-range development, and transportation projects are directed by Connect SoCal, SCAG's Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS), the broader impacts of which were evaluated in the Program EIR for Connect SoCal, which serve as a foundation for subsequent, site-specific environmental review documents for individual transportation and development projects in the region (SCAG 2019). Table 4-2 depicts the 2020 population for the City and the San Bernardino-Ontario-Riverside region based on estimates from the Department of Finance (DOF) and the 2016 SCAG forecast. A detailed estimation of regional growth is provided in Section 4.12, *Population and Housing*.

Table 4-2 SCAG Projections for the City of Riverside, Moreno Valley, and the San Bernardino-Ontario-Riverside Region

	2020 Population Estimate	2035 Population Estimate	Change 2020-2035
City of Riverside	328,155	384,100	55,945
Moreno Valley	208,838	250,200	41,362
San Bernardino-Ontario-Riverside region	659,099	772,500	113,401

[1]DOF 2020

[2]SCAG 2016

SCAG = Southern California Association of Governments

Local, long-range planning documents such as the City's General Plan, neighborhood plans, and specific plans are designed to manage and direct growth in the area around UCR. These plans provide the context for longer-term cumulative impact analysis. The environmental impacts of each plan have been evaluated under CEQA, either as a separate CEQA document or included in the City's

General Plan EIR. The cumulative impact analyses in this Draft EIR reviewed the City's neighborhood plans encompassing and abutting UCR.

Connect SoCal

Connect SoCal is the 2020-2045 RTP/SCS adopted by SCAG in 2020.[1] It is a long-range vision plan that balances future mobility and housing needs with economic, environmental, and public health goals. Connect SoCal embodies a collective vision for the region's future and was developed with input from local governments, county transportation commissions, tribal governments, non-profit organizations, businesses, and local stakeholders in the counties of Imperial, Los Angeles, Orange, Riverside, San Bernardino, and Ventura. The plan details how the region will address its transportation and land use challenges and opportunities in order to achieve its regional emissions standards and GHG reduction targets. The RTP/SCS is updated every 4 years. Connect SoCal contains over 4,000 transportation projects—ranging from highway improvements, railroad grade separations, bicycle lanes, new transit hubs, and replacement bridges. One such transportation project is the Riverside County Transportation Commission (RCTC) and Caltrans I-215 North Project to add two high-occupancy vehicle (HOV) lanes in an approximately 11-mile section of I-215 from Nuevo Road in Perris to the I-215/SR 60 interchange in the City near Box Spring Road, approximately 3 miles southeast of the campus (SCAG 2020).

The City of Riverside General Plan

The City's 2025 General Plan, adopted in 2007, is a strategic, long-range planning guiding growth to 2025. The main land use objectives of the General Plan include:

- Encouraging the revitalization of underutilized commercial properties through redesignation of lands for mixed-use development
- Allowing for higher-density residential uses at underutilized in-town locations
- Ensuring the provision of adequate public facilities and public services
- Accommodating the growth projected by SCAG in an environmentally sensitive manner
- Providing circulation facilities adequate to serve proposed land uses and meet community needs
- Minimizing the negative impacts of regional traffic upon the City's local roadways
- Establishing policies to protect residents from negative air quality and noise impacts
- Preserving and enhancing the City's natural and cultural assets

The City amended its land use section, including its land use policy map in 2019 (City of Riverside 2019).

University Neighborhood Plan

Included as Appendix C of the General Plan and adopted in 2008, the University Neighborhood Plan is intended to direct and manage growth and improve the quality of life in the University neighborhood, which encompasses the UCR campus and the single- and multi-family residential areas and retail areas north and east of the campus. The land use vision of the University Neighborhood Plan embodies the following goals:

[1] https://scag.ca.gov/read-plan-adopted-final-plan

- Protect the single-family neighborhoods nestled against the Box Springs Mountain Reserve Park to the east of the existing Watkins Drive and the University's need for quality, affordable housing for residents and UCR students, faculty, and staff
- Improve neighborhood shopping facilities where residents and UCR students, faculty, and staff can shop and meet in an appealing environment

The objectives and policies carried over from the General Plan 2025 recognize the importance of providing diverse housing opportunities in the University neighborhood, including new rental apartments, the retention of existing and future rental stock, and affordable housing units. These objectives and policies stress the importance of providing quality apartments and multi-family housing within the University neighborhood and recommend the development of future new student housing along the University Avenue corridor. Additionally, the objectives and policies encourage the protection of single-family neighborhoods and the minimization of potential town-grown conflicts. The University Neighborhood Plan also accommodates the expansion of UCR while ensuring the preservation and enhancement of residential areas within the University neighborhood and encourages the reuse or revitalization of underutilized commercial areas with appropriately scaled mixed-use developments to serve both residents and UCR students, faculty, and staff. A specific policy in the University Neighborhood Plan is to update the University Avenue Specific Plan to allow for mixed-use and residential development along the corridor that supports land use designations of the General Plan (City of Riverside 2008a).

Eastside Neighborhood Plan

Included as Appendix D of the City's 2025 General Plan and adopted in 2009, the Eastside Neighborhood Plan is intended to direct and manage growth and improve the quality of life in the Eastside Neighborhood, which encompasses the single- and multi-family residential, retail, and industrial areas directly east of West Campus, west of the downtown neighborhood, and south of Hunter Industrial Park. Plans related to the Eastside neighborhood include the University Avenue Specific Plan, which directs land uses and transportation modes along the University Avenue corridor, and the Riverside Marketplace Specific Plan, which directs land use and historic preservation in the Marketplace area (City of Riverside 2009).

Sycamore Canyon Specific Plan and Sycamore Highlands Specific Plan

The Canyon Crest Neighborhood is located south of West Campus and southwest of the I-215/SR 60 freeway. Canyon Crest includes the Sycamore Canyon Specific Plan and the Sycamore Highlands Specific Plan areas, adopted in 1984 and 1990, respectively. The Sycamore Canyon Specific Plan was last amended in 1991 (City of Riverside 1991). The Sycamore Highlands Specific Plan was amended in 2008. The main objective of these specific plans is to direct the development of existing and annexed lands for residential uses in a manner compatible with the preservation of open space areas high in scenic quality, biological, and cultural significance, including the Sycamore Canyon Park (City of Riverside 2008b).

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4.1 Aesthetics

This section evaluates the potential impacts of the proposed 2021 LRDP related to aesthetics, including potential impacts on scenic vistas, visual character and quality, and impacts from light and glare.

4.1.1 Environmental Setting

Regional Setting

The UCR campus is located on the eastern side of Riverside, in western Riverside County, California, an urbanized area surrounded by natural landscape features, hills, ridgelines, and parkland. The higher elevation hills shape the visual outline of the city's viewshed. Specifically, the La Sierra/Norco Hills, Mount Rubidoux, Box Springs Mountains, Sycamore Canyon, and the many smaller ranges south of the city provide a visual backdrop as viewed from streets, buildings, and open spaces. The Santa Ana River watercourse and riverbed is just north of the city's boundary line and serves as a significant natural habitat for many species of birds and other animals. It also forms a visual landmark for visitors and residents who can view this river (City of Riverside 2007a).

Riverside is characterized by a pattern of auto-oriented, low- to medium-density land uses in an established urban environment typical of southern California, with areas of higher density and diverse uses in the downtown area, along Market Street and Mission Inn Avenue, approximately 3 miles from campus.

Parks and open space flank both sides of the northeastern area of the city, with Mount Rubidoux Park and Fairmount Park on the western side and Box Springs Mountain Reserve Park and Sycamore Canyon Wilderness Park on the eastern side. Mount Rubidoux is an approximately 1,331-foot-tall peak just west of downtown Riverside that offers views of the city and surrounding area, trails, and historic landmarks such as the Peace Bridge and the Sierra Cross (Rivers and Lands Conservancy 2018). Sycamore Canyon Wilderness Park, approximately 0.7 mile southeast of West Campus, is an approximately 1,500-acre park of natural lands with trails and the Ameal Moore Nature Center. The Hidden Valley Wildlife Area, just south of the Santa Ana River, is an approximately 1,500-acre hilly nature preserve with public access trails and a nature center. It rests largely in the unincorporated county, but the eastern edge falls within the city boundary.

Riverside Municipal Airport flanks the city's northern boundary on the western edge of the city, near where Central Avenue intersects Jurupa Avenue. This area also features a mix of industrial uses, undeveloped lands, commercial uses along Jurupa Avenue, and single- and multi-family residential development. SR 91 bisects the east and west parts of the city, transitioning to I-215 at its northern terminus and continuing to Orange County and Los Angeles in the west. Where this corridor occurs in Riverside, higher residential and commercial density coincides. SR 91 and the I-215/SR 60 freeway intersect in the middle of the northeastern area of the city, which is largely developed with office and industrial parks east of I-215, northwest of the campus.

The southeastern part of Riverside is characterized by suburban neighborhoods, educational uses, and commercial and office uses along Magnolia Avenue and Arlington Avenue. The Arlington Heights neighborhood in the southwestern area of the city is known as Riverside's greenbelt. Victoria Avenue is an arterial boulevard with a large median lined with eucalyptus, willow, and palm trees, including flowers and other ornamental plants. The roadway and several historic homes along this avenue are listed on the National Register of Historic Places (City of Riverside 2007a). The

approximately 377-acre California Citrus State Historic Park is east of Victoria Avenue, at Van Buren Boulevard and Dufferin Avenue. It forms this area's prominent parkland, with citrus groves, a segment of the historic Gage Canal, a museum, visitor's center, and event facilities (Friends of California Citrus Park 2020). Agricultural and equestrian businesses in the Arlington Heights district, southeast of Victoria Avenue, give way to the hillside residential neighborhoods further east.

Visual Character – West Campus

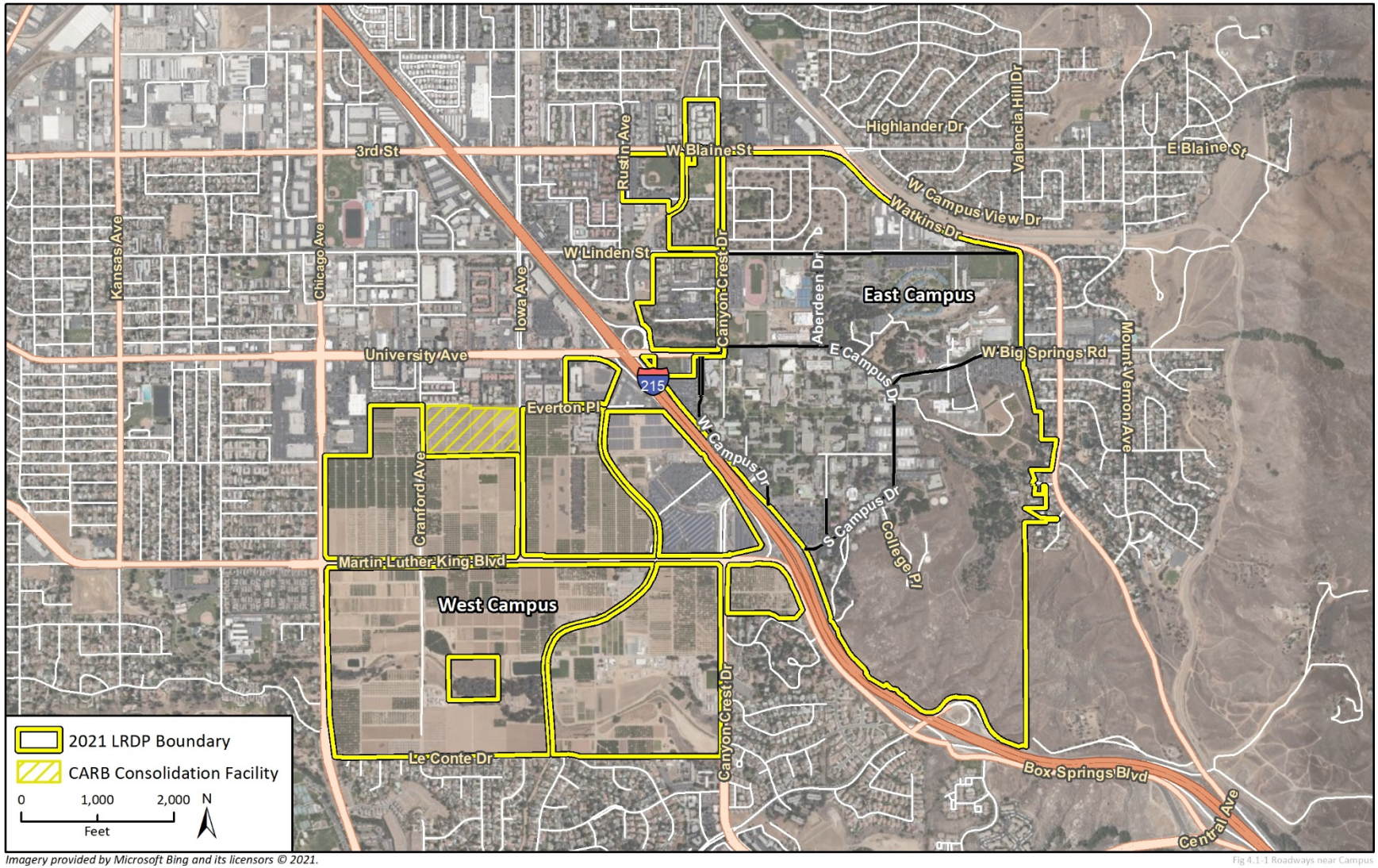
West Campus is adjacent to residential neighborhoods, retail, and commercial areas along University Avenue, Martin Luther King Boulevard, Le Conte Drive, Canyon Crest Drive, Iowa Avenue, and Chicago Avenue. West Campus is generally bounded by University Avenue on the north. The University Avenue corridor is lined with tall palm trees, eucalyptus trees, and ornamental landscape and features a mix of commercial, hospitality, and residential development. Two- to four-story, multi-family residential development are interspersed with commercial shopping centers, banks, and other neighborhood-serving uses. University Avenue continues east under the elevated I-215/SR 60 freeway and the underpass features a mural on both walls.

Martin Luther King Boulevard traverses West Campus in an east-west direction and bounds a portion of West Campus on the north. Martin Luther King Boulevard is lined with palm trees in the West Campus segment. Residences north of Martin Luther King Boulevard and west of West Campus are mostly single-story ranch-style structures on small lots. Residences located south of Martin Luther King Boulevard, west of West Campus, are typically two-story structures on small, landscaped lots with central and linear community green space and recreational amenities. West Campus is bounded by Le Conte Drive on the south with a mix of trees and ornamental landscape. Single-family residential development is located south of Le Conte Drive except for the United States Department of Agriculture Forest Service Southwest Research Station with single-story buildings toward the eastern end of Le Conte Drive, at the corner of Monte Vista Drive and Canyon Crest Drive. West Campus is bounded by Canyon Crest Drive on the east with a mix of trees and ornamental landscape. The northern segment of Canyon Crest Drive connects to East Campus under the elevated I-215/SR 60 freeway. One- to two-story single-family residential development and a church are located east of Canyon Crest Drive, across from West Campus. A mix of single-family residential development, multi-family development, retail, commercial uses, and undeveloped lands are located along Canyon Crest Drive south and southeast of West Campus.

Iowa Avenue traverses the northern half of West Campus in a north-south direction, north of Martin Luther King Boulevard with a mix of trees and ornamental landscape. A mix of multi-family residential development, retail, and commercial uses are located along Iowa Avenue. These structures are up to four stories tall, with some parking structures up to six levels. Iowa Avenue also fronts the new California Air Resources Board (CARB) Consolidation Facility which includes approximately 400,000 sf of new structure, which is up to approximately 45 feet high (CARB 2020). The CARB facility provides office space, vehicle emission testing facilities, laboratories, and an auditorium. West Campus is bounded by Chicago Avenue on the west with a mix of trees and ornamental landscape. Single-family residences, an assisted living facility, commercial shopping centers, and the Victory club golf course are located along Chicago Avenue. Refer to Figure 4.1-1 for a list of the streets and roadways described above.

Shade and shadow are also a component of visual character and occur when there is blockage of direct sunlight by existing and proposed structures. There is currently some development on or around West Campus, including the recently constructed CARB Facility, existing residential development, solar panels, and landscaping/agriculture.

Figure 4.1-1 Streets and Roadways Discussed in this Analysis



Imagery provided by Microsoft Bing and its licensors © 2021.

Fig 4.1-1 Roadways near Campus

Off-Campus Visual Character – East Campus

East Campus is surrounded to the north, west, and east by residential neighborhoods and some commercial centers. Two- to four-lane streets are lined with mature palm, pine, and other large trees. Most streets have sidewalks. Residences on or near West Linden Street and Blaine Street tend to be two-story multi-family complexes with surface parking lots, some of which were constructed as late as the 1960s. Many of these are used for student housing. Aboveground power lines, streetlights, and cellular towers occur on the north and south sides of Blaine Street, along with mature trees and shrubs of varying heights.

Non-residential uses include churches on University Avenue and a commercial area is north of Blaine Street across from the North District and features a car wash and food service establishment. A modest brick and stucco strip mall, the University Plaza, is further east on Blaine Street, where the County of Riverside building, other food service and neighborhood serving uses, and a surface parking lot occur. East of East Campus along Big Springs Road are two- to three-story multi-family residences. A small one- to two-story commercial center occurs north of Big Springs Road at the intersection with Watkins Drive and contains two religious facilities, a bookstore, yoga studio, a market, and parking lots. The Islander Park and public swimming pool are east of the commercial center on Big Springs Road. Single-family residential neighborhoods occur north and south of Big Springs Road along the foothills of the Box Springs Mountains. UCR Campus is generally not visible from most public locations east of East campus due to the minor elevation change and surrounding structures.

Shade and shadow are also a component of visual character and occur when there is blockage of direct sunlight by existing and proposed structures. Currently, there are shade and shadow effects from the existing development and landscaping on campus (e.g., UCR Bell Tower [161 feet tall], North District Phase I [6 stories], Dundee Glasgow [7 stories]) onto surrounding areas given the heights of the structures, the time of day and direction of the sun.

Campus Setting

Situated in eastern Riverside, the UCR campus is located on the western edge of the Box Springs Mountains. The I-215/SR 60 freeway divides the west and east sides of the campus, where the freeway is largely at-grade, with multiple lanes divided by concrete barriers and a sound wall on the eastern side. The freeway is above grade where it passes over Canyon Crest Drive as it enters the campus and at the eastern terminus of Martin Luther King Boulevard. The communities that surround the campus include a mix of low-slung apartments dating from the 1960s, single-family housing, low-density commercial shopping centers, suburban-scaled parks and sports parks, and religious and educational facilities. These are developed along major arterial roads and freeways in a manner typical of communities in southern California. Topography in most of the developed portions of East Campus and West Campus is gently sloped towards the slopes of the Box Springs Mountains, affording broader views westerly from the wide boulevards as positioned further east towards the hills. The southeast part of East Campus is situated on the westernmost slopes of the Box Springs Mountains. Dotted with mature eucalyptus trees and cradling the extensive UCR Botanic Gardens, this part of campus is the most visually interesting from a topographical perspective.

The UCR Botanic Gardens houses several buildings on the site, including a Gatehouse with two small restrooms and a meeting room near the entrance. Located on the Gardens property are a second

restroom building, garage used as an office and equipment space, propagation lath house, greenhouse, and a business office, meeting rooms, the Schneider House, which is located along the eastern edge of the Gardens approximately halfway up the property from the entrance (UCR 2021).

West Campus

West Campus is a square-shaped area west of the I-215/SR 60 freeway, which forms its northeast border, with University Avenue and Everton Place to the north, Canyon Crest Drive to the east, Le Conte Drive to the south, and Chicago Avenue to the west. Everton Place, Iowa Avenue, Martin Luther King Boulevard, and Canyon Crest Drive are the only paved streets within West Campus, as it is mostly dedicated to agricultural use. Visually dominated by orange groves that are used for research, this area typifies the Riverside area's historic role in citrus industry development. The bright green evergreen foliage of the groves provides a stark contrast against the dusky golden-brown slopes of the Box Springs Mountains for viewers looking east through this zone. These uses are square lots divided by dirt roads. Structures in the area include facilities and infrastructure greenhouses, lath houses, equipment associated with farming, storage and barn structures, research-related infrastructure, and utilities transmission lines. Because of the variations in elevation, existing structures, and the mature landscaping throughout the area, the campus is not generally visible from public locations in these neighborhoods.

Figure 4.1-2 shows agricultural uses from the corner of Martin Luther King Boulevard and the entrance to Parking Lot 30 (see Figure 3-4 in Section 3, *Environmental Setting*), showing representative visual character on this part of campus. Street trees such as those visible in the foreground occur periodically along Martin Luther King Boulevard to where it intersects with Chicago Avenue at the westernmost edge of the campus. The eastern reach of the San Gabriel Mountains is visible in the distant background, beyond the citrus orchards in the middle ground.

Figure 4.1-3 through Figure 4.1-32 are generally sourced from Google street photos and provide baseline information regarding visual character in the area. However, some of these figures are taken from elevated positions when cameras were positioned on the tops of vehicles (approximately 8.2 feet). Consequently, some of these figures may overemphasize views of mountains and other objects available to the average human observer, as they increase the line of sight around obstructions (e.g., fences, which are typically six feet tall according to the Riverside Municipal Code Section 19.550.030, and bushes). Consequently, portions of these views may not be as visible to a human observer at average eye level (approximately 5 feet).

Figure 4.1-2 Northwesterly View of Citrus Orchards on West Campus with San Gabriel Mountains in the Background

Source: Google Earth 2020

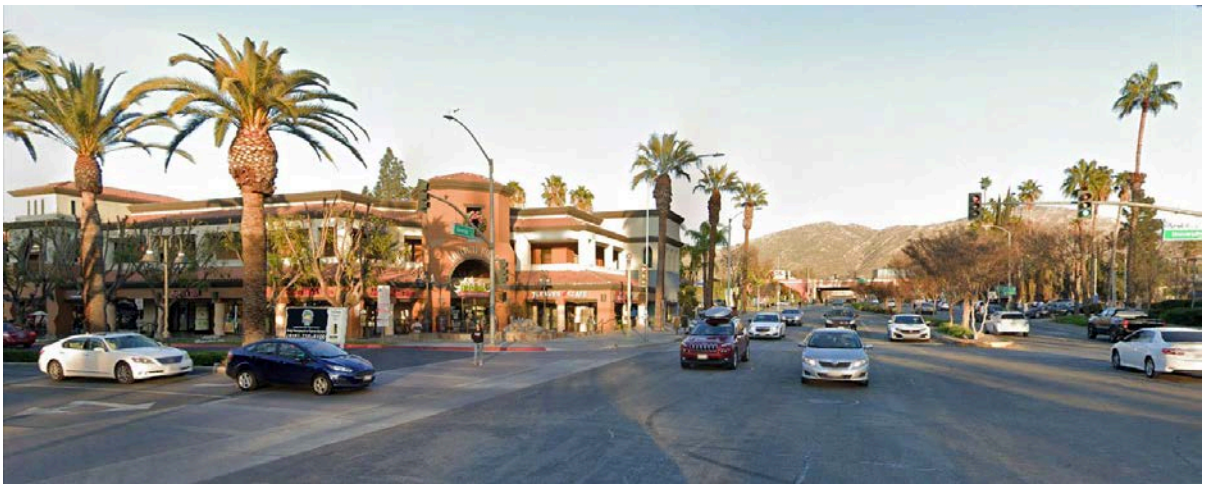
Martin Luther King Boulevard is a four-lane east-west arterial lined with palm trees that bisects West Campus between Chicago Avenue and the I-215/SR 60 freeway. A two-lane north-south arterial, Iowa Avenue, bisects the northern half of West Campus and ends in the south at the signalized intersection with Martin Luther King Boulevard. Chicago Avenue is a four-lane north-south arterial that forms the western boundary of West Campus. The campus agricultural lands are surrounded by chain-link fence in this area.

The Gage Canal generally has a north/south orientation from where it enters the campus in the agricultural area south of Martin Luther King Boulevard. It continues aboveground to the northern end of Parking Lot 52 (see Figure 3-4 in Section 3, *Environmental Setting*), where it goes underground through part of East Campus to the northern border of the UCR Baseball Complex. The concrete-lined canal is shallow and narrow, about 8-foot wide, with approximately 20 feet of flat gravel or concrete area running along both its banks. A University solar farm is situated east of the Gage Canal, south of Everton Place, west of the I-215/SR 60 freeway, and north of the campus community garden, university substation, and waste transfer station.

Iowa Avenue is lined with sidewalks, street trees, and a planted median near University Avenue, but these are discontinued south of Everton Place, as the roadway transitions into the agricultural research area of West Campus. East of Iowa Avenue, an alleyway and chain-link fence separate the UCR agricultural uses from two-story student residential complexes and parking areas. International Village, a multi-story complex of student residences, and Parking Lot 52 are situated just west of the solar farm and south of the four-story, glass, concrete, and steel University Extension Center building and surface Parking Lots 50 and 51 (see Figure 3-4 in Section 3, *Environmental Setting*). These West Campus facilities are situated south of University Avenue and north of Everton Place, just west of the Caltrans Maintenance Station. An auto-oriented complex of one-story commercial and restaurant uses occurs south of University Avenue and west of the University Extension Center. Everton Place crosses over the Gage Canal, fenced off from public use at each end of the street with chain-link fencing.

University Avenue intersects Iowa Avenue at University Village, a mixed-use complex with a cinema (also used as a lecture hall), parking structure, commercial and restaurant uses, and the University Police Department annex (Figure 4.1-3). West of the campus, light industrial and multi-family residential uses are situated along Chicago Avenue from West Linden Street to University Avenue, where uses transition to auto-oriented commercial plazas on both sides of Chicago Avenue, until 12th Street.

Figure 4.1-3 View East from University Avenue, with University Village on Northeast Corner, I-215/SR 60 Visible in Middle Ground, and Box Springs Mountains Visible at Horizon



Source: Google Earth 2020

East Campus

East Campus comprises two distinct sections situated on the north and south sides of University Avenue, North Campus Drive, and Big Springs Road. The northern area of East Campus contains UCR's athletics and recreation facilities, student housing, Environmental Health & Safety, and Corporation Yard. The southern area of East Campus contains the Academic Center and other academic and student support facility areas, hillside open space, and the UCR Botanic Gardens.

East Campus is bordered by residential, commercial, and restaurant uses along Blaine Street to the north, residential neighborhoods and commercial uses north and east of Watkins Drive, the I-215/SR 60 freeway to the west, the I-215/SR 60 freeway followed by a mix of residential development, and open space to the south. For the most part, the edges of East Campus blend into the surrounding neighborhood of residential, commercial, and educational facilities, where for example, multi-story student housing transitions to multi-family and single-family residential along Big Springs Road (Figure 4.1-4).

Where Parking Structure 1 occurs south of Big Springs Road and west of Valencia Hill Drive, an undeveloped utility easement creates a buffer between the built environment of this part of campus and the residential neighborhood to the east. The landscaped edge at the corner continues along the western side of Valencia Hill Drive and includes grassy lawn and mature shade trees that soften the rectilinear forms of the campus just beyond and soften the views of the campus looking northwest and west. Furthermore, these landscaped setbacks retain the softly rolling topography of the area, and next to Valencia Hill Drive, for example, contribute to the softened transition from single-family residential on Watkins Drive and Big Springs Road to the public institutional development of the campus (Figure 4.1-5).

Most of East Campus features very gently rolling topography with multi-story buildings and a dense, mature urban landscape that includes shrubbery, grassy areas, pedestrian paths, and hardscaping. From within East Campus, the multi-story buildings are situated around the central open spaces on campus. At the edges, the campus built environment opens to larger views that vary based on heights and orientations of adjacent development. From flat expanses such as parking lots, nearby mountains and hills form the main visual context but do not form expansive views for the most part. As pictured in Figure 4.1-1, a network of two-lane roads surrounding and traversing East Campus connects with the larger city grid, leading to residential areas to the north and east, on-campus open space on the south, and downtown Riverside to the west. Figure 4.1-4 through Figure 4.1-32 offer viewpoints from within the campus and from adjacent neighborhoods toward the campus.

Figure 4.1-4 View of Landscaped Buffer between Parking Structure 1 and Valencia Hill Drive, North of Big Springs Road, Campus on Left, Residential Neighborhood on Right

Source: Google Earth 2021

Figure 4.1-5 Southerly View Toward Campus from Valencia Hill Drive with Multi-family Residential Units on Left and Landscaped Setback by Glen Mor Student Residences on the Right, Mountains Visible in the Background

Source: Google Earth 2020

Figure 4.1-6 Southeast Edge of East Campus, Showing Gentle Slopes that Characterize the Campus with Contrast between Urban Landscape and Brown Hill Slopes

Source: Google Earth 2020

University Avenue provides the main access to East Campus from downtown Riverside. The mix of uses on the west side of the I-215/SR 60 freeway serve to blend the campus into the adjacent urban fabric traveling east on the avenue. A stone monument sign announces the entrance to campus at the north side of the intersection between University Avenue and West Campus Drive. University Avenue terminates at the eastern portion of the roadway and turns into Canyon Crest Drive heading

north. The Alumni and Visitors Center, Bannockburn Village, and Oban Apartments are located west of Canyon Crest Drive between University Avenue and West Linden Street. Falkirk Apartments and the UCR Baseball Complex are located west of Canyon Crest Drive between West Linden Street and Blaine Street. The Amy S. Harrison Athletic Field, UCR soccer field, Parking Lot 24 (see Figure 3-4 in Section 3, *Environmental Setting*), UCR Police Department, track facility and Student Recreation Center are located east of Canyon Crest Drive between University Avenue and West Linden Street. The North District Development area (Phase I under construction and future phases not yet constructed) is located east of Canyon Crest Drive between West Linden Street and Blaine Street. From the streets and pedestrian walkways looking east, low buildings and parking lots give way to dramatic views of the nearby mountains and the campus buildings in the distance (Figure 4.1-7).

Looking east from Canyon Crest Drive, East Campus contains UCR's student housing complexes and athletic facilities. East of Aberdeen Drive, the Aberdeen-Inverness, Dundee-Glasgow, Lothian, and Pentland Hills residence halls, and the Glen Mor apartments are surrounded by tree-lined grassy open space, arroyo, pedestrian pathways, and parking lots. The residence halls are typically three-story complexes with multiple wings or long buildings. The Dundee-Glasgow will have two seven-story residence halls. For example, the older four-story Lothian residence hall features ivy-covered walls, wide pedestrian walkways, and picnic benches under mature trees (Figure 4.1-8). The newer Pentland Hills complex of student residences is arranged in a roughly circular maze of concrete and stucco buildings, blue metal sloped roofs, and deep, first-floor overhangs, with open spaces and pedestrian walkways between each building (Figure 4.1-9). Further east, the five-story Glen Mor apartments and associated facilities are surrounded by mature trees, open space, arroyo, and pedestrian pathways. The Glen Mor buildings have a contemporary southwestern style, with flat roofs, sand-colored brick and glass style architecture, separated by grass and concrete pavilions with young trees and ornamental plants (Figure 4.1-10). An approximately 0.4-mile-long arroyo, lined with native plants, snakes through the area, with two pedestrian bridges connecting the northern and southern buildings. The four-level Big Springs Parking Structure is situated just north of Big Springs Road and is an open structure with wire screening between concrete pylons.

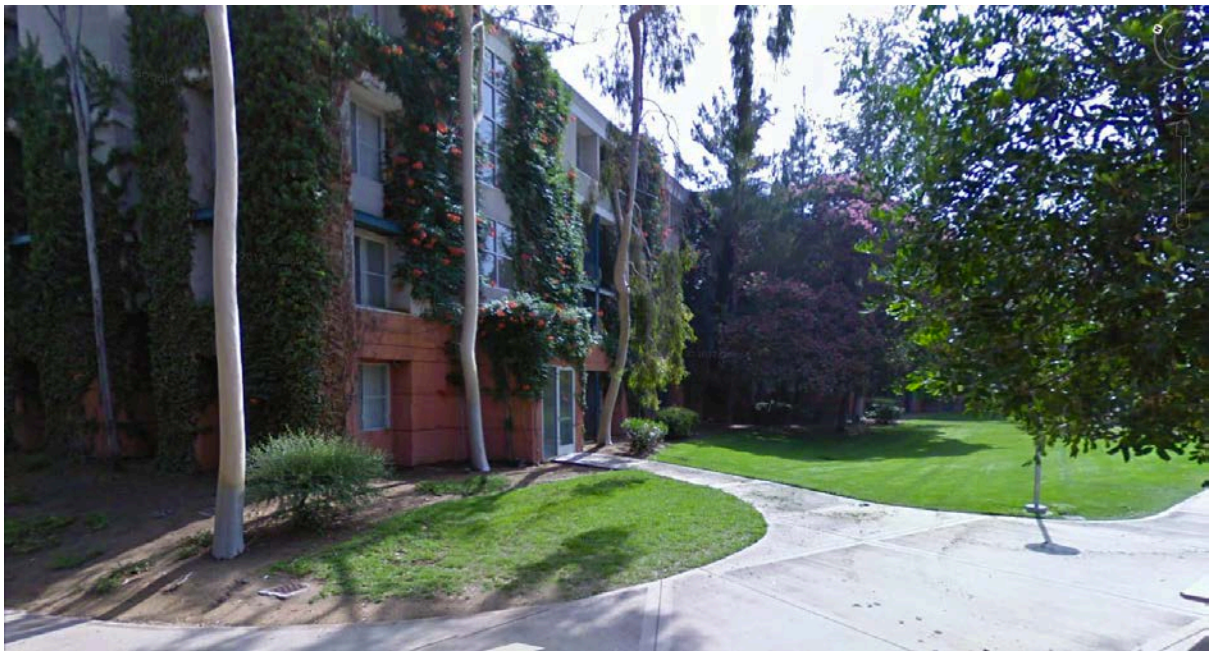
The Corporation Yard consists of a cluster of single-story structures in a large, paved parking area. Other campus support facilities lie east of the Corporation Yard. Tubular steel fencing separates the triangular landscaped area from Watkins Drive and a stucco and brick wall fences off the Corporation Yard and other campus support facilities, where the rectangular buildings appear relatively visually innocuous and congruent with the bermed railroad alignment on the east side of Watkins Drive (Figure 4.1-11). In the figure, the fences are visible in the foreground with mature palm trees beyond and the mountains on the distant horizon.

North of the Corporation Yard is the Early Childhood Services (Child Development Center), with singe-story modern structures, mature trees, and ornamental landscaping. North of the campus across Blaine Street are low-rise (two- to three-story) multi-family residences, a church, a car wash, and the University Plaza commercial center, where restaurants and commercial uses are clustered in a large parking lot. From this area, the North District is visible.

Figure 4.1-7 Southeasterly View of Box Springs Reserve from Canyon Crest Drive and West Linden Street, across Parking Lot 24

Source: Google Earth 2020

Figure 4.1-8 Lothian Hall Looking Northeast



Source: Google Earth 2020

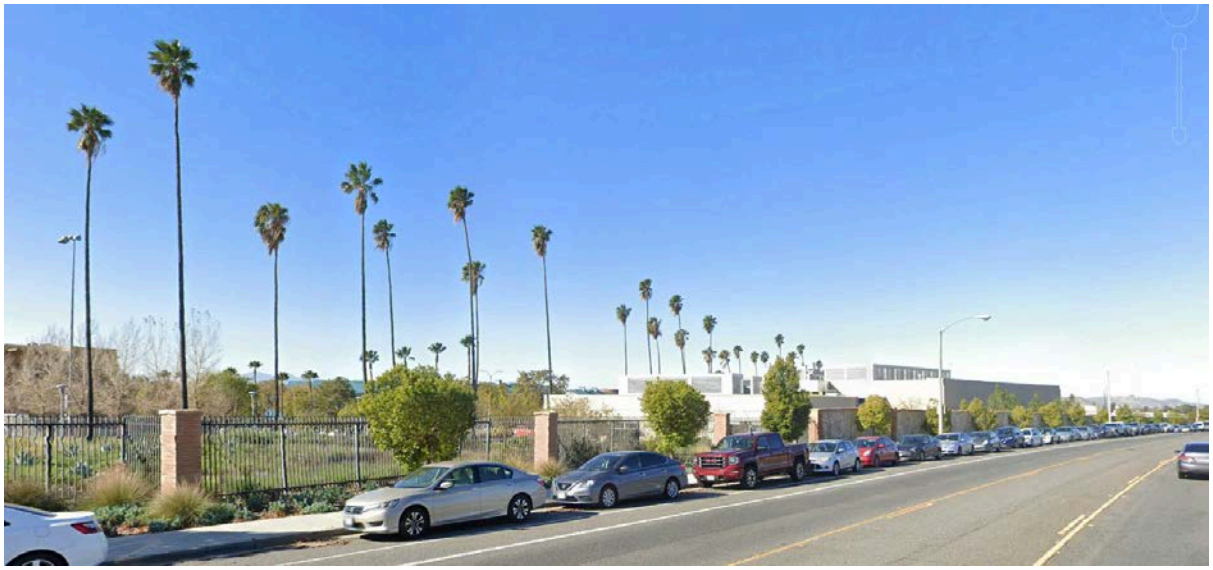
Figure 4.1-9 Pentland Hills Residence Complex Looking Northeast

Source: Google Earth 2020

Figure 4.1-10 Glen Mor Residential Complex Looking Southeast

Source: Google Earth 2020

Figure 4.1-11 Westerly View of Corporation Yard and Triangular Landscaped Area from Watkins Drive



Source: Google Earth 2020

On the western edge, East Campus is bordered by the I-215/SR 60 freeway and by West Campus Drive, between the freeway and Parking Lots 1, 4, and 5 (see Figure 3-4 in Section 3, *Environmental Setting*). Academic and student buildings include Hinderaker Hall, the College of Humanities and Social Sciences (CHASS), CHASS Interdisciplinary Building, Arts Building, Sproul Hall, and the newly renovated Barn Complex. Hinderaker and Sproul halls are part of the historic mid-century modern architecture that characterizes the form of the Academic Center (described below), with repetitive rectilinear forms, flat roofs, and concrete structural elements, that are important to the visual unity of that section of campus (Figure 4.1-12).

Newer architecture, like the CHASS Interdisciplinary Building, features simple, multi-story structures finished in brick with concrete edges that emphasize the subtle angled articulations in the expansive wall surfaces. As with many of the academic and research buildings, the three-story Interdisciplinary Building forms a courtyard on its west side and provides a human-scale, shady, quiet area for study or interaction (Figure 4.1-13).

The Arts Building, designed by Frank Isreal in the early 2000s, features asymmetrical rectilinear compositions of multilevel platforms, terraces, and courtyards that integrate the visual aspects of the regional desert landscape through colors that range from deep brown to dark violet, a range of asymmetrical angles, and layered elevations (Figure 4.1-14). From the exterior and interior views, the building appears as a stylized rendering of the nearby mountainous landscape. From within the complex, intersections of the various terraces and platforms frame the sky as if the viewer were in a desert canyon looking up at the larger, more distant landscape through the frame of geologic forms.

Throughout the campus, new and renovated buildings are designed to maintain a relationship to the architectural roots of the campus and to the dramatic, natural landscape features, while they also feature innovative, contemporary design. The Barn renovation, for example, retains the structural form and architectural integrity by keeping the original form and details like the exposed wooden trusses from the historic building. Updated and expanded available square footage and the outdoor meeting areas integrate in a way that looks both contemporary and anchored in the history of the building. Figure 4.1-15 shows the original building with its addition and expanded courtyard and

entrance and Figure 4.1-16 shows the addition with contemporary glass and wood elements that integrate with the form of the original building.

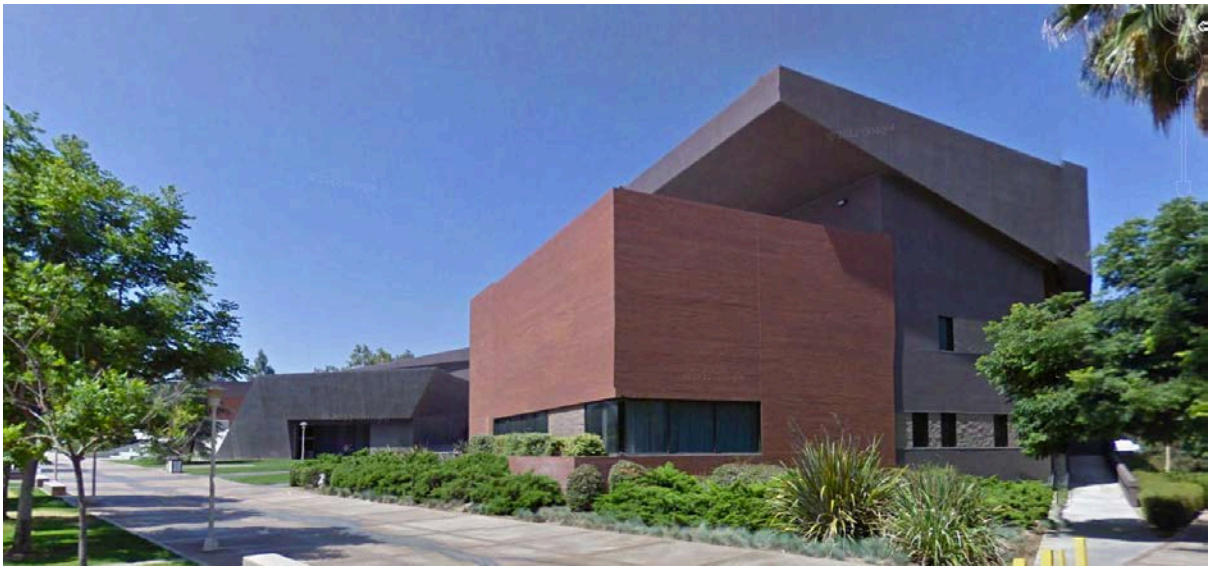
Figure 4.1-12 Hinderaker Hall on the Western Part of East Campus, Looking Northeast

Source: Rincon Consultants, Inc. 2020

Figure 4.1-13 CHASS Interdisciplinary Building, Looking Northeast

Source: Google Earth 2020

Figure 4.1-14 Arts Building, Looking Southwest



Source: Google Earth 2020

Figure 4.1-15 Renovated Original Structure of The Barn, Looking Southwest

Source: UCR 2020b

Figure 4.1-16 Addition to The Barn - Event Center and Restaurant, Looking East

Source: Design West Engineering 2020

The Academic Center is the core of East Campus and contains most of the existing academic and administrative buildings. In general, this area is characterized by wide pedestrian malls and quad spaces, expansive grassy areas that feature ornamental landscaping and a dense, mature tree canopy of eucalyptus, catalpa, and other tree species organized around the 161-foot-tall UCR Bell Tower (Figure 4.1-17). Most of the buildings in the central core are mid-rise, mid-century modern architectural styles that feature concrete arches and narrow, vertical window slats, as seen in the arcade and building architecture of Tomás Rivera Library (Figure 4.1-17 and Figure 4.1-18). Curved and rectangular forms repeat in different configurations that are simple and elegant, with a strong sense of movement and stability. These forms are evident in the long windows and rectangular structures of Sproul Hall and its courtyards (Figure 4.1-19). Olmstead Hall and University Theatre feature repeating arched and rectangular forms that connect the buildings and frame the landscape (Figure 4.1-20 and Figure 4.1-21).

Along with the simple brick and concrete forms, Watkins Hall features a breezeway with a concrete screen penetrated on sides and top with circular openings that relate to the arched forms in the other buildings, cast shadows during the day, and frame views across the Academic Center (Figure 4.1-22) and Pierce Hall (Figure 4.1-23), all of which are connected by the surrounding tree-covered lawns and by pedestrian pathways designed to repeat the rectilinear forms that make up the distinctive components of the architecture. Finally, west of Pierce Hall, the contemporary architecture of the HUB connects to the Academic Center through the curved forms that make up the courtyard and the southeast corner of the building, facing the UCR Bell Tower (Figure 4.1-24).

Figure 4.1-17 UCR Bell Tower Looking North with Rivera Library Arches to the Right

Source: Jaime Engbrecht 2021

Figure 4.1-18 Tomás Rivera Library and Arcade

Source: Jaime Engbrecht 2021

Figure 4.1-19 West Side of Sproul Hall Looking Northeast

Source: Google Earth 2020

Figure 4.1-20 Olmstead Hall and University Theatre Looking Southwest

Source: Google Earth 2020

Figure 4.1-21 Arcade Arches to University Theatre Looking Southeast

Source: Jaime Engbrecht 2021

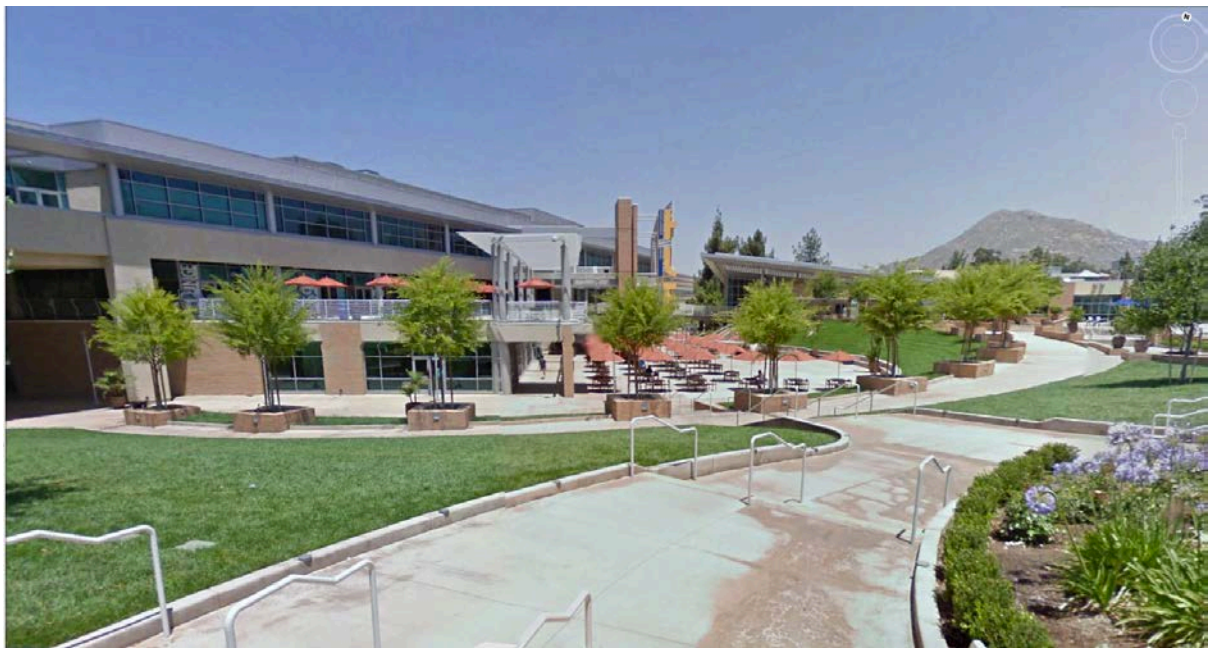
Figure 4.1-22 Watkins Hall Breezeway Looking East

Source: Google Earth 2020

Figure 4.1-23 Pierce Hall Looking Northeast

Source: Google Earth 2020

Figure 4.1-24 HUB Courtyard Looking North, Box Springs Mountains Visible in Background



Source: Google Earth 2020

The buildings in the Academic Center adhere to the style of mid-century modern architecture that includes repetition of form, use of empty space to frame the built and landscaped environment, and human-scale but still grand forms that create an intimate, function, yet graceful sense of place. The Academic Center forms the visual foundation for the newer architecture on the south and east sides

of East Campus. Figure 4.1-25 shows the Physics Building on the right and Winston Chung Hall on the left. The newer building includes contemporary materials contrast harmoniously with the older Physics Building. The rhythmic repetition of rectilinear forms is evident in the open walkways that mediate the tall, uniform brick walls, and the framing of the windows makes a visual connection with the rhythms and patterns of the original, modernist architecture. Rather than dominate, the height and placement of Winston Chung Hall relative to the Physics Building create a visual relationship that ties in with the overall aesthetic of the Academic Center at the same time it continues the campus-wide, architectural scheme of evoking the nearby mountainous landscape in which it is situated.

Similarly, the Materials Science and Engineering Building draws on some of the forms found in the early modernist architecture, such as repetitive rectangles of various sizes and contrasting light-colored concrete with red-brown brick, but with the addition of the industrial metal siding, and angled entrance overhang that correspond with the research areas for which the building is designated (Figure 4.1-26). Moving out from the central core of East Campus, these more contemporary-styled buildings cohere with the intent of the original architectural style, and thus, unify the expanding campus.

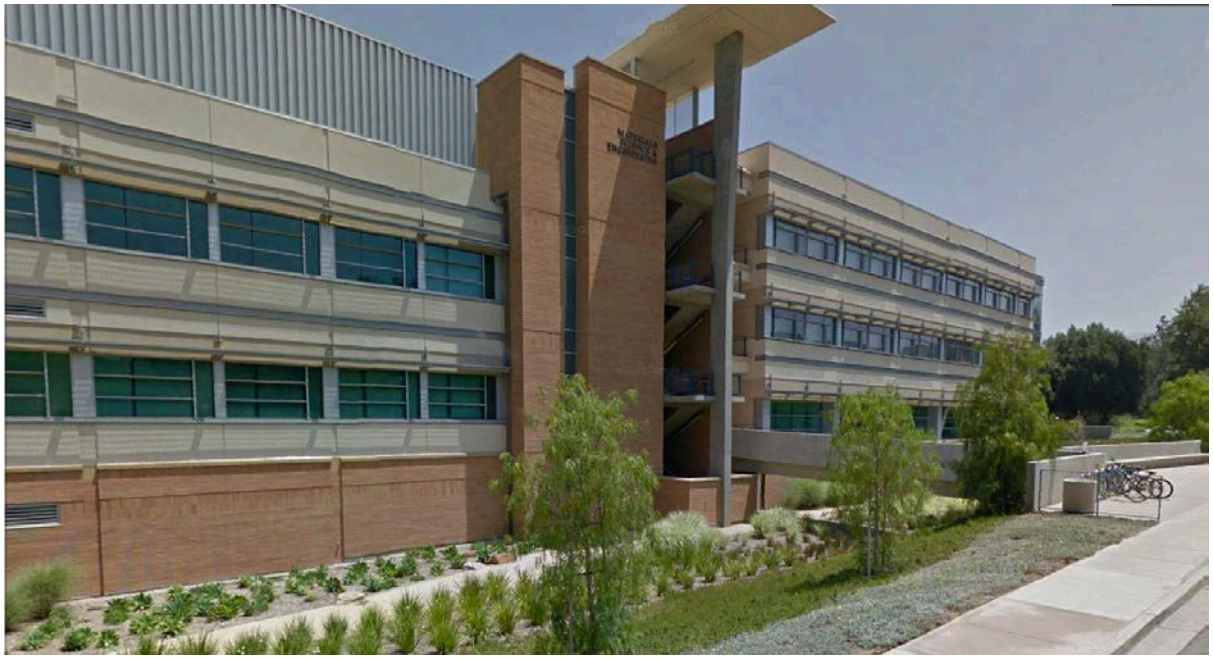
South of Eucalyptus Drive and Olmstead Hall, the Psychology Building and Parking Lot 6 (see Figure 3-4 in Section 3, *Environmental Setting*) compose the southwestern side of East Campus. Flanked by expanses of lawn and landscaped areas, the Psychology Building is a contemporary brick and stucco-clad, three-story building with forms that also draw on the modernist style of the Academic Center while introducing a more monumental scale-by-means of the extended roof forms and vertical glass components that draw the eye up to the vast sky (Figure 4.1-27). A low canopy of drought tolerant plants along the front of the building emphasizes the building proportions as well and integrate more clearly with the campus perimeter's desert-like setting than the more densely forested, shaded interior of the campus.

The area east of Citrus Drive and south of Eucalyptus Drive is the University's laboratory and research center, with wide three- and four-story buildings, such as the more modern Genomics Building, Entomology Building, SOM Health Science Research Building, and the Fawcett Laboratory building. These buildings surround Picnic Hill, a grassy tree-lined outdoor relaxation area. The buildings are a mix of architectural styles, including the contemporary style similar to the Psychology Building and a mission colonial revival-style like Anderson Hall and Chapman Hall (Figure 4.1-28). Typically, the buildings are four stories or less and some have adjacent parking areas. All feature mature trees and other landscaping.

Figure 4.1-25 Physics Building and Winston Chung Hall Looking Northeast

Source: Google Earth 2020

Figure 4.1-26 Material Science and Engineering Building Looking Northeast



Source: Google Earth 2020

Figure 4.1-27 Psychology Building Looking Northeast

Source: Google Earth 2020

Figure 4.1-28 Anderson Hall and Chapman Hall Looking Northeast

Source: Google Earth 2020

The Computing and Communications Building, lath houses and greenhouses, the Chemical Sciences Building, the USDA Salinity Laboratory and agricultural/research lands, UCR Botanic Gardens, Parking Lot 13 (see Figure 3-4 in Section 3, *Environmental Setting*), and Parking Structure 1 (construction completion anticipated Summer 2021) occur east of East Campus Drive. Big Springs Road serves as the eastern access point to the campus from the adjacent neighborhood, discussed above. This area transforms from flat to hilly, particularly in and around the UCR Botanic Gardens and open space reserve. The Salinity Laboratory is a single-story building constructed on a hill above

Parking Lot 13, just north of the UCR Botanic Gardens. It is surrounded by landscaped trees and shrubs and is only slightly visible from Parking Lot 13 looking south (Figure 4.1-29).

The UCR Botanic Gardens occur at the southeastern edge of East Campus, just beyond the easternmost campus facility buildings (Figure 4.1-30). Situated on a slight rise, the gardens cover approximately 40 acres and include 4 miles of scenic trails, scenic vistas, and two prominent arroyos with steep slopes and intermittent water flow in Chancellor's Canyon and a group of large, weathered granite boulders in the upper reaches of Alder Canyon (UCR 2020a). From the gardens, views of the rest of the campus are largely obscured by the dense vegetation and mature tree canopy.

East of the UCR Botanic Gardens, across Watkins Drive, single- and multi-family residences make up established neighborhoods in a hilly terrain with many mature trees and other vegetation. Because of the variations in elevation, existing structures, and the mature landscaping throughout the area, the campus is generally not visible from most public locations in these neighborhoods.

Figure 4.1-29 Salinity Laboratory Viewed from Parking Lot 13 Looking Southeast

Source: Google Earth 2020

Figure 4.1-30 UCR Botanic Gardens Entry Looking East

Source: Google Earth 2020

In the area south of South Campus Drive, East Campus is characterized by scattered educational and agricultural facilities (such as the College Buildings North and South and greenhouses), the Superintendent's Cottage, and associated parking lots interspersed in a tree-lined landscape that gives way to UCR's Open Space Reserve characterized by steep hills with rocky outcroppings and grassy vegetation. This distinct area of campus is generally characterized by older buildings and small parking lots in a rural setting. College Place, a narrow road without sidewalks, cuts southward into the hillside before turning into east and north by a dead-end just beyond a water storage tank.

Open Space and Landscaping

Noted mid-century modern landscape architect Ruth Shellhorn was selected as supervising landscape architect for UCR and greatly influenced the 1964 Master Landscape Plan. Shellhorn took inspiration from the natural landscapes and topography of the Riverside area, and she preserved canyons and mesas wherever possible, favoring pedestrian bridges and minimizing grade cuts. Canyons were preserved for recreational uses such as hiking trails and environmental study areas. Shellhorn favored tall shade trees such as olive and eucalyptus, which blended with the native coastal sage scrub plant community. Natural rock outcroppings inspired the use of rock in walls and paved pedestrian areas. The hot summers and cool winters featured into Shellhorn's design consideration, prompting the development of shaded walkways and sunken gardens (Comras 2016).

Today, the campus has distinct landscaping styles in different areas, reflecting the history of campus development and the variation in topography. According to Figure F3.4 in the proposed 2021 LRDP, the campus open space framework has the following fundamental elements:

- Open Space Reserve
- UCR Botanic Gardens
- Primary Open Spaces

- Secondary Open Spaces
- Planned Open Space
- Public Road Streetscapes
- Campus Road Streetscapes

The Box Springs Mountains in the southeast portion of the campus form an open space reserve with steep hills and rugged outcroppings creating the nearby natural open space (Figure 4.1-31). A notable visual feature of these shrub covered slopes are the annual color changes. In winter and spring, new grasses and established brush transform the normally brown slopes into vibrant green expanses. As spring wears on, the green yellows and browns in color, back to its dominant appearance.

Naturalistic open spaces form an attractive and informal transition from the formal malls and courtyards of the campus into the nearby mountain areas. In these less-maintained areas, the landscape offers space for passive recreation, wildlife habitat, and water flow into arroyos and drainages. Naturalistic open spaces make up critical connective elements of the campus open space system, weaving through campus as expressions of the area's natural heritage. Examples of naturalistic open spaces include Picnic Hill and the open spaces between new buildings on the site of the current Intramural Athletic Fields (Figure 4.1-32). The northern and northwestern areas of the East Campus feature a series of remnant naturalistic arroyos flowing westward down from the Box Springs Mountains.

Figure 4.1-31 Box Springs Mountains Viewed from Mount Vernon Drive, Looking Northeast

Source: Google Earth 2020

Figure 4.1-32 Picnic Hill Naturalistic Open Space Looking East

Source: Google Earth 2020

Pedestrian malls are the signature formal open space type on the UCR campus. The Academic Center of East Campus features a series of iconic linear grassy malls and pedestrian pathways, flanked by large, mature trees. Courtyards and plazas are located throughout campus, typically shaded by trees and sometimes with grass and ornamental landscaping. Some courtyards and plazas have interactive gathering areas, dining terraces, outdoor classrooms and amphitheaters, small informal lawn areas, and thematic gardens (UCR 2019). The plaza outside the HUB, for example, contains a paved outdoor dining area and a lawn for casual sitting and relaxation, with ornamental trees and plants (refer back to Figure 4.1-24).

Structural landscaped spaces are areas between and adjacent to buildings. There are a variety of landscaped spaces on the UCR campus, and typically include trees, shrubs, and groundcover such as grass or low-lying shrub. Streets are typically lined with trees from shady evergreens to palms. Trees and landscaping are also found along bicycle and pedestrian pathways and in parking areas, which typically have shade trees lining the edges in row planters.

Public Views

Off-campus viewpoints consist of publicly available vantage points looking towards campus from various directions. Public views are those visible from major roadways, parks and recreation areas, and publicly accessible open space areas. Views of East Campus and portions of West Campus may be available from the very highest points in Sycamore Canyon Wilderness Park and accessible from the Ameal Moore Nature Center. However, these views would become part of the larger urbanized landscape that makes up this part of Inland Southern California. Views of the campus are also available from trails on west-facing slopes in the Box Springs Mountains and Sycamore Highlands Park, but similarly they would be at such a distance that they would be part of the urbanized landscape. Views of the campus from many streets are obscured by mature trees, topography, and existing development. Nonetheless, the following description characterizes the views from

perimeter roads to present the existing visual conditions and contribute to the consideration of how new development might affect those conditions.

Key viewpoints (KVP) were generally selected based upon their proximity to locations where development is anticipated, looking toward the campus. These locations are considered representative of other nearby areas and similarly situated locations. Analysis at these locations typically provides a conservative assessment and aesthetic impacts usually decrease with distance as aesthetic details become less discernable to the human eye. The KVP locations are mainly from Canyon Crest Drive, looking south toward East Campus and east and west at existing residential units or parking areas, from Watkins Drive looking southwest toward Lot 20, and looking northwest toward the UCR Botanic Gardens. Figure 4.1-33 indicates the KVPs on an aerial map of the campus and Figure 4.1-34 through Figure 4.1-44 offer images of those views. Table 4.1-1 lists the KVPs, their locations, the direction of the view, visual quality, and viewer sensitivity.

Scenic Vistas

For the purposes of this EIR, scenic vistas may be described in two ways: panoramic views (visual access to a large geographic area, for which the field of view is wide and extends into the distance), and focal views (visual access to a particular object, scene, setting, or feature of interest). Panoramic views are typically associated with vantage points that provide a sweeping geographic orientation and may include urban skylines, valleys, or mountain ranges. Scenic vistas are typically those available from a publicly accessible viewpoint, such as roads or public gathering places, rather than views available from private residences (UCR 2005). Near the UCR campus, the Box Springs Mountains are the most prominent visual feature from many locations, and thus sweeping panoramic views of the Box Springs Mountains are considered a scenic vista for the purposes of this EIR.

Figure 4.1-33 Key Viewpoint Locations Around UCR

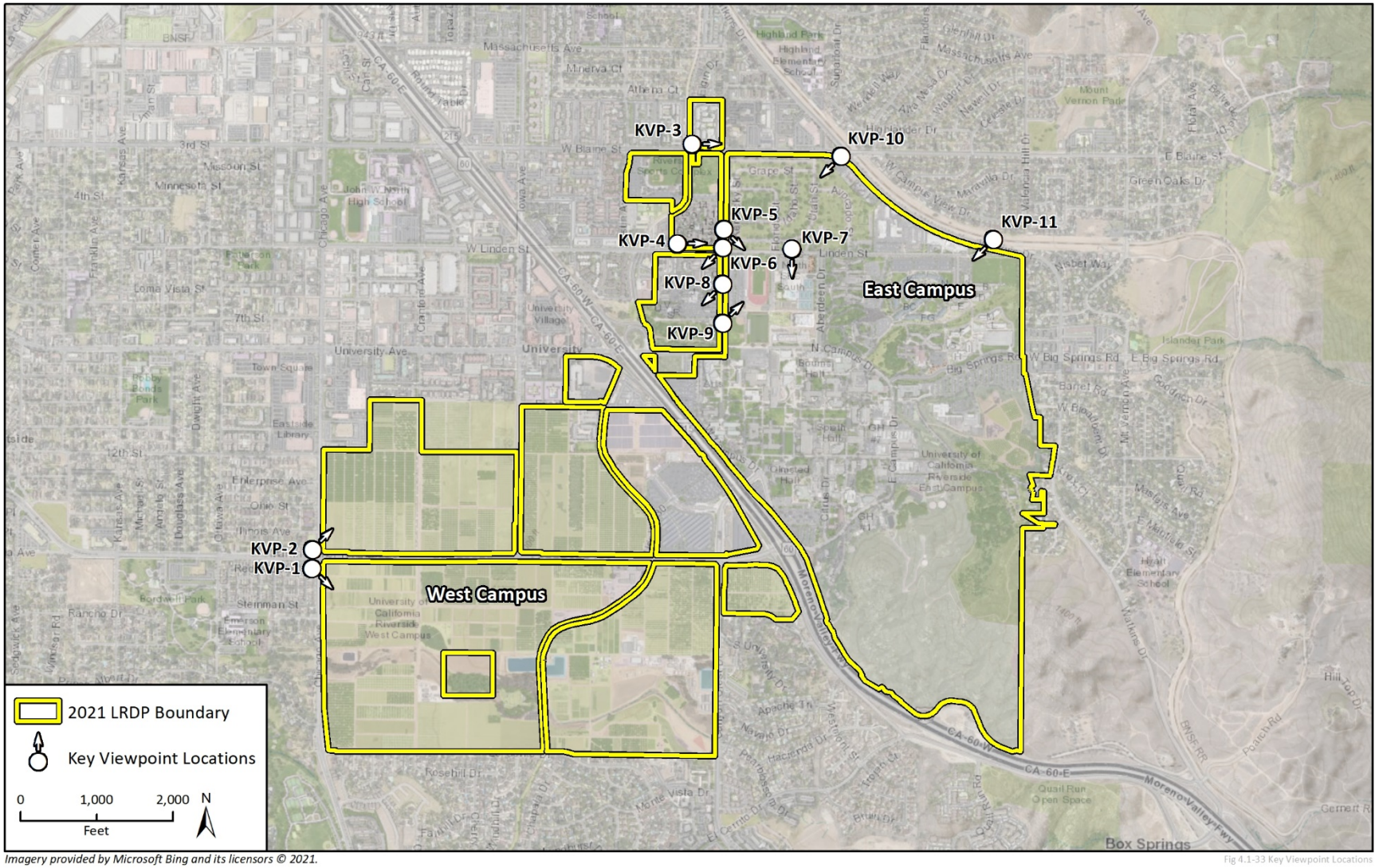


Fig 4.1-33 Key Viewpoint Locations

Table 4.1-1 Summary of KVP Details

KVP	Location	Direction	Visual Quality	Viewer Sensitivity
KVP 1	MLK Bl. & Chicago Av.	SE	High	Moderately High – High
KVP 2	MLK Bl. & Chicago Av.	NE	High	Moderately High
KVP 3	Blaine St., east of Rustin Av.	E	Moderate	Moderately Low to Moderate
KVP 4	West Linden St., east of Rustin Av.	E	Moderate	Moderately Low to Moderate
KVP 5	Canyon Crest Dr., north of West Linden St.	SE	Moderately Low	Moderately Low
KVP 6	Canyon Crest Dr. at West Linden St.	SW	Moderate	Moderate (motorists) Moderately High (pedestrians)
KVP 7	West Linden St. near Aberdeen Dr., east of Student Recreation Center	S	Moderately High	Moderate to Moderately High
KVP 8	Canyon Crest Dr., south of West Linden St. by Parking Lot 24	SW	Moderately Low to Moderate	Moderate (motorists) to Moderately High (pedestrians)
KVP 9	Canyon Crest Dr. at University Av.	NE	Moderately High	High
KVP 10	Watkins Dr. at Blaine St.	SW	Moderate	Moderate
KVP 11	Watkins Dr., west of Valencia Hill Dr.	SW	Moderately High	Moderate

Definitions:	NE = Northeast
KVP = Key Viewpoint	NW = Northwest
Av. = Avenue	E = East
Dr. = Drive	S = South
MLK Bl. = Martin Luther King Boulevard	SE = Southeast
St. = Street	SW = Southwest

Views of West Campus from KVP 1 and KVP 2 on Martin Luther King Boulevard consist largely of relatively flat agricultural research fields (Figure 4.1-34 and Figure 4.1-35). From the roadway, expansive vistas are available in both directions toward the Box Springs Mountains and Sycamore Canyon. In the foreground, palm trees and native shrubs are planted periodically in the easement between the road and the research fields in a way that does not restrict the longer-range views. In the middle distance, orange groves are visible at various stages of growth. KVP 2 also shows the new CARB consolidation facility in the middle distance. The visual quality is high from these perspectives as they offer expansive views of the natural and agricultural landscape. Viewer sensitivity would be moderately high to high as these expansive views are an important part of the visual corridor, and, although motorists may be traveling up to 45 miles per hour (mph) along Martin Luther King Boulevard, the transition from relatively dense development west of Chicago Avenue to the open spaces and expansive views east of that roadway is dramatic in terms of aesthetic effect.

Figure 4.1-34 KVP 1: Corner of Chicago Avenue and Martin Luther King Boulevard Looking Southeast Across Agricultural Fields of West Campus

Source: Google Earth 2020

Figure 4.1-35 KVP 2: Corner of Chicago Avenue and Martin Luther King Boulevard Looking Northeast Across Agricultural Fields of West Campus with CARB Facility in the Middle Ground

Source: UCR 2021

On Blaine Street, east of Rustin Avenue, looking east, KVP 3 shows residential development (Stonehaven student apartments) in the foreground and the mountains in the distant background. Mature trees partially screen the development from the street and aboveground utility lines, streetlights, and traffic signals are also visible in the foreground and into the distance down the

roadway, creating a degree of visual clutter. Nonetheless, the nearby mountains along public rights-of-way are visible looking east on Blaine Street (Figure 4.1-36). The visual quality is moderate in this area as the development does not block entire views of the distant mountains from public rights-of-way, but neither does it integrate into the natural environment in terms of its design, and there is no sense of order to the landscaping. Viewer sensitivity along sidewalks and roadways would be moderate to moderately low through this area as development intervenes consistently with views.

Figure 4.1-36 KVP 3: View East on Blaine Street with Stonehaven Apartments to the Left of Image and the Baseball Field to the Right

Source: Stephanie Tang 2021

Views toward East Campus from KVP 4 feature street trees, including the long-standing palms along West Linden Street, one- and two-story residential development, and institutional (church) uses. The Box Springs Mountains are visible in the background and form a prominent landscape feature. Aboveground utility poles and cars are parked along both sides of the roadway. The visual quality is moderate in this area, as the development does not block views from public rights-of-way, but neither does it integrate into the natural environment in terms of its design (Figure 4.1-37). Viewer sensitivity along sidewalks and roadways would be moderately low to moderate through this area as speed limits are 40 mph on West Linden Street, cars are parked along the roadways, and drivers would be attending to the demands of driving.

Figure 4.1-37 KVP 4: West Linden Street East of Rustin Avenue Looking East

Source: Google Earth 2020

From Canyon Crest Drive looking southeast, KVP 5 shows mature street trees that soften the edges of the Falkirk Apartments to the west (Figure 4.1-38). The development is in poor condition and the landscaping does not follow a discernable design pattern. No distant views are available beyond the development. Thus, visual quality is moderately low. Viewer sensitivity would be moderately low through this area for pedestrians and drivers alike.

Figure 4.1-38 KVP 5: View from Canyon Crest Drive North of West Linden Street Looking Southeast

Source: Google Earth 2020

KVP 6 shows a view southwest on Canyon Crest Drive toward University Avenue, where the Humanities & Social Sciences building can be seen on the distant horizon. The apartment buildings (Oban Family Housing) along the west side of Canyon Crest Drive are two stories and built close to the roadway (Figure 4.1-39). A few mature trees occur between the sidewalk and the buildings.

Intervening development obscures views of the mountains to the south, and the university buildings are only visible in the distant southern background. Visual quality is moderate as the apartment architecture is not distinctive and the landscaping is unremarkable. Furthermore, the views into the campus are not impressive for drivers or pedestrians traveling on West Linden Street or on Canyon Crest Drive. Viewer sensitivity would be moderate for drivers to moderately high for pedestrians through this area as motorists would likely be attending to driving, but pedestrians would have more time to observe surroundings.

Figure 4.1-39 KVP 6: Canyon Crest Drive at West Linden Street Looking Southwest

Source: Google Earth 2020

From West Linden Street looking south, KVP 7 shows that the SRC is largely hidden from view by trees and shrubbery (Figure 4.1-40). The eastern edge of the existing SRC is visible in the right side of the image. The visual quality is moderately high in this area due to landscaping and the consistent architecture. The more distant landscape is obscured by intervening landscaping and development, restricting access to vistas. On the north side of West Linden Street, construction has begun on the North District, where multi-use buildings, including multi-story residential units will occur close to the street.[1] Viewer sensitivity would be moderate to moderately high through this area as views are obscured by existing development, but the architecture and landscaping at the SRC to the south, the North District to the north, and the student housing areas to the east are unified in visual character and designed to create a pedestrian-oriented district.

[1] The North District Development Plan Environmental Impact Report offers a full analysis of the visual impacts of this project on the area (UCR 2019).

Figure 4.1-40 KVP 7: View South from West Linden Street toward Ropes Course by the SRC

Source: Google Earth 2020

In KVP 8, from Canyon Crest Drive, south of KVP 6 and closer to the intersection with University Avenue, the Bannockburn Village is visible on the west side of the street and Parking Lot 24 can be seen on the east side (Figure 4.1-41). The two-story apartments are constructed close to the roadway. Mature trees line the parkway between the sidewalk and the buildings but follow no clear landscape design plan. Buses are parked along the west side of Canyon Crest Drive. From the position in KVP 8, the western Humanities & Social Sciences Building is visible on the southern horizon, just beyond the trees. An edge of the Arts Building can also be glimpsed just west of the southernmost tree line. In the photograph, the painted signage in the windows of a restaurant is partly visible from behind the street tree.

Figure 4.1-41 KVP 8: Canyon Crest Drive Looking Southwest with Bannockburn Village on the Right and Parking Lot 24 on the Left

Source: Google Earth 2020

Reflected in Figure 4.1-41, the poor condition of the apartment complex and the provisional signage in the restaurants contribute to the moderately low to moderate visual quality through the area, despite the long-distance views of East Campus to the south. Viewer sensitivity would be moderate for drivers and moderately high for pedestrians through this area as the motorists would be occupied with attending to multiple distractions, including buses entering and exiting traffic from on-street bus stops, pedestrians crossing the street near the southern end of Parking Lot 24, and vehicles entering and exiting parking areas on the east and west sides of the street. Pedestrians would have more time to observe the surroundings.

The proposed 2021 LRDP designates the current site of the Amy S. Harrison Athletic Field and the soccer field east of Canyon Crest Drive as sites for future academic expansion. From the roadway looking northeast, KVP 9 shows the nearby mountains form, even with the intervening development in the middle ground (Figure 4.1-42) and thus is considered a scenic vista. The SRC, the Materials Science & Engineering building, and the Multi-disciplinary Research Building 1 can be seen beyond the soccer fields, with the mountains in the horizon. Although not pictured in the image, Phase I of the North District project is under construction and may be visible beyond the athletic field, as the heights of the North District structures are greater than the SRC. The visual quality is moderately high as the dramatic ridgeline is distinctive and the building heights, colors, and forms are in relative unity with the landscape. Viewer sensitivity would be high in this area as motorists would slow down as they curve traveling from east on University Avenue to north on Canyon Crest Drive. Pedestrians traversing the heart of East Campus would be sensitive to the transition from the built environment at the Academic Center and to the opening of the viewshed to the mountains on northeast horizon.

Figure 4.1-42 KVP 9: View Northeast on Canyon Crest Drive toward Amy S. Harrison Athletic Field and Soccer Fields

Source: Melissa Garrety 2021

From Watkins Drive at Blaine Street, KVP 10 shows a southwesterly view of East Campus (Figure 4.1-43). The foreground comprises the sidewalk along Watkins Drive, Early Childhood Services (Child Development Center), the easement planted with drought-tolerant bushes and trees, and the tubular steel fence. Beyond, the North District Phase I can be seen under construction in the middle distance along with other mature trees on campus. On the distant horizon, partial views of

the mountainous ridgeline can be seen. While the mountains are partially visible in the distance, intervening development prevents this perspective from being considered a scenic vista. The visual quality is moderate in this area as there are no distinctive visual resources in either the natural or built environments. Viewer sensitivity would be moderate as speed limits are 40 to 45 mph in the area, cars are parked along the roadways, and distant views are not dramatic enough to draw attention away from attending to the demands of driving.

Figure 4.1-43 KVP 10: Watkins Drive Looking Southwest toward Campus

Source: Google Earth 2020

From Watkins Drive, KVP 11 is oriented toward the Glen Mor Intermural Fields on the northeastern edge of East Campus (Figure 4.1-44). In the foreground, the fence along the campus boundary, a row of palm trees, and intramural field lighting feature prominently. The middle ground comprises a grassy field, a row of trees, and some buildings, beyond which the southern hillsides form the horizon line. The visual quality is moderately high as there is little intervening development, but there are also no remarkable visual resources, and the views of the distant hillsides are not particularly notable. Viewer sensitivity would be moderate through this area as speed limits are 40 to 45 mph in the area, cars are parked along the roadways, and distant views are not dramatic enough to draw attention away from attending to the demands of driving.

Figure 4.1-44 KVP 11: Watkins Drive Looking Southwest toward Campus

Source: Google Earth 2020

Scenic Vistas on and Near UCR

As noted above, scenic views of the hills and open space preserves are the predominant scenic vistas in the area. Scenic vistas for the campus include those publicly accessible and important panoramic views of the Box Springs Mountains approximately 1 mile to the north, northeast, east, and southeast of campus; Mount Rubidoux approximately 3 miles to the west; the San Bernardino Mountains approximately 15 miles to the northeast; and the San Gabriel Mountains approximately 20 miles to the northwest. These scenic vista areas can be seen, in general, from the existing Open Space Reserve, flat areas of expansive spaces in East Campus such as the Glen Mor Intermural Fields, certain parts of the UCR Botanic Gardens, and sections of Canyon Crest Drive and Big Springs Road. In other areas of East Campus, the existing views of the distant mountains are intermittent and substantially obstructed by on-campus and off-campus structures and trees. Portions of West Campus provide partial views of Mount Baldy, San Gabriel Mountains, and San Bernardino Mountains. West Campus views are generally accessible in agricultural areas unobscured by built structures and along roadways such as Everton Place, Iowa Avenue, and Martin Luther King Boulevard (Figure 4.1-34 and Figure 4.1-35). As shown in the KVPs, intervening development limits public views. However, publicly accessible, and at times, panoramic views of the Box Springs Mountains are visible from various sites around campus considered for development under the 2021 LRDP and are considered represented by KVP 9.

The UCR Botanic Gardens, located in the southeastern portion of East Campus, provides a scenic landscape and regional visual resource, containing landscaping features such as waterfalls, ponds, trails, and plant collections (Figure 4.1-30). Views of the UCR Botanic Gardens are not accessible from public vantage points on or off campus.

Light and Glare

Light refers to light emissions (brightness) generated by a source of light. Stationary sources of light typically include exterior parking lot and building security lighting, campus building lighting, illuminated signage, athletic field lighting, and street and traffic lights. Moving sources of light

include the headlights and taillights of vehicles driving on roadways. Ambient lighting is the general overall level of lighting in each area due to the various light sources present. Excessive lighting can interrupt human sleep. For discussion of lighting and its effects on wildlife, see Section 4.4, *Biological Resources.*

The UCR main campus and surrounding development within the City generate levels of light typical for a highly urbanized setting with substantial sources of ambient lighting. Due to the urban setting of the campus as well as the surrounding area, it is difficult to view the night sky under existing conditions.

Glare is defined as focused, intense light emanated directly from a source or indirectly when light reflects from a surface. Daytime glare is caused in large part by sunlight shining on highly reflective surfaces at or above eye level. Reflective surfaces are associated with buildings that have expanses of polished or glass surfaces, and the windshields of parked cars.

On-Campus Light and Glare

Most existing sources of nighttime illumination on campus come from interior and exterior building illumination and lighting along internal campus roadways, in surface parking lots, and along pedestrian pathways. Other sources of nighttime illumination include overhead lighting installed at the aquatics center, tennis courts, and athletic fields and stadiums illuminated during nighttime games and practices. UCR has replaced some campus lighting with high-efficiency, full cutoff, LED lamps and fixtures, which has reduced nighttime light pollution (UCR 2015). However, there remains unshielded lighting under existing conditions, some of which is used for highlighting architectural elements/features, security lighting, and legacy unshielded light fixtures. Existing sources of glare on campus include reflective surfaces such as building exteriors and glass. Glare from reflected sunlight off adjacent buildings is generally minimized due to the low density of development, the relatively low height of buildings (e.g., one to four stories), the extent of mature trees and landscaping, and the limited use of reflective glass surfaces in existing buildings. Some of the buildings at the center of the campus were constructed after 2000 and designed with reflective materials such as metal and large windows (e.g., the HUB as pictured in Figure 4.1-24).

Off-Campus Light and Glare

Off-campus lighting sources include overhead street lighting on local streets, headlights and taillights from vehicles traveling along the I-215/SR 60 freeway, headlights from the train, as well as traffic lights. Other sources of outdoor lighting near campus include lighting from residences, commercial businesses, parking lot lighting, and lighting from the park. The nearby commercial and residential structures have security lighting, architectural building highlighting, and landscape nighttime lighting. These all contribute to the artificial nighttime light levels.

The use of reflective building materials is generally low in the areas surrounding the campus. Buildings in the area are typically constructed of brick, stucco, or wood, and commercial buildings with large windows generally are set back from the street or campus uses. As such, opportunities for noticeable glare during daytime hours are low.

4.1.2 Regulatory Setting

Federal

There are no applicable federal regulations regarding the protection of visual resources that would be applicable to the proposed 2021 LRDP.

State

California Code of Regulations, Title 24

Title 24 of the California Code of Regulations (CCR), also known as the California Building Standards Code, consists of regulations to control building standards throughout the State. The California Electrical Code (Title 24, Part 3) and Green Building Standards Code (also referred to as the CALGreen Code; Title 24, Part 11) stipulate minimum light intensities for safety and security at pedestrian pathways, circulation ways, and paths of egress.

The CALGreen Code (24 CCR, Part 11, Paragraph 5.106.8, Light Pollution Reduction) provides that all nonresidential outdoor lighting must comply with the following:

- The minimum requirements in the California Energy Code (CEC) for Lighting Zones 1–4 as defined in Chapter 10 of the California Administrative Code
- Backlight, Uplight, and Glare (BUG) ratings as defined in the Illuminating Engineering Society's Technical Memorandum on Luminaire Classification Systems for Outdoor Luminaires
- Allowable BUG ratings not exceeding those shown in Table A5.106.8 in Section 5.106.85 of the CALGreen Code
- A local ordinance lawfully enacted pursuant to Section 101.7 of the CALGreen Code, whichever is more stringent

The 2019 updates to the CalGreen Code went into effect on January 1, 2020. They require nonresidential buildings to maximize light emitting diode (LED) technology in indoor and outdoor lighting plans.

University of California

Design Review Process

The UC initiated independent design and cost review of building plans in 1985 in response to concerns about the design quality management of a rapidly growing capital improvement program. Current UC policy 5.1 requires independent architectural design review and independent cost estimates of projects when a total project cost exceeds $5 million. The policy requires design reviews to be performed early in the design process, at suitable intervals during design, and at the time of completion of design. Selection of the review or reviewers and the format for the design review process are left to the discretion of the Chancellor. This policy is available online at https://www.ucop.edu/construction-services/facilities-manual/volume-3/vol-3-chapter-5.html#5-1. Additional information on the design process is available at https://www.ucop.edu/construction-services/facilities-manual/volume-3/vol-3-chapter-1.html.

University of California, Riverside

Long Range Development Plan

The LRDP is a general guide that discusses future land use patterns and development of facilities, circulation, open space and infrastructure. To assist in implementation of the LRDP, UCR references a number of more detailed documents, including the *Physical Design Framework* and *Campus Construction and Design Standards*, which are considered during the Design Review process. UCR considers these as living documents and will update these documents as necessary to continue to align with the 2021 LRDP.

Physical Design Framework

The UCR Physical Design Framework provides guidelines for future architects and planners to inform any physical changes to the campus, emphasizing the elements of the campus physical setting, landscape, and infrastructure, as well as architectural themes characteristic to the University. It provides guidance on the broader character of the campus as well as layout and specific focus areas, as well as specific guidelines for facility orientation, materials, components, design and color palette, massing, and articulation. It includes simple and legible guidelines to shape the campus' physical form, allowing the campus to evolve in a dynamic way that recognizes the physical and academic roots that define campus character.

Campus Construction and Design Standards

The 2007 *Campus Design Guidelines* has been recast and expanded as a living document in the form of the *Campus Construction and Design Standards*. This document includes up-to-date provisions related to lighting and includes requirements to focus on providing an even, consistent coverage, softening contrast ratios at edges and thus improving visibility by avoiding excess illumination and brightness. Details and specifications for light fixtures that meet these requirements have been incorporated as a campus standard. Additionally, new pedestrian walkways associated with the campus project would typically use the "UCR tan" color mixture to reduce surface glare.

UCR Design Review Process

Each proposed major capital project which involves new construction or exterior alterations undergoes a review process, consistent with the UC-wide process discussed above. The project designs are reviewed by the Design Review Board (DRB), which is comprised of outside design professionals who are advisory to the Chancellor, in discussion with the Campus Architect. For each major building, landscaping, or infrastructure project, a project-specific Project Advisory Committee offers programmatic and design input. The committee is made up of faculty, students, administrative leaders, and senior capital planning and design and construction staff.

The DRB, with the assistance of the Campus Architect, advises the Chancellor on the designs of new buildings, major landscape projects, and master planning efforts to ensure consistency with applicable planning principles and guidelines. All projects are reviewed a minimum of two times by the board.

The responsibilities of the DRB include, but is not limited to, the following:

- To assure compatibility with the approved 2021 LRDP and supporting planning documents that have been adopted by the campus

- To review planning studies, proposed building designs and siting alternatives for compatibility with their settings and appropriateness to their function programs and budgets
- To ensure that proposals for new campus projects are presented in a broad context, with due consideration given at all points of project development to issues of landscape design, circulation, and environmental protection
- To review all aspects of exterior urban and landscape design and to provide guidance to the design teams, building committees, and the campus planning committee
- To identify and articulate to the campus community planning and design issues critical to ongoing campus development

4.1.3 Environmental Impacts and Mitigation Measures

Significance Criteria

UCR utilizes the following 2020 CEQA Guidelines Appendix G significance criteria questions with minor modifications related to Aesthetics.

Would the proposed 2021 LRDP:

a) Have a substantial adverse effect on a scenic vista?
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?
c) In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from publicly accessible vantage point)?
d) Create a new source of substantial light or glare that would adversely affect daytime or nighttime views in the area?

Issues Not Evaluated Further

State Scenic Highways (Criterion b)

The Initial Study for the proposed 2021 LRDP (Appendix A) determined that that UCR campus is not located within the viewshed of an identified State Scenic Highway. Thus, the threshold related to this subject is not evaluated further.

Analysis Methodology

The evaluation of potential aesthetic and visual resource impacts is based on on-site review of the LRDP area and surrounding environment, review of site photographs representing KVPs, and surrounding areas. In determining the level of significance, this analysis focuses on the nature and magnitude of visual change, the number of public vantage points from where this change would be visible, and the number of viewers who would be affected by this change. In addition, the analysis considers viewer sensitivity as a function of the visibility of resources in the landscape, proximity of the viewers to the visual resource, elevation of the viewers relative to the visual resource, frequency and duration of views, numbers of viewers, and types and expectations of individuals and viewer groups. It is assumed that projects implemented under the 2021 LRDP would comply with existing procedures pertaining to development within UCR (e.g., Design Review) and would be consistent with the UCR Physical Design Framework.

As addressed in CEQA analysis, *aesthetics* refers to visual concerns. *Aesthetics* or *visual resources analysis* is a process to assess the visible change that could result from project implementation. Methodologies developed by federal and State agencies have been adopted here for assessments consistency with industry-wide standards (Bureau of Land Management 1984, Federal Highway Administration 2015). While the conclusions of these assessments may seem partly subjective, value is measured based on generally accepted criteria for quality, viewer sensitivity, and viewer response, supported by consistent levels of agreement in research on visual quality evaluation. Modifications in a landscape that repeat basic elements found in that landscape are said to be in harmony with their surroundings. Changes that do not harmonize often look out of place and can be found to form an unpleasant contrast when their effects are not evaluated adequately. An aesthetics impacts assessment uses data from three steps, as follows:

- Identify visual features or resources in the landscape from KVPs
- Assess the character and quality of those resources relative to the overall regional visual character
- Evaluate potential significance of features in the landscape to people who view them and determine their potential sensitivity to the changes proposed by the project

For the purposes of this EIR, scenic vistas are viewpoints that provide a publicly accessible expansive and panoramic view of a large geographic area. Furthermore, panoramic views provide visual access to a large geographic area for which the field of view can extend into the distance. They can be associated with a dramatic change in elevation, but they can also be from an undeveloped flat area toward features, such as mountains in the distance. In addition, these views are typically available from a publicly accessible viewpoint, such as roads or public gathering places, rather than views available from private residences. Near the UCR campus, the Box Springs Mountains are the most prominent visual feature from many locations, and thus sweeping panoramic views of the Box Springs Mountains are considered a scenic vista for the purposes of this EIR. As pictured in the KVPs described above, scenic vistas as defined by UCR are not available from most locations around the campus, with the exception of those visible at KVP 1 and KVP 2 on Martin Luther King Boulevard and Chicago Avenue, and KVP 9 on Canyon Crest Drive (see Figure 4.1-34, Figure 4.1-35, and Figure 4.1-42).

Although not considered scenic vistas, other visual features of note in the vicinity include Mount Rubidoux to the west, the San Bernardino Mountains and the San Gabriel Mountains to the northwest, with these ranges being visible from the campus only when atmospheric conditions permit.

Visual character is described in terms of high, moderate, and low visual quality. Scenic quality can be described best as the overall impression a viewer retains after driving through, walking through, or flying over an area (Bureau of Land Management 1984). Viewer response is a function of the number of viewers, number of views seen, distance of the viewers from the KVP, and the viewing duration. Viewer sensitivity reflects the extent of public concern for a particular viewshed (Federal Highway Administration 2015). High quality areas must be vivid, memorable, distinctive, unique, and intact; they can be natural, park-like, or urban (with urban areas displaying strong and consistent or notable architectural and urban design features). Moderate quality areas are generally pleasant appearing but are considered common or ordinary as they lack dramatic or memorable features. Low quality areas may be visually out of place, lack visual coherence, not have compositional harmony, or contain elements considered an eyesore. The potential for degradation of visual character of the campus and its surroundings is evaluated in terms of substantial adverse

change in the visual character or quality, including a change in land use, and development of currently undeveloped land. Visual change that is compatible with existing patterns of development would not be considered a significant impact.

This analysis also reviewed potential impacts from new or increased sources of light and glare. Light sources may include exterior and interior building lighting, parking lot lighting, lighting from recreational fields, streetlights, pathway and security lighting, and headlights/taillights from vehicles. *Glare* refers to light from reflective surfaces that is so bright that it creates a nuisance or a hazard or inhibits the ability to see effectively.

2021 LRDP Objectives and Policies

The proposed 2021 LRDP contains objectives and policies relevant to aesthetics and visual resources:

Land Use (LU)

- Objective LU1 – Serve as good stewards of limited campus lands and natural resources as UCR continues to grow and develop toward its enrollment goals
  - Policy: Promote increased densities on East Campus through increased site coverage and heights of future projects flanking northern and western gateways and campus loop road
- Objective LU2 – Retain existing land-based research operations on West Campus, while balancing the need for innovative partnerships and initiatives
  - Policy: Require increased development density on East Campus
- Objective LU3 – Maintain the general height and character of the Mid-Century Modern Core to preserve its unique design legacy in the Mid-Century Modern Core
  - Policy: Plan and design future buildings consistent with the existing established heights, building setbacks, and character of the Academic Center
  - Policy: Retain the Carillon Mall as a major campus mall, respecting its existing dominant width of approximately 200 feet throughout its length
- Objective LU4 – Generally locate higher density future growth adjacent to and outside of the campus loop road
  - Policy: Allow increased heights and increased density on underutilized lands such as surface parking lots and in infill areas to meet future needs
- Objective LU5 – Continue to grow on-campus student housing to 40 percent and increase student life facilities
  - Policy: Provide increased housing capacity and student life facilities in existing student neighborhoods in the northern portions of East Campus
- Objective LU6 – Enhance Canyon Crest Drive as a new campus “Main Street” and northern gateway
  - Policy: Ensure that all proposed buildings include a mix of active uses that have a street interface

- Objective LU7 – Celebrate the University Avenue corridor as the primary gateway into campus
  - Policy: Promote new facilities in this area which serve a broad swath of the campus population, engage the community, and support multi-modal access
- Objective LU8 – Enhance campus edges to promote a welcoming impression to visitors and visually communicate the transition to campus-owned land areas
  - Policy: Locate key campus community-related facilities to engage campus edges and enhanced landscape strategies
- Objective LU9 – Develop and maintain current principles and standards on the design of campus buildings and landscapes
  - Policy: Provide project designers with a current version UCR Physical Design Framework and Campus Construction and Design Standards

Open Space (OS)

- Objective OS1 – Preserve and enhance major open spaces (malls, courtyards, streetscapes, quads, and pedestrian corridors) which contribute to the unique character and beauty of UCR
  - Policy: Limit future campus development from intruding into major open spaces as defined by the Open Space Framework Diagram [Figure F3.3 of the proposed 2021 LRDP], while allowing for supporting elements like individual project site design, landscaping, signage, etc., but ensuring those are sensitively integrated
- Objective OS2 – Balance open spaces with the built environment throughout all areas of campus and provide opportunities for indoor-outdoor relationships between campus facilities and the landscape
  - Policy: Encourage new facility construction and renovations to activate first floors to allow for increased access and integration with the natural campus environment
- Objective OS3 – Provide opportunities to engage with informal, naturalized landscapes with a special focus on internal campus Open Space Reserve areas and the UCR Botanic Gardens
  - Policy: Ensure safe, accessible entry points to informal landscape areas for passive recreational opportunities to benefit the entire campus population
- Objective OS4 – Consider views to Box Springs Mountains and the San Gabriel Mountains at the terminus of view corridors and from primary campus open spaces to the extent feasible
  - Policy: Consider the preservation of terminal views from locations accessible to the general public along public corridors and panoramic views from primary open spaces in the location and configuration of new facilities or the introduction of new landscape features
- Objective OS5 – Demonstrate an increased commitment to preservation and enhancement of the natural environment through the design and placement of future campus landscapes
  - Policy: Consider the ecological and potential stormwater management functions of proposed landscapes. Utilize climate-appropriate, native/drought-tolerant, and/or low maintenance landscape materials outside of signature campus open spaces

- Policy: Protect the steep and natural hillsides on the southeast campus designated as an Open Space Reserve, to protect cultural resources, wildlife habitat, provide a visual backdrop to the campus, and protect against erosion
- Policy: In Open Space Reserve areas, where arroyos and other natural features exist, preserve wherever feasible, existing landforms, native plant materials, and trees. Where appropriate, restore habitat values

Impact Analysis

Impact AES-1 Result in a Substantial Adverse Effect on a Scenic Vista.

Development under the proposed 2021 LRDP could block or impede views of scenic vistas, namely views of the Box Spring Mountains. Impacts to scenic vistas would be significant and unavoidable.

Agricultural lands on West Campus would mostly remain in their current state for land-based research, including those locations near KVP 1 and KVP 2. Thus, views would remain available to motorists traveling on Chicago Avenue, Martin Luther King Boulevard, and Iowa Avenue looking east. New development may occur in infill locations including the Agricultural/Campus Research, Student Neighborhood, Campus Support, and University Avenue Gateway LRDP land use designations. These locations are surrounded on three sides by existing development. Some of these new structures would be visible, similar to the CARB facility shown in the middle ground of KVP 2, however this development on West Campus would not substantially impair scenic vistas to the general public.

Under the proposed 2021 LRDP, a resource-efficient approach to land use planning on East Campus would be reinforced to accommodate growth pressures for the projected increase in student and faculty population. As currently envisioned, development under the proposed 2021 LRDP would occur primarily in previously disturbed areas, adjacent to previously developed areas, surface parking areas, generally along North/South/East/West Campus Drive, and generally along University Avenue, Canyon Crest Drive, Big Springs Road, Aberdeen Drive, and West Linden Street. Additionally, development under the 2021 LRDP would primarily be infill development or expansion of already developed areas. Some limited development is programmatically assumed for a new interpretative center in the UCR Botanic Gardens LRDP land use designation, however, no specific plans have been proposed.

From on campus, views toward the nearby hillsides and mountains are framed by the campus buildings, where architectural style, orientation, and landscaping are designed to evoke similar shapes, colors, and horizon lines as those created by the natural landscape. From nearby roadways looking toward the campus, including West Linden Street, Blaine Street, Watkins Drive, Canyon Crest Drive, and University Avenue, the existing built environment is either distant enough from the scenic landscape not to be visible, or dense enough not to afford expansive views of that landscape. Impacts on scenic vistas in the areas listed above would be **less than significant**.

Additional student housing is projected to occur through strategic infill and selective replacement of existing housing facilities in the northern part of East Campus, including the North District Development area, Bannockburn Village and Oban Apartments on Canyon Crest Drive south of West Linden Street, and the Falkirk Apartments on Canyon Crest Drive north of West Linden Street. Infill development may replace the existing Amy S. Harrison Athletic Field near the northeast corner of University Avenue and Canyon Crest Drive (KVP 9). New development would be designed and

constructed in a manner consistent with, and generally adjacent to, existing development which has already altered some long-distance views. In addition, any campus-related development would be required to comply with the UCR Design Review process and be generally consistent with the Physical Design Framework.

As summarized in Table 4.1-1, most of the KVPs in the area of West Linden Street and Canyon Crest Drive, where these sites are situated, do not feature expansive views that meet the definition of a scenic vista. Where new development would replace existing, deteriorating buildings, no new impact to scenic vistas would occur, even if those buildings are taller. The exception would be academic buildings that could be constructed where the athletic and soccer fields occur east of Canyon Crest Drive and the CHASS Interdisciplinary Building (KVP 9 and similarly situated views within campus). Because expansive views are available across the campus from this site, scenic vistas could be impacted with the construction of new buildings that may be five to eight stories or up to 65 to 80 feet tall. Although, adherence to the Design Review process, including the UCR *Physical Design Framework*, would ensure that new buildings fit in and contribute to the current sense of place and developing with campus expansion, new campus development in this area would potentially block views of the Box Springs Mountains from the roadway and pedestrian walkways. As such, impacts to scenic vistas for KVP 9 would be considered **significant.**

The UCR Botanic Gardens is in the easternmost portion of East Campus, at the foothills of the Box Springs Mountains, and serves a unique role as a venue for a wide array of teaching, research, and demonstration activities. Approximately one-third of the UCR Botanic Gardens land remains natural, featuring the native habitat of the region. The UCR Botanic Gardens houses several buildings on the site, including a Gatehouse with two small restrooms and a meeting room near the entrance. Located on the Gardens property are a second restroom building, garage used as an office and equipment space, propagation lath house, greenhouse, and a business office, the Schneider House, which is located along the eastern edge of the Gardens approximately halfway up the property from the entrance.

The predominant UCR Botanic Gardens uses may include demonstration gardens, habitat restoration and management areas, and incidental facilities such as a new interpretive center, seating and viewing areas, and other amenities typically compatible with a botanic garden program. Secondary permissible uses may include support facilities for the UCR Botanic Gardens and parking. Development proposed within the UCR Botanic Gardens area includes facilities typical of this type of use and thus would not substantially affect the existing views of the UCR Botanic Gardens nor substantially affect the distant views of the Box Springs Mountains as future proposed development such as trails would afford partial views of these areas. Therefore, impacts on scenic vistas would be **less than significant**.

Mitigation Measures

No feasible mitigation available.

Significance After Mitigation

Impacts would be significant and unavoidable.

Impact AES-2 DEGRADE EXISTING VISUAL CHARACTER OR QUALITY.

DEVELOPMENT UNDER THE PROPOSED 2021 LRDP WOULD INCLUDE CONSTRUCTION OF NEW FACILITIES AND GREEN SPACE ON THE UCR CAMPUS AND RENOVATIONS OF EXISTING STRUCTURES. PHYSICAL CHANGES WOULD NOT DEGRADE THE VISUAL CHARACTER OF THE CAMPUS OR SURROUNDING AREAS. IMPACTS WOULD BE LESS THAN SIGNIFICANT. NO MITIGATION MEASURES ARE REQUIRED.

Construction

Potential visual impacts would arise from intermittent construction activities (i.e., barricade installation, construction staging, and grading). During construction, areas would be graded and excavated, which would include the removal of existing structures, and the temporary removal of some of the existing ground cover and vegetation. The types and number of equipment would vary throughout the construction period, depending on the types of activities occurring, but the presence of trucks with building materials and equipment would result in short-term visual degradation. These would occur on construction sites and in nearby staging areas, as appropriate for each project. Visual degradation would be limited to the duration of construction and to specific project sites. From public roadways and nearby public places, such as shopping centers, the visibility of construction staging would vary, depending on project location. While construction sites could be unsightly, it would be temporary, phased over time, and screened to an extent with construction fencing as noted in the Campus Construction and Design Standards. While this would temporarily change the visual character and quality of the site, construction activities and equipment are common features in the area, and would not result in permanent visual degradation and would not substantially degrade the existing visual character or quality of the site and its surroundings. Therefore, impacts during construction would be **less than significant.**

Operation

Existing visual quality of the campus is generally high, due to the existing high number of visual resources such as consistent architectural elements, landscaping, and resources such as the UCR Bell Tower and Carillon Mall, Modernist and contemporary architectural styles, and open spaces, such as Picnic Hill and the UCR Botanic Gardens. New development would be designed to support the campus academic mission and enhance the sense of place on the campus and in nearby student housing and mixed-use facilities, to sustain the well-being of UCR's student, faculty, and staff communities (UCR 2010). All new development on campus would be subject to the design review and approval processes described in the *Physical Design Framework*, that includes multiple working groups and advisory committees. These advisory committees feature membership from Faculty Senate, undergraduate and graduate student associations, and other campus stakeholders who consider topics as broad as pedestrian and vehicular circulation, campus art, and orderly growth.

In some cases, the existing built environment is neither cohesive in terms of design and plan nor maintained to a degree that the buildings and cultivated landscape are harmonious or remarkable. This is particularly evident in the older student apartment complexes along Blaine Street, West Linden Street, and Canyon Crest Drive, as described in KVP 3, KVP 4, KVP 5, and KVP 6 (Figure 4.1-36, Figure 4.1-37, Figure 4.1-38, and Figure 4.1-39). Thus, older development competes visually with newer construction and reduces the visual quality overall. This is particularly true along areas of West Linden Street and Blaine Street, west of Watkins Drive and west and east of Canyon Crest Drive. New development that results from implementation of the proposed 2021 LRDP would therefore have a beneficial effect on visual quality as architectural and landscape design would

comply with the UCR Physical Design Framework and increase the unity, harmony, and overall quality of these areas.

As shown on Figure F3.2, Density Framework, of the proposed 2021 LRDP, heights of up to 55 feet to 80 feet would be allowed within the northern portions of East Campus; heights of up to 55 feet to 65 feet would be allowed in the Academic Center; heights of up to 55 feet to 85 feet would be allowed in the southern portions of East Campus; and heights of up to 55 feet to 85 feet would be allowed in the Campus Support (55 feet high), Student Neighborhood (65 feet high), Agricultural/Campus Research (65 feet high) and University Avenue Gateway (85 feet high) LRDP land use designations. The proposed heights will cast shade and shadow during times of the day during different seasons of the year similar to that of other taller campus facilities on campus (e.g., North District Phase I – 6 stories, Dundee Glasgow – 7 stories). As specific projects are not being evaluated here, exact shadow studies are not possible. Nonetheless, new sources of shadow would change the degree to which different areas experience direct sunlight.

The proposed 2021 LRDP would strengthen the visual quality by replacing deteriorating residential buildings, increasing the sense of place campus-wide, and enhancing gateways on Canyon Crest Drive and University Avenue. These would improve visual resources and overall scenic quality on and off campus. As noted above, a new interpretative center has also been programmatically assumed in the UCR Botanic Gardens LRDP land use designation. This development would be similar in nature to the existing structures, which include several buildings on the site, as described in greater detail in the environmental setting above.

Agricultural lands on West Campus would mostly remain in their current state for land-based research, including those locations near KVP 1 and KVP 2. New development may occur in infill locations on West Campus including the Agricultural/Campus Research, Student Neighborhood, Campus Support, and University Avenue Gateway designations. These locations are surrounded on three sides by existing development. Some of these new structures would be visible, similar to the CARB facility shown in the middle ground of KVP 2 and would change these parcels from agricultural land to urbanized land. However, these changes are considered a **less than significant impact.**

As described in the regulatory setting above, as new construction would undergo design review, new buildings would have a high-quality visual character, such that the overall visual quality of the campus would be maintained or improved. Therefore, the proposed 2021 LRDP would have **less than significant impacts** on visual character and quality.

Mitigation Measures

No mitigation required.

Significance After Mitigation

Impacts would be less than significant without mitigation.

Impact AES-3 CREATE A NEW SOURCE OF LIGHT OR GLARE.

IMPLEMENTATION OF THE PROPOSED 2021 LRDP WOULD LEAD TO MORE INTENSIVE DEVELOPMENT ON THE CAMPUS AND NEW SOURCES OF NIGHTTIME ILLUMINATION. FUTURE DEVELOPMENT WOULD BE REQUIRED TO COMPLY WITH UCR CAMPUS CONSTRUCTION AND DESIGN STANDARDS AND CALIFORNIA POLICIES AND STANDARDS SPECIFICALLY DESIGNED TO REDUCE LIGHTING IMPACTS. ADHERENCE TO THESE POLICIES AND STANDARDS AS WELL AS INCORPORATION OF MITIGATION MEASURES MM AES-1 AND MM AES-2 WOULD REDUCE LIGHT AND GLARE IMPACTS TO A LESS THAN SIGNIFICANT LEVEL.

As discussed in Section 4.1.1, existing moderate to high levels of exterior lighting are typical for the level of campus facilities, commercial, and residential development in the urbanized project area and immediate vicinity. Existing light sources located in the immediate vicinity of the campus area include street and parking lot lighting, lighting associated with recreational uses, campus facilities, commercial and residential uses, as well as lighting from vehicle headlights and taillights.

Construction

Temporary and intermittent glare during construction would be anticipated from sunlight reflecting from equipment or vehicle windshield or material staging areas; however, the amount of glare from such equipment is not anticipated to be substantial given the limited number of construction equipment on-site at any one time. Furthermore, the duration of construction equipment is temporary, and construction areas are routinely fenced (opaque screen mesh) from public view. Impacts would be a **less than significant impact**.

Construction may occasionally occur at night with associated equipment and construction lighting. However, construction would primarily be limited to daytime hours. In addition, some sites may utilize temporary nighttime security lighting during construction. Use of construction lighting would be minimal and temporary in nature and focused on the work area within the project site. No long-term significant lighting or glare impacts are anticipated during construction. Impacts would be a **less than significant impact**.

Operation

As described in Section 4.1.1, there is existing moderate to high levels of exterior lighting that are typical for the level of campus, commercial, and residential development in the LRDP area and immediate vicinity.

Implementation of the proposed 2021 LRDP would create new light sources associated with new or remodeled residential and academic buildings, parking structures, recreational uses, and lighting for pathways, signs, transit hubs, security, and pedestrian crossings. These would include building safety lighting, parking lot lights, street/pathway lighting, lighting from recreational related uses, architectural lighting, signage, lights that could emanate from windows at night, and cars entering and exiting parking lots and parking structures at night.

Glare could be produced by the sun shining on the windshields of parked vehicles, reflective glass exteriors, or other light-colored surfaces. The exterior or façade of facilities developed under the proposed 2021 LRDP could include reflective surfaces such as glass and metal that have the potential to create glare.

New sources of exterior lighting would be subject to the development guidelines and standards of California Title 24, as assured by the *Physical Design Framework* or *Campus Construction and Design Standards* that specify fundamental development standards including:

- Developments include sufficient lighting for safety
- All new and replacement pathway, street, and parking facilities light fixtures will be full cutoff and shielded as necessary
- Lighting should be visually compatible to developments, and as appropriate, highlight key features such as special building or landscape elements
- Specialty lighting shall meet the programmatic and functional requirements of the development
- Typical campus exterior light temperatures are as follows:
    - Street and parking lot lighting: 5,000 Kelvin (K)
    - Walkway lighting: 4,000K
    - Special area and accent lighting: 3,000K

The campus is currently characterized by a moderate to high level of nighttime illumination, depending on location, that allows for safe and secure nighttime operation of campus facilities and events and on-campus residential life. New structures developed under the 2021 LRDP would comply with the current lighting standards outlined in the Physical Design Framework or the Campus Construction and Design Standards. Infill development along Canyon Crest Drive, University Avenue, West Linden Street, Blaine Street, Big Springs Road, Aberdeen Drive, and North/South/East/West Campus Drive may improve lighting conditions, making those areas safer for pedestrians traversing the campus and its residential neighborhoods. Furthermore, the Physical Design Framework requires that sidewalks be shaded to the greatest extent feasible to reduce heat. Landscaping would also reduce the amount of light that would spill into public places from uncovered windows and exterior fixtures.

Additionally, development under the proposed 2021 LRDP would occur primarily within previously disturbed areas, adjacent to previously developed areas, and surface parking areas where parking lot lighting would be removed for the construction of new structures, potentially reducing the amount of lighting within that specific area.

Sensitive light and glare receptors in Riverside include residents in nearby areas; however, as most development proposed by the 2021 LRDP would occur in already developed areas, sensitive receptors would not be impacted more than under current conditions by new light sources. New lighting would be in proximity to off-campus residential uses adjacent to campus, but lighting within internal campus would be similar to that of existing lighting conditions. Although the new lighting associated with implementation of the proposed 2021 LRDP would contribute to the overall ambient glow of the campus and immediate surrounding areas, lighting on on-site campus uses would be required to be reflected away from adjacent residential premises to prevent light spillover. Further, the UCR main campus and surrounding development within the City generate levels of light typical for a highly urbanized setting with substantial sources of existing ambient lighting. Due to the urban setting of the campus as well as the surrounding area, it is difficult to view the night sky under existing conditions. However, new sources of exterior light could impact visibility of the night sky if they were to be bright enough or directed upward such that they increase the light levels in the area substantially. Thus, impacts to light and glare is considered to be significant. New lighting would be subject to the Campus Construction and Design Standards along with Mitigation Measure **MM AES-1**. With implementation of the Campus Construction and Design Standards and Mitigation Measure **MM AES-1**, impacts would be **less than significant with mitigation incorporated**.

As projects are implemented under the proposed 2021 LRDP, they would be developed in accordance with the UCR Physical Design Framework, which requires that building materials and color palettes are contextually sensitive. New pedestrian walkways associated with the project would typically use the "UCR tan" color mixture to reduce surface glare.

Increased vehicular traffic could impact glare effects along Martin Luther King Boulevard and Canyon Crest Drive, University Avenue and Everton Place, east of Iowa Avenue, West Linden Street, west of Canyon Crest Drive, West Linden Street and Blaine Street, and Watkins Drive, east of Canyon Crest Drive, as vehicles enter and exit parking structures. However, these effects would be temporary and adjacent uses would not experience significant impacts from increased glare. Furthermore, the construction of new parking facilities in garage structures would limit glare from parked cars.

With adherence to the *Campus Construction and Design Standards*, the UCR *Physical Design Framework*, the policies in the proposed 2021 LRDP related to light and glare, and incorporation of Mitigation Measures **MM AES-1 and MM AES-2**, impacts would be **less than significant with mitigation incorporated**.

Mitigation Measures

MM AES-1

UCR shall incorporate site-specific consideration of the orientation of the building, use of landscaping materials, lighting design, and choice of primary façade materials to minimize potential off-site spillover of lighting and glare from new development. As part of this measure and prior to project approval, UCR shall require the incorporation of site- and project-specific design considerations (to be included in the lighting plans) to minimize light and glare, including, but not limited to, the following:

- New outdoor lighting adjacent to on-campus residences and adjacent off-campus sensitive uses shall utilize directional lighting methods with full cutoff type light fixtures (and shielding as applicable) to minimize glare and light spillover.
- All elevated light fixtures such as in parking lots, parking structures, and athletic fields shall be shielded to reduce glare.
- Provide landscaped buffers where on-campus student housing, uses identified as Open Space Reserve and UCR Botanic Gardens, and off-campus residential neighborhoods might experience noise or light from UCR activities.
- All lighting shall be consistent with the Illuminating Engineering Society of North America (IESNA) Lighting Handbook.
- The UCR Planning, Design, & Construction staff shall review all exterior lighting design for conformance with the Campus Design and Construction Standards.

Verification of inclusion in project design shall be provided at the time of design review and lighting plans shall be reviewed and approved prior to project-specific design and construction document approval.

MM AES-2

Ingress and egress from new parking areas and parking structures shall be designed and situated to direct vehicular headlights away from adjacent residential uses, as necessary. Walls, landscaping, or other light barriers and shielding shall be provided where appropriate. Site plans shall be reviewed and approved as part of project-specific design and construction document approval.

Significance After Mitigation

Impacts would be less than significant with Mitigation Measures MM AES-1 and MM AES-2 incorporated.

4.1.4 Cumulative Impacts

The cumulative context for aesthetic resource impacts for the proposed 2021 LRDP include the existing and planned land uses on and around the campus, including in adjacent neighborhoods in Riverside. Development of past and current projects and future projects continue to alter the visual environment of the city and the surrounding area. The projects listed in Table 4-1, represent development and redevelopment that will physically change the visual environmental setting on the campus, creating cumulative on-campus impacts; further described in Section 4 are several neighborhood plans that will also contribute to cumulative aesthetic impacts to the city of Riverside in combination with development facilitated by the proposed 2021 LRDP.

The largest of the on-campus projects listed in Table 4-1, is the North District mixed-use development, a multi-phase project that would have the most potential to cause aesthetic impacts as it increases density and changes the visual character of the area in which it is being or will be built. However, aesthetics impacts for this development were found to be **cumulatively less than significant** and, even, beneficial.

Elsewhere, the Eastside Neighborhood Plan will implement development of single- and multi-family residential, retail, and industrial areas directly west of West Campus, east of the downtown neighborhood, and south of Hunter Industrial Park. Plans related to the Eastside Neighborhood include the University Avenue Specific Plan, which directs land uses and transportation modes along the University Avenue corridor, and the Riverside Marketplace Specific Plan, which directs land use and historic preservation in the Marketplace area (City of Riverside 2009). The Sycamore Canyon Specific Plan occurs in the Canyon Crest Neighborhood south of West Campus and southwest of the I-215/SR 60 freeway. The main objective of this specific plan is to direct the development of existing and annexed lands for residential uses in a manner that preserves open space areas high in scenic quality, biological, and cultural significance, including the Sycamore Canyon Park (City of Riverside 2007b).

These specific plans are designed to comply with the Citywide Design and Sign Guidelines, which limit impacts to aesthetic resources by reducing interruptions of scenic vistas, maintaining and enhancing scenic resources and visual character, and reducing light and glare in various planning areas. The City's General Plan also includes policies that reduce any given project's contribution to cumulative aesthetic impacts related to scenic vistas and light and glare (City of Riverside 2007b).

These planning areas are in the vicinity of UCR but are not visible from public vantage points on or adjacent to campus. Despite the adjacency, development in those areas would occur in areas that have existing development and would be required to comply with the policies concerning community character, design, and aesthetics of the City's General Plan, the City's Municipal Code, and the City's Citywide Design and Sign Guidelines. Furthermore, the Hillside Residential designation

in the City's General Plan limits development in ecologically and visually sensitive areas, reducing potential cumulative impacts but regulating the amount of development that can occur near areas like Box Springs Mountains or Sycamore Canyon Park. Thus, the regulatory environment and design guidelines for the city provide a framework for future development to enhance community cohesion and visual identity, ensure design compatibility, strengthen linkages between UCR and the surrounding community, and preserve natural amenities and views.

Academic buildings could be constructed where the athletic and soccer fields occur east of Canyon Crest Drive and the CHASS Interdisciplinary Building (KVP 9 and similarly situated views within campus). Because expansive views are available across the campus from this site, scenic vistas could be impacted with the construction of new buildings that may be five to eight stories or up to 65 to 80 feet tall. Although, adherence to the Design Review process, including the UCR *Physical Design Framework,* would ensure that new buildings fit in and contribute to the current sense of place and developing with campus expansion, new campus development in this area would potentially block views of the Box Springs Mountains from the roadway and pedestrian walkways. As such, impacts to scenic vistas for KVP 9 would be considered **significant.** Therefore, the project's contribution to impacts to scenic vistas (Impact AES-1) would be **cumulatively significant**.

Cumulative effects of lighting are visible over a wide area, and collective lighting from denser development can create skyglow, which would be a significant cumulative impact. The campus and surrounding areas are in an urban setting with lighting from streetlights, illumination for paths, buildings, and other facilities and structures. As described in Section 4.1.4, implementation of the 2021 LRDP would introduce new lighting sources, but these would be like existing sources. Campus lighting design guidelines and lighting regulations under CalGreen would limit light trespass and glare on areas adjacent to UCR. Impacts would be less than significant with the implementation of **MM AES-1** and **MM AES-2**. Therefore, the project's contribution to light and glare (Impact AES-3) would be **cumulatively less than significant with mitigation incorporated.**

4.1.5 References

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4.2 Agricultural Resources

This section describes the level and type of existing agricultural resources in and around campus, including identification of any Prime Farmland, Unique Farmland, or Farmland of Statewide Importance and addresses the potential for implementation of the proposed 2021 LRDP to result in the conversion of agricultural lands to other uses.

4.2.1 Environmental Setting

Regional Setting

The citrus industry was the mainstay of the region's economy starting in the late nineteenth century and, as recently as the mid-1950s, large areas of Riverside remained in citrus groves. The late twentieth century saw a significant increase in pressure to convert agricultural land to suburban uses and, as a result, farmland has slowly been replaced by non-agricultural uses in the City of Riverside (City). The only significant block of agriculture remaining in the City limits is the Arlington Heights Greenbelt, in the southern and central portion of the City. Even in this area, many of the citrus groves are being converted to wholesale nurseries. More farmland conversion occurs in the western portion of the County of Riverside, where the City is located, than other areas of the County (City of Riverside 2007).

Campus Setting

UCR's agricultural roots are older than the University itself, when the UC founded the Citrus Research Center and Agricultural Experiment Station (CRC-AES) in 1907. The CRC-AES is managed by the Department of Agricultural Operations, a support department of the College of Natural and Agricultural Sciences. The mission of CRC-AES is to discover and disseminate research-based knowledge to ensure an abundant and nutritious food supply, protection of natural resources, healthy people and communities, and economic and ecological sustainability for the future of California, the nation, and the world. The CRC-AES at UCR is part of the broader UC Division of Agriculture and Natural Resources, whose vision is to address challenges to the State to ensure a high quality of life, a healthy environment, and economic success for future generations.

The Department of Agricultural Operations serves as a point of integration for applied and basic research under field, greenhouse, and screenhouse conditions and offers the opportunity to collaborate across disciplines. CRC-AES hosts research projects addressing issues in agriculture, biotechnology, horticulture, plant pathology, entomology, nematology, food systems, natural resources, environmental sciences, and social sciences. CRC-AES includes the U.S. Department of Agriculture (USDA) Germplasm Repository for Citrus and Dates and active programs involving community participants, research faculty from other UC campuses, county-based UC Cooperative Extension Advisors, as well as collaborations with other institutions outside of California.

The UCR campus contains 21 different fields and many agricultural facilities such as greenhouses, screen and lath house spaces, and services for research projects. West Campus contains a variety of plant species for agricultural research, including different types of citrus, avocado, European olive, and corn (Psomas 2019; Appendix D). UCR also manages the 540-acre Coachella Valley Agricultural Research Station located 90 miles southeast of campus, which was adopted as a mitigation measure for the loss of agricultural land at UCR and would not be affected by the 2021 LRDP.

The UCR campus contains land categorized as Prime Farmland, Farmland of Statewide Importance, Unique Farmland (collectively referred to herein as "Farmland"), and Farmland of Local Importance (as described in Section 4.2.2 below). Most of the categorized Farmland is on West Campus, though a relatively small area is on East Campus near the USDA Salinity Laboratory north of the UCR Botanic Gardens (DOC 2016). The remaining acreage is considered urban and built-up land or other land (on East Campus). Existing farmland categories on the UCR campus are described in Table 4.2-1 and shown in Figure 4.2-1.

Table 4.2-1 UCR Existing Farmland

FMMP Category	East Campus Acreage	West Campus Acreage
Prime Farmland	0	265.9
Farmland of Statewide Importance	10.7	85.6
Farmland of Local Importance	0	17.3
Unique Farmland	1.5	24.4
Urban and Built-Up Land	431.8	63.0
Other Land	159.6	47.6
Total Acreage (Rounded)	**604**	**504**

FMMP = Farmland Mapping and Monitoring Program

Source: DOC 2016

East Campus

East Campus Farmland is primarily Farmland of Statewide Importance (10.7 acres) with some Unique Farmland (1.5 acres) concentrated near the eastern campus boundary at the USDA Salinity Laboratory, a seven-acre research facility run by the USDA Agriculture Research Service's Agricultural Water Efficiency and Salinity Research Unit (USDA 2019)[1].

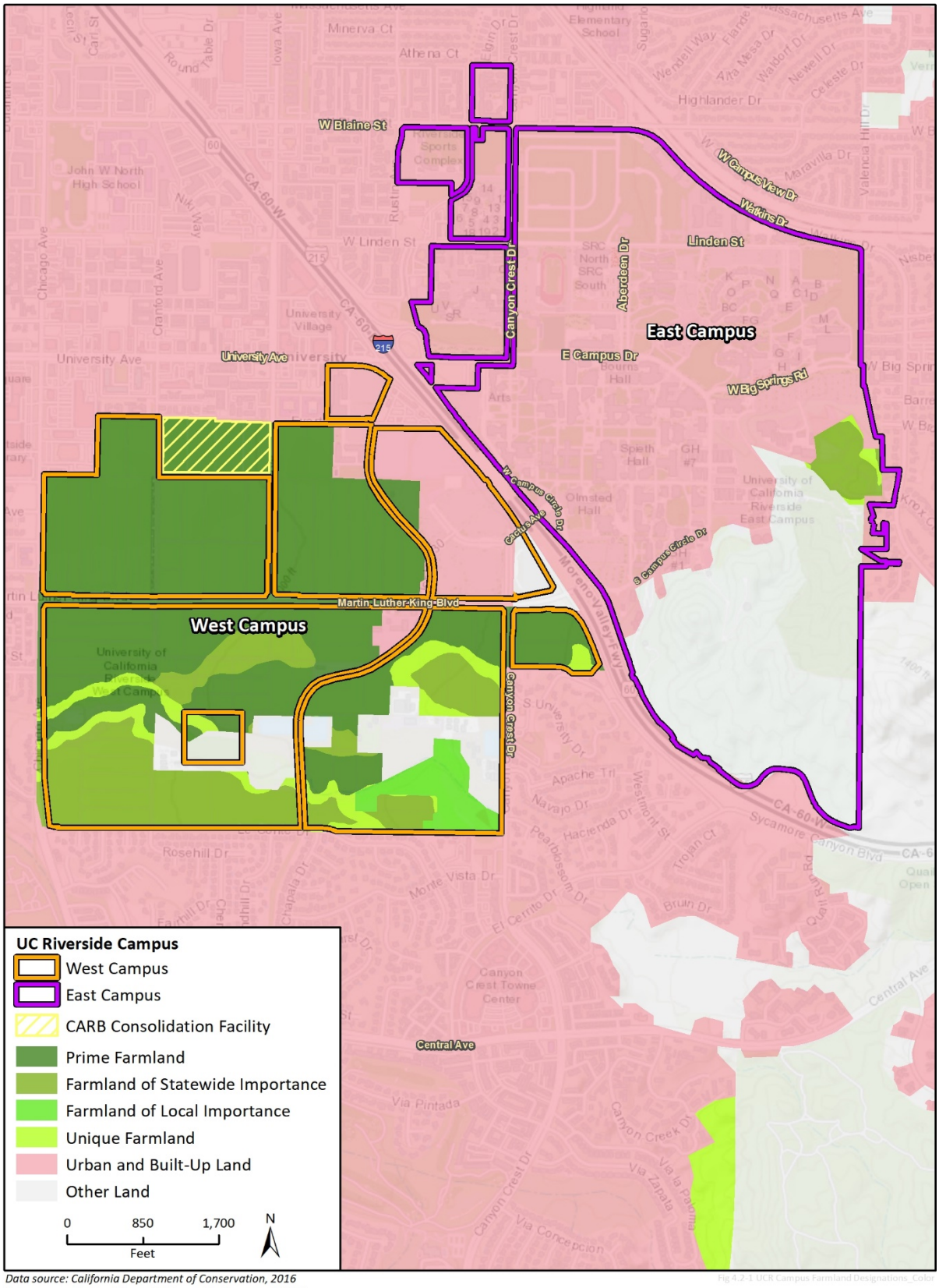
West Campus

Historically, West Campus land has been devoted to agricultural research uses. Nearly 20 percent of the University's research expenditures occurs in agricultural fields and in the indoor labs which support them (UCR 2020).

West Campus Farmland is primarily Prime Farmland (265.9 acres) concentrated in areas north and south of Martin Luther King Boulevard. Slivers of land categorized as Unique Farmland (24.4 acres) generally follow the Box Springs Arroyo which runs east-west through the lower half of West Campus. South of the Box Springs Arroyo is generally Farmland of Statewide Importance (85.6 acres). There are also areas of Farmland of Statewide Importance and Unique Farmland east of the Gage Canal and north of the agricultural research facilities. Farmland of Local Importance (17.3 acres) is concentrated in the southeastern corner of West Campus south of the Box Springs Arroyo.

[1] The United States Department of Agriculture Salinity Laboratory is on UCR property, on East Campus, and has an existing 50-year ground lease agreement (March 1, 1988 to March 1, 2038).

Figure 4.2-1 UCR Campus Farmland Designations



Data source: California Department of Conservation, 2016
Imagery provided by Microsoft Bing and its licensors © 2020.

4.2.2 Regulatory Setting

Federal

There are no applicable federal regulations regarding the protection of agricultural resources that would be applicable to the proposed 2021 LRDP.

State

California Department of Conservation Farmland Mapping and Monitoring Program

Important Farmland in California is classified and mapped according to the Department of Conservation (DOC) Farmland Mapping and Monitoring Program (FMMP). Authority for the FMMP comes from Government Code Section 65570(b) and Public Resources Code Section 612. Government Code Section 65570(b) requires the DOC to collect or acquire information on the amount of land converted to or from agricultural use for every mapped county and to report this information to the Legislature. Public Resources Code Section 612 requires the DOC to prepare, update, and maintain Important Farmland Series Maps and other soils and land capability information.

DOC FMMP Farmland Classifications are based on a combination of physical and chemical characteristics of the soil and climate that determine the degree of suitability of the land for crop production. The broad definitions of these categories from the FMMP are provided below:

- "Prime Farmland" is irrigated land with the best combination of physical and chemical features able to sustain long term production of agricultural crops. This land has the soil quality, growing season, and moisture supply needed to produce sustained high yields. Land must have been used for production of irrigated crops at some time during the four years prior to the mapping date.
- "Farmland of Statewide Importance" is irrigated land similar to Prime Farmland that has a good combination of physical and chemical characteristics for the production of agricultural crops. This land has minor shortcomings, such as greater slopes or less ability to store soil moisture than Prime Farmland. Land must have been used for production of irrigated crops at some time during the four years prior to the mapping date.
- "Farmland of Local Importance" is land of importance to the local economy, as defined by each county's local advisory committee and adopted by its Board of Supervisors. Farmland of Local Importance is either currently producing or has the capability of production; but does not meet the criteria of Prime, Statewide or Unique Farmland.
- "Unique Farmland" is land of lesser quality soils that is usually irrigated but may include non-irrigated orchards or vineyards, as found in some climatic zones in California. Land must have been cropped at some time during the four years prior to the mapping date.
- "Urban and Built-Up Land" is occupied by structure with a building density of at least one unit for every 1.5 acres, or approximately six structures to a 10-acre parcel. Common examples include residential, industrial, commercial, institutional facilities, cemeteries, airports, golf courses, sanitary landfills, sewage treatment, and water control structures.
- "Other Land" is land not included in any other mapping category. Common examples include low density rural developments, brush, timber, wetland, and riparian areas not suitable for livestock grazing, confined livestock, poultry, or aquaculture facilities, strip mines, borrow pits,

and water bodies smaller than 40 acres. Vacant and non-agricultural land surrounded by urban development and greater than 40 acres is mapped as other land (DOC 2016).

Williamson Act Land Preserves

In 1965, the California Land Conservation Act, also known as the Williamson Act, was adopted. This voluntary program allows property owners to have their property assessed on the basis of its agricultural production rather than at the current market value. The property owner is thus relieved of having to pay higher property taxes, as long as the land remains in agricultural production. The purpose of the act is to encourage property owners to continue to farm their land and to prevent the premature conversion of farmland to urban uses. Participation requires that the area consist of 100 contiguous acres of agricultural land under one or more ownerships.

Upon approval of an application by the City Council, the agricultural preserve is established, and the land within the preserve is restricted to agricultural and compatible uses for 10 years. The Williamson Act contracts are automatically renewed annually for an additional 1-year period, unless the property owner applies for non-renewal or early cancellation. The Williamson Act also contains limited provisions for cancellation of contracts. In this case, specific findings regarding the non-viability of the agricultural use must be made, and a substantial penalty for the cancellation is assessed.

University of California, Riverside

UCR Riverside Agricultural Mitigation (Coachella Valley Agricultural Research Station)

The 2005 UCR LRDP called for the conversion of approximately 125 acres of Prime Farmland on West Campus into non-agricultural uses. The 2005 LRDP relied upon mitigation measures contained in the earlier 1990 LRDP, which identified the loss of Prime Farmland as a significant impact (Impact 4.1-1). As a result, MM 4.1-1, from the 1990 LRDP EIR, called for the acquisition of off-campus agricultural land to mitigate the loss of agricultural teaching and research land (UCR 1990). Consistent with that mitigation measure, the campus acquired the Coachella Valley Agricultural Research Station (CVARS), a 540-acre facility (UCR 2011). The 2005 LRDP EIR further noted that "the acquisition of the CVARS reduces the programmatic loss of the 125 acres of agricultural land on campus, but it does not offset the net reduction in farmland in the region. As no new farmlands are being created in the vicinity of the campus, no feasible mitigation has been identified to reduce this significant impact."

Since analysis and approval of the 2005 LRDP, UCR has only converted approximately 43 acres[2] of Farmland in the West Campus (which is less than the 125 acres assumed to be converted in the 2005 LRDP).

Regional and Local (Non-Binding)

As noted in Section 4, "University of California Autonomy," UCR, a constitutionally-created State entity, is not subject to municipal regulations of surrounding local governments for uses on property owned or controlled by UCR that are in furtherance of the University's educational purposes. However, UCR may consider, for coordination purposes, aspects of local plans and policies of the

[2] The approximate 43-acre total development and conversion of Farmland on West Campus since the 2005 LRDP efforts include the Solar Farm, the hammer throw area, and the CARB facility.

communities surrounding the campus when it is appropriate and feasible but not bound by those plans and policies in its planning efforts.

4.2.3 Environmental Impacts and Mitigation Measures

Significance Criteria

UCR utilizes the following 2020 CEQA Guidelines Appendix G significance criteria questions related to Agricultural Resources.

Would the proposed 2021 LRDP:

a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?

b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?

c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?

d) Result in the loss of forest land or conversion of forest land to non-forest use?

e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?

Issues Not Evaluated Further

Williamson Act Contracts (Criterion b)

The Initial Study for the proposed 2021 LRDP (Appendix A) concluded that the UCR campus does not contain land under current Williamson Act contracts. Therefore, no impacts would occur to designated Williamson Act lands. Potential conflicts with Williamson Act contracts are not evaluated further.

Forestry Resources and Timberland (Criteria c, d, and portion of e)

The Initial Study for the proposed 2021 LRDP (Appendix A) concluded that the UCR campus does not contain lands designated as forest or timber-production lands, therefore, no forestry resources that could be affected by implementation of the 2021 LRDP. Issues related to forestry resources and timberland are not evaluated further.

Analysis Methodology

To evaluate the potential impacts of the proposed 2021 LRDP on agricultural resources, the type and degree of agricultural resources that would be lost or converted were analyzed in relation to FMMP designations of lands in the LRDP boundary and any policies and programs related to the preservation of agricultural resources.

2021 LRDP Objectives and Policies

There are no objectives or policies in the proposed 2021 LRDP related to agricultural resources.

Impact Analysis

Impact AG-1 Convert Lands Designated as Important Farmlands to Non-Agricultural Use.

Implementation of the proposed 2021 LRDP would result in the conversion of Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland) to non-agricultural use. No mitigation is sufficient to substantially reduce impact. Therefore, impacts would be significant and unavoidable.

Construction (On-Campus)

The 1990 LRDP identified and recognized the need to convert Prime Farmland to non-agricultural land uses to accommodate future campus growth. To combat future loss of the Prime Farmland, UCR acquired 540 acres in Coachella Valley, approximately 80 miles east of the main campus, in 1994 and established the CVARS. CVARS is currently operational and supporting UCR's agricultural research mission, focusing on researching agriculture in desert regions (UCR 2005).

The 2005 LRDP proposed development on West Campus of approximately 125 acres of academic, support, housing, parking, and recreational uses north of Martin Luther King Boulevard. The 2005 LRDP EIR concluded that while the acquisition of agricultural land in the Coachella Valley in the 1990s reduced the programmatic loss of the approximate 125 acres of agricultural land at the main campus, it did not offset the net reduction in farmland in the region as no new farmlands were being created in the vicinity of the campus. Therefore, the 2005 LRDP EIR found impacts to Prime Farmland to be significant and unavoidable (UCR 2005). Notably, development processed under the 2005 LRDP has not converted all assumed 125 acres to non-agricultural uses, and most of the land north of Martin Luther King Boulevard is still used primarily for agricultural research (UCR 2005). Since analysis and approval of the 2005 LRDP, UCR has only converted approximately 43 acres[3] of Farmland in the West Campus (which is less than the 125 acres assumed to be converted).

In 2011, the 2005 LRDP was amended (2005 LRDP Amendment 2) to allow for the development of the School of Medicine on West Campus. Congruent with the 2005 LRDP EIR, the 2005 LRDP Amendment 2 EIR found the acquisition and establishment of agricultural land in the Coachella Valley did not offset the net reduction in farmland in the region as no new farmlands were being created in the vicinity of the campus. Therefore, the 2005 LRDP Amendment 2 EIR found impacts to Prime Farmland to be significant and unavoidable (UCR 2011). Subsequent to the 2005 LRDP, as amended, the School of Medicine facilities were ultimately developed on East Campus and a future School of Medicine Building 2 is proposed on East Campus and thus, no impacts to Farmland on West Campus would occur as a result of the construction of School of Medicine facilities.

Under the proposed 2021 LRDP, most land designated as Prime Farmland, Unique Farmland, or Farmland of Statewide Importance is located on West Campus in areas designated as Agricultural/Campus Research or Land-based Research.

Agricultural/Campus Research designated lands would comprise approximately 19.4 acres in two areas in the northern portion of West Campus flanking the east and west sides of the site of the CARB Southern California headquarters. The land planning vision for the LRDP explains that These Agricultural/Campus Research designations are proposed to be developed in a manner that facilitates interdisciplinary research endeavors, including agricultural/land-based research. Land-

[3] The approximate 43-acre total development and conversion of Farmland on West Campus since the 2005 LRDP efforts include the Solar Farm, the hammer throw area, and the new CARB facility.

based Research designations would comprise approximately 419.3 acres on West Campus currently used for agriculture research purposes, mainly south of the designated Agricultural/Campus Research lands south to the border of West Campus at Le Conte Drive (see Figure 2-1).

The Agricultural/Campus Research land use area would provide space to enhance and expand external engagement of UCR's research, education, and public service mission. Agricultural/Campus Research land uses would support the shared UCR and City's aspirations to make and showcase UCR as a center for innovation in agricultural sciences and technology. Agricultural/Campus Research facilities may include space for interdisciplinary research and education, support of land-based research activities, external research partnerships, and public-private innovation partnerships. Secondary permissible uses include parking, open space, utility infrastructure, and other support uses. Development of these facilities on the Agricultural/Campus Research designations would result in the loss of 19.4 acres of Farmland.

Land-based Research land uses may include agricultural field research, instructional and research laboratories, greenhouses, and uses supporting agricultural research. Secondary permissible uses include parking, storage, utility infrastructure, and related support services and facilities. Where these potential secondary uses and associated acreage may be developed are unknown at this time. While some lands currently used for agricultural research would be removed from agricultural production to accommodate these secondary uses, such facilities would support agriculture use and associated research. Given the ancillary nature of these uses, the loss of agricultural land would be less than the acreage assumed to be lost and mitigated in the prior LRDP EIRs, but would still convert acreage in comparison to baseline conditions. Development of the Campus Support designation would also result in the conversion of the triangular parcel of Farmland located east of the Gage Canal between the two solar farms. This triangular parcel measures approximately 4.3 acres.

On East Campus, the USDA Salinity Laboratory and surrounding land is categorized as Farmland of Statewide Importance (10.7 acres) and Unique Farmland (1.5 acres). The underlying land use designation for this area would be Academics & Research under the proposed 2021 LRDP. Academics & Research facilities may include classrooms, instructional and research laboratories and greenhouses; undergraduate, graduate, and professional schools and associated programs; libraries; advanced scientific research facilities; federal research partnerships; performance and cultural facilities; clinical facilities; and ancillary support facilities, such as general administrative offices, conference rooms, and meeting spaces. However, the USDA Salinity Laboratory has a 50-year lease agreement with UCR that expires March 2038; therefore, it is not anticipated that this area would be converted to non-agricultural use during the life of the proposed 2021 LRDP.

The proposed 2021 LRDP reinforces the commitment to the densification of the existing Academic Center and existing urban environment on East Campus, limiting sprawl into existing open space and agricultural and land-based research areas on West Campus.

Agricultural and land-based research is expected to continue to be a major component of UCR's research portfolio over the lifetime of the proposed 2021 LRDP. The proposed 2021 LRDP would impact fewer acres of Farmland than previous UCR LRDPs. However, implementation of the proposed 2021 LRDP would still reduce land available for agricultural research on Farmland in comparison to existing conditions. Consistent with past LRDP EIRs, the establishment of the CVARS as mitigation for impacts to Farmland does not fully offset the net reduction in farmland in the region as no new farmlands were being created in the vicinity of the campus. Therefore, impacts would be **significant and unavoidable**.

Construction (Off-Campus)

The City has identified the Arlington Heights Greenbelt and the Arlanza-La Sierra Lands as important agricultural lands for protection through the City's Measures R and C (approved in 1979 and 1987, respectively). However, the UCR campus is not located adjacent to either of these areas. Land uses surrounding the UCR campus include developed, urban areas and roadways, and are not used for agriculture. The UCR campus is zoned Public Facilities/Institutional by the City and is not considered an area of important agricultural preservation. Furthermore, the majority of UCR's agricultural lands on West and East Campus would continue to be used for agriculture-based research and teaching purposes.

Construction of facilities developed under the proposed 2021 LRDP would not result in the conversion of adjacent or nearby off-campus Farmland and would not impact agricultural uses in the City. Therefore, off-campus impacts related to the conversion of agricultural to non- agricultural uses would be **less than significant,** and no mitigation is required.

Operation (On-Campus)

Impacts related to conversion of Farmland to non-agricultural use on-campus are limited to initial construction impacts. **No on-campus operation impacts** would occur.

Operation (Off-Campus)

Impacts related to operation of new facilities on East and West Campus would not impact off-campus areas designated for agricultural preservation. **No off-campus operation impacts** would occur.

Mitigation Measures

As previously noted, the 1990 LRDP identified and recognized the need to convert Prime Farmland to non-agricultural land uses to accommodate future campus growth. To combat future loss of the Prime Farmland, UCR acquired 540 acres in Coachella Valley, approximately 80 miles east of the main campus, in 1994 and established the CVARS. CVARS is currently operational and supporting UCR's agricultural research mission, focusing on researching agriculture in desert regions (UCR 2005).

The 2005 LRDP proposed development on West Campus of approximately 125 acres of academic, support, housing, parking, and recreational uses north of Martin Luther King Boulevard. The 2005 LRDP EIR concluded that while the acquisition of agricultural land in the Coachella Valley in the 1990s reduced the programmatic loss of the approximate 125 acres of agricultural land at the main campus, it did not offset the net reduction in farmland in the region as no new farmlands were being created in the vicinity of the campus. Therefore, the 2005 LRDP EIR found impacts to Prime Farmland to be significant and unavoidable (UCR 2005). Notably, development processed under the 2005 LRDP has not converted all assumed 125 acres to non-agricultural uses, and most of the land north of Martin Luther King Boulevard is still used primarily for agricultural research (UCR 2005). Since analysis and approval of the 2005 LRDP, UCR has only converted approximately 43 acres of Farmland in the West Campus (which is less than the 125 acres assumed to be converted).

Significance After Mitigation

The establishment of the CVARS as mitigation for impacts to Farmland does not fully offset the net reduction in farmland in the region as no new farmlands were being created in the vicinity of the campus. As such, impacts would be **significant and unavoidable**.

4.2.4 Cumulative Impacts

The cumulative setting for agricultural resources includes the geographic area of Riverside County and San Bernardino County. These two counties were selected because the UCR campus is in Riverside County, but in the western area of Riverside County in proximity to San Bernardino County. Additionally, agriculture is a regional resource common to both counties.

Most land surrounding the UCR campus is suburban use and not designated Farmland. Substantial farmland conversion has already occurred in the western portion of the County of Riverside where UCR is located (City of Riverside 2007). According to the FMMP 2006-2008 mapping cycle report, approximately 19,400 acres of irrigated farmland was removed from agriculture use in Riverside County (including cities) (County of Riverside 2015). Meanwhile, during the same reporting period, Riverside County gained just over 15,100 acres of urban land, well above the biennial average gain of 12,400 acres between the years 1984 and 2006. Homes, golf courses, commercial and community facilities constituted much of the new urban uses. Land idling continues to be common in Riverside County. Nearly 5,500 acres were removed from irrigated agricultural categories to grazing uses during 2005-2006. The State pinpointed the lack of water availability and agricultural market conditions as driving the trend towards agricultural lands being fallowed[4] (County of Riverside 2015). From 2008 to 2010, nearly another 17,000 acres of farmland was converted to another type of land use in Riverside County (DOC 2014).

There were approximately 19,821 acres of mapped important Farmland in neighboring San Bernardino County in 2016, mostly in the Valley Region (mainly in the cities and unincorporated areas around Chino, Chino Hills, Ontario, Redlands, and Yucaipa) and the North Desert Region (east along Highway 40 and SR-66). About 57 percent of the total was Prime Farmland, and most of the remainder was Farmland of Statewide Importance (County of San Bernardino 2019). From 1984 to 2004, San Bernardino County experienced a loss of 82,961 acres of agricultural lands, with an average of 7,651 acres per year since 2000 (City of Chino 2008). According to the Final EIR prepared for the San Bernardino County General Plan, growth envision in the County's General Plan would result in conversion of additional Farmland to urban uses (County of San Bernardino 2007).

Lands converted from agricultural use to non-agricultural use typically do not return to agricultural use later but become part of a more urban condition. Therefore, the removal of such agricultural land would be considered cumulatively considerable in the context of agricultural lands in Riverside County and San Bernardino County. UCR is not accountable for designated agricultural uses and Farmland outside of the campus jurisdiction. The preservation of designated farmland is the responsibility of the public agency in which the land is located. General Plans for the City of Riverside and the Counties of Riverside and San Bernardino contain policies that encourage preservation of lands designated for agricultural uses and those that may be listed as Farmland under the FMMP. However, growth anticipated in the General Plans would result in unavoidable conversion of Farmland. Due to the historic decline in available Farmland in the region and the projected continued conversion of Farmland because of growth and urbanization of the area

[4] Fallowing is typically seen in agricultural areas as an "interim" use in the transition of an area from active agricultural production to eventual urban, non-agricultural uses

envisioned in applicable General Plans, cumulative impacts on agricultural resources would be **significant and unavoidable**.

While the proposed 2021 LRDP would limit the potential further reduction of available Farmland in the region to the extent feasible, it would not fully prevent further reduction in available Farmland. As described above in Impact AG-1, the 2021 LRDP would result in significant and unavoidable impacts on agricultural resources. The establishment of the CVARS as mitigation for impacts to Farmland does not fully offset the net reduction in farmland in the region as no new farmlands were being created in the vicinity of the UCR campus. Accordingly, the significant and unavoidable impacts of the 2021 LRDP would be **cumulatively considerable**.

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4.3 Air Quality

This section analyzes the potential air quality impacts associated with construction and operation of the proposed 2021 LRDP, including from conflicts with applicable air quality plans, exceedance of air quality standards from criteria pollutant emissions, exposure of sensitive receptors to substantial pollutant concentrations, and odor emissions. The analysis in this section is based in part on modeling using the California Emissions Estimator Model (CalEEMod; modeling outputs included in Appendix C) and the *2021 Long Range Development Plan Programmatic Health Risk Assessment* (HRA; Appendix C).

4.3.1 Environmental Setting

Local Climate and Meteorology

The UCR campus is located in the South Coast Air Basin (SCAB), which encompasses an approximately 6,600-square-mile coastal plain, bounded by the San Gabriel, San Bernardino, and the San Jacinto Mountains to the north and east and the Pacific Ocean to the west and includes all of Orange County and the non-desert portions of Los Angeles, Riverside, and San Bernardino Counties, in addition to the San Gorgonio Pass area in Riverside County. The regional climate in the SCAB is semi-arid and characterized by warm summers, mild winters, infrequent seasonal rainfall, moderate daytime onshore breezes, and moderate humidity. Air quality in the SCAB is primarily influenced by meteorology and a wide range of emissions sources, such as dense population centers, substantial vehicular traffic, and industry.

Air pollutant emissions in the SCAB are generated primarily by stationary and mobile sources. Stationary sources can be divided into two major subcategories: point and area sources. Point sources occur at a specific location and are often identified by an exhaust vent or stack. Examples include boilers or combustion equipment that produce electricity or generate heat. Area sources are widely distributed and include such sources as residential and commercial water heaters, painting operations, lawn mowers, agricultural fields, landfills, and some consumer products. Mobile sources refer to emissions from motor vehicles, including tailpipe and evaporative emissions and are classified as either on-road or off-road. On-road sources may be legally operated on roadways and highways. Off-road sources include aircraft, ships, trains, and self-propelled construction equipment. Air pollutants can also be generated by the natural environment, such as when high winds suspend fine dust particles.

Air Quality Standards

The federal and State governments have established ambient air quality standards for the protection of public health. The United States Environmental Protection Agency (US EPA) is the federal agency designated to administer air quality regulation, while the California Air Resources Board (CARB) is the state equivalent in the California Environmental Protection Agency (Cal/EPA). County-level Air Pollution Control Districts (APCDs) provide local management of air quality. The South Coast Air Quality Management District (SCAQMD) is the designated air quality control agency in the SCAB. CARB has established air quality standards and is responsible for the control of mobile emission sources, while the local APCDs are responsible for enforcing standards and regulating stationary sources. CARB has established 14 air basins statewide.

The federal Clean Air Act (CAA) requires the US EPA to designate areas within the country as either attainment or nonattainment for each criteria pollutant based on whether the National Ambient Air Quality Standards (NAAQS) have been achieved. Similarly, the California CAA requires CARB to designate areas in California as either attainment or nonattainment for each criteria pollutant based on whether the California Ambient Air Quality Standards (CAAQS) have been achieved. If a pollutant concentration is lower than the State or federal standard, the area is classified as being in attainment for that pollutant. If a pollutant violates, or is above, the standard, the area is considered a nonattainment area.

The US EPA has set primary NAAQS for ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter 10 micrometers in diameter or less (PM_{10}), fine particulate matter 2.5 micrometers in diameter or less ($PM_{2.5}$), and lead (Pb). Primary standards are those levels of air quality deemed necessary, with an adequate margin of safety, to protect public health. In addition, California has established health-based ambient air quality standards for these and other pollutants, some of which are more stringent than the federal standards. Table 4.3-1 lists the current federal and State standards for regulated pollutants.

Table 4.3-1 Federal and State Ambient Air Quality Standards

Pollutant	Averaging Time	Federal Primary Standards	California Standard
Ozone	1-Hour	–	0.09 ppm
	8-Hour	0.070 ppm	0.070 ppm
Carbon Monoxide	8-Hour	9.0 ppm	9.0 ppm
	1-Hour	35.0 ppm	20.0 ppm
Nitrogen Dioxide	Annual	0.053 ppm	0.030 ppm
	1-Hour	0.100 ppm	0.18 ppm
Sulfur Dioxide	Annual	–	–
	24-Hour	–	0.04 ppm
	1-Hour	0.075 ppm	0.25 ppm
PM_{10}	Annual	–	20 µg/m³
	24-Hour	150 µg/m³	50 µg/m³
$PM_{2.5}$	Annual	12 µg/m³	12 µg/m³
	24-Hour	35 µg/m³	–
Lead	30-Day Average	–	1.5 µg/m³
	3-Month Average	0.15 µg/m³	–

ppm = parts per million

µg/m³ = micrograms per cubic meter

PM_{10} = particulate matter 10 micrometers in diameter or less; $PM_{2.5}$= fine particulate matter 2.5 micrometers in diameter or less

Source: California Air Resource Board (CARB) 2016a

SCAB is designated nonattainment for the federal and State 1-hour and 8-hour O_3 standards, the State PM_{10} standard, the federal 24-hour $PM_{2.5}$ standard, and the State and federal annual $PM_{2.5}$ standard. SCAB is in attainment of all other federal and State standards.

Air Quality Pollutants of Primary Concern

The federal and State clean air acts mandate the control and reduction of certain air pollutants. Under these laws, US EPA and CARB have established ambient air quality standards for certain criteria pollutants. Ambient air pollutant concentrations are affected by the rates and distributions of corresponding air pollutant emissions and by the climate and topographic influences discussed above. Proximity to major sources is the primary determinant of concentrations of non-reactive pollutants, such as CO and suspended PM. Ambient CO levels usually follow the spatial and temporal distributions of vehicular traffic. A discussion of each primary criterion pollutant is provided below.

Ozone

O_3 is produced by a photochemical reaction (i.e., triggered by sunlight) between nitrogen oxides (NO_X) and reactive organic gases (ROG).[1] NO_X is formed during the combustion of fuels, while ROG is formed during combustion and evaporation of organic solvents. Because O_3 requires sunlight to form, it mostly occurs in substantial concentrations between the months of April and October. O_3 is a pungent, colorless, toxic gas with direct health effects on humans including respiratory and eye irritation and possible changes in lung functions, including constriction of the airways resulting in shortness of breath. Groups most sensitive to O_3 include children, the elderly, people with respiratory disorders, and people who exercise strenuously outdoors. O_3 can aggravate existing respiratory diseases such as asthma, bronchitis, and emphysema. Additional details and studies on health effects associated with O_3 are provided below under Impact AQ-2, *Health Consequences of Ozone and PM.*

Carbon Monoxide

CO is an odorless, colorless gas and can cause several health problems including fatigue, headache, confusion, and dizziness. When inhaled at high concentrations, CO combines with hemoglobin in the blood and reduces the oxygen-carrying capacity of the blood. This results in reduced oxygen reaching the brain, heart, and other body tissues. This condition is especially critical for people with cardiovascular diseases, chronic lung disease, or anemia.

The incomplete combustion of petroleum fuels in on-road vehicles and at power plants is a cause of CO. CO is also produced during the winter from wood stoves and fireplaces. CO tends to dissipate rapidly into the atmosphere; consequently, violations of the State CO standards are generally associated with major roadway intersections during peak-hour traffic conditions.

Localized CO “hotspots” can occur at intersections with heavy peak-hour traffic. Specifically, hotspots can be created at intersections where traffic levels are sufficiently high that the local CO concentration exceeds the NAAQS of 35.0 parts per million (ppm) or the CAAQS of 20.0 ppm.

[1] Organic compound precursors of O_3 are routinely described by a number of variations of three terms: hydrocarbons (HC), organic gases (OG), and organic compounds (OC). These terms are often modified by adjectives such as total, reactive, or volatile, and result in an array of acronyms: HC, THC (total hydrocarbons), RHC (reactive hydrocarbons), TOG (total organic gases), ROG (reactive organic gases), TOC (total organic compounds), ROC (reactive organic compounds), and VOC (volatile organic compounds). While most of these differ in some way from a chemical perspective, two groups are important from an air quality perspective: non-photochemically reactive in the lower atmosphere, or photochemically reactive in the lower atmosphere (HC, RHC, ROG, and VOC).

Nitrogen Dioxide

NO_2 is a by-product of fuel combustion, with the primary source being motor vehicles and industrial boilers and furnaces. Nitric oxide (NO) is the principal form of NO_X produced by combustion, but NO reacts rapidly to form NO_2, creating the mixture of NO and NO_2 commonly called NO_X. Aside from its contribution to O_3 formation, NO_2 can increase the risk of acute and chronic respiratory disease, is an irritant and can reduce visibility. A relationship between NO_2 and chronic pulmonary fibrosis may exist, and an increase in bronchitis may occur in young children at concentrations below 0.3 ppm. NO_2 absorbs blue light and causes a reddish-brown cast to the atmosphere and reduced visibility. It can also contribute to the formation of PM_{10} and acid rain.

Suspended Particulate Matter

PM_{10} is PM measuring 10 microns or less in diameter; $PM_{2.5}$ is fine PM measuring 2.5 microns in diameter or less. Suspended particulates are mostly dust particles, nitrates, and sulfates. Both PM_{10} and $PM_{2.5}$ are by-products of fuel combustion and wind erosion of soil and unpaved roads and are directly emitted into the atmosphere through these processes. Suspended particulates are also created in the atmosphere through chemical reactions. The characteristics, sources, and potential health effects associated with the small particulates (those between 2.5 and 10 microns in diameter) and fine particulates (those 2.5 microns and below) can be very different.

The small particulates generally come from windblown dust and dust kicked up by mobile sources. The fine particulates are generally associated with combustion processes and form in the atmosphere as a secondary pollutant through chemical reactions. Fine PM is more likely to penetrate deeply into the lungs and poses a health threat to all groups but particularly to the elderly, children, and those with respiratory problems. More than half of the small and fine PM inhaled into the lungs remains there. These materials can damage health by interfering with the body's mechanisms for clearing the respiratory tract or by acting as carriers of an absorbed toxic substance. Acute and chronic health effects associated with high particulate levels include the aggravation of chronic respiratory diseases, heart and lung disease, as well as coughing, bronchitis and respiratory illnesses in children. Recent mortality studies have shown an association between morbidity and mortality and daily concentrations of PM in the air.

Ultrafine particles are particles that are 0.1 micron or less in diameter. These particles have the potential to be more easily inhaled and can be deposited deeper into the lungs. Because of their size they can rapidly penetrate into lung tissue and other organs in the body. Ultrafine particles are associated with death from heart disease caused by blocked arteries. Additional details and studies on health effects associated with PM are provided below under Impact AQ-2, *Health Consequences of Ozone and PM.*

Toxic Air Contaminants

The California Health and Safety Code defines a toxic air contaminant (TAC) as "an air pollutant which may cause or contribute to an increase in mortality or in serious illness, or which may pose a present or potential hazard to human health." According to The California Almanac of Emissions and Air Quality (CARB 2009), the majority of the estimated health risk from TACs can be attributed to relatively few compounds, the most important being PM from diesel-fueled engines (diesel PM). Diesel PM differs from other TACs in that it is not a single substance but rather a complex mixture of hundreds of substances. Although diesel PM is emitted by diesel-fueled internal combustion engines, the composition of the emissions varies depending on engine type, operating conditions, fuel composition, lubricating oil, and whether an emission control system is present.

CARB has made preliminary concentration estimates based on a PM exposure method. This method uses the CARB emissions inventory's PM_{10} database, ambient PM_{10} monitoring data, and the results from several studies to estimate concentrations of diesel PM. In addition to diesel PM, the TACs for which data are available that pose the greatest existing ambient risk in California are benzene, 1,3-butadiene, acetaldehyde, carbon tetrachloride, hexavalent chromium, para-dichlorobenzene, formaldehyde, methylene chloride, and perchloroethylene.

According to CARB, diesel engine emissions are believed to be responsible for about 70 percent of California's estimated known cancer risk attributable to TACs and they make up about 8 percent of outdoor $PM_{2.5}$ (CARB 2016b).

Lead

Pb is a metal found in the environment and in manufacturing products. The major sources of Pb emissions historically have been mobile and industrial sources. In the early 1970s, the US EPA set national regulations to gradually reduce the Pb content in gasoline. In 1975, unleaded gasoline was introduced for motor vehicles equipped with catalytic converters. The US EPA completed the ban prohibiting the use of leaded gasoline in highway vehicles in December 1995. As a result of the US EPA's regulatory efforts to remove Pb from gasoline, atmospheric Pb concentrations have declined substantially over the past several decades. The most dramatic reductions in Pb emissions occurred prior to 1990 due to the removal of Pb from gasoline sold for most highway vehicles. Pb emissions were further reduced substantially between 1990 and 2008, with reductions occurring in the metals industries at least in part because of national emissions standards for hazardous air pollutants (US EPA 2013). Because of phasing out leaded gasoline, metal processing is now the primary source of Pb emissions. The highest level of Pb in the air is found generally near Pb smelters. Other stationary sources include waste incinerators, utilities, and Pb-acid battery manufacturers.

The SCAQMD has found that the highest stationary source emitter of Pb is from the lead-acid battery recycling industry, and this is the only known stationary source category that has the potential to violate the lead NAAQS (SCAQMD 2012). As the proposed project is a campus long range development plan that does not include a lead-acid battery recycling facility, the proposed project would not be a source of Pb that has the potential to exceed the NAAQS or pose a health issue to the local environment.

While lead-based paint (LBP) may currently exist on the property due to the age of the buildings, there are strict regulations in place the governs the handling of LBP during removal, including but not limited to the California Occupational Safety and Health Administration's (Cal/OSHA's) Construction Lead Standard, Title 8 California Code of Regulations (CCR) Section 1532.1 and Department of Health Services Regulation 17 CCR Sections 35001– 36100, as may be amended. These regulations have been implemented to reduce or eliminate the risk to nearby-sensitive receptors during demolition activities. Therefore, the removal of LBP would not pose a health concern for existing nearby sensitive receptors.

Pb has been well below regulatory thresholds for decades and is still below the regulatory thresholds for the project area. Construction related removal of LBP is regulated by existing laws to reduce or eliminate the risk to nearby receptors. Further, the proposed project is not an air-based source of Pb. Additionally, LBP removal occurs in the basin on a daily basis and has yet to result in an increase in the regional ambient air emissions for Pb to near or above the threshold. Therefore, implementation of the project will not result in an environmental impact with respect to Pb and therefore is not discussed further in this analysis.

Current Air Quality

The SCAQMD operates a network of air quality monitoring stations throughout the SCAB. The purpose of the monitoring stations is to measure ambient concentrations of pollutants and determine whether ambient air quality meets the California and federal standards. The monitoring station located closest to UCR is the Riverside-Rubidoux station, located at 5888 Mission Boulevard Riverside, California 92509, approximately 5.3 miles west of the campus and is considered representative of air quality at UCR. Table 4.3-2 indicates the number of days that each of the air quality standards have been exceeded at the Riverside-Rubidoux station.

Table 4.3-2 Ambient Air Quality at the Riverside-Rubidoux Monitoring Station

Pollutant	2017	2018	2019
8-Hour Ozone (ppm), 8-Hour Maximum	0.118	0.101	0.096
Number of Days of Federal Exceedances (>0.070 ppm)	81	53	59
Ozone (ppm), 1-Hour Maximum	0.145	0.123	0.123
Number of Days of State Exceedances (>0.09 ppm)	47	22	24
Number of Days of Federal Exceedances (>0.112 ppm)	2	0	0
Nitrogen Dioxide (ppb) - 1-Hour Maximum	63.0	55.4	56.0
Number of Days of State Exceedances (>0.18 ppm)	0	0	0
Number of Days of Federal Exceedances (0.10 ppm)	0	0	0
Particulate Matter 10 microns, μg/m^3, 24-Hour Maximum	92.0	86.5	132.5
Number of Days above Federal Standard (>150 μg/m^3)	0	0	0
Particulate Matter <2.5 microns, μg/m^3, 24-Hour Maximum	50.3	66.3	55.7
Number of Days above Federal Standard (>35 μg/m^3)	7	3	5

ppm = parts per million
ppb = parts per billion
μg/m^3 = micrograms per cubic meter
Source: CARB 2019a.

Despite the current nonattainment status and local air quality standard exceedances, air quality in the Basin has improved generally since the inception of air pollutant monitoring in 1976. This improvement is due mainly to lower-polluting on-road motor vehicles, more stringent regulation of industrial sources, and the implementation of emission reduction strategies by the SCAQMD. This trend toward cleaner air has occurred despite continued population growth.[2] As discussed in the 2012 Air Quality Management Plan (AQMP) for the SCAB as a whole (SCAQMD 2013):

> Despite this growth, air quality has improved significantly over the years, primarily due to the impacts of the region's air quality control program…PM_{10} levels have declined almost 50 percent since 1990, and $PM_{2.5}$ levels have also declined 50 percent since measurements began in 1999…the only air monitoring station that is currently exceeding or projected to exceed the 24-hour $PM_{2.5}$ standard from 2011 forward is the Mira Loma station in Western Riverside County.

[2] These trends are shown in greater detail on SCAQMD's website at: http://www.aqmd.gov/home/air-quality/historical-air-quality-data.

> Similar improvements are observed with O_3, although the rate of O_3 decline has slowed in recent years.[3]

As also discussed in the 2016 AQMP for the SCAB:

> Since the end of World War II, the Basin has experienced faster population growth than the rest of the nation. The annual average percent growth has slowed but the overall population of the region is expected to continue to increase through 2023 and beyond… Despite this population growth, air quality has improved significantly over the years, primarily due to the impacts of air quality control programs at the local, State and federal levels…$PM_{2.5}$ levels in the Basin have improved significantly in recent years. By 2013 and again in 2014 and 2015, there were no stations measuring $PM_{2.5}$ in the Basin violating the former 1997 annual $PM_{2.5}$ NAAQS (15.0 µg/m3) for the 3-year design value period with the filter-based federal reference method (FRM). On July 25, 2016, the US EPA finalized a determination that the Basin attained the 1997 annual (15.0 µg/m3) and 24-hour $PM_{2.5}$ (65 µg/m3) NAAQS, effective August 24, 2016.

As discussed in the 2016 AQMP, similar trends are anticipated generally to occur under future cumulative projections.

Sensitive Receptors

Ambient air quality standards have been established to represent the levels of air quality considered sufficient, with a margin of safety, to protect public health and welfare. They are designed to protect that segment of the public most susceptible to respiratory distress, such as children under 14, the elderly over 65, persons engaged in strenuous work or exercise, and people with cardiovascular and chronic respiratory diseases. Most sensitive receptor locations are, therefore, schools, hospitals, convalescent homes, and residences.

Residential areas are considered sensitive to poor air quality because people usually stay home for extended periods of time, with associated greater exposure to ambient air quality. Recreational uses also are considered sensitive due to the greater exposure to ambient air quality conditions because vigorous exercise associated with recreation places a high demand on the human respiratory system.

Sensitive uses located in the vicinity primarily include multi- and single-family residential uses. Specifically, the nearest residential developments are: (1) multi-family residential located directly north of the project site along Canyon Crest Drive (approximately 20 feet from campus boundary), (2) multi-family residences directly east across Blaine Street (approximately 120 feet from campus boundary), and (3) the residential community to the east, adjacent to Big Springs Road (approximately 120 feet from campus boundary). The nearest school is Islamic Academy of Riverside, approximately 16 feet west of campus boundary. These receptors are representative of the sensitive receptors within the project area and are focused on because they are the closest and, therefore, the most directly affected by proposed 2021 LRDP activities.

Emissions from Existing Uses

The UCR campus is composed of approximately 604 acres on the East Campus and approximately 504 acres on the West Campus. The total campus space is approximately 7,205,252 gsf, with

[3] 2012 Air Quality Management Plan for the South Coast Air Basin. (Introduction, pages 1-5; Available at: http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2012-air-quality-management-plan/final-2012-aqmp-(february-2013)/main-document-final-2012.pdf

1,830,425 gsf of academics and research, 2,188,463 gsf of academic support, 2,813,945 gsf of student life, and 372,419 gsf of other facilities. These uses generate existing air quality emissions and are included in the regional monitoring station data.

4.3.2 Regulatory Setting

Federal

Clean Air Act

The US EPA is charged with implementing national air quality programs. US EPA's air quality mandates are drawn primarily from the federal CAA, passed in 1963 by the U.S. Congress and amended several times. The 1970 federal CAA amendments strengthened previous legislation and laid the foundation for the regulatory scheme of the 1970s and 1980s. In 1977, Congress again added several provisions, including nonattainment requirements for areas not meeting NAAQS and the Prevention of Significant Deterioration program. The 1990 federal CAA amendments represent the latest in a series of federal efforts to regulate air quality in the U.S. The federal CAA allows states to adopt more stringent standards or to include additional pollution species.

National Ambient Air Quality Standards

The federal CAA requires the US EPA to establish primary and secondary NAAQS for several criteria air pollutants. The air pollutants for which standards have been established are considered the most prevalent air pollutants known to be hazardous to human health. NAAQS have been established for O_3, CO, NO_2, SO_2, PM_{10}, $PM_{2.5}$, and Pb.

Construction Equipment Fuel Efficiency Standards

The US EPA sets emission standards for construction equipment. The first federal standards (Tier 1) were adopted in 1994 for all off-road engines over 50 horsepower and were phased in by 2000. A new standard was adopted in 1998 that introduced Tier 1 for all equipment below 50 horsepower and established the Tier 2 and Tier 3 standards. The Tier 2 and Tier 3 standards were phased in by 2008 for all equipment. The current iteration of emissions standards for construction equipment are the Tier 4 efficiency requirements are contained in 40 Code of Federal Regulations Parts 1039, 1065, and 1068 (originally adopted in 69 Federal Register 38958 [June 29, 2004], and most recently updated in 2014 [79 Federal Register 46356]). Emissions requirements for new off-road Tier 4 vehicles were completely phased in by the end of 2015.

CARB is also charged with developing air pollution control regulations based upon the best available control measures and implementing every feasible control measure under the State and federal CAA. (Health & Saf. Code, §§ 39602.5, 39667, 43013, subds. (a) and (h), 43018, 40600, 40601, 40612(a)(2) and (c)(1)(A). Pursuant to these directives, stringent emission standards were adopted in 2004 for off-road construction equipment (i.e., "Tier 4" standards) (40 Code of Federal Regulations Parts 1039, 1065, and 1068; Cal. Code Regs., tit. 13, § 2025; AR 2854). CARB also adopted emission standards for on-road heavy duty diesel vehicles (i.e., haul trucks). (Cal. Code Regs., tit. 13, § 1956.8.) These haul truck regulations mandate fleet turn-over to ensure that by January 1, 2023 nearly all on-road diesel trucks will have 2010 model year engines or equivalent [i.e., Tier 4]. In addition, interim steps are incorporated into the regulations (e.g., vehicles older than 1999 will be replaced with newer engines by 2020).

Corporate Average Fuel Economy Standards

The Corporate Average Fuel Economy (CAFE) standards are federal rules established by the National Highway Traffic Safety Administration (NHTSA) that set fuel economy and GHG emissions standards for all new passenger cars and light trucks sold in the U.S. It is, however, legally infeasible for individual municipalities to adopt more stringent fuel efficiency standards. The CAA (42 United States Code [USC] Section 7543[a]) states that "no state or any political subdivision therefore shall adopt or attempt to enforce any standard relating to the control of emissions from new motor vehicles or new motor vehicle engines subject to this part."

In October 2012, the US EPA and the NHTSA, on behalf of the Department of Transportation, issued final rules to further reduce GHG emissions and improve CAFE standards for light-duty vehicles for model years 2017 and beyond (77 Federal Register [FR] 62624). NHTSA's CAFE standards have been enacted under the Energy Policy and Conservation Act since 1978. This national program requires automobile manufacturers to build a single light-duty national fleet that meets all requirements under both federal programs and the standards of California and other states. This program would increase fuel economy to the equivalent of 54.5 miles per gallon limiting vehicle emissions to 163 grams of CO_2 per mile for the fleet of cars and light-duty trucks by model year 2025.

Safer Affordable Fuel-Efficient Vehicles Rule (Modification to the CAFE Standards)

On August 2, 2018, the NHTSA and US EPA, operating under the direction of the Trump Administration, proposed the Safer Affordable Fuel-Efficient Vehicles Rule (SAFE Rule). This rule addresses emissions and fuel economy standards for motor vehicles and is separated in two parts as described below.

- Part One, "One National Program" (84 FR 51310) revokes a waiver granted by the US EPA to the State of California under Section 209 of the CAA to enforce more stringent emission standards for motor vehicles than those required by US EPA for the explicit purpose of GHG reduction, and indirectly, criteria air pollutants and O_3 precursor emission reduction. This revocation became effective on November 26, 2019, potentially restricting the ability of CARB to enforce more stringent GHG emission standards for new vehicles and set zero emission vehicle mandates in California.
- Part Two addresses CAFE standards for passenger cars and light trucks for model years 2021 to 2026. This rulemaking proposes new CAFE standards for model years 2022 through 2026 and would amend existing CAFE standards for model year 2021. The proposal would retain the model year 2020 standards (specifically, the footprint target curves for passenger cars and light trucks) through model year 2026. The proposal addressing CAFE standards is being jointly developed by NHTSA and US EPA, with US EPA simultaneously proposing tailpipe CO_2 standards for the same vehicles covered by the same model years.

The US EPA and NTHSA published final rules to amend and establish national CO_2 and fuel economy standards on April 30, 2020 (Part Two of the SAFE Vehicles Rule) (85 FR 24174). California and 22 other states are currently challenging this new rule in the court system, and it is reasonably foreseeable that the State will be successful in its legal challenges, for the reasons outlined in the State's lawsuit (State of California 2019) and on the CARB website (CARB 2021). Furthermore, on January 20, 2021, President Biden signed an executive order directing the Government to revise fuel economy standards with the goal of further reducing emissions (White House 2021). In February 2021, the Biden Administration's Department of Justice also asked courts to put the litigation on hold while the administration "reconsidered the policy decisions of a prior administration." Most

recently, on April 22, 2021, the Biden Administration proposed to formally roll back portions of the SAFE Rule thereby restoring California's right to enforce more stringent fuel efficiency standards.

It is, however, legally infeasible for individual agencies (in this case, the UC system) to adopt more stringent fuel efficiency standards for commuter vehicles. The CAA (42 United States Code [USC] Section 7543[a]) states that "no state or any political subdivision therefore shall adopt or attempt to enforce any standard relating to the control of emissions from new motor vehicles or new motor vehicle engines subject to this part." Therefore, UCR abides by federal and State transportation fuel efficiency standards related to commuter vehicles.

State

California Clean Air Act

The California CAA, signed into law in 1988, requires all areas of the State to achieve and maintain the CAAQS by the earliest practical date. CARB is the State air pollution control agency and is a part of Cal/EPA. CARB is the agency responsible for coordination and oversight of State and local air pollution control programs in California and for implementing the requirements of the California CAA. CARB overseas local district compliance with federal and California laws, approves local air quality plans, submits the State implementation plans to the US EPA, monitors air quality, determines and updates area designations and maps, and sets emissions standards for new mobile sources, consumer products, small utility engines, off-road vehicles, and fuels.

California Ambient Air Quality Standards

The California CAA requires CARB to establish CAAQS. Similar to the NAAQS, CAAQS have been established for O_3, CO, NO_2, SO_2, PM_{10}, $PM_{2.5}$, Pb, vinyl chloride, hydrogen sulfide, sulfates, and visibility-reducing particulates. In most cases, the CAAQS are more stringent than the NAAQS. The California CAA requires all local air districts to endeavor to achieve and maintain the CAAQS by the earliest practical date. The California CAA specifies that local air districts should focus attention on reducing the emissions from transportation and area-wide emission sources and provides districts with the authority to regulate indirect sources.

Toxic Air Contaminants

A TAC is a substance CARB has determined to have the potential to cause serious health effects. TACs tend to be localized and are found in relatively low concentrations in ambient air; however, exposure to low concentrations over long periods can result in increased risk of cancer and/or adverse health effects.

The State of California has taken regulatory action to identify, evaluate, and control the harmful effects of TACs through the California Air Toxics Program, which establishes the process for the identification and control of TACs and includes provisions to make the public aware of significant toxic exposures and for reducing risk. The California Air Toxics Program is implemented by CARB and shaped by multiple key pieces of legislation originating in the 1980s.

In 1983, the California Legislature enacted a program to identify the health effects of TACs and to reduce exposure to these contaminants to protect the public health (Assembly Bill [AB] 1807: Health and Safety Code Sections 39650–39674). The Legislature established a two-step process to address the potential health effects from TACs. The first step is the risk assessment (or identification) phase. The second step is the risk management (or control) phase of the process.

Additionally, the Air Toxics "Hot Spots" Information and Assessment Act (AB 2588, Connelly Bill) was enacted in 1987 and requires stationary sources to report the types and quantities of certain substances routinely released into the air. The goals of the Air Toxics "Hot Spots" Act are to collect emission data, identify facilities having localized impacts, ascertain health risks, notify nearby residents of significant risks, and reduce those significant risks to acceptable levels. The Children's Environmental Health Protection Act, California Senate Bill 25 (Chapter 731, Escutia, Statutes of 1999), focuses on children's exposure to air pollutants. The act requires CARB to review its air quality standards from a children's health perspective, evaluate the statewide air quality monitoring network, and develop any additional air toxic control measures needed to protect children's health.

Fuel Economy Standards

PAVLEY I AND II

AB 1493 (known as Pavley I) provided the nation's first GHG standards for automobiles. AB 1493 required CARB to adopt vehicle standards that will lower GHG emissions from new light-duty autos to the maximum extent feasible beginning in 2009. Additional strengthening of the Pavley standards (referred to previously as Pavley II and now referred to as the Advanced Clean Cars [ACC] measure) was adopted for vehicle model years 2017–2025 in 2012.

The SAFE Vehicle Rule Part One (discussed above) revokes California's authority to set its own GHG emissions standards and establish zero-emission vehicle (ZEV) mandates in California, which affects some of the underlying assumptions in CARB's EMission FACtors (EMFAC) models. As noted above under "Federal Regulations," this revocation has been challenged by the State of California and is being reconsidered by the Biden Administration. To account for the effects of the Part One Rule, CARB released off-model adjustment factors on November 20, 2019 to adjust criteria air pollutant emissions outputs from the EMFAC model (CARB 2019b). These off-model adjustment factors are to be applied by multiplying the emissions calculated for light- and medium-duty vehicles by the adjustment factor. With the incorporation of these adjustment factors, operational emissions generated by light-duty automobiles, light-duty trucks, and medium-duty trucks associated with project-related vehicle trips at the year 2040 would be approximately 0.5 percent greater for ROG, 1.4 percent greater for PM, 0.5 percent greater for NO_X, and 1.6 percent greater for CO.

LOW CARBON FUEL STANDARD

The Low Carbon Fuel Standard (LCFS) mandates a statewide goal be established to reduce the carbon intensity of California's transportation fuels by at least 10 percent by 2020. In September 2018, the LCFS regulation was amended to increase the statewide goal to a 20 percent reduction in carbon intensity of California's transportation fuels by at least by 2030. Note that while the LCFS regulation was amended and extended to ensure compliance with the 2030 Scoping Plan, CARB ultimately adopted a more stringent target (20 percent reduction in carbon intensity by 2030) than assumed in the 2030 Scoping Plan (18 percent reduction in carbon intensity by 2030). Therefore, future updates to the Scoping Plan are likely to include the more stringent version of the LCFS that was adopted by CARB. Note that the majority of the emissions benefits due to the LCFS come from the production cycle (upstream emissions) of the fuel rather than the combustion cycle (tailpipe).

Executive Order B-48-18: Zero-Emission Vehicles

On January 26, 2018, Governor Brown signed Executive Order B-48-18 requiring all State entities to work with the private sector to have at least 5 million ZEVs on the road by 2030, as well as install

200 hydrogen fueling stations and 250,000 electric vehicle charging stations by 2025. It specifies that 10,000 of the EV charging stations should be direct current fast chargers. This order also requires all State entities to continue to partner with local and regional governments to streamline the installation of ZEV infrastructure. The Governor's Office of Business and Economic Development is required to publish a Plug-in Charging Station Design Guidebook. All State entities are required to participate in updating the 2016 ZEV Action Plan, along with the 2018 ZEV Action Plan Priorities Update, which includes and extends the 2016 ZEV Action Plan (Governor's Interagency Working Group on Zero-Emission Vehicles 2016, 2018), to help expand private investment in ZEV infrastructure with a focus on serving low-income and disadvantaged communities. The Governor's Office of Business and Economic Development updated the *Hydrogen Station Permitting Guidebook* with the second edition in September 2020 (Eckerle and Vacin 2020).

Executive Order N-79-20

Governor Gavin Newsom signed Executive Order N-79-20 in September 2020, which sets a statewide goal that 100 percent of all new passenger car and truck sales in the State will be zero-emissions by 2035. It also sets a goal that 100 percent of statewide new sales of medium- and heavy-duty vehicles will be zero emissions by 2045, where feasible, and for all new sales of drayage trucks to be zero emissions by 2035. Additionally, the Executive Order targets 100 percent of new off-road vehicle sales in the State to be zero-emission by 2035. CARB is responsible for implementing the new vehicle sales regulation.

University of California

UC Policy on Sustainable Practices

At the direction of the Regents of the UC, the UC Office of the President (UCOP) developed a Sustainable Practices Policy which establishes sustainability goals to be achieved by all campuses, medical centers, and the Lawrence Berkeley National Laboratory in the UC system. The policy is regularly updated, with the most recent update occurring in July 2020. The policy goals encompass nine areas of sustainable practices: green building, clean energy, transportation, climate protection, sustainable operations, waste reduction and recycling, environmentally preferable purchasing, sustainable foodservice, and sustainable water systems (UCOP 2020). The policy includes the following provisions relevant to the air quality emissions reductions, primarily via zero-emission transportation policies. Energy efficiency policies are relevant to air quality in so far as they reduce emissions from the combustion of natural gas and other on-site combustible fuels:

- **Green Building Design**
  - All new buildings projects, other than acute care facilities, shall be designed, constructed, and commissioned to outperform the California Building Code (Title 24 portion of the California Code of Regulations) energy efficiency standards by at least 20 percent or achieve energy performance targets, related to 1999 benchmarks, shown in Table 1 of Section V.A.3 of the policy.
  - All new buildings will strive to achieve certification of U.S. Green Building Council's (USGBC) Leadership in Energy and Environmental Design (LEED) "Gold" and achieve a minimum of LEED "Silver" certification, whenever possible within the constraints of program needs and standard budget parameters.

- **Sustainable Transportation**
  - By 2025, ZEVs or hybrid vehicles shall account for at least 50 percent of all new light-duty vehicle acquisitions.
  - By 2025, each location shall strive to reduce its percentage of employees and students commuting by single-occupant vehicle (SOV) by 10 percent relative to its 2015 SOV commute rates.
  - By 2050, each location shall strive to have no more 40 percent of its employees and no more than 30 percent of all employees and students commuting to the location by SOV.
  - By 2025, each location shall strive to have at least 4.5 percent of commuter vehicles be ZEV.
  - By 2050, each location shall strive to have at least 30 percent of commuter vehicles be ZEV.
- **Sustainable Building Operations for Campuses**
  - Each campus shall seek to certify as many existing buildings as possible through the "LEED for Operations and Maintenance" rating system, within budgetary constraints and eligibility limitations.
  - All new buildings will achieve a USGBC LEED "Silver" certification at a minimum. All new buildings will strive to achieve certification at a USGBC LEED "Gold" rating or higher, whenever possible within the constraints of program needs and standard budget parameters.
  - The UC will design, construct, and commission new laboratory buildings to achieve a minimum of LEED "Silver" certification as well as meeting at least the prerequisites of the Laboratories for the 21st Century (Labs21) Environmental Performance Criteria (EPC). Laboratory spaces in new buildings also shall meet at least the prerequisites of Labs21 EPC. Design, construction, and commissioning processes shall strive to optimize the energy efficiency of systems not addressed by the California Energy Code energy efficiency standards.
  - No new building or major renovation that is approved after June 30, 2019 shall use on-site fossil fuel combustion (e.g., natural gas) for space and water heating (except those projects connected to an existing campus central thermal infrastructure). Projects unable to meet this requirement shall document the rationale for this decision, as described in Section V.A.4 of the UC Policy on Sustainable Practices.
- **Clean Energy**
  - Energy Efficiency: Each location will implement energy efficiency actions in buildings and infrastructure systems to reduce the location's energy use intensity by an average of least 2 percent annually.
  - On-campus Renewable Electricity: Campuses and health locations will install additional on-site renewable electricity supplies and energy storage systems whenever cost-effective and/or supportive of the location's Climate Action Plan or other goals.
  - Off-campus Clean Electricity: By 2025, each campus and health location will obtain 100 percent clean electricity.
  - On-campus Combustion: By 2025, at least 40 percent of the natural gas combusted on-site at each campus and health location will be biogas.

University of California, Riverside

UCR Campus Standards

The current UCR *Campus Standards* that specifically relate to air quality and sustainability include the following: Section 1, subsection 1.5(C) – Permits and Plan Checking. SCAQMD "permit to construct" is required for air pollution control devices and combustion sources.

Section 1, subsection 1.30(A) - (C) – UC Policy on Green Building Design.

A. UCR by UC policy shall incorporate the principles of energy efficiency and sustainability in all capital projects within budgetary constraints and programmatic requirements. UCR's minimum requirement is to attain USGBC LEED "certified" rating and strives to achieve "Silver" certification whenever possible (based bid LEED certification level required for project is described in specification section 01 8113, Sustainable Design Requirements).
B. Prerequisites requirements from the LEED program must be incorporated into each project, as applicable.
C. Provide areas dedicated to recycling as required by Materials & Resources prerequisite MRp1: Storage & Collection of Recyclables Required.

Section 3, subsection 1.10(A) - (B) – Sustainability.

A. All University projects, including major renovations, shall attempt to meet and exceed the requirements of *Materials and Resources Credit 4 – Recycled Content* and *Credit 5 – Regional Materials* under the current LEED rating system for this material. Generally, the use of cement substitutes and additives in the concrete design that promote the use of recycled materials, such as fly ash and slag shall be considered. Concrete materials and products should be extracted, recovered, and manufactured within 500 miles of University.
B. Sustainable Materials, Products and Equipment.
    1. Specify materials, products and equipment with the following attributes where they meet the performance goals needed for the project:
        a. Materials, products and equipment that have an inherent ability to serve their function with minimal maintenance.
        b. Materials, products or equipment that can be removed and re-used when they are no longer needed for the project.
        c. Materials, products or equipment that create no or minimal health risks to the people who occupy, construct and maintain the project.
        d. Materials, products or equipment that have significant post-industrial and post-consumer recycled content.
        e. Local/regional materials and equipment manufactured or having final assembly at a facility within 500 miles of the Project.
        f. Certified wood from manufacturers declaring conformance with Forest Stewardship Council Guidelines for certified wood building components.

Section 6, subsection 1.11(E) – Adhesives. Type I, complying with SCAQMD Rule 1168.

Section 6, subsection 1.11(F) – Adhesive for Bonding Plastic Laminate. Type I, specific formulation as recommended by manufacturer for application.

1. Adhesives applied on-site shall comply with SCAQMD Rule 1168.

Section 7, subsection 1.9(A) – Detail all special conditions. All materials used shall be top-of-the-line available suited for the conditions being sealed and in compliance with the VOC requirements listed in the *Campus Standards*.

Section 23, subsection 1.1(E) – Campus Heating and Cooling Overview. Chlorofluorocarbon (CFC) and Hydro chlorofluorocarbon (HCFC) refrigerants shall not be used for any new HVAC equipment on campus. Any existing buildings being renovated and which contain CFC refrigerant shall have the refrigeration system changed to a newer non-CFC and HCFC refrigerant. UCR Environmental Health & Safety Ozone Depleting Substances (ODS)/Refrigerant Emissions Program facilitates compliance with the SCAQMD and the US EPA regulations, which apply to stratospheric ODSs, such as CFCs and HCFCs used in stationary and motor vehicle refrigeration and air conditioning systems.

Section 23, subsection 1.2(S)(3) – HVAC Design Criteria. Outside air brought into a building for ventilation and indoor air quality shall conform to the latest edition of ASHRAE Standard (ANSI/ASHRAE Std. 62.1) and/or California Energy Code for Ventilation for Acceptable Indoor Air Quality as stated in the *Campus Standards*.

Section 32, subsection 2.5(A) – Local/Regional Materials. Use materials or products extracted, harvested, or recovered, as well as manufactured, within a 500-mile radius from the project site, if available. Submit documentation indicating distance between manufacturing facility and the project site. Indicate distance of raw material origin from the project site.

UCR Transportation Demand Management

UCR's Transportation Demand Management (TDM) programs include multi-pronged efforts such as marketing, incentives, expanded vanpool offerings, on- and near-campus housing amenities, parking pricing, and more. UCR encourages students to use designated bike paths to commute to and travel within the campus. Registered bicyclists or walkers are eligible to receive a complimentary bicycle parking allotment and are eligible to utilize the day-use locker and shower facilities at the SRC without charge (UCR 20210). UCR has also encouraged ride-sharing services, and the average vehicle ridership has increased from approximately 1.36 to 1.57 occupants per vehicle over the last 15 years.

Regional and Local (Binding)

SCAQMD Air Quality Management Plan

The SCAQMD's AQMP is regularly updated, and each update has a 20-year horizon. The 2016 AQMP was adopted on March 3, 2017 and incorporated new scientific data and notable regulatory actions that have come about since adoption of the 2012 AQMP, including the approval of the new federal 8-hour O_3 standard of 0.070 ppm that was finalized in 2015 (SCAQMD 2017).

The 2016 AQMP addresses several federal and State planning requirements and incorporates new scientific information, primarily in the form of updated emissions inventories, ambient measurements, and updated meteorological air quality models. The 2016 AQMP builds upon the approaches taken in the 2012 AQMP for the attainment of federal PM and O_3 standards and highlights the significant reductions to be achieved. It emphasizes the need for interagency planning to identify strategies to achieve reductions in the timeframes allowed under the federal CAA, especially with mobile sources. The 2016 AQMP also includes a discussion of emerging issues and

opportunities, such as fugitive toxic particulate emissions, zero-emission mobile source control strategies, and the interacting dynamics among climate, energy, and air pollution. The AQMP includes attainment demonstrations of the new federal 8-hour O_3 standard and vehicle miles traveled emissions offsets, according to recent US EPA requirements.

SCAQMD Rules and Regulations

All projects are subject to SCAQMD rules and regulations in effect at the time of construction. Specific rules applicable to the proposed project would include the following[4] (additional SCAQMD rules relevant to other resource areas are described in other chapters of this Draft EIR):

RULE 53 – SPECIFIC AIR CONTAMINANTS (RIVERSIDE COUNTY)

For sulfur compounds, a person shall not discharge into the atmosphere from any single source within the following areas of Riverside County, sulfur compounds in any state or combination thereof, in excess of the following concentrations at the point of discharge: (1) In the west-central area, 0.05 percent by volume calculated as sulfur dioxide (SO_2); (2) In all portions of Riverside County not within the west-central area, 0.15 percent by volume calculated as sulfur dioxide (SO_2). For fluorine compounds, emission shall be controlled to the maximum degree technically feasible in respect to the process or operation causing such emission, but no emission shall be permissible which may cause injury to the property of others.

RULE 401 – VISIBLE EMISSIONS

A person shall not discharge into the atmosphere from any single source of emission whatsoever any air contaminant for a period or periods aggregating more than 3 minutes in any 1 hour that is as dark or darker in shade as that designated No. 1 on the Ringelmann Chart, as published by the United States Bureau of Mines; or of such opacity as to obscure an observer's view to a degree equal to or greater than does smoke described in the rule.

RULE 402 – NUISANCE

A person shall not discharge from any source whatsoever such quantities of air contaminants or other material that cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or that endanger the comfort, repose, health, or safety of any such persons or the public, or that cause, or have a natural tendency to cause, injury or damage to business or property. The provisions of this rule do not apply to odors emanating from agricultural operations necessary for the growing of crops or the raising of fowl or animals.

RULE 403 – FUGITIVE DUST

This rule is intended to reduce the amount of PM entrained in the ambient air as a result of anthropogenic (human-made) fugitive dust sources by requiring actions to prevent, reduce, or mitigate fugitive dust emissions. Rule 403 applies to any activity or human-made condition capable of generating fugitive dust and identifies measures to reduce fugitive dust. This includes soil treatment for exposed soil areas. Treatment shall include, but not necessarily be limited to, periodic watering, application of environmentally safe, non-toxic soil stabilization materials, and/or roll

[4] Rule 53 can be found here: http://www.aqmd.gov/docs/default-source/rule-book/rule-iv/reg-iv-addendum.pdf?sfvrsn=6; Rules 401, 402, 403, 475 can be found here: http://www.aqmd.gov/home/regulations/rules/scaqmd-rule-book/regulation-iv; Rule 1113 can be found here: http://www.aqmd.gov/home/regulations/rules/scaqmd-rule-book/regulation-xi.

compaction as appropriate. As indicated in SCAQMD's guidance they are "increasing reliance on non-toxic chemical dust suppressants to stabilize soils" (SCAQMD 2014).

RULE 473 – DISPOSAL OF SOLID AND LIQUID WASTES

A person shall not burn any combustible refuse in any incinerator except in a multiple-chamber incinerator or in equipment found by the Air Pollution Control Officer to be equally effective for the purpose of air pollution control. A person is also prohibited from discharging into the atmosphere from any incinerator or other equipment except as allowed by the rule.

RULE 475 – ELECTRIC POWER GENERATING EQUIPMENT

A person shall not discharge into the atmosphere from any equipment having a maximum rating of more than 10 net megawatts used to produce electric power, for which a permit to build, erect, install or expand is required after May 7, 1976, air contaminants that exceed the provisions in the rule.

RULE 1113 – ARCHITECTURAL COATINGS

No person shall apply or solicit the application of any architectural coating (e.g., paint) within the SCAQMD with volatile organic compounds (VOC) content in excess of the values specified in a table incorporated in the rule.

RULE 1403 – ASBESTOS EMISSIONS FROM DEMOLITION/RENOVATION ACTIVITIES

This rule governs work practice requirements for asbestos in all renovation and demolition activities. The purpose of the rule is to protect the health and safety of the public by limiting dangerous emissions from the removal and associated disturbance of asbestos-containing materials (ACM). Rule 1403 applies to owners and operators of any demolition or renovation activity, and the associated disturbance of asbestos-containing material, any asbestos storage facility, or any active waste disposal site. These regulations require testing of any facility being demolished or renovated for the presence of all friable and Class I and II non-friable ACM. They also establish notification procedures, removal procedures, handling operations, and warning label requirements. Approved procedures for ACM removal to protect surrounding uses include HEPA filtration, the glovebag method, wetting, and some methods of dry removal.

Southern California Association of Governments

The Southern California Association of Governments (SCAG) is a regional planning agency that serves as a forum for regional issues relating to transportation, economics, community development, and environmental issues. SCAG is not an air quality management agency, but it is responsible for development of transportation, land use, and energy conservation measures that impact air quality. SCAG's Regional Comprehensive Plan and Guide provide growth forecasts used by SCAQMD to develop air quality and land use strategies (SCAG 2008). SCAG is charged with developing and implementing Senate Bill 375, a measure that addresses GHG reduction in the State, with participation from Riverside County and the other cities and counties that make up SCAG.

Regional and Local (Non-Binding)

As noted in Section 4, "University of California Autonomy," UCR, a constitutionally created State entity, is not subject to municipal regulations of surrounding local governments for uses on property owned or controlled by UCR that are in furtherance of the university's educational purposes.

However, UCR may consider, for coordination purposes, aspects of local plans and policies of the communities surrounding the campus when it is appropriate and feasible, but not bound by those plans and policies in its planning efforts.

City of Riverside General Plan

The City of Riverside's (City's) General Plan Air Quality element includes objectives and policies that help reduce air quality impacts. These objectives and policies include general measures to reduce transportation-related air quality emissions and to consider sensitive receptors in placement of land uses.

4.3.3 Environmental Impacts and Mitigation Measures

Significance Criteria

UCR utilizes the following 2020 CEQA Guidelines Appendix G significance criteria questions related to Air Quality.

Would the proposed 2021 LRDP:

a) Conflict with or obstruct implementation of the applicable air quality plan?

b) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in nonattainment under an applicable federal or state ambient air quality standard?

c) Expose sensitive receptors to substantial pollutant concentrations?

d) Result in other emissions such as those leading to odors adversely affecting a substantial number of people?

Issues Not Evaluated Further

Other Emissions such as Odors (Criterion d)

The Initial Study for the 2021 LRDP (Appendix A) determined that there would be a less than significant impact related to other emissions, such as odors, adversely affecting a substantial number of people. This topic is not evaluated further in this section.

Analysis Methodology

Criteria pollutant and GHG emissions for project construction and operation were calculated using the CalEEMod, Version 2016.3.2. CalEEMod is a statewide land use emissions computer model designed to provide a uniform platform for government agencies, land use planners, and environmental professionals to quantify potential criteria pollutant and GHG emissions associated with both construction and operations from a variety of land use projects. The model was developed by BREEZE Software for the California Air Pollution Control Officers Association (CAPCOA) in collaboration with the California air districts. CalEEMod allows for the use of standardized data (e.g., emission factors, trip lengths, meteorology, source inventory) provided by the various California air districts to account for local requirements and conditions, and/or user-defined inputs. The model calculates criteria pollutant emissions and GHGs emissions, reported as CO_2e (discussed further in Section 4.8, *Greenhouse Gas Emissions*). The calculation methodology and input data used in CalEEMod can be found in the CalEEMod User's Guide Appendices A, D, and E (CAPCOA 2017). The input data and subsequent construction and operation emission estimates for the project are

detailed in the following discussion. CalEEMod output files (which include a list of model inputs) for the project are included in Appendix C of the EIR.

For analysis of Impact AQ-1, a project would be inconsistent with the AQMP if it would generate population, housing, or employment growth exceeding forecasts used in the development of the AQMP.

Construction Emissions

Project construction would primarily generate temporary criteria pollutant and GHG emissions from construction equipment operation on-site, construction worker vehicle trips to and from the site, and from export of materials off-site. Construction input data for CalEEMod include but are not limited to: (1) the anticipated start and finish dates of construction activity; (2) inventories of construction equipment to be used; (3) areas to be excavated and graded; and (4) volumes of materials to be exported from and imported to the project site. The analysis assessed maximum daily emissions from individual construction activities, including demolition and site preparation, grading, building construction, paving, and architectural coating. Construction equipment estimates are based on surveys of construction projects within California conducted by members of CAPCOA (CAPCOA 2017). Modeling accounted for SCAQMD Rule 403 with the assumption of watering (or soil stabilizers) twice daily to control fugitive dust emissions. Diesel welders were removed from CalEEMod default construction list for building construction because they would not be anticipated to be used in construction; instead, electric welders are more common in modern construction and these would be covered by a generator set during the building construction phase.

In contract documents with contractors, UCR requires the design builder/contractor to implement Tier 4 engines for 75 percent of the off-road diesel-powered construction equipment that is 50 horsepower or larger. In addition, as construction equipment fleet turnover continues to occur, the base amount of Tier 4 engines in a contractor's fleet will increase. Construction modeling conservatively assumed only 75 percent of construction equipment would use Tier 4 engines.

CONSTRUCTION TIMELINE

Although the exact timeline of 2021 LRDP buildout is unknown at this stage of planning, for a conservative analysis, it was assumed that the largest amount of construction would occur during the first year of LRDP buildout at 700,000 gsf (approximately 13 percent of total construction of approximately 5.5 million gsf). This number was determined because historically the campus has developed at a much lower number than 700,000 gsf per year, with only the most intensive years approaching this number. The remaining years were analyzed at 367,258 gsf per year (approximately 7 percent of total construction per year). It is conservative to assume construction would be front-loaded into the first year out of 14 years of proposed 2021 LRDP development, since in CalEEMod emissions from equipment are higher in earlier years (i.e., CalEEMod assumes advancements in engine technology and turnover in the equipment fleet that results in lower estimated emission levels in future years).

DEMOLITION

Demolition assumptions were based upon the demolition assumptions used in the project's GHG emissions analysis (Appendix G), which assumed 885,279 total gsf to be demolished during the LRDP. This was inputted into the model for each scenario by estimating 13 percent of the demolished gsf would occur for the 2022 scenario, and 7 percent of the demolished gsf would occur per year for the 2023-2035 scenario. This factored in the smaller size(s) of existing buildings (i.e.,

fewer floors, less assignable square footage) than proposed buildings, as well as sites where no demolition would occur.

SOIL MOVEMENT

The amount of import and export of soil for each scenario was estimated by assuming a 20-foot cut depth for 25 percent of the proposed gsf, and then assuming 50 percent of that soil would be exported, and 50 percent imported. This is considered a reasonable assumption because a depth of 20 foot is a reasonable depth for a multi-story building, and as most buildings would be multi-story, the sf for the cut would be a fraction of the total building gsf.

BUILDING CONSTRUCTION

Table 4.3-3 details the assigned land uses for proposed 2021 LRDP facilities based on CalEEMod User Guide.

Table 4.3-3 Proposed 2021 LRDP Facility Types per CalEEMod User Guide

Project Description	CalEEMod Land Use Designation	2022 Scenario Square Footage (gsf)	2023-2035 Scenario Annual Square Footage (gsf)
Academics & Research	Research & Development	82,644	43,361
Academic Support	General Office Building	171,896	90,188
Student Life Facilities	Mid-Rise Apartments	432,963	227,162
Indoor Recreation	Health Club	12,498	6,557
Totals		700,000	367,268

It should be noted that the sequencing and phasing of proposed construction is only a prediction and is ultimately subject to funding, demand, etc. Project-specific information used in model assumptions is based on information at this stage of planning. The analysis is presented as a conservative scenario of potential project impacts given available information. It is possible that later LRDP years include a higher development intensity than earlier years; however, by performing the analysis where higher development intensities occur in earlier years, the emissions estimates are conservative given construction fleet turnover and increasing fuel efficiency.

CalEEMod has the capability to calculate reductions in construction emissions from the effects of dust control, diesel-engine classifications, and other selected emissions reduction measures. Emissions calculations assume application of water during grading (or soil stabilizers) and a 15-mph speed limit on unpaved surfaces in compliance with SCAQMD Rule 403, Fugitive Dust (as detailed above in Section 4.3.2), and use of architectural coatings with a VOC content of 50 grams/liter (g/L) in compliance with SCAQMD Rule 1113 (as detailed above in Section 4.3.2). Based on CalEEMod version 2016.3.2, the PM_{10} and $PM_{2.5}$ reduction for watering two times per day is 55 percent.

Operational Emissions

Operational sources of criteria pollutant emissions include area, energy, and mobile sources. These sources are described below.

ENERGY SOURCES

Emissions from energy use that generate criteria pollutant emissions include natural gas use. The emissions factors for natural gas combustion are based on US EPA's AP-42 (*Compilation of Air*

Pollutant Emissions Factors) and California Climate Action Registry (CCAR) General Reporting Protocol (CCAR 2009). Electricity emissions only apply to GHG emissions (as discussed in Section 4.8, *Greenhouse Gas Emissions*, of this EIR) as the energy is generated off-site and therefore may not be relevant for local and regional air quality conditions.

AREA SOURCES

Emissions associated with area sources, including space and water heating, consumer products, landscape maintenance, and architectural coating were calculated in CalEEMod and utilize standard emission rates from CARB, US EPA, and emission factor values provided by the local air district (CAPCOA 2017).

MOBILE SOURCES

Mobile source emissions are generated by the increase in vehicle trips to and from the project site associated with operation of onsite development. Trip rates were adjusted in CalEEMod to account for the project-generated vehicle miles traveled as determined by the Transportation analysis (Section 4.15) and GHG Supporting Information (Appendix G). Modeling conservatively did not assume emissions reductions from UCR vehicles in accordance with Executive Order B-48-18.

TOXIC AIR CONTAMINANTS

Rincon prepared a Programmatic HRA to evaluate potential impacts associated with emissions of TACs under implementation of the proposed 2021 LRDP. The Programmatic HRA evaluates TAC emissions from six primary sources of TAC emissions on campus:

- **Kitchen Equipment.** This source includes natural gas ovens located at University dining facilities.
- **Emergency Generators.** This source includes diesel- and natural gas-fired emergency back-up generators located at critical facilities throughout campus.
- **Boilers**. This source includes on-site boilers at University housing facilities and emissions from the University's Central Plant.
- **Gasoline Dispensing Facilities**. This source includes emissions from gasoline storage and refueling areas at three gasoline dispensing facilities on-campus.
- **Laboratory Chemical Usage**. This source includes emissions from laboratory fume hoods at University research labs.
- **Diesel Delivery Trucks**. This source includes emissions of diesel PM from delivery trucks circulating on and adjacent to campus.

The Programmatic HRA characterizes emissions of TACs under two scenarios: Baseline (2018/2019 academic year) and Future (2035 horizon year). By employing a scenario-based modeling approach, the Programmatic HRA provides a direct comparison of health risk associated with buildout of the proposed 2021 LRDP to clearly assess potential impacts of the proposed project for the purposes of CEQA. Figure 4.3-1 and Figure 4.3-2 show the location of emissions sources modeled on campus under the Baseline and Future scenarios, respectively.

Figure 4.3-1 TAC Emissions Sources – Baseline Scenario

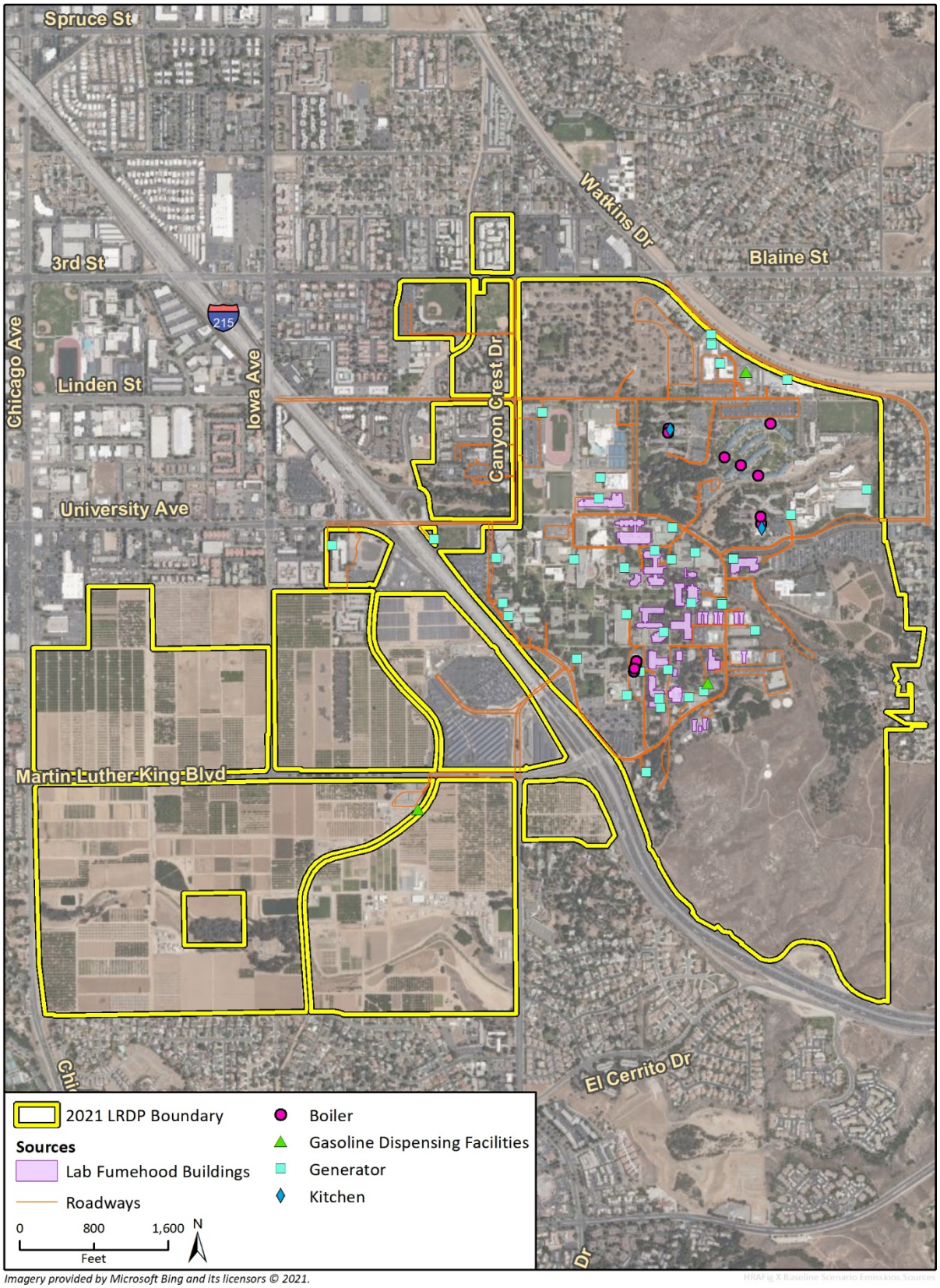
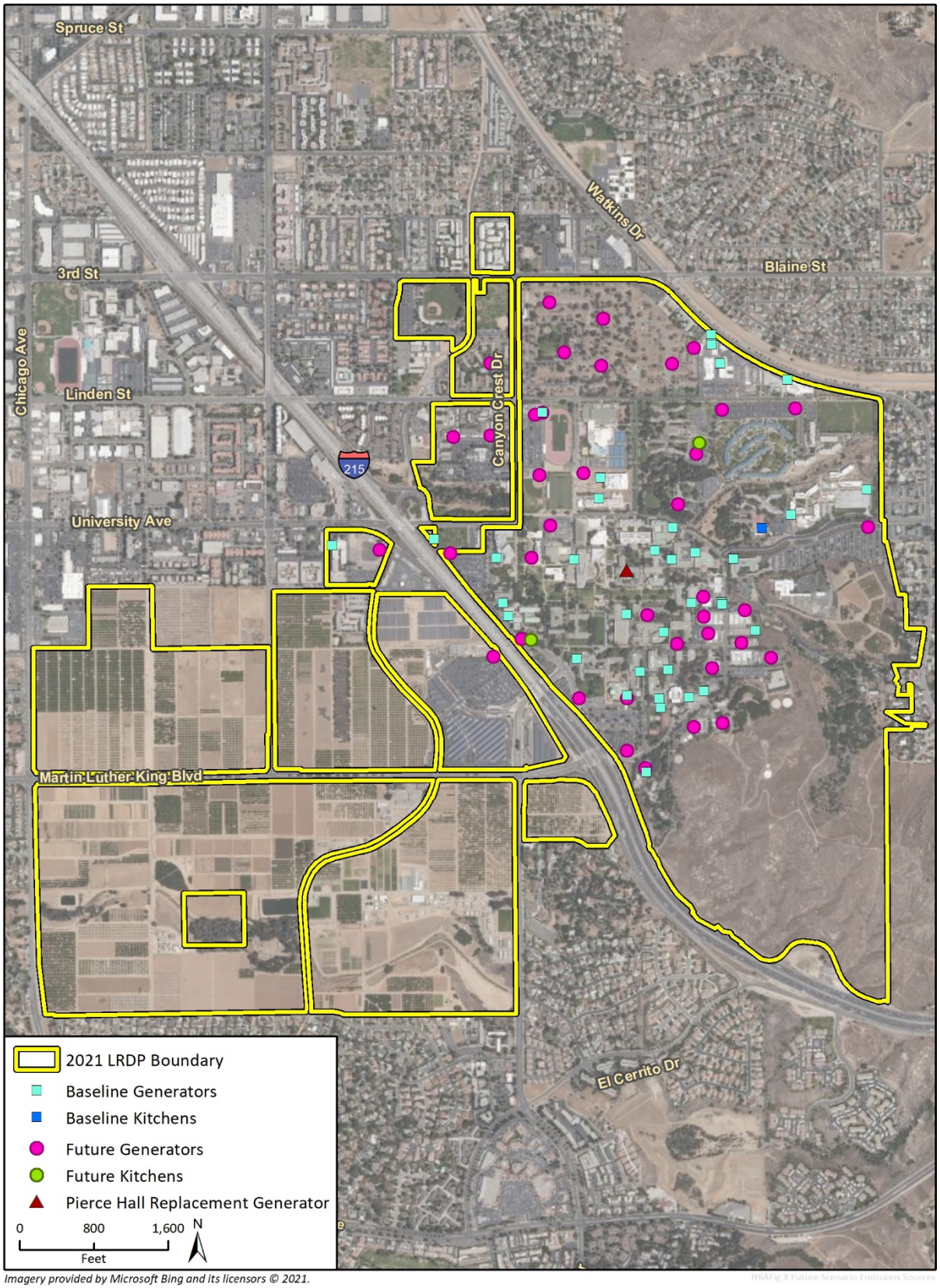


Figure 4.3-2 New/Relocated TAC Emissions Sources – Future Scenario



Air dispersion modeling using the American Meteorological Society/US EPA Regulatory Model (AERMOD) and health risk calculations in CARB's Hotspots Analysis and Reporting Program version 2 (HARP 2) were used to determined carcinogenic and non-carcinogenic health risks at on-campus and off-campus sensitive receptors under the Baseline and Future scenarios. Additional information on AERMOD and HARP 2 is available in the user guides linked in the references section below. In total, the Programmatic HRA calculated health risk at over 6,300 receptors across campus and surrounding neighborhoods to evaluate potential health risk associated with implementation of the proposed 2021 LRDP. Receptors located further away from these locations would have reduced project related impacts, as concentrations would be further reduced with increasing distance.

For more detailed discussion of the methodology used to evaluate health risk associated with campus operations under the Baseline and Future scenarios, refer to the Programmatic HRA (Appendix C).

Thresholds

REGIONAL

Pursuant to CEQA Guidelines Section 15064(h)(3), SCAQMD's approach for assessing cumulative impacts is based on the AQMP forecasts of attainment of ambient air quality standards in accordance with the requirements of the federal and State CAAs. If a project's mass regional emissions do not exceed the applicable SCAQMD, then the project's criteria pollutant emissions would not be cumulatively considerable. The SCAQMD recommends quantitative regional significance thresholds for temporary construction activities and long-term project operation in the SCAB, shown in Table 4.3-4.

Table 4.3-4 SCAQMD Regional Significance Thresholds

Construction Thresholds	Operational Thresholds
75 pounds per day of ROG	55 pounds per day of ROG
100 pounds per day of NO_X	55 pounds per day of NO_X
550 pounds per day of CO	550 pounds per day of CO
150 pounds per day of SO_X	150 pounds per day of SO_X
150 pounds per day of PM_{10}	150 pounds per day of PM_{10}
55 pounds per day of $PM_{2.5}$	55 pounds per day of $PM_{2.5}$

ROG = reactive organic gases
NO_x = nitrogen oxides
CO = carbon monoxide
SO_x = sulfur dioxide
PM_{10} = particulate matter 10 micrometers in diameter or less
$PM_{2.5}$ = fine particulate matter 2.5 micrometers in diameter or less
Source: SCAQMD 2015.

Air districts, such as SCAQMD, base their significance thresholds on the federal and California CAAs. The federal and State CAAs regulate emissions of airborne pollutants and have established AAQS for the protection of public health. An air quality standard is defined as "the maximum amount of a pollutant averaged over a specified period of time that can be present in outdoor air without harming public health" (CARB 2019c). Pursuant to Section 109(b) of the federal CAA, the NAAQS established at the federal level are designed to be protective of public health with an adequate

margin of safety. To derive these standards, the US EPA reviews data from integrated science assessments and risk/exposure assessments to determine the ambient pollutant concentrations at which human health impacts occur, then reduces these concentrations to establish a margin of safety (US EPA 2018). In addition, the State of California has established health-based AAQS for these and other pollutants, some of which are more stringent than the federal standards (CARB 2019d and 2019e). SCAQMD's thresholds for evaluating VOC, NO_X, and CO emissions are consistent with the federal CAA *de minimis* thresholds. The *de minimis* thresholds are used in the US EPA's general conformity process and are the emission levels at which an activity would not cause or contribute to a violation of the NAAQS, worsen an existing violation of the NAAQS, or delay attainment of the NAAQS (US EPA 2017).

LOCAL

In addition to regional thresholds, the SCAQMD has developed Localized Significance Thresholds (LSTs) in response to the Governing Board's Environmental Justice Enhancement Initiative (1-4). LSTs were devised in response to concern regarding exposure of individuals to criteria pollutants in local communities and have been developed for NO_X, CO, PM_{10}, and $PM_{2.5}$. LSTs represent the maximum emissions from a project that will not cause or contribute to an air quality exceedance of the most stringent applicable federal or State ambient air quality standard at the nearest sensitive receptor, taking into consideration ambient concentrations in each source receptor area (SRA), distance to the sensitive receptor, and project size. LSTs have been developed for emissions within construction areas up to 5 acres in size. LSTs only apply to emissions in a fixed stationary location and are not applicable to mobile sources, such as cars on a roadway (SCAQMD 2008). Therefore, LSTs are applied only to construction emissions for this analysis. The SCAQMD LST methodology states: "LSTs are applicable at the project-specific level and generally are not applicable to regional projects such as local General Plans unless specific projects are identified in the General Plans." Nevertheless, to be conservative, this LST analysis has been provided below.

The SCAQMD provides LST lookup tables for project sites that measure 1, 2, or 5 acres. Overall project construction would occur over several hundred acres, and each phase modeled (described above under *Analysis Methodology*) would cover an area that exceeds 5 acres. Therefore, the LST analysis conservatively uses 5-acre LSTs. LSTs are provided for receptors at 82 to 1,640 feet from the project disturbance boundary to the sensitive receptors. The border of construction activity would occur immediately adjacent to nearest on-site sensitive receptors and 55 feet to off-site sensitive (single-family residential buildings). According to the SCAQMD's publication, *Final LST Methodology*, projects with boundaries located closer than 82 feet to the nearest receptor should use the LSTs for receptors located at 82 feet. Therefore, the analysis below uses the LST values for 82 feet. In addition, the project is in SRA 23 (Metropolitan Riverside County). LSTs for construction in SRA 23 on a 5-acre site with a receptor 82 feet away are shown in Table 4.3-5.

Table 4.3-5 SCAQMD LSTs for Construction (SRA 23)

Pollutant	Allowable Emissions for a 5-acre Site in SRA 23 for a Receptor 82 feet Away (lbs/day)
Gradual conversion of NO_X to NO_2	270
CO	1,577
PM_{10}	13
$PM_{2.5}$	8

SRA = source receptor area
lbs/day = pounds per day
NO_x/NO_2 = nitrogen oxides
CO = carbon monoxide
PM_{10} = particulate matter 10 micrometers in diameter or less
$PM_{2.5}$ = fine particulate matter 2.5 micrometers in diameter or less
Source: SCAQMD 2009.

HEALTH RISK

SCAQMD has developed significance thresholds for the emissions of TACs based on health risks associated with elevated exposure to such compounds. For carcinogenic compounds, cancer risk is assessed in terms of incremental excess cancer risk. A project would result in a potentially significant impact if it would generate a Maximum Incremental Cancer Risk of 10 in 1 million or a cancer burden of 0.5 excess cancer cases in areas exceeding 1 in 1 million risk. Additionally, non-carcinogenic health risks are assessed in terms of a Hazard Index. A project would result in a potentially significant impact if it would result in a chronic and acute Hazard Index greater than 1.0 (SCAQMD 2015).

2021 LRDP Objectives and Policies

The proposed 2021 LRDP explains that TDM Programs at UCR, such as the highly successful UPASS program, will continue to further encourage the use of public transit, ride-sharing, vanpooling, cycling, and walking to campus. These programs reduce the demand for parking and vehicle trips to campus. TDM programs include multi-pronged efforts such as marketing, incentives, expanded vanpool offerings, on- and near campus housing amenities, parking pricing, and more." The proposed 2021 LRDP contains objectives and policies relevant to air quality, including:

Mobility (M)

- Objective M1: Reduce future vehicular traffic, parking demand, and GHG emissions, by increasing student housing on campus up to 40 percent of the projected enrollment in 2035.
  - Policy: Continue to grow and support on-campus residency by focusing on more affordable student housing options, as well as the capacity for returning students (upperclassmen) and graduate students.
  - Promote public transit as a convenient and preferred mode of commuting to campus and connecting campus residents to the community and regional destinations.
  - Policy: Develop the University Avenue and Canyon Crest Drive Gateway streetscapes to support increased use and functional efficiency of the RTA system, improved clarity of drop-off and pick-up locations for ride-sharing services, reduced conflict, and improved safety for

cyclists, pedestrians, and emerging micro-mobility[5] solutions in these increasingly busy mixed-mode circulation areas.

- Policy: Improve access to public transit on campus by providing connectivity to access points via pathways or shuttles, as well as comfortable waiting facilities, proximate to commuter related services, where appropriate.
- Policy: Advocate and support the development of a Metrolink train platform along Watkins Drive adjacent to campus to provide direct access and significantly reduce commute times. Consider dedicated vanpools or shuttles to nearby stations in the interim.

- Objective M2: Invest in infrastructure to increase bicycle use and support other active transportation modes to integrate desired routes with the campus' and City's circulation framework.
  - Policy: Support and facilitate City-led initiatives to extend bikeways to campus from every direction, including routes proposed along Canyon Crest Drive, Martin Luther King Boulevard, and the Gage Canal.
  - Policy: Develop wayfinding systems to interconnect preferred bicycle routes and invest in safe and secure pathways along all bicycle routes.
  - Policy: Provide adequate support amenities to facilitate and encourage the use of bicycles and other alternative transportation modes.
  - Policy: Develop a comprehensive improvement plan for Campus Drive to improve function, safety, and utility for each mode of travel, as incremental growth occurs.

- Objective M3: Emphasize safe and pleasing passage for pedestrians and bicycle riders through the careful, continued development and integration of the campus' multi-modal circulation framework and its extensions into the immediate community.
  - Policy: Identify and address gaps within the existing non-motorized circulation network, both on campus and within the adjacent community.
  - Policy: Implement University policies to improve pedestrian safety and encourage social interaction in zones of high pedestrian activity.

Campus Utility Infrastructure (INF) – Electricity (E)

- Objective INF E1: Prioritize redundancy and overall reliability in the campus' power distribution network.
  - Policy: Ensure infrastructure services and demands are regularly monitored and expanded as needed to meet applicable planned campus development.
- Objective INF E2: Emphasize high-performance new construction and building retrofits in support of the UC Policy on Sustainable Practices and minimize the need to purchase carbon offsets.
  - Policy: For mechanical systems in existing facilities, a 30 percent reduction in electrical energy use is projected, inclusive of a 30 percent reduction in electrical energy usage in existing facilities' mechanical systems.

[5] Micro-mobility is a category of modes of transport that are provided by very light vehicles such as electric scooters, electric skateboards, shared bicycles and electric pedal assisted bicycles. The primary condition for inclusion in the category is a gross vehicle weight of less than 500 kg.

  - Policy: Take the fullest possible advantage of RPU's clean energy plans and the City's "greening of the grid" initiatives.
  - Policy: Achieve a 5 percent improvement in energy performance for new building mechanical systems through retro-commissioning.

- Objective INF E3: Support alternative measures (e.g., alternative fuels, energy sources, practices, carbon offsets, etc.) and mixed energy source portfolios in support of green sustainability practices.
  - Policy: Continuously explore the potential to use alternative fuels over time as they become feasibly available.
  - Policy: Evaluate procurement options for alternative energy while considering long-term financial viability for the University.
  - Policy: Incorporate solar panels on the roofs of new construction to the maximum feasible extent.
  - Policy: Incorporate solar panels as integral elements of new construction design and applicable green building certifications to the maximum feasible extent.

Campus Utilities Infrastructure (INF) – Natural Gas (NG)

- Objective INF NG1: Reduce reliance on natural gas in conformance with UC policies.
  - Policy: Future projects shall not employ or expand demand for natural gas as an energy source.
  - Policy: Continue to work with RPU and UCOP to reduce current natural gas demand through efficiency improvements to the existing system, conversion of steam boilers to electricity as they are replaced over time, and, rigorous pursuit of obtaining sources for biogas, or renewable energy credit purchases to fully offset GHG emissions in conformance with UC policies.
  - Policy: Take the fullest possible advantage of RPU's clean energy plans, and the City's "greening of the grid" initiatives.

Campus Utilities Infrastructure (INF) – Potable Water, Wastewater and Irrigation (WWI)

- Objective INF WWI1: Commit to a multi-prong approach to conserving potable water use.
  - Policy: Reduce potable water use in an existing building in the Academic Center by 20 percent.
  - Policy: Reduce potable water use in student residential buildings by 30 percent.
  - Policy: Reduce potable water use in new facilities by exceeding applicable codes by a minimum of 20 percent.
  - Policy: Retrofit existing urinals, toilets, showerheads, and faucets for existing buildings with higher water efficiency rated equipment.

- Objective INF WWI2: Explore options to shift away from potable water use where feasible.
  - Policy: Design new building irrigation and efficient toilet flushing systems for use with future non-potable water sources.

- Policy: Achieve a further 20 percent reduction of potable water use for irrigation by extending Gage Canal water to also irrigate the UCR Botanic Gardens and reducing turf on campus and replacing with lower water use landscaping.

Campus Sustainability (CS)

- Objective CS1: Continue to build on this commitment to environmental stewardship to account for the impacts of development and expansion of campus infrastructure. Major planning and policy issues of the University will be subject to include the following:
  - Policy: Carbon Neutrality Initiative: Carbon Neutral by 2025 – Climate neutrality from Scope 1 & Scope 2 sources by 2025.
  - Policy: Climate neutrality from specific Scope 3 sources by 2050 or sooner - At a minimum, meet the UC intermediate goal in pursuit of climate neutrality (see AB 32) and California Global Warming Solutions Act of 2006: emission limit (SB 32).
  - Policy: Energy Efficiency: UC Annual 2 percent Energy Use Intensity (EUI) Reduction Policy (Energy Efficiency) – Each location will implement energy efficiency actions in buildings and infrastructure systems to reduce the location's energy use intensity by an average of at least 2 percent annually.
  - Policy: On-Campus Renewable Electricity – Campuses and health locations will install additional on-site renewable electricity supplies and energy storage systems whenever cost-effective and/or supportive of the location's Climate Action Plan or other goals.
  - Policy: Off-Campus Clean Electricity: 100 percent Renewable Electricity by 2025 – By 2025, each campus and health location will obtain 100 percent clean electricity.
  - Policy: On-Campus Combustion – By 2025, at least 40 percent of the natural gas combusted on-site at each campus and health location will be biogas.

Impact Analysis

Impact AQ-1 Conflict with or Obstruct Implementation of an Applicable Air Quality Plan.

Implementation of the proposed 2021 LRDP would not generate population, housing, or employment growth exceeding forecasts in the 2016 AQMP. Therefore, impacts would be less than significant.

A project may be inconsistent with the AQMP if it would generate population, housing, or employment growth exceeding forecasts used in the development of the AQMP. The 2016 AQMP, the most recent AQMP adopted by the SCAQMD, incorporates local city general plans and SCAG's 2016 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) socioeconomic forecast projections of regional population, housing, and employment growth.

Pursuant to Section 4.12, *Population and Housing,* the proposed 2021 LRDP would incrementally accommodate an additional 7,419 undergraduate students and 3,659 graduate students plus 2,806 faculty and staff, resulting in a net increase to the campus population of approximately 13,884 people by the 2035 horizon year. The net increase of 13,884 people by academic year 2035/2036 is within the total regional population projections for 2035 of 356,839 net increase in regional population. It can be assumed logically that many students, faculty, and staff would be from the region. In fact, according to available zip code information for UCR students, faculty, and staff, approximately 85 percent of the campus population currently resides in a "reasonable" commute

radius (approximately 1 hour each way). It is reasonable to assume that these trends will continue and that much of the campus population projected in the proposed 2021 LRDP will have already been accounted for in existing and/or projected population growth in the Inland Southern California region.

As discussed in Section 4.12, *Population and Housing,* the proposed 2021 LRDP assumes approximately 6,395 new students and faculty/staff would require non-UCR-affiliated, off-campus housing between the baseline (2018/2019) and buildout (2035/2036) years (13,884 net increase to the campus population – 7,489 new on-campus beds). Using a conservative estimate of even population growth each year assuming no students currently reside in the region, approximately 376 new residents[6] (6,395 students/17 years) could require non-UCR-affiliated, off-campus housing in the region year over year.

The net increase of 6,395 housing units by academic year 2035/2036 represents approximately 5.6 percent of the net increase of total regional housing projections for 2035 (6,395 net increase in off-campus housing units/113,401 net increase in regional housing units). Furthermore, if the vacancy rate for the region remains in line with 2020 at 4.8 percent, then approximately 37,080 available housing units would be available in the region in 2035. Therefore, the new campus population residing in non-UCR-affiliated housing could be absorbed into the already assumed future housing stock.

The employment growth forecasts in SCAG's 2016 RTP/SCS for Riverside estimate that the total number of jobs would increase from 145,400 to 188,700 in 2040, an increase of 43,300 jobs. The increase in employment anticipated from the proposed 2021 LRDP of 2,806 would be within SCAG's project 2040 employment increase of jobs from 2020, and the project would not exceed regional employment projections.

In support of SCAG's overall goals in the 2016 RTP/SCS, the project would increase student housing opportunities on campus by approximately 7,489 beds, which would house approximately 68 percent of the increase in total student population. The proposed 2021 LRDP therefore also would further the underlying goals of the AQMP by providing significantly more on-campus housing through proposed 2021 LRDP Objective M1, which would provide VMT and air quality emission benefits. The project is consistent with SCAG's growth projections and land use policies, including the policies of focusing growth and development within urban areas, encouraging infill development, and re-using previously developed urban land. UCR implements, and would continue to implement pursuant through the LRDP, numerous programs and policies to improve air quality in the region, including TDM measures that would reduce vehicle trips and minimizing energy use through project design and through proposed 2021 LRDP Objectives M1 through M3.

As implementation of the proposed 2021 LRDP would not generate population, housing, or employment growth exceeding forecasts in the 2016 AQMP, impacts would be **less than significant**.

Mitigation Measures

Mitigation measures are not required.

Significance After Mitigation

Impacts would be less than significant without mitigation.

[6] This number is reduced to approximately 57 new residents when accounting for the 85 percent campus draw from the existing regional population.

Impact AQ-2 CONSTRUCTION AND OPERATION-GENERATED EMISSIONS OF CRITERIA AIR POLLUTANTS AND PRECURSORS.

CONSTRUCTION OF THE PROPOSED 2021 LRDP WOULD GENERATE ROG AND NO_X IN QUANTITIES THAT EXCEED SCAQMD SIGNIFICANCE THRESHOLDS. OPERATION WOULD EXCEED SCAQMD THRESHOLDS FOR ROG, NO_X, AND PM_{10}. FOLLOWING MITIGATION, THIS IMPACT WOULD BE SIGNIFICANT AND UNAVOIDABLE.

Construction

As discussed in Section 2, *Project Description*, buildout under the proposed 2021 LRDP would include construction activities, including demolition, grading, construction worker travel to and from the LRDP Plan Area, delivery and hauling of construction supplies and debris to and from campus, and fuel combustion by on-site construction equipment, which would generate emissions. Table 4.3-6 summarizes the estimated maximum daily emissions of pollutants associated with construction emissions from buildout of the proposed 2021 LRDP. Additional details regarding this modeling are provided above in Section 4.3.3 under "Analysis Methodology" and Appendix C.

Table 4.3-6 Construction Emissions

	Maximum Emissions (lbs/day)					
	ROG	NO_x	CO	SO_2	PM_{10}	$PM_{2.5}$
2022 Scenario						
Construction Year 2022	260	108	52	<1	12	5
2023-2035 Scenario						
Construction Year 2023 – 2035	136	49	41	<1	9	5
Maximum Emissions	**260**	**108**	**52**	**<1**	**12**	**5**
SCAQMD Regional Thresholds	75	100	550	150	150	55
Threshold Exceeded?	**Yes**	**Yes**	**No**	**No**	**No**	**No**
Maximum On-site Emissions	N/A	21	31	N/A	9	5
SCAQMD Localized Significance Thresholds (LSTs)	N/A	270	1,577	N/A	13	8
Threshold Exceeded?	**N/A**	**No**	**No**	**N/A**	**No**	**No**

Notes: See Appendix C for modeling results. Some numbers may not add up precisely due to rounding considerations. Maximum on-site emissions are the highest emissions that would occur on the project site from on-site sources, such as heavy construction equipment and architectural coatings, and excludes off-site emissions from sources such as construction worker vehicle trips and haul truck trips. These numbers do not include any mitigation measures. Compliance with SCAQMD Rule 403 has been accounted for with watering twice (or soil stabilizers) per day for fugitive dust control.

As shown in Table 4.3-6, the year with the maximum daily emissions for ROG, NO_X, CO, SO_2, PM_{10}, and $PM_{2.5}$ is under the 2022 scenario. CO, SO_2, PM_{10}, and $PM_{2.5}$ emissions would not exceed SCAQMD regional thresholds or LSTs under either the 2022 scenario or 2023-2035 scenario. NO_X emissions would not exceed the SCAQMD regional threshold from 2023 to 2035; however, ROG emissions would. In addition, under the 2022 scenario, ROG and NO_X emissions would exceed the SCAQMD regional threshold for ROG and NO_X emissions. This exceedance is due to the conservative assumption that the highest year of LRDP construction would occur within a single year, which results in a large amount of soil import and export assumed for 2022 that leads to a large number of

hauling trips, and results in a large amount of painting which increases ROG emissions. Therefore, impacts from ROG and NO_X emissions would be **significant**.

As discussed in Section 4.3.1, ROG and NOx are precursor chemicals which can form O_3 in the atmosphere. Health effects of O_3 include respiratory and eye irritation and possible changes in lung functions, including constriction of the airways resulting in shortness of breath. Groups most sensitive to O_3 include children, the elderly, people with respiratory disorders, and people who exercise strenuously outdoors. O_3 can also aggravate existing respiratory diseases such as asthma, bronchitis, and emphysema. Aside from its contribution to O_3 formation, NO_2 can increase the risk of acute and chronic respiratory disease, is an irritant, and can reduce visibility.

Operational

As discussed in Section 2, *Project Description*, buildout under the proposed 2021 LRDP would result in long-term air pollutant emissions over the course of operations. Emissions include energy sources, area sources, and mobile emissions. Emissions from energy use that generate criteria pollutant emissions include natural gas use. Area sources include space and water heating, consumer products, landscape maintenance, and architectural coating. Mobile source emissions are generated by the increase in vehicle trips to and from the project site associated with operation of onsite development. Table 4.3-7 summarizes the operational emissions by emission source (area, energy, and mobile) attributed to the proposed 2021 LRDP. Additional details regarding this modeling are provided above in Section 4.3.3 under "Analysis Methodology" and Appendix C.

Table 4.3-7 Project Operational Emissions

	Maximum Daily Emissions (lbs/day)					
Emission Source	**ROG**	**NO_X**	**CO**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**
Area	126	2	205	<1	1	1
Energy	2	17	11	<1	1	1
Mobile	21	124	275	2	156	42
Project Emissions	**149**	**144**	**491**	**2**	**159**	**45**
SCAQMD Regional Thresholds	55	55	550	150	150	55
Threshold Exceeded?	**Yes**	**Yes**	**No**	**No**	**Yes**	**No**

Notes: See Appendix C for modeling results. Some numbers may not add up precisely due to rounding considerations. These results do not include mitigation measures.

The proposed 2021 LRDP would house approximately 68 percent of the increase in total student population on campus which would also provide regional VMT and air quality emission benefits. Development under the proposed 2021 LRDP would also incorporate an existing TDM Plan discussed in Section 4.3.2 that would include measures to reduce vehicle trips. This TDM Plan includes multi-pronged efforts such as marketing, incentives, expanded vanpool offerings, on- and near-campus housing amenities, parking pricing, and more. This Plan also encourages students to use designated bike paths to commute to and travel within the campus. Registered bicyclists or walkers are eligible to receive a complimentary bicycle parking allotment and are eligible to utilize the day-use locker and shower facilities at the SRC without charge. UCR has also encouraged ride-

sharing services, and the average vehicle ridership has increased from approximately 1.36 to 1.57 occupants per vehicle over the last 15 years. This would have the effect of reducing operational NO_X, PM_{10}, and $PM_{2.5}$ emissions. The proposed 2021 LRDP, through Objectives M1 through M3, further encourages the reduction of vehicular traffic and investing in infrastructure on campus to encourage alternative modes of transportation.

However, at this stage of planning, specifics on the TDM Plan that would be quantifiable in the modeling were not available. In addition, the operational air quality analysis assumes a worst-case scenario in estimating vehicular emissions associated with the proposed 2021 LRDP, as it assumes that all project vehicular trips are new trips to the region that would result in new additional mobile emissions. However, it is important to note that it is highly unlikely that those vehicular trips would be entirely additive to the traffic in the region. Many of the students and faculty that are a part of the campus growth live in the SCAQMD and undertake vehicle trips that already contribute to the NO_X, PM_{10}, and $PM_{2.5}$ emissions of the area. As discussed under Impact AQ-1, 85 percent of the campus population currently resides within a "reasonable" commute radius (approximately 1 hour each way). In addition, the construction of new student housing on campus would allow for more students to live on campus instead of commuting, and the proposed 2021 LRDP for some persons would thereby have a positive effect on reducing their VMT and therefore a reduction in their NO_X, PM_{10}, and $PM_{2.5}$ emissions. The quantitative analysis is considered conservative, because the beneficial effects of this displaced growth were not considered.

The campus is well served by public transportation systems, including buses, providing alternative transportation options for students, employees, and visitors going to and from campus. As discussed in Section 4.15, *Transportatio*n, the existing UCR campus produces a lower VMT per Service Population. This is likely due to the reduction in trip and trip lengths associated with students who live on campus and the UCR community's use of available transit services used to access the campus.

Table 4.3-7 summarizes the operational emissions by emission source (area, energy, and mobile) attributed to the proposed 2021 LRDP. The emissions generated by operation of the campus would not exceed SCAQMD regional thresholds for criteria pollutants for CO, SO_2, and $PM_{2.5}$. However, operational emissions would exceed the SCAQMD regional thresholds for ROG, NO_X, and PM_{10}. Most ROG emissions are associated with area emissions from consumer product use. The majority of NO_X and PM_{10} emissions are from vehicle trips associated with the project.

As such, impacts for ROG, NO_X, and PM_{10} would be **significant**.

As discussed in Section 4.3.1, ROG and NO_x are precursor chemicals which can form O_3 in the atmosphere. Health effects of O_3 include respiratory and eye irritation and possible changes in lung functions, including constriction of the airways resulting in shortness of breath. Groups most sensitive to O_3 include children, the elderly, people with respiratory disorders, and people who exercise strenuously outdoors. O_3 can also aggravate existing respiratory diseases such as asthma, bronchitis, and emphysema. Aside from its contribution to O_3 formation, NO_2 can increase the risk of acute and chronic respiratory disease, is an irritant, and can reduce visibility.

Acute and chronic health effects associated with high particulate levels (PM_{10}) include the aggravation of chronic respiratory diseases, heart and lung disease, and coughing, bronchitis and respiratory illnesses in children. Recent mortality studies have shown an association between morbidity and mortality and daily concentrations of PM in the air. Ultrafine particles are particles that are 0.1 micron or less in diameter. These particles have the potential to be more easily inhaled and can be deposited deeper into the lungs. Because of their size, they can rapidly penetrate into

lung tissue and other organs in the body. Ultrafine particles are associated with death from heart disease caused by blocked arteries. The Health Risk Assessment under Impact AQ-3 includes consideration of PM, which is a subset of TACs.

Mitigation Measures

See Mitigation Measure **MM GHG-1** in Section 4.8, *Greenhouse Gas Emissions*.

Significance After Mitigation

NO_X and PM emissions during operation are primarily generated from mobile trips (e.g., students and faculty/staff commuting). Implementation of Mitigation Measure **MM GHG-1** is proposed to reduce the project's GHG emissions impacts, as described in Section 4.8. Parts of this measure would have an effect of reducing criteria pollutant emissions from mobile trips. For example, Measure FL1 would replace fleet vehicles with electric vehicles or low-emission alternative vehicles that would lower operational NO_X and PM mobile. Measure EN1 in Mitigation Measure **MM GHG-1**, which would provide 100 percent electrification of new campus buildings, would have the effect of reducing natural gas emissions on campus (and thus area emissions during operation). In addition, Measures TR2 through TR4 would reduce VMT and therefore NO_X and PM mobile emissions from operation. While the TDM plan, the proposed 2021 LRDP Objectives M1 through M3, and Mitigation Measure **MM GHG-1** would reduce campus VMT and campus vehicle fleet emissions associated with the project, some of these measures are not quantifiable, and due to the amount of development associated with the LRDP, NO_X and PM, emissions would still exceed the SCAQMD NO_X and PM threshold during operation.

Project ROG emissions exceed the SCAQMD threshold of 55 pounds per day due to consumer product use, which is determined by individual consumer behavior (e.g., residents using personal cleaning or hair products) that would not be feasible to mitigate.

Construction ROG emissions exceed the SCAQMD threshold of 75 pounds per day due to the large amount of sf assumed to be painted during the most conservative year analyzed of 2022. Lower VOC paints may not be available or feasible for the type of construction involved; therefore, these emissions would not be feasible to mitigate. In the modeled years of 2023 to 2035, the project would not exceed the SCAQMD threshold of 75 pounds per day.

NO_X emissions from construction activities are primarily generated from off-site hauling trips (e.g., vendor deliveries and soil import and export). Due to the loads these trucks must carry, they are typically generated by diesel or gasoline engines; there is no feasible mitigation measures to reduce NO_X emissions as these vehicles are powered by a fossil fuel source. Therefore, NO_X emissions during construction would still exceed the SCAQMD NO_X construction threshold.

Infeasibility of Additional Health Risk Analysis

Per the *Sierra Club v. County of Fresno* (Friant Ranch, L.P.) (2018) California Supreme Court decision, it is not scientifically feasible at the time of drafting of this report to substantively connect this individual project's criteria pollutant impacts to likely health consequences.

The SCAQMD provided an amicus brief regarding the case that is included in Appendix C. With regard to the analysis of air quality-related health impacts, the SCAQMD, the air quality authority for the SCAB, has stated that "EIRs must generally quantify a project's pollutant emissions, but in some cases, it is not feasible to correlate these emissions to specific, quantifiable health impacts (e.g.,

premature mortality; hospital admissions)." In such cases, a general description of the adverse health impacts resulting from the pollutants at issue may be sufficient.

The SCAQMD stated that from a scientific standpoint, it takes a large amount of additional precursor emissions to cause a modeled increase in ambient O_3 levels over an entire region. For example, the SCAQMD's 2012 AQMP showed that reducing NO_X by 432 tons per day and reducing ROG by 187 tons per day would only reduce O_3 levels at the SCAQMD's monitor site with the highest levels by only 9 parts per billion (SCAQMD 2013). SCAQMD staff does not currently know of a way to accurately quantify O_3-related health impacts caused by NO_X or ROG precursor emissions from relatively small projects.

SCAQMD acknowledged that it may be feasible to analyze air quality related health impacts for projects on a regional scale with very high emissions of NO_X and ROGs, where impacts are regional. The example SCAQMD provided was for proposed Rule 1315, which authorized various newly permitted sources to use offsets from the "internal bank" of emission reductions. The CEQA analysis accounted for essentially all of the increases in emissions due to new or modified sources in the District between 2010 and 2030, or approximately 6,620 pounds per day of NO_X and 89,947 pounds per day of ROG, to expected health outcomes from O_3 and PM (e.g., 20 premature deaths per year and 89,947 school absences in the year 2030 due to O_3).

PM_{10} and $PM_{2.5}$, as calculated in CalEEMod, is primarily from light-duty automobiles from brake and tire wear. These emissions occur on a more regional level as the vehicle miles are calculated in CalEEMod over a distance of up to 16 miles from campus, and a localized model of criteria pollutants such as PM_{10} and $PM_{2.5}$ would not provide meaningful and accurate data.

The SCAQMD stated its staff does not currently know of a way to accurately quantify O_3- and PM-related health impacts from relatively small projects, then a general description of the adverse health impacts resulting from the pollutants at issue, described in this report, is all that can be provided at this time. Please see the above description of general adverse health impacts resulting from O_3 and PM.

The San Joaquin Valley Air Pollution Control District (SJVAPCD) amicus brief is incorporated by reference under Appendix C and also addresses whether it is scientifically feasible to correlate an individual project's air quality emissions to specific health impacts. Human health impacts associated with criteria pollutants are analyzed and taken into consideration when the US EPA sets the NAAQS for each criteria pollutant (42 U.S.C. Section 7409(b)(1)). The health impact of a particular criteria pollutant is analyzed on a regional, not a facility level, based on how close the area is to complying with (attaining) the NAAQS. As discussed by the SJVAPCD, it is not feasible to conduct a criteria air pollutant analysis detailing health impacts, as currently available computer modeling tools are not equipped for this task.

In proposing a health risk type analysis for criteria air pollutants, it is important to understand how the relevant criteria pollutants (O_3 and PM) are formed, dispersed and regulated. Ground level O_3 (smog) is not directly emitted into the air but is instead formed when precursor pollutants, such as NO_X and ROG are emitted into the atmosphere and undergo complex chemical reactions in the process of sunlight. Once formed, O_3 can be transported long distances by wind. Because of the complexity of O_3 formation, a specific tonnage amount of NO_X or ROGs emitted in a particular area does not equate to a particular concentration of O_3 in that area. Even rural areas that have relatively low tonnages of emissions of NO_X or ROG can have high levels of O_3 concentrations simply due to wind transport. Conversely, areas that have substantially more NO_X and ROG emissions could

experience lower concentrations of O_3 simply because sea breezes disperse the emissions (SJVAPCD 2007).

The disconnect between the tonnage of precursor pollutants and the concentration of O_3 formed is important, because it is not necessarily the tonnage of precursor pollutants that causes human health effects; rather, it is the concentration of resulting O_3 that causes these effects. The NAAQS, which are statutorily required to be set by US EPA at levels that are requisite to protect the public health, are established as concentrations of O_3 and not as tonnages of their precursor pollutants. Because the NAAQS are focused on achieving a particular concentration region-wide, the SJVAPCD's tools and plans for attaining the NAAQS are regional in nature.

The computer models used to simulate and predict an attainment date for O_3 are based on regional inventories of precursor pollutants and meteorology in the air basin. At a very basic level, the models simulate future O_3 levels based on predicted changes in precursor emissions basin-wide. The computer models are not designed to determine whether the emissions generated by an individual development project will affect the date that the air basin attains the NAAQS. Instead, the models help inform regional planning strategies based on the extent all of the emission-generating sources in the air basin must be controlled in order to reach attainment.

In the case of the LRDP, operational emissions exceed the SCAQMD operational significance thresholds for NO_X, ROG, and PM. However, this does not mean that one can feasibly determine the concentration of O_3 and PM that would be created at or near a project site on a particular day or month of the year, or the specific human health impacts that may occur. This is especially true for the LRDP, where most of the criteria pollutant emissions derive not from a single "point source," but from mobile sources (cars and trucks) driving to, from, and around campus, or from consumer product and architectural coating use that can occur in many individual areas of campus.

In addition, it would be infeasible to model the impact on NAAQS attainment that these emissions from the LRDP may have. As discussed above, the currently available tools are equipped to model the impact of all emission sources in the air basin on attainment. According to the SCAQMD's 2016 AQMP, basin-wide emissions in 2012 of ROG was 162.4 tons per day, 293.1 tons per day of NO_X, and 14.4 tons of $PM_{2.5}$ emissions (SCAQMD 2017). Running the photochemical grid model used for predicting O_3 attainment with the emissions solely from a project (which equates to less than one percent for ROG, NO_x, and $PM_{2.5}$) would not yield valid information given the relatively small scale involved.

HEALTH CONSEQUENCES OF O_3 AND PM

A summary discussion of air pollution and potential health effects was provided in Section 4.3.1. In addition, the national and State criteria pollutants and the applicable ambient air quality standards were also provided in Section 4.3.1. As stated above, air pollution is a major public health concern, and the adverse health effects associated with air pollution are diverse. O_3 is a pungent, colorless, toxic gas with direct health effects on humans, including respiratory and eye irritation and possible changes in lung functions. Groups most sensitive to O_3 include children, the elderly, persons with respiratory disorders, and people who exercise strenuously outdoors. PM_{10} and $PM_{2.5}$ can damage health by interfering with the body's mechanisms for clearing the respiratory tract or by acting as carriers of an absorbed toxic substance.

The adverse effects reported with short-term O_3 exposure are greater with increased activity, because activity increases the breathing rate and the volume of air reaching the lungs, resulting in an increased amount of O_3 reaching the lungs. Children may be a particularly vulnerable population

to air pollution effects, because they spend more time outdoors, are generally more active, and have a higher ventilation rate than adults. A number of adverse health effects associated with ambient O_3 levels and PM levels have been identified from laboratory and epidemiological studies. These include increased respiratory symptoms, damage to cells of the respiratory tract, decreases in lung function, increased susceptibility to respiratory infection, and increased risk of hospitalization.

The Children's Health Study, conducted by researchers at the University of Southern California, followed a cohort of children that live in 12 communities in southern California with differing levels of air pollution for several years. A publication from this study found that school absences in fourth graders for respiratory illnesses were associated with ambient O_3 levels and 24-hour PM_{10} values. An increase of 20 parts per billion of O_3 was associated with an 83 percent increase in illness-related absence rates, and change of 10 micrograms per meter in PM was associated with a 5.7 percent increase in illness-related absences (Gilliland et al. 2004). In addition, long-term exposure to elevated levels of PM can affect acute response to O_3. The number of hospital admissions and emergency room visits for all respiratory causes (infections, respiratory failure, chronic bronchitis, etc.), including asthma, show a consistent increase as ambient O_3 levels increase in a community. These excess hospital admissions and emergency room visits are observed when hourly O_3 concentrations are as low as 0.08 to 0.10 ppm.

Numerous recent studies have found positive associations between increases in O_3 levels and excess risk of mortality. These associations persist even when other variables including season and levels of PM are accounted for. This indicates that O_3 mortality effects are independent of other pollutants (Bell et al. 2004). Several population-based studies suggest that asthmatics are more adversely affected by ambient O_3 levels, as evidenced by increased hospitalizations and emergency room visits. Laboratory studies have attempted to compare the degree of lung function change seen in age and gender-matched healthy individuals versus asthmatics and those with chronic obstructive pulmonary disease. While the degree of change evidenced did not differ significantly, that finding may not accurately reflect the true impact of exposure on these respiration-compromised individuals. Since the respiration-compromised group may have lower lung function to begin with, the same degree of change may represent a substantially greater adverse effect overall.

A publication from the Children's Health Study focused on children and outdoor exercise. In communities with high O_3 concentrations, the relative risk of developing asthma in children playing three or more sports was found to be over three times higher than in children playing no sports (McConnell et al. 2002). These findings indicate that new cases of asthma in children are associated with heavy exercise in communities with high levels of O_3. The susceptibility to O_3 observed under ambient conditions could be due to the combination of pollutants that coexist in the atmosphere or O_3 may actually sensitize these subgroups to the effects of other pollutants. A study of birth outcomes in southern California found an increased risk for birth defects in the aortic and pulmonary arteries associated with O_3 and PM exposure in the second month of pregnancy (Ritz et al. 2000). In summary, acute adverse effects associated with O_3 exposures have been well documented, although the specific causal mechanism is still somewhat unclear. Additional research efforts are required to evaluate the long-term effects of air pollution and to determine the role of O_3 in influencing chronic effects.

The evidence linking these effects to air pollutants is derived from population based observational and field studies (epidemiological) as well as controlled laboratory studies involving human subjects and animals. There have been an increasing number of studies focusing on the mechanisms (that is, on learning how specific organs, cell types, and biochemicals are involved in the human body's response to air pollution) and specific pollutants responsible for individual effects. Yet the

underlying biological pathways for these effects are not always clearly understood. Although individuals inhale pollutants as a mixture under ambient conditions, the regulatory framework and the control measures developed are mostly pollutant-specific. This is appropriate, in that different pollutants usually differ in their sources, their times and places of occurrence, the kinds of health effects they may cause, and their overall levels of health risk. Different pollutants, from the same or different sources, may sometimes act together to harm health more than they would acting separately. Nevertheless, as a practical matter, health scientists, as well as regulatory officials, usually must deal with one pollutant at a time in determining health effects and in adopting air quality standards. To meet the air quality standards, comprehensive plans are developed such as the SCAQMD's AQMP.

CONCLUSIONS

Consistent with the California Supreme Court's Friant Ranch decision, the above information provides additional details regarding the potential health effects from the project's significant and unavoidable criteria pollutant emissions. It also explains why it is not scientifically feasible at the time of drafting of this report to substantively connect this individual project's criteria pollutant impacts to likely health consequences so that the public may make informed decisions regarding the costs and benefits of the LRDP.

In summary, at this stage of planning, project design features and mitigation are not available that would feasibly reduce impacts from construction NO_X and ROG emissions and operational ROG, NO_X, and PM emissions to a less-than-significant level. Therefore, impacts from construction and operational emissions would be **significant and unavoidable**.

Impact AQ-3 EXPOSE SENSITIVE RECEPTORS TO SUBSTANTIAL POLLUTANT CONCENTRATIONS FROM CO HOTSPOTS OR TACS.

IMPLEMENTATION OF THE PROPOSED 2021 LRDP WOULD NOT EXPOSE SENSITIVE RECEPTORS TO SUBSTANTIAL POLLUTANT CONCENTRATIONS FROM CO HOTSPOTS OR TACS. IMPACTS WOULD BE LESS THAN SIGNIFICANT. NO MITIGATION WOULD BE REQUIRED.

CO Hotspots

A CO hotspot is a localized concentration of CO that is above a CO ambient air quality standard. Localized CO hotspots can occur at intersections with heavy peak hour traffic. Specifically, hotspots can be created at intersections where traffic levels are sufficiently high such that the local CO concentration exceeds the federal 1-hour standard of 35.0 ppm or the federal and State 8-hour standard of 9.0 ppm (CARB 2016a).

The SCAB is in conformance with State and federal CO standards, and most air quality monitoring stations no longer report CO levels. In 2019, the Riverside-Rubidoux station, located at 5888 Mission Boulevard Riverside, California 92509, approximately 5.3 miles west of the campus, detected an 8-hour maximum CO concentration of 1.2 ppm, which is substantially below the State and federal standards (US EPA 2018). Under the proposed 2021 LRDP, the campus would result in CO emissions of approximately 513 pounds per day, below the 550 pounds per day threshold. Additional details regarding this modeling are provided above in Section 4.3.3 under "Analysis Methodology" and Appendix C. Based on the low-background level of CO in the campus area, improving vehicle emissions standards for new cars in accordance with State and federal regulations, and the proposed 2021 LRDP's operational CO emissions, implementation of the proposed 2021 LRDP would

not create new hotspots or contribute substantially to existing hotspots, and impacts are considered to be **less than significant**.

Toxic Air Contaminants

Construction

Construction-related activities would result in temporary emissions of diesel PM exhaust from off-road, heavy-duty diesel equipment for site preparation, grading, building construction, and other construction activities.

The dose of a contaminant to which the receptors are exposed is the primary factor used to determine health risk. Dose is a function of the concentration of a substance or substances in the environment and the extent of exposure that person has with the substance. Dose is positively correlated with time, meaning that a longer exposure period generally results in a higher exposure level for the maximally exposed individual. The risks estimated for a maximally exposed individual are higher if a fixed exposure occurs over a longer period.

Current models and methodologies for conducting HRAs are associated with longer-term exposure periods of 9, 30, and 70 years that do not correlate well with the temporary and highly variable nature of construction activities, resulting in difficulties in producing accurate estimates of health risk. Furthermore, individual projects would be located throughout the approximately 1,108-acre campus. Generation of diesel PM from individual construction projects under the proposed 2021 LRDP would occur in a single area for a relatively short period of time, limiting the potential for localized health risk impacts associated with construction.

The maximum diesel PM emissions would generally occur during site preparation and grading activities when heavy equipment is operating most consistently. These activities would typically be expected to last months for individual construction projects. Diesel PM emissions would decrease for other construction activities such as building construction and architectural coating, as these activities would require less diesel-fueled construction equipment. Furthermore, as described under Impact AQ-2, above, maximum on-site construction emissions would not exceed applicable LSTs for any criteria pollutants; LSTs are used to evaluate localized air quality impacts and intended to be protective of human health. Given that the maximum diesel PM emissions associated with construction would occur at a single site for a small fraction of the recommended health risk exposure period and that construction emissions would be dispersed across the greater, approximately 1,108-acre campus area, diesel PM generated by construction of individual project construction under the proposed 2021 LRDP would not create unsafe or potentially hazardous conditions for sensitive receptors. Construction-related impacts are considered to be **less than significant**.

Operation

The Programmatic HRA assesses potential operational health risk to on- and off-campus sensitive receptors associated with implementation of the proposed 2021 LRDP. As described in *Analysis Methodology*, above, the Programmatic HRA employed a scenario-based approach to accurately assess the potential health risk impact of the proposed 2021 LRDP. Health risks from six primary sources of TAC emissions on-campus were quantified under both a baseline and future scenario. Baseline emissions were based primarily on TAC emissions reported in UCR's 2019 Annual Emissions Report submitted to SCAQMD. Future emissions were estimated using source-specific information provided by UCR, VMT modeling conducted by Fehr & Peers, and/or growth factors to project

increased emissions commensurate with an increase in relevant campus land uses (i.e., laboratory fume hood emissions were projected to increase in the Future scenario commensurate with an increase in wet lab square footage). For more information regarding the methodology employed in the Programmatic HRA, refer to Appendix C.

To assess impacts to sensitive receptors, the Programmatic HRA identifies the maximally exposed receptors for each scenario. The maximally exposed receptor is the modeled receptor experiencing the highest health risk under the exposure scenario being modeled. The Programmatic HRA identifies the off-campus and on-campus maximally exposed individual residents (MEIRs), as well as the off-campus and on-campus maximally exposed individual workers (MEIWs). Additionally, modeled receptors at the Early Childhood Services (Child Development Center) were evaluated to identify the maximum health risk faced by children at the daycare facility. The maximally exposed receptors were determined through an iterative process evaluating potential receptors based on model-generated risk contours to ensure the maximum health risks were captured for each scenario. The maximally exposed receptors for carcinogenic (cancer) risk and non-carcinogenic (chronic and acute) risk were identified in the Programmatic HRA.

Cancer Risk

Carcinogenic health risk is the probability for an individual to develop cancer over a lifetime as a result of exposure to a possible carcinogen. Carcinogenic health risk is generally presented as the incremental excess cancer risk, a probability expressed in "chances per 100,000" or "chances per million." To provide a perspective on cancer risk, the American Cancer Society (2020) reports that in the U.S., men have about a 40 in 100 chance (0.40 probability) and women about a 39 in 100 chance (0.39) of developing cancer during a lifetime. Based on this background cancer risk level in the general population, application of a 10 in 1 million (1.0×10^{-5}) excess risk limit means that the contribution from a toxic hazard should not cause the resultant cancer risk for the exposed population to exceed 0.40001 for men or 0.39001 for women.

Incremental excess cancer risk values at the off-campus and on-campus MEIR, MEIW, and Early Childhood Services (Child Development Center) are described in Table 4.3-8. As shown, incremental excess cancer risks attributable to the proposed 2021 LRDP would not exceed the SCAQMD threshold of 10 in 1 million at the off- or on-campus MEIR, MEIW, or Early Childhood Services (Child Development Center).

Table 4.3-8 Cancer Risk Results

Scenario	Cancer Risk
Off-Campus Resident[1]	
Baseline Scenario	20.9 in 1 million
Future Scenario	25.8 in 1 million
Net Increase	4.9 in 1 million
SCAQMD Significance Threshold	10 in 1 million
Exceeds Threshold?	**No**
On-Campus Resident[2]	
Baseline Scenario	3.2 in 1 million
Future Scenario	3.5 in 1 million
Net Increase	0.3 in 1 million

Scenario	Cancer Risk
SCAQMD Significance Threshold	10 in 1 million
Exceeds Threshold?	**No**
Off-Campus Worker[3]	
Baseline Scenario	1.1 in 1 million
Future Scenario	1.4 in 1 million
Net Increase	0.3 in 1 million
SCAQMD Significance Threshold	10 in 1 million
Exceeds Threshold?	**No**
On-Campus Worker[4]	
Baseline Scenario	14.0 in 1 million
Future Scenario	14.1 in 1 million
Net Increase	0.1 in 1 million
SCAQMD Significance Threshold	10 in 1 million
Exceeds Threshold?	**No**
Early Childhood Services (Child Development Center)[5]	
Baseline Scenario	3.7 in 1 million
Future Scenario	6.8 in 1 million
Net Increase	3.1 in 1 million
SCAQMD Significance Threshold	10 in 1 million
Exceeds Threshold?	**No**

SCAQMD = South Coast Air Quality Management District

[1] Evaluated over a 30-year exposure duration. Off-campus Maximally Exposed Individual Resident (MEIR) for cancer risk is located at residence near the intersection of Valencia Hill Drive and Big Springs Road.

[2] Evaluated over a 6-year exposure duration. On-campus MEIR for cancer risk is located at Glen Mor Building H.

[3] Evaluated over 25-year exposure duration. Off-campus Maximally Exposed Individual Worker (MEIW) for cancer risk is located at commercial structure near the intersection of Watkins Drive and Big Springs Road.

[4] Evaluated over 25-year exposure duration. On-campus MEIW for cancer risk is located at Geology building.

[5] Evaluated over 6-year exposure duration

Source: Programmatic HRA (Appendix C)

Non-Cancer Risk

Non-carcinogenic health risks are health risks that do not result in cancer. These risks include acute and chronic health effects. Unlike carcinogenic health risk, neither chronic nor acute health risk impacts are expressed in "chances per million," but instead as a unitless "hazard index." The hazard index is calculated by dividing the concentration of the pollutant (i.e., maximum hourly concentration for acute risk, annual average concentration for chronic risk) by a pollutant-specific reference exposure level. The reference exposure level is the concentration level at or below which no adverse health effects are anticipated for a given contaminant, based on medical and toxicological literature.

Chronic Health Risk Impacts

Chronic health risks are long-term health issues resulting from longer-term exposure (from 1 year to a lifetime) that are not cancer. This may include reproductive health issues, heart disease, or

respiratory illness. Chronic hazard indices at the off-campus and on-campus MEIR, MEIW, and Early Childhood Services (Child Development Center) are described in Table 4.3-9. As shown, chronic hazard indices under the proposed 2021 LRDP would not exceed the SCAQMD threshold of 1.0 at the off- or on-campus MEIR, MEIW, or Early Childhood Services (Child Development Center).

Table 4.3-9 Chronic Health Risk Results

Scenario	Chronic Hazard Index
Off-Campus Resident[1]	
Baseline Scenario	0.04
Future Scenario	0.06
Net Increase	0.02
SCAQMD Significance Threshold	1.0
Exceeds Threshold?	**No**
On-Campus Resident[2]	
Baseline Scenario	0.09
Future Scenario	0.11
Net Increase	0.02
SCAQMD Significance Threshold	1.0
Exceeds Threshold?	**No**
Off-Campus Worker[3]	
Baseline Scenario	0.01
Future Scenario	0.02
Net Increase	0.01
SCAQMD Significance Threshold	1.0
Exceeds Threshold?	**No**
On-Campus Worker[4]	
Baseline Scenario	0.13
Future Scenario	0.15
Net Increase	0.02
SCAQMD Significance Threshold	1.0
Exceeds Threshold?	**No**

Scenario	Chronic Hazard Index
Early Childhood Services (Child Development Center)	
Baseline Scenario	0.01
Future Scenario	0.02
Net Increase	0.01
SCAQMD Significance Threshold	1.0
Exceeds Threshold?	**No**

SCAQMD = South Coast Air Quality Management District

[1] Off-campus Maximally Exposed Individual Resident (MEIR) for chronic health risk is located at the rear/side yard of a single-family residence at the western terminus of West Broadbent Drive.

[2] On-campus MEIR for chronic health risk is located at the southern portion of Lothian Hall.

[3] Off-campus Maximally Exposed Individual Worker (MEIW) for chronic health risk is located at commercial structure near the intersection of Watkins Drive and Big Springs Road.

[4] On-campus MEIW for chronic health risk is located at Geology building under baseline scenario and Science Lab 1 under future scenario.

Source: Programmatic HRA (Appendix C)

Acute Health Risk Impacts

Acute health risks are short-term and sometimes immediate reactions to health risks. These health risks are based on 1-hour exposure and generally include symptoms such as throat pain, eye irritation, and other similar symptoms. Acute hazard indices at the off-campus and on-campus MEIR, off-campus MEIW, and Early Childhood Services (Child Development Center) are described in Table 4.3-10. As shown, acute hazard indices under the proposed 2021 LRDP would not exceed the SCAQMD threshold of 1.0 at the off- or on-campus MEIR, off-campus MEIW, or Early Childhood Services (Child Development Center).

Table 4.3-10 Acute Health Risk Results

Scenario	Acute Hazard Index
Off-Campus Resident[1]	
Baseline Scenario	0.10
Future Scenario	0.13
Net Increase	0.03
SCAQMD Significance Threshold	1.0
Exceeds Threshold?	**No**
On-Campus Resident[2]	
Baseline Scenario	0.23
Future Scenario	0.27
Net Increase	0.04
SCAQMD Significance Threshold	1.0
Exceeds Threshold?	**No**

Scenario	Acute Hazard Index
Off-Campus Worker[3]	
Baseline Scenario	0.07
Future Scenario	0.11
Net Increase	0.04
SCAQMD Significance Threshold	1.0
Exceeds Threshold?	**No**
Early Childhood Services (Child Development Center)	
Baseline Scenario	0.10
Future Scenario	0.14
Net Increase	0.04
SCAQMD Significance Threshold	1.0
Exceeds Threshold?	**No**

SCAQMD = South Coast Air Quality Management District

[1] Off-campus Maximally Exposed Individual Resident (MEIR) for acute health risk is located at the rear yard of a single-family residence along West Campus View Drive, north of the campus Physical Plant.

[2] On-campus MEIR for acute health risk is located at the eastern portion of Lothian Hall.

[3] Off-campus Maximally Exposed Individual Worker (MEIW) for acute health risk is located at church near the intersection of University Avenue and West. Campus Drive.

Note: Health risk modeling as described in the Programmatic HRA identified the on-campus MEIW for acute health risk at campus laboratory facilities. However, the HRA methodology results in an inflated acute hazard index for on-campus workers, given that standard laboratory safety procedures cannot be incorporated. Such screening values are not reflective of the true acute health risk posed to on-campus workers under baseline or future scenarios, and therefore, are not described further in the Programmatic HRA. Nevertheless, health risk modeling indicated a net increase in acute hazard index of less than 0.1 for the on-campus MEIW between the baseline and future scenarios, below the SCAQMD significance threshold of 1.0.

Source: Programmatic HRA (Appendix C)

As summarized in Table 4.3-8 through Table 4.3-10, implementation of the proposed 2021 LRDP would not result in a net health risk increase exceeding SCAQMD's carcinogenic or non-carcinogenic health risk significance thresholds. Projects implemented under the proposed 2021 LRDP that include new sources of TACs will be required to undergo the appropriate level of project-specific environmental review to determine their consistency with the conclusions of this EIR, including the Programmatic HRA. Furthermore, new or altered sources of TACs would remain subject to all applicable State and air district regulations, including AB 2588 and SCAQMD New Source Review and Rule 1402 (*Control of Toxic Air Contaminants from Existing Sources*). Sources of TACs exceeding air district health risk standards would be required to implement risk reduction measures to minimize potential health risks to sensitive receptors. The Programmatic HRA also conservatively evaluates health risk at the edge of buildings without separation by windows or walls and assumes no use of California Energy Code-required building filtration systems. Nevertheless, despite these conservative assumptions, the health risk impacts associated with the proposed 2021 LRDP were determined not to exceed applicable SCAQMD thresholds. Consequently, operation of the proposed 2021 LRDP would not expose sensitive receptors to substantial pollutant concentrations, and this impact is considered to be **less than significant**.

Mitigation Measures

Mitigation measures are not required.

Significance After Mitigation

Impacts would be less than significant without mitigation.

4.3.4 Cumulative Impacts

The cumulative context for air quality is regional. The SCAB is designated a nonattainment area for the federal and State 1-hour and 8-hour O_3 standards, the State PM_{10} standards, the federal 24-hour $PM_{2.5}$ standard, and the federal and State annual $PM_{2.5}$ standard. SCAB is in attainment of all other federal and State standards. Despite the current nonattainment status and local air quality standard exceedances, air quality in the SCAB has generally improved since the inception of air pollutant monitoring in 1976. This improvement is mainly due to lower-polluting on-road motor vehicles, more stringent regulation of industrial sources, and the implementation of emission reduction strategies by the SCAQMD. This trend toward cleaner air has occurred despite continued population growth.[7] As discussed in the 2012 AQMP for the SCAB (SCAQMD 2013):

> Despite this growth, air quality has improved significantly over the years, primarily due to the impacts of the region's air quality control program…PM_{10} levels have declined almost 50 percent since 1990, and $PM_{2.5}$ levels have also declined 50 percent since measurements began in 1999…the only air monitoring station that is currently exceeding or projected to exceed the 24-hour $PM_{2.5}$ standard from 2011 forward is the Mira Loma station in Western Riverside County. Similar improvements are observed with O_3, although the rate of O_3 decline has slowed in recent years.

The proposed 2021 LRDP would contribute PM and the O_3 precursors ROG and NO_X to the area during construction and operation. As described under Impact AQ-2 above, regional emissions during construction would exceed SCAQMD ROG and NO_X thresholds and contribute substantially to an existing or projected air quality violation and would be potentially significant. ROG emissions during construction would exceed the SCAQMD ROG threshold because of the conservative construction scenario assumed for 2022, in which feasible mitigation is not available to reduce below significance. As the NO_x emissions exceedance is primarily due to off-site hauling trips, mitigation measures are not available that would feasibly reduce impacts from construction NO_X emissions to a less-than-significant level. Therefore, after mitigation impacts would be significant and unavoidable, and the proposed 2021 LRDP would have a significant and unavoidable **cumulatively considerable contribution of ROG and NO_X from construction emissions**.

Similarly, project operation would result in ROG, NO_X, and PM_{10} emissions that exceed SCAQMD thresholds during operation. Consumer product use is ultimately dependent on future individual consumer behavior, and therefore feasible mitigation measures do not exist to reduce these emissions. In addition, while a TDM Plan would be implemented as part of the proposed 2021 LRDP that would reduce mobile emissions, however additional mitigation measures are not available that would further reduce impacts from operational (i.e., mobile) NO_X and PM_{10} emissions to a less-than-significant level. Therefore, after mitigation impacts would be significant and unavoidable, and the proposed 2021 LRDP would have a significant and unavoidable **cumulatively considerable contribution of ROG, NO_X, and PM_{10} from operational emissions**.

As identified in Section 4.3.3, Impact Analysis and Mitigation Measures, under Impact AQ-3, the proposed 2021 LRDP would not have a significant impact from CO hotspots or construction or operational emissions of TACs. Existing and increased traffic and population growth in Inland

[7] These trends are show in greater detail on SCAQMD's website at: http://www.aqmd.gov/home/air-quality/historical-air-quality-data.

Southern California have cumulatively resulted in air quality impacts. In the area surrounding campus, existing sources of TACs and other pollutant emissions include the heavily-traveled I-215/SR 60 freeway, Metrolink railroad facilities, and gasoline storage and dispensing facilities in commercial corridors. Given southern California's longstanding history of degraded air quality and the presence of substantial pollution sources off-campus, it is reasonable to conclude that sensitive receptors in the project vicinity have been and may continue to be exposed to substantial pollutant concentrations from a wide range of sources, and such cumulative impacts are considered to be significant.

To date, SCAQMD has not adopted cumulative health risk thresholds to analyze cumulative environmental impacts associated with exposure of sensitive receptors to substantial pollutant concentrations. However, the analysis contained herein evaluates potential health risk impacts associated with construction and implementation of the proposed 2021 LRDP and compares such impacts to SCAQMD's project-level health risk thresholds. As discussed under Impact AQ-3, neither construction nor implementation of the proposed 2021 LRDP would result in exceedances of SCAQMD's health risk thresholds, which are intended to be protective of human health. Therefore, while cumulative impacts associated with exposure of sensitive receptors to substantial pollutant concentrations may be potentially significant, the proposed 2021 LRDP's contribution to such impacts **would not be cumulatively considerable**.

4.3.5 References

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4.4 Biological Resources

This section analyzes the potential effects of the proposed 2021 LRDP on biological resources. The analysis is based on the *Biological Resources Constraints Report for Long Range Development Plan at University of California, Riverside* prepared for the campus by Psomas (2019; Appendix D). The report includes a literature review that was conducted to identify special-status plants, wildlife, and habitats that have been reported to occur in the vicinity of the survey area (the UCR campus), and a general plant and wildlife survey and assessment of potential jurisdictional waters that was conducted in December 2018.

4.4.1 Environmental Setting

MSHCP Jurisdictional Lands

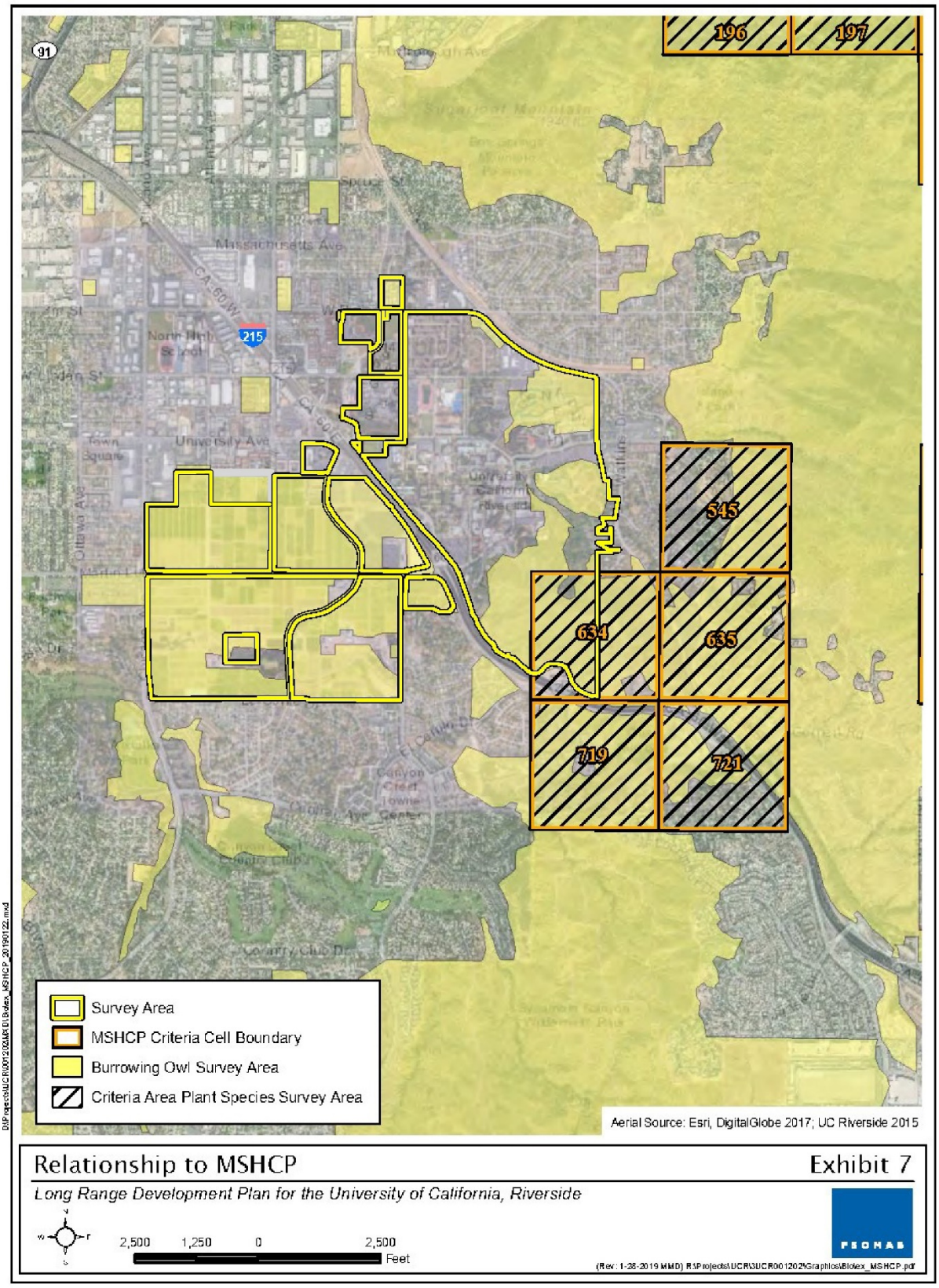
The Western Riverside County Regional Conservation Authority (RCA) was formed in 2004 to develop the Multiple Species Habitat Conservation Plan (MSHCP) to protect 146 native species of plants, birds, and animals, as well as to preserve a half-million acres of habitat (RCA n.d.). The MSHCP is a comprehensive, multi-jurisdictional plan that focuses on conservation of species and their associated habitats in Western Riverside County. The MSHCP allows participating jurisdictions to authorize the "take" of plant and wildlife species identified within the plan area. UCR is in the MSHCP area and has the option of utilizing the MSHCP as a Participating Special Entity (PSE).[1] If processing a project under the MSHCP, UCR would need to follow all aspects of the MSHCP for that project. However, if choosing not to process a project under the MSHCP, the project would have to be processed under traditional consultation and permitting mechanisms (Psomas 2019).

Pursuant to the MSHCP, the UCR campus is in the cities of Riverside and Norco, as well as in the Area Plan. The target conservation acreage range for this area plan is 3,465 to 3,615 acres. The southeast portion of the campus is part of the Area Plan Subunit 2: Sycamore Canyon – West. Biological issues and considerations for this Subunit include augmentation of conservation in Subunit 1 of the Highgrove Area Plan, conservation of grasslands adjacent to sage scrub to provide foraging habitat for raptors, maintenance of a linkage area for bobcat (*Lynx rufus*), and conservation of upland habitat supporting Bell's sage sparrow (*Amphispiza belli belli*) and southern California rufous-crowned sparrow (*Aimophila ruficeps canescens*). The planning species for this Subunit include Bell's sage sparrow, loggerhead shrike (*Lanus ludovicianus*), southern California rufous-crowned sparrow, and bobcat.

Figure 4.4-1 shows the locations of the MSHCP Criteria Cells on and near the UCR campus. The southeast portion of East Campus is in an MSHCP Criteria Area, specifically Criteria Cell 634. Conservation in this cell will contribute to assembly of Proposed Constrained Linkage 7, which is the only connection between existing core habitat in Sycamore Canyon Wilderness Park to the southwest and existing noncontiguous habitat block A in the Box Springs Mountains to the northeast. Conservation in this cell is planned to focus on upland scrub habitat to connect upland scrub habitat proposed for conservation in Criteria Cell 635 to the east with Criteria Cell 719 to the south.

[1] A Participating Special Entity is any regional public facility provider (e.g., a utility company, a public district or agency) that operates and/or owns land within the MSHCP Plan Area and that applies for Take Authorization pursuant to Section 11.8 of the Implementing Agreement.

Figure 4.4-1 MSHCP Criteria Cells



Psomas 2019; Appendix D

Conservation in Criteria Cell 634 will be approximately 5 percent of the cell, focusing on the eastern portion of the Cell. Since the UCR campus boundary only extends over the western half of Criteria Cell 634, future development of this area as part of the proposed 2021 LRDP would not conflict with the conservation goals for Criteria Cell 634 (Psomas 2019).

The UCR campus is in western Riverside County, which includes the watersheds of the San Jacinto and Santa Ana Rivers, the Cleveland and Angeles National Forests, and federal wilderness and wildlife areas (County of Riverside 2015). Riverside's biological diversity supports an abundance of wildlife species and plant communities, particularly due to its arroyos. The arroyos of Riverside are naturally occurring ephemeral drainages created over thousands of years as seasonal rains eroded the hills. Natural runoff in addition to that from agriculture and development has created a year-round supply of water, and riparian plants flourish throughout the year in the arroyos. The canyons of the southern hillsides also provide valuable migratory corridors for wildlife. These migratory corridors are connected where two drainages pass near one another or at the confluence of different drainage swales (City of Riverside 2012).

Topography on the UCR campus is relatively flat with an elevation of approximately 1,000 to 1,100 feet above mean sea level. Topography in the southeast portion of the campus consists of gently sloping hills with a peak elevation of 1,548 feet above mean sea level. A variety of soils are mapped on campus, including loam and sandy loam soils of the Arlington, Buren, Cieneba, Gorgonio, Hanford, Madera, Monserate, Ramona, and Vista series and terrace escarpments (Psomas 2019).

Psomas biologists conducted a general plant and wildlife survey, mapped vegetation, and performed an assessment of potential jurisdictional waters on December 12, 2018 and December 13, 2018. The survey area includes the entire UCR campus.

Vegetation

On-campus vegetation can be described as natural, naturalistic, landscaped, and agricultural areas. For continuity, vegetation types mapped in the survey area were grouped into these broad categories. Nomenclature for vegetation types generally follows that of *A Manual of California Vegetation* (California Native Plant Society [CNPS] 2019). Generally, unvegetated areas were mapped as other areas and include basins, disturbed areas, and developed areas. Table 4.4-1 lists the vegetation types and other landcover mapped in the survey area. Figure 4.4-2 shows the locations of the vegetation types and other landcovers. Nomenclature of plant taxa conform to the *Special Vascular Plants, Bryophytes, and Lichens List* (California Department of Fish and Wildlife [CDFW] 2021a) for special-status species and the *Jepson eFlora* (Jepson Herbarium 2014) for all other taxa.

Natural Areas

Natural areas are defined as undeveloped open space areas that are composed of native and naturally occurring plant species.

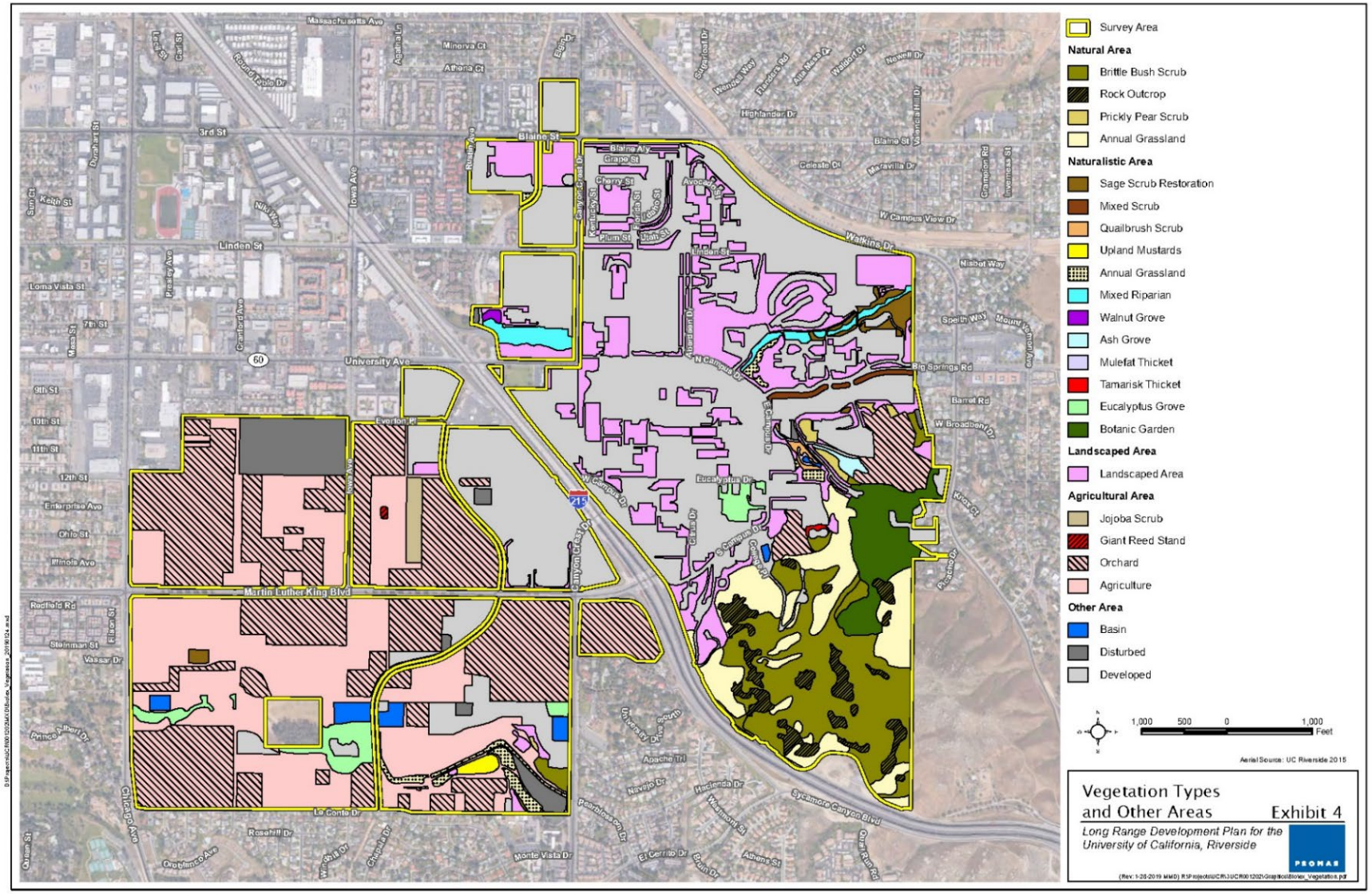
Table 4.4-1 Vegetation Types and Other Areas on the UCR Campus

Vegetation Type and Other Area	Approximate Amount in Survey Area (acres)	CNPS 2019 Equivalent	CDFW Sensitive Natural Community
Natural Areas			
Brittle Bush Scrub	65.73	*Encelia farinosa* Shrubland Alliance	No
Rock Outcrop	16.16	*Encelia farinosa* Shrubland Alliance	No
Prickly Pear Scrub	2.75	*Opuntia littoralis – Opuntia oricola – Cylindropuntia prolifera* Shrubland Alliance	Yes
Annual Grassland	42.40	Varies, including the *Bromus* (*diandrus*, *hordeaceus*) – *Brachypodium distachyon,* Herbaceous Semi-natural Alliance, *Bromus rubens – Schismus* (*arabicus*, *barbatus*), Herbaceous Semi-natural Alliance, or *Avena* (*barbata*, *fatua*) Herbaceous Semi-natural Alliance	No
Naturalistic Areas			
Sage Scrub Restoration	5.96	Not a natural community; similar to various shrubland Alliances including *Artemisia californica*, *Eriogonum fasciculatum*, and *Salvia mellifera* Shrubland Alliances	Not a natural community; not sensitive
Mixed Scrub	2.31	Not a natural community; similar to *Isocoma menziesii* Shrubland Alliance associated with non-native shrubs	Not a natural community; not sensitive
Quailbush Scrub	1.08	*Atriplex lentiformis* Shrubland Alliance	No
Upland Mustards	1.80	No named equivalent, but functionally similar to the *Brassica nigra – Raphanus* spp. Herbaceous Semi-natural Alliance	No
Annual Grassland	8.13	Varies, including the *Bromus* (*diandrus*, *hordeaceus*) – *Brachypodium distachyon,* Herbaceous Semi-natural Alliance, *Bromus rubens – Schismus* (*arabicus*, *barbatus*), Herbaceous Semi-natural Alliance, or *Avena* (*barbata*, *fatua*) Herbaceous Semi natural Alliance	No
Mixed Riparian	8.26	Not a natural community; similar to various woodland Alliances such as *Salix gooddingii* and *Platanus racemosa* Woodland Alliances associated with non-native trees	Not a natural community; not sensitive
Walnut Grove	0.57	Not a natural community; similar to *Juglans californica* Woodland Alliance or *Juglans hindsii* and Hybrids Woodland Special Stands and Semi-natural Alliance.	Not a natural community; not sensitive
Ash Grove	1.52	Not a natural community, but functionally similar to the *Fraxinus latifolia* Forest Alliance	Not a natural community; not sensitive
Mulefat Thicket	0.58	*Baccharis salicifolia* Shrubland Alliance	No
Tamarisk Thicket	0.35	*Tamarix* spp. Shrubland Semi-natural Alliance	No
Eucalyptus Grove	13.96	*Eucalyptus* spp. *– Ailanthus altissima – Robinia pseudoacacia* Woodland Semi natural Alliance	No
UCR Botanic Gardens	22.86	Not a natural community; no equivalent	No
Landscaped Areas			
Landscaped Areas	124.45	Not a natural community; no equivalent	No

Vegetation Type and Other Area	Approximate Amount in Survey Area (acres)	CNPS 2019 Equivalent	CDFW Sensitive Natural Community
Agricultural Areas			
Jojoba Scrub	4.28	Not a natural community; similar to the *Simmondsia chinensis* Provisional Shrubland Alliance	Not a natural community; not sensitive
Giant Reed Stand	0.25	*Phragmites australis – Arundo donax*, Herbaceous Semi-natural Alliance	No
Orchard	227.29	Not a natural community; no equivalent	No
Agriculture	165.22	Not a natural community; no equivalent	No
Other Areas			
Basin	7.07	Not a natural community; no equivalent	No
Disturbed	26.36	Not a natural community; no equivalent	No
Developed	377.59	Not a natural community; no equivalent	No
Total	**1,126.93**		

CNPS = California Native Plant Society, CDFW = California Department of Fish and Wildlife
Source: Psomas 2019 (Appendix D)

Figure 4.4-2 Vegetation Types and Other Areas



Source: Psomas 2019; Appendix D

BRITTLE BUSH SCRUB

Brittle bush scrub occurs on the hillsides and drainages in the southeast corner of the campus. This area is relatively undeveloped, with dirt and paved access roads and trails, storage structures, and incidental field research facilities. The dominant shrub is brittlebush (*Encelia farinosa*). Native shrubs present in lower amounts include California sagebrush (*Artemisia californica*) and California buckwheat (*Eriogonum fasciculatum*). Other scattered natives include wishbone bush (*Mirabilis laevis* var. *crassifolia*), filago-leaved sand-aster (*Corethrogyne filaginifolia*), phacelia (*Phacelia* sp.), and cryptantha (*Cryptantha* sp.). The shrub canopy is relatively open over most of the area. At the time of the survey, the understory and spaces between shrubs were either bare or contained annual species such as redstem filaree (*Erodium cicutarium*), eastern sisymbrium (*Sisymbrium orientale*), and non-native grasses (immature, but likely including species such as cheat grass [*Bromus tectorum*], ripgut grass [*Bromus diandrus*], red brome [*Bromus madritensis* ssp. *rubens*], Mediterranean grass [*Schismus* sp.], or oat [*Avena* sp.]). Other annual understory species expected to occur based on previous documentation includes tidy-tips (*Layia platyglossa*), cream cups (*Platystemon californicus*), California poppy (*Eschscholzia californica*), ovate plantain (*Plantago ovata*), splendid mariposa lily (*Calochortus splendens*), and blue dicks (*Dichelostema capitatum*) (EIP 2005). Brittle bush scrub is not designated as a sensitive natural community (CDFW 2020).

ROCK OUTCROP

Rock outcrops occur throughout the hillsides in the southeast corner of the campus. These areas contain exposed granitic rock with many crevices and soil between individual rocks. Vegetation growing between the rocks is similar to that of the brittle bush scrub. Rock outcrop is not designated as a sensitive natural community (CDFW 2020).

PRICKLY PEAR SCRUB

Prickly pear scrub occurs naturally on the slopes along the UCR Botanic Gardens Road and in a small patch in the West Campus. It is dominated by Vasey's prickly pear (*Opuntia vaseyi*) with lesser amounts of cholla (*Cylindropuntia* sp.) and brittle bush. Prickly pear scrub is considered sensitive by the CDFW (CDFW 2020).

ANNUAL GRASSLAND

Annual grassland is patchily distributed on slopes in the southeastern corner of campus. Portions of this community contain existing dirt and paved access roads and trails, storage structures, and incidental field research facilities. This vegetation type is dominated by non-native grasses that were immature at the time of the survey conducted by Psomas. Species composition likely includes cheat grass, ripgut grass, red brome, Mediterranean grass, and/or oat. *Redstem filaree* and *eastern sisymbrium* were also observed by Psomas in these areas. Other annual understory species expected to occur based on previous documentation includes common fiddleneck (*Amsinckia intermedia*), common goldenstar (*Bloomeria crocea*), baby blue eyes (*Nemophila menziesii*), and California croton (*Croton californicus*) (EIP 2005). It should be noted that annual grassland occurring in areas subject to disturbance (such as graded slopes) on the UCR campus are discussed below under Naturalistic Areas. Annual grassland is not designated as a sensitive natural community (CDFW 2020).

Naturalistic Areas

Naturalistic areas are defined as mostly undeveloped areas that have been subject to disturbance and modification or the introduction of ornamental trees and shrubs.

SAGE SCRUB RESTORATION

Sage scrub restoration occurs along the drainage in the eastern portion of the East Campus. It is considered a Naturalistic Area because the slopes have been modified, the vegetation has been planted, and the area is actively maintained. This vegetation type contains a mix of planted sage scrub species, including California sagebrush, California buckwheat, black sage (*Salvia mellifera*), brittle bush, coyote brush (*Baccharis pilularis* ssp. *consenguinea*), mule fat (*Baccharis salicifolia* ssp. *salicifolia*), and deer grass (*Muhlenbergia rigens*).

MIXED SCRUB

Mixed scrub occurs between Parking Lot 13 and Big Springs Road. It is considered a Naturalistic Area because the vegetation has been planted. This vegetation type contains a mix of native (e.g., coastal goldenbush [*Isocoma menziesii*] and California buckwheat) and non-native (primarily acacia [*Acacia* sp.]) shrubs along a potential drainage feature.

QUAILBUSH SCRUB

Quailbush scrub occurs on the slopes immediately surrounding the UCR Botanic Gardens basin. It is considered a Naturalistic Area because the slopes have been modified and the vegetation has been planted. This vegetation type is dominated by big saltbush (*Atriplex lentiformis*) with a lesser amount of mule fat and coastal goldenbush. Weedy, non-native species, such as grayish shortpod mustard (*Hirschfeldia incana*) and tree tobacco (*Nicotiana glauca*), are abundant. The slopes in this area are covered with an erosion control mat.

UPLAND MUSTARDS

Upland mustards occur on a slope in the West Campus. It is considered a Naturalistic Area because the slopes have been modified. This vegetation type is dominated by eastern sisymbrium, a non-native species.

ANNUAL GRASSLAND

Annual grassland occurring in areas subject to disturbance, such as graded slopes on the UCR campus, are considered Naturalistic Areas. This vegetation type is dominated by non-native grasses that were immature at the time of the survey. Species composition likely includes cheat grass, ripgut grass, red brome, Mediterranean grass, and/or oat.

MIXED RIPARIAN

Mixed riparian occurs along drainages in the East Campus. The riparian area in the eastern portion of the East Campus is considered a Naturalistic Area because the slopes have been modified and the vegetation has been planted as mitigation for a previous project (i.e., Glen Mor 2 Student Apartments Arroyo Improvements). This vegetation consists of a mix of riparian species such as Goodding's black willow (*Salix gooddingii*), arroyo willow (*Salix lasiolepis*), western sycamore (*Platanus racemosa*), Fremont cottonwood (*Populus fremontii* ssp. *fremontii*), Mexican palo verde

(*Parkinsonia aculeata*), and coast live oak (*Quercus agrifolia*). There is scattered mule fat in the drainage and along the banks. The understory of this vegetation type is generally open.

The riparian area along University Avenue is considered a Naturalistic Area because the area has been historically modified (i.e., historic aerial imagery from 1948 shows orchards in this area). This vegetation contains similar species as above, including Goodding's black willow, western sycamore, Fremont cottonwood, walnut (*Juglans* sp.), and mule fat. It also contains escapee ash trees such as shamel ash (*Fraxinus uhdei*) and velvet ash cultivars (*Fraxinus velutina*). The understory contains leaf litter and scattered species such as California blackberry (*Rubus ursinus*) and hoary nettle (*Urtica dioica* ssp. *holosericea*).

WALNUT GROVE

A walnut grove occurs in the northwestern portion of the East Campus. It is considered a Naturalistic Area, because it occurs on a graded parcel, and the vegetation likely consists of escapees.[2] This vegetation type consists of a stand of mature walnuts (likely a hybrid of southern California black walnut [*Juglans californica*], northern California black walnut [*Juglans hindsii*], or black walnut [*Juglans nigra*]).

ASH GROVE

An ash grove occurs in the eastern portion of East Campus. It is considered a Naturalistic Area because the vegetation likely consists of escapees. This vegetation type is dominated by shamel ash and velvet ash cultivars with lesser amounts of coast live oak, walnut, and mule fat. The understory contains leaf litter and scattered herbs such as petty spurge (*Euphorbia peplus*) and milk thistle (*Silybum marianum*).

MULEFAT THICKET

Mulefat thicket occurs around the basin in the UCR Botanic Gardens. It is considered a Naturalistic Area, because it is part of a manufactured basin. This vegetation type is dominated by mule fat, with scattered, immature red willow (*Salix laevigata*), arroyo willow, and Mexican palo verde; mugwort (*Artemisia douglasiana*) occurs in the understory.

TAMARISK THICKET

Tamarisk thicket occurs around water tanks at the edge of open space in the southeast corner of the East Campus. It is considered a Naturalistic Area, because it consists of non-native species. This vegetation is dominated by saltcedar (*Tamarix ramosissima*) with scattered brittlebush and an understory of non-native grasses.

EUCALYPTUS GROVE

Eucalyptus groves occur along drainages in West Campus and south of Eucalyptus Drive in East Campus. It is considered a Naturalistic Area, because it consists of non-native species. This vegetation type is dominated by mature gum trees (*Eucalyptus* spp.). Individual gum trees intermixed with other species are included as landscaped areas, described below.

[2] *Escapees* are cultivated plants that began growing wild through volunteer seedlings.

UCR BOTANIC GARDENS

The UCR Botanic Gardens is considered a naturalistic landscaped area. It contains a mix of native and non-native planted species, primarily from Mediterranean climates and arid areas similar to California, including geographical collections from Australia, Baja California, Mexico, South Africa, and temperate deciduous forests. Paved and unpaved trails in the gardens are not mapped separately. The UCR Botanic Gardens is mapped separately from landscaped areas on East Campus, because it has a more natural topography and generally lacks turf grass as a ground cover.

Landscaped Areas

Landscaped areas are considered open spaces that have been developed with turf-covered lawn areas or groundcover, mature trees, and shrubs. Landscaped areas occur throughout East Campus and consist of ornamental vegetation planted in open areas between buildings, in road medians, and along the edges of walkways and roads. This vegetation type includes a variety of mature trees such as jacaranda (*Jacaranda mimosifolia*), bottlebrush (*Melaleuca* sp.), gum tree, deodar cedar (*Cedrus deodara*), pepper tree (*Schinus molle*), Brazilian pepper tree (*Schinus terebinthifolius*), walnut, and coast live oak. Understory vegetation is limited. The primary groundcover is turf grass; other areas contain rock, leaf litter, bare ground, or mulch.

Agricultural Areas

Agricultural areas are used for agricultural teaching and research and are dominated by row crops and orchards.

JOJOBA SCRUB

Jojoba scrub occurs on a single plot in the Agricultural Area of West Campus. It is dominated by jojoba (*Simmondsia chinensis*) with scattered pepper trees around the edges of the plot. This was part of an experimental plot of Dr. Yermanos planted in the 1970s and 1980s (Psomas 2019)

GIANT REED STAND

Giant reed stand occurs in the Agricultural Area of West Campus. It consists of giant reed (*Arundo donax*) growing on debris piles in a fallow field.

ORCHARD

Orchards occur primarily on the West Campus but also in small areas on the East Campus. Trees, of varying levels of maturity, include different types of citrus (*Citrus* spp.), avocado (*Persea americana*), and European olive (*Olea europaea*).

Other Areas

Other areas include basins, disturbed areas, and developed areas. These areas are generally unvegetated, though they may include ornamental landscaping that is closely associated with a structure and smaller than the 0.25-acre minimum mapping unit.

BASIN

Basins occur throughout the West Campus, at the edge of the East Campus adjacent to undeveloped open space, and along the road to the UCR Botanic Gardens. The UCR Botanic Gardens basin is unlined but has concrete weirs and a concrete spillway. The center of the basin lacks vegetation and

contains built-up sediment, but the outer portion of the basin and banks are vegetated. This basin holds water intermittently. The other basins are unvegetated; some are concrete lined while others are soft bottomed. Based on a review of historic aerials, these basins appear to hold water for extended periods of time and/or year-round.

DISTURBED

Disturbed areas occur throughout the UCR campus and consist of bare ground that has been graded or otherwise altered. It should be noted that unpaved access roads (e.g., in the agricultural areas and the southeast corner of the campus) have not been mapped separately from the surrounding vegetation.

DEVELOPED

Developed areas occur throughout the campus and include structures (such as buildings, water tanks, greenhouses, etc.) and paved surfaces (such as paved roads and parking lots). Most developed areas occur on the East Campus. Water tanks occur in the southeast corner of East Campus, while various offices, greenhouses, and laboratories occur on the both East Campus and West Campus. Ornamental vegetation that is closely associated with these structures (i.e., not meeting the 0.25-acre minimum mapping unit) was not mapped separately.

Wildlife

The quality of wildlife habitat varies across the survey area. Natural areas (undeveloped areas with native vegetation) and naturalistic areas (larger areas of vegetation such as the UCR Botanic Gardens) provide relatively high-quality habitat. Landscaped areas (smaller patches of vegetation among developed areas) and the agricultural areas of West Campus provide moderate quality habitat. Densely developed areas with limited vegetation generally provide low-quality wildlife habitat. The presence of non-native vegetation, human activity, and surrounding urban development generally decrease the wildlife value relative to undisturbed areas. Wildlife species present are expected to be relatively urban-tolerant and acclimated to human activity. Wildlife detections were based on observations that occurred during the field survey by Psomas or that are expected to occur on the UCR campus based on presence of suitable habitat. Taxonomy and nomenclature for wildlife generally follows the *Special Animals List* (CDFW 2021b for special-status species and other species; the Center for North American Herpetology (2015) for amphibians and reptiles; the American Ornithological Society (2018) for birds; and the Smithsonian National Museum of Natural History (2011) for mammals.

Fish and Amphibians

No fish species were observed during the biological survey by Psomas, and suitable aquatic habitat is minimal. The drainages are ephemeral and travel underground for portions of their length, so are not expected to provide fish habitat. The basins may hold introduced species, such as western mosquitofish (*Gambusia affinis*). No amphibian species were observed during the biological survey by Psomas. Common species that may occur on campus include Baja California treefrog (*Pseudacris hypochondriaca*) and American bullfrog (*Lithobates [=Rana] catesbeianus*).

Reptiles

The MSHCP does not identify any covered or special-status reptilian species as potentially occurring on the project site. Reptile species observed in the survey area include western fence lizard (*Sceloporus occidentalis*) and side-blotched lizard (*Uta stansburiana*). Other common reptile species expected to occur in the survey area include southern alligator lizard (*Elgaria multicarinata*), Belding's orange-throated whiptail (*Aspidoscelis hyperythra beldingi*), southern Pacific rattlesnake (*Crotalus oreganus helleri*), and gopher snake (*Pituophis catenifer*).

Birds

Bird species observed on or adjacent to the UCR campus include mallard (*Anas platyrhynchos*), ring-necked duck (*Aythya collaris*), hooded merganser (*Lophodytes cucullatus*), pied-billed grebe (*Podilymbus podiceps*), rock pigeon (*Columba livia*), white-throated swift (*Aeronautes saxatalis*), Anna's hummingbird (*Calypte anna*), Allen's hummingbird (*Selasphorus sasin*), American coot (*Fulica americana*), killdeer (*Charadrius vociferus*), great egret (*Ardea alba*), red-tailed hawk (*Buteo jamaicensis*), belted kingfisher (*Megaceryle alcyon*), Nuttall's woodpecker (*Picoides nuttallii*), black phoebe (*Sayornis nigricans*), Say's phoebe (*Sayornis saya*), Cassin's kingbird (*Tyrannus vociferans*), California scrub-jay (*Aphelocoma californica*), common raven (*Corvus corax*), bushtit (*Psaltriparus minimus*), house wren (*Troglodytes aedon*), blue-gray gnatcatcher (*Polioptila caerulea*), wrentit (*Chamaea fasciata*), hermit thrush (*Catharus guttatus*), northern mockingbird (*Mimus polyglottos*), American pipit (*Anthus rubescens*), house finch (*Haemorhous mexicanus*), lesser goldfinch (*Spinus psaltria*), spotted towhee (*Pipilo maculatus*), rufous-crowned sparrow (*Aimophila ruficeps*), California towhee (*Melozone crissalis*), song sparrow (*Melospiza melodia*), white-crowned sparrow (*Zonotrichia leucophrys*), western meadowlark (*Sturnella neglecta*), great-tailed grackle (*Quiscalus mexicanus*), and yellow-rumped warbler (*Setophaga coronata*).

Mammals

No mammal species were directly observed during the survey by Psomas; however, evidence of mammal presence (e.g., scat, tracks, or burrows) was observed. California ground squirrel (*Otospermophilus beecheyi*) burrows, bobcat scat, coyote (*Canis latrans*) scat and tracks, and southern mule deer (*Odocoileus hemionus*) tracks were present in the survey area. Other mammal species that may occur include Botta's pocket gopher (*Thomomys bottae*), common raccoon (*Procyon lotor*), Virginia opossum (*Didelphia virginiana*), and striped skunk (*Mephitis mephitis*). Common bat species with potential to forage in the survey area include big brown bat (*Eptesicus fuscus*) and California myotis (*Myotis californicus*). Bats may also roost in trees, buildings, and rock crevices on campus.

Special-Status Species and Natural Communities

Special-status species are those plants and animals listed, proposed for listing, or candidates for listing as Threatened or Endangered by the U.S. Fish and Wildlife Service (USFWS) under the Federal Endangered Species Act (FESA), those considered Species of Concern by the USFWS, those listed or candidates for listing as Rare, Threatened, or Endangered by the CDFW under the California ESA (CESA) and Native Plant Protection Act, animals designated as Fully Protected by the California Fish and Game Code, animals listed as Species of Special Concern by the CDFW, CDFW Special Plants (specifically those with California Rare Plant Ranks [CRPR] of 1B, 2, 3, and 4 in the California Native Plant Society Inventory of Rare and Endangered Vascular Plants of California), and species identified as sensitive by the MSHCP (County of Riverside 2003).

Plants with a CRPR of 1B are rare throughout their range with the majority of them endemic to California. Most of the plants that are ranked 1B have declined substantially over the last century. CRPR 1B plants constitute the majority of taxa in the CNPS Inventory, with more than 1,000 plants assigned to this category of rarity. Plants with a CRPR of 2A are presumed extirpated[3] because they have not been observed or documented in California for many years. This list only includes plants that are presumed extirpated in California but more common elsewhere in their range. Plants with a CRPR of 2B meet the requirements of 1B ranking within California but are common in other states or countries. Plants with a CRPR of 3 lack the necessary information to assign them to one of the other ranks or to reject them. Plants with a CRPR of 4 are of limited distribution or infrequent throughout a broader area in California, and their status is being monitored.

CRPR Ranks at each level also include a threat rank (e.g., CRPR 4.3) and are determined as follows: 0.1-Seriously threatened in California (over 80 percent of occurrences threatened/high degree and immediacy of threat), 0.2-Moderately threatened in California (20-80 percent of occurrences threatened/moderate degree and immediacy of threat), 0.3-Not very threatened in California (less than 20 percent of occurrences threatened/low degree and immediacy of threat or no current threats known).

Queries of the following databases were conducted for the United States Geological Service 7.5 Minute Riverside East quadrangle to obtain comprehensive information for federally- and State-listed species, sensitive communities, and federally-designated Critical Habitat known to or considered to have potential to occur on or near the UCR campus:

- California Natural Diversity Database (CDFW 2018)
- CNPS Online Inventory of Rare, Threatened, and Endangered Plants of California (CNPS 2019)
- Previous reports for the UCR campus

The literature search identified seven special-status plant species, 56 special-status wildlife species, and three special-status plant communities as having potential to occur in the vicinity of the UCR campus. Special-status plant and wildlife species were evaluated for their potential to occur within the LRDP boundaries based on habitat requirements, availability and quality of suitable habitat, and known distributions.

Special-Status Wildlife Species

Fifty-six special-status wildlife species have been reported in the vicinity of the survey area. Of these, 15 species are federally- and/or State-listed Endangered or Threatened or are candidates for listing:

- Santa Ana sucker (Catostomus santaanae)
- Steelhead – southern California Distinct Population Segment (Oncorhynchus mykiss irideus pop. 10)
- Riverside fairy shrimp (Streptocephalus woottoni)
- Delhi Sands flower-loving fly (Rhaphiomidas terminates abdominalis)
- Southern mountain yellow-legged frog (Rana muscosa)
- Swainson's hawk (Buteo swainsoni)
- Bald eagle (Haliaeetus leucocephalus)

[3] A plant that is extirpated from California has been eliminated from California but may still occur elsewhere in its range.

- Western yellow-billed cuckoo (Coccyzus americanus occidentalis)
- California black rail (Laterallus jamaicensis coturniculus)
- Southwestern willow flycatcher (Empidonax traillii extimus)
- Least Bell's vireo (Vireo bellii pusillus)
- Coastal California gnatcatcher (Polioptila californica californica)
- Tricolored blackbird (Agelaius tricolor)
- San Bernardino kangaroo rat (Dipodomys merriami parvus)
- Stephens' kangaroo rat (Dipodomys stephensi)

Marginally suitable habitat for Riverside fairy shrimp occurs in the basins on campus. Marginally suitable habitat for least Bell's vireo occurs in the mixed riparian vegetation and the mulefat thicket in the survey area. Suitable habitat for coastal California gnatcatcher occurs in the brittle bush scrub, rock outcrops, sage scrub restoration, mixed scrub, and prickly pear scrub in natural and naturalistic areas on campus. Marginally suitable habitat for Stephens' kangaroo rat occurs in the annual grassland in natural areas on campus. Swainson's hawks may forage in the larger open space areas of campus as migrants but do not nest in the project region. The remaining listed species as being in the vicinity of the survey area are not expected to occur in the UCR Campus due to lack of suitable habitat.

In addition to species formally listed by the resource agencies, several special-status species (California Species of Special Concern [SSC], Watch List, and Fully Protected species) have been reported near the survey area. Species having potential to occur include western spadefoot (*Spea hammondii*), burrowing owl (*Athene cunicularia*), and Los Angeles pocket mouse (*Perognathus longimembris brevinasus*).

In addition, the following special-status species have potential or limited potential to occur in the survey area due to the presence of suitable or marginally suitable habitat:

- San Diego banded gecko (*Coleonyx variegatus abbottii*)
- Coast horned lizard (*Phrynosoma blainvillii*)
- Orange-throated whiptail
- Coastal whiptail (*Aspidoscelis tigris stejnegeri*)
- Southern California legless lizard (*Anniella stebbinsi*)
- California glossy snake (*Arizona elegans occidentalis*)
- Coast patch-nosed snake (*Salvadora hexalepis virgultea*)
- Two-striped garter snake (*Thamnophis hammondii*)
- Red-diamond rattlesnake (*Crotalus ruber*)
- White-tailed kite (*Elanus leucurus*)
- Cooper's hawk (*Accipiter cooperii*)
- Ferruginous hawk (Buteo regalis)
- Merlin (*Falco columbarius*)
- Loggerhead shrike
- Southern California rufous crowned sparrow
- Bell's sage sparrow
- Yellow-breasted chat (*Icteria virens*)
- Yellow warbler (*Setophaga petechia*)
- Northwestern San Diego pocket mouse (*Chaetodipus fallax fallax*)
- Southern grasshopper mouse (*Onychomys torridus ramona*)
- San Diego black-tailed jackrabbit (*Lepus californicus bennettii*)
- Western yellow bat (*Lasiurus xanthinus*)
- Pallid bat (*Antrozous pallidus*)
- American badger (*Taxidea taxus*)

For these non-listed species, impacts on a small amount of habitat (relative to the availability of habitat in the region) are not expected to reduce the regional population below a self-sustaining level. The remaining species reported from database searches are not expected to occur in the survey area due to lack of suitable habitat.

Burrowing Owl

The project site is partially within the MSHCP designated survey area for burrowing owl (refer to Figure 4.4-3). Burrowing owl is currently designated as a SSC. The burrowing owl is a grassland specialist distributed throughout western North America where it occupies open areas with short vegetation and bare ground within shrub, desert, and grassland environments. Suitable habitat for burrowing owl is present on the UCR campus. Burrowing owls use a wide variety of arid and semi-arid environments with level to gently sloping areas characterized by open vegetation and bare ground. The western burrowing owl (*A.c. hypugaea*), which occurs throughout the western United States including California, rarely digs its own burrows and is instead dependent upon the presence of burrowing mammals (i.e., California ground squirrels, coyotes, and American badgers [*Taxidea taxus]*), whose burrows are often used for roosting and nesting. The presence or absence of colonial mammal burrows is often a major factor that limits the presence or absence of burrowing owls. Where mammal burrows are scarce, burrowing owls have been found occupying man-made cavities, such as buried and non-functioning drainpipes, standpipes, and dry culverts. They also require low growth or open vegetation allowing line-of-sight observation of the surrounding habitat to forage and watch for predators. In California, the burrowing owl breeding season extends from the beginning of February through the end of August.

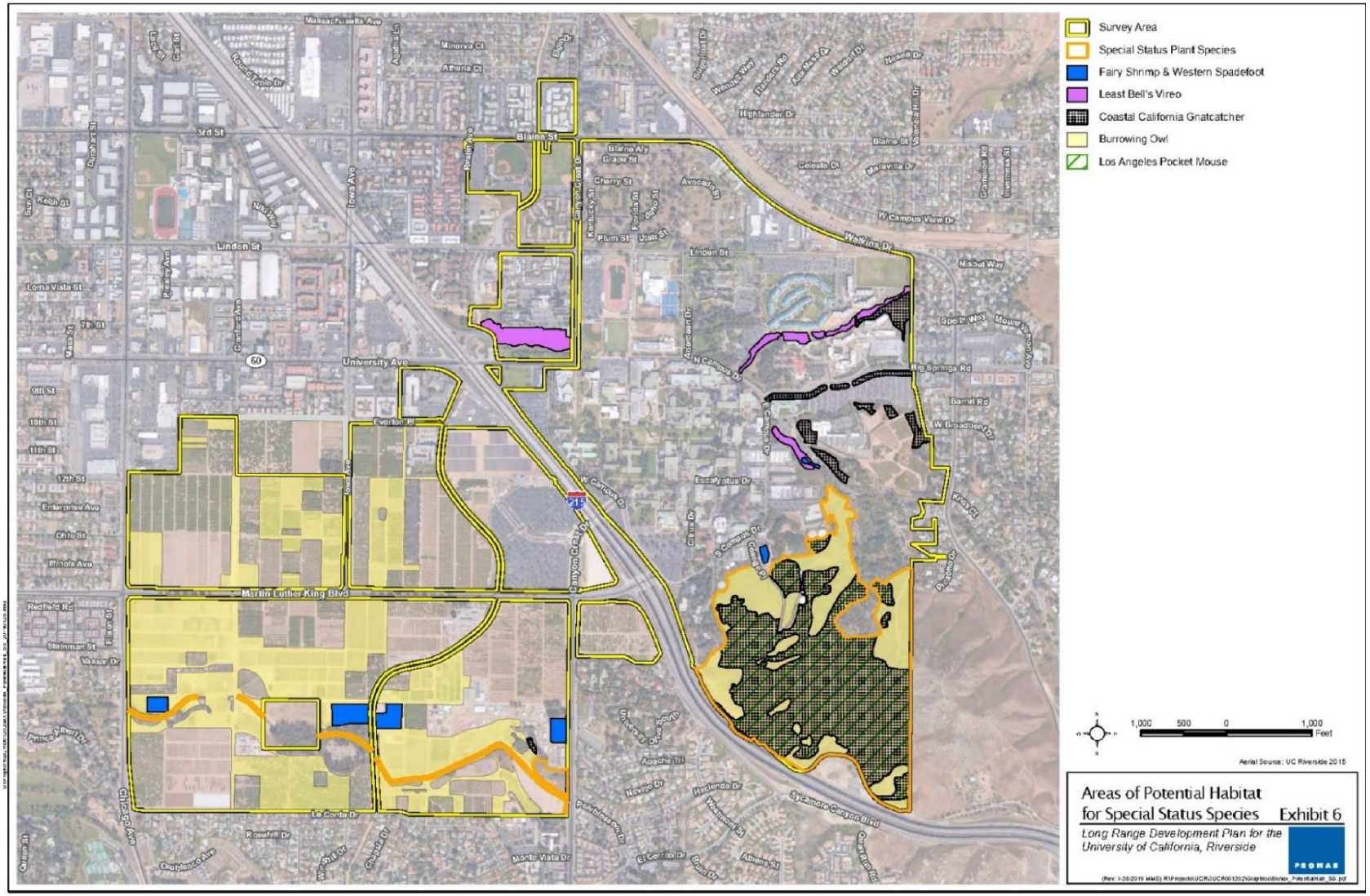
Special-Status Plant Communities

The CDFW provides a list of vegetation Alliances, Associations, and Special Stands that are considered "Sensitive Natural Communities" based on their rarity and threat (Psomas 2019). As discussed in Table 4.4-1, prickly pear scrub would be considered a sensitive natural community.

Special-Status Plant Species

Forty-one special-status plant species have been reported within 5 miles of the UCR campus. Of these, marginally suitable habitat for four federal and/or State-listed Endangered or Threatened species occurs within the naturally vegetated areas present in the study area. Munz's onion (*Allium munzii*), San Diego ambrosia (*Ambrosia pumila*), Nevin's barberry (*Berberis nevinii*), and slender-horned spineflower (*Dodecahema leptoceras*) all have low potential to occur in the UCR Campus (Psomas 2019).

Figure 4.4-3 Areas of Potential Habitat for Special-Status Species



Psomas 2019; Appendix D

Additionally, 14 species with a CRPR ranking of 1A, 1B, or 2B also have low potential to occur in the UCR campus. These 14 species are chaparral sand-verbena (*Abronia villosa* var. *aurita*), smooth tarplant (*Centromadia pungens* ssp. *laevis*), Parry's spineflower (*Chorizanthe parryi* var. *parryi*), long-spined spineflower (*Chorizanthe polygonoides* var. *longispina*), snake cholla (*Cylindropuntia californica* var. *californica*), many-stemmed dudleya (*Dudleya multicaulis*), mesa horkelia (*Horkelia cuneata* var. *puberula*), California satintail (*Imperata brevifolia*), Parish's desert-thorn (*Lycium parishii*), Brand's star phacelia (*Phacelia stellaris*), chaparral ragwort (*Senecio aphanactis*), salt spring checkerbloom (*Sidalcea neomexicana*), prairie wedge grass (*Sphenopholis obtusata*), and San Bernardino aster (*Symphyotrichum defoliatum*). One CRPR 4.3 species, Robinson's peppergrass (*Lepidium virginicum* ssp. *robinsonii*), has been observed within the southeastern portion of the study area, but plant species with a CRPR of 3 or 4 are not typically considered constraints on development. All the above-mentioned species have a low potential to occur within the naturally vegetated areas present in the study area (Psomas 2019).

Critical Habitat

Under the FESA, "Critical Habitat" is designated at the time of listing of a species or within 1 year of listing. Critical Habitat refers to specific areas within the geographical range of a species at the time it is listed that include the physical or biological features that are essential to the survival and eventual recovery of that species. Maintenance of these physical and biological features requires special management considerations or protection, regardless of whether individuals or the species are present or not. The UCR campus is not located in areas designated or proposed as Critical Habitat.

Potential Jurisdictional Resources

The National Wetlands Inventory (NWI) identified four basins in the West Campus; these are mapped as freshwater ponds classified as PUBK (i.e., in the Palustrine System with unconsolidated bottom and artificially flooded water regime). These artificial basins were also observed during the field survey and contain surface water. They are potential jurisdictional resources under the Porter-Cologne Water Quality Control Act and Section 1602 of the California Fish and Game Code, as described in greater detail below in the subsequent subsections "*Regional Water Quality Control Board and California Department of Fish and Wildlife.*"

The NWI identified another freshwater pond classified as PUBK in the middle of the eastern edge of the UCR Botanic Gardens. This freshwater pond was not observed during the field survey, as mature trees and an access road were present where the freshwater pond was mapped. The feature that was mapped by the NWI was not observed by Psomas during the time of the site visit; therefore, no jurisdictional resource occurs at this location. A basin in the UCR Botanic Gardens was not identified by the NWI. This basin was artificially created as part of the UCR Flood Control Management Plan for the University Arroyo Watershed (Jones & Stokes 2005) and is a potential jurisdictional resource. A different basin adjacent to undeveloped open space in the southeastern portion of the East Campus is artificial and was not identified by the NWI, although is similar to the basins in the West Campus described above. This other basin is a potential jurisdictional resource.

Two drainage features on the UCR campus were identified by the NWI. The Gage Canal conveys flows through the central portion of the survey area and through both East Campus and West Campus. A second channel flows through the agricultural area south of Martin Luther King Boulevard. This drainage was referred to as the Box Springs Arroyo in the previous LRDP (EIP 2005). The eastern portion was classified as R4SBC, while the western portion was classified as R4SBA (i.e.,

streambeds in the Riverine System with intermittent flow that are either seasonally flooded or temporarily flooded). The field-verified alignment of this drainage varies slightly from the NWI mapping. Both drainages are potential jurisdictional resources.

The main drainage on campus is referred to as the University Arroyo. It traverses Big Springs Road, North Campus Drive, and University Avenue. Portions of this drainage have been channelized and are diverted underground via culverts. The tributary between Pentland Hills and Lothian residence halls is surrounded by riparian and sage scrub habitat that has been planted as part of a restoration effort and is referred to as the Glen Mor Arroyo. The western end of University Arroyo was referred to as Gage Basin. This drainage and its tributaries are potential jurisdictional resources (Psomas 2019).

An arroyo also traverses the northern edge of the UCR Botanic Gardens, along the road leading to the garden, and into the UCR Botanic Gardens basin, which was discussed above. A tributary of the arroyo extends from the hills south of the East Campus. These drainages are potential jurisdictional resources. Additional small drainage features are in the hills in the southeastern corner of the East Campus. Culverts are located at the downstream ends of these features at the I-215/SR 60 freeway. Each of these drainages are potential jurisdictional resources. Figure 4.4-4 shows the locations of potential jurisdictional resources on campus.

U.S. Army Corps of Engineers

Section 404 of the federal Clean Water Act (CWA) regulates activities affecting water resources under the jurisdiction of the United States Army Corps of Engineers (USACE). Waters of the United States (WOUS) under the jurisdiction of the USACE include navigable coastal and inland waters, lakes, rivers, streams, and their tributaries, interstate waters and their tributaries, wetlands adjacent to such waters, intermittent streams, and other waters that could affect interstate commerce.

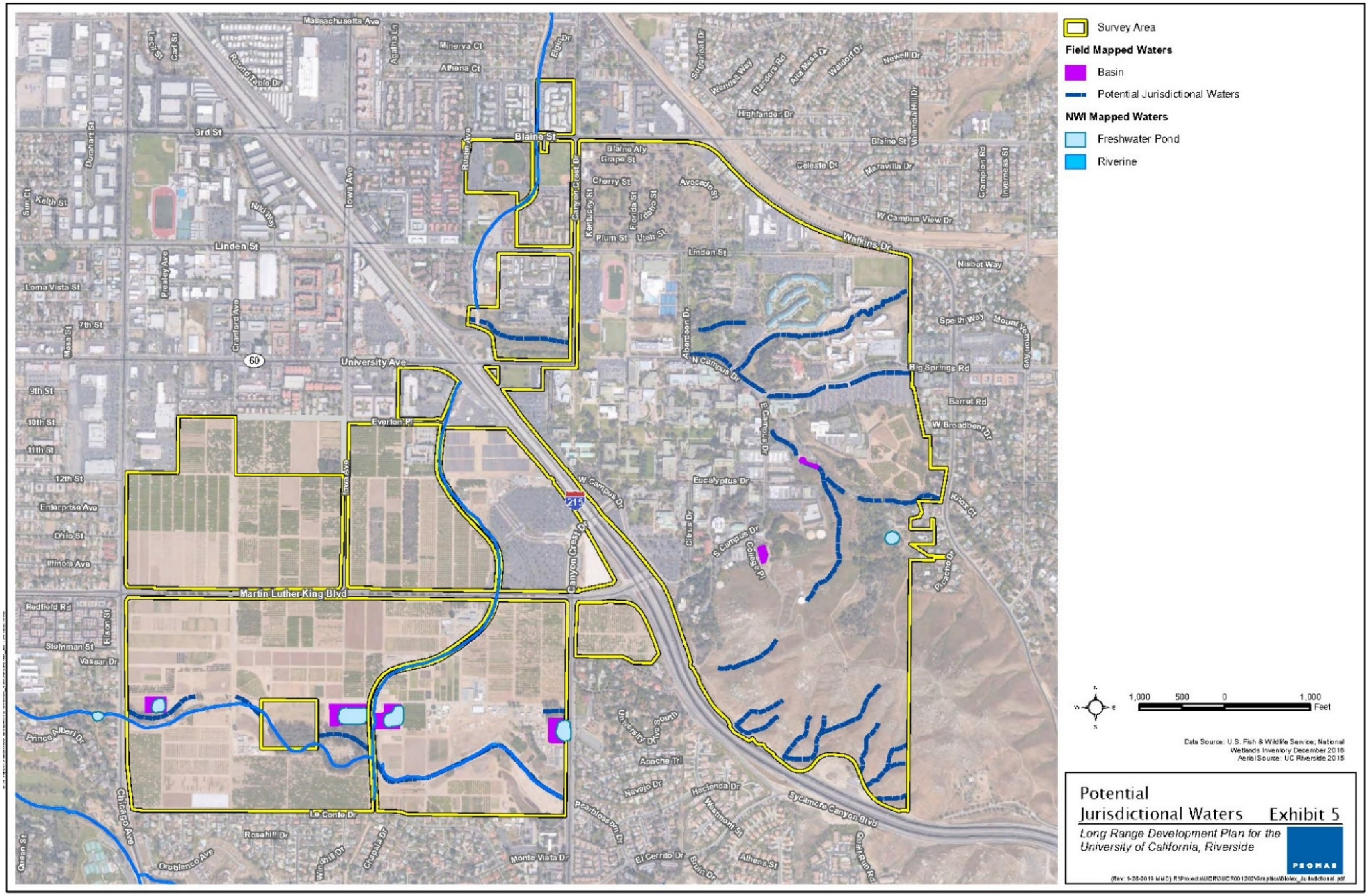
The University Arroyo, including its tributaries and the UCR Botanic Gardens basin, connects with the campus storm drain system, which enters the Gage Basin and then the City of Riverside storm drain system. This ultimately connects to the Santa Ana River, which flows to the Pacific Ocean. With a significant nexus to a traditional navigable water, these areas would likely be considered WOUS.

The drainage features in the hills in the southeastern corner of East Campus go underground at the I-215/SR 60 freeway. If these connect to the City's storm drain system and the Santa Ana River, they may be considered WOUS. Except for the basin in the UCR Botanic Gardens, the on-campus basins are isolated and so would not be considered WOUS (Psomas 2019).

Regional Water Quality Control Board

Section 401 of the CWA provides the Santa Ana Regional Water Quality Control Board (RWQCB) with the authority to regulate, through a Water Quality Certification, any proposed federally-permitted activity that may affect water quality. The RWQCB also has jurisdiction over isolated wetlands and waters under the Porter-Cologne Water Quality Control Act (Porter-Cologne). The RWQCB would take jurisdiction over WOUS, described above. The isolated basins were artificially created within uplands and do not support vegetation; however, the RWQCB may take jurisdiction over them.

Figure 4.4-4 Potential Jurisdictional Waters



Psomas 2019; Appendix D

California Department of Fish and Wildlife

Section 1602 of the *California Fish and Game Code* regulates activities affecting water resources under the jurisdiction of the CDFW. The CDFW has jurisdictional authority over resources associated with rivers, streams, and lakes.

Drainages on the campus have defined bed and banks, with some areas supporting riparian vegetation. The CDFW is expected to take jurisdiction over the on-campus drainages and basins. Although the isolated basins were artificially created within uplands and do not support vegetation, they provide pond habitat for wildlife.

Riparian/Riverine Habitat Assessment

MSHCP Section 6.1.2, Protection of Species Associated with Riparian/Riverine Areas and Vernal Pools, describes the process through which protection of riparian/riverine areas, vernal pools, and fairy shrimp species will occur within the MSHCP Area. Protection of these resources is important for a number of MSHCP conservation objectives. Guidelines for determining whether or not these resources exist on site are described as follows:

- **Riparian/Riverine Areas** are described by the MSHCP as "lands which contain habitat dominated by trees, shrubs, persistent emergent, or emergent mosses and lichens which occur close to or which depend upon soil moisture from a nearby fresh water source or areas with fresh water flow during all or a portion of the year." Riparian/riverine areas under the MSHCP also include drainage areas that are vegetated or have upland (non-riparian/riverine) vegetation that drain directly into an area that is described for conservation under the MSHCP (or areas already conserved).
- **Vernal Pools** are described by the MSHCP as "seasonal wetlands that occur in depression areas that have wetland indicators of all three parameters (soils, vegetation, and hydrology) during the wetter portion of the growing season but normally lack wetland indictors of hydrology and/or vegetation during the drier portion of the growing season."
- **Listed Fairy Shrimp Habitat** is described in the MSHCP as habitat for Riverside fairy shrimp (*Streptocephalus woottoni*), vernal pool fairy shrimp (*Branchinecta lynchi*), or Santa Rosa Plateau fairy shrimp (*Linderiella santarosae*), and includes ephemeral pools, artificially created habitat, and/or other features determined appropriate by a qualified biologist.

In addition, Section 6.1.2 of the MSHCP states:

> "With the exception of wetlands created for the purpose of providing wetlands habitat or resulting from human actions to create open waters or from the alteration of natural stream courses, areas demonstrating characteristics as described above which are artificially created are not included in these definitions."

Riparian/riverine habitat and vernal pools within the survey area were identified, mapped, and recorded during the field reconnaissance survey.

Wildlife Corridors and Linkages

Habitat linkages provide links between larger undeveloped habitat areas that are separated by development. Wildlife corridors are similar to linkages but provide specific opportunities for animals to disperse or migrate between areas. A corridor can be defined as a linear landscape feature of

sufficient width to allow animal movement between two comparatively undisturbed habitat fragments. Adequate cover is essential for a corridor to function as a wildlife movement area. It is possible for a habitat corridor to be adequate for one species yet inadequate for others. Wildlife corridors are significant features for dispersal, seasonal migration, breeding, and foraging. Additionally, open space can provide a buffer against both human disturbance and natural fluctuations in resources.

UCR is located at the edge of urban development in the eastern portion of the City. Because of this, there is no regional connection to other open space areas to the north or west. The southeast corner of the campus consists of undeveloped open space linking in the Box Springs Mountains to the northeast with Sycamore Canyon Wilderness Park to the southwest. It should be noted that the MSHCP identifies the hillside areas to the northeast of East Campus as important for wildlife movement. The southern portion of East Campus is in an MSHCP Criteria Area, specifically Criteria Cell 634. Conservation in this cell will contribute to assembly of Proposed Constrained Linkage 7, which is the only connection between existing core habitat in Sycamore Canyon Wilderness Park to the southwest and existing noncontiguous habitat block A in the Box Springs Mountains to the northeast. Conservation in this cell is planned to focus on upland scrub habitat to connect upland scrub habitat proposed for conservation in Criteria Cell 635 to the east with Criteria Cell 719 to the south. Conservation in Criteria Cell 634 will be approximately 5 percent of the cell, focusing on the eastern portion of the Cell.

Although the main campus is developed, University Arroyo, Gage Canal, and the drainage south of Martin Luther King Boulevard provide opportunities for local wildlife movement. Wildlife would also be expected to move through the agricultural portions of the survey area west of the I-215/SR 60 freeway.

4.4.2 Regulatory Setting

Federal

U.S. Army Corps of Engineers

Under Section 404 of the federal CWA, the USACE has authority to regulate activities that could discharge dredge or fill material into wetlands or other WOUS. The definition of WOUS has been the subject of recent litigation, regulatory guidance, and agency rulemaking.

On April 21, 2020, the USACE and United States Environmental Protection Agency published the *Navigable Waters Protection Rule: Definition of "Waters of the United States."* This rule, effective on June 22, 2020, defines four categories of jurisdictional waters, documents certain types of waters that are excluded from jurisdiction, and clarifies some regulatory terms. Under the *Navigable Waters Protection Rule*, WOUS include:

(1) Territorial seas and traditional navigable waters
(2) Perennial and intermittent tributaries that contribute surface flow to those waters
(3) Certain Lakes and ponds, and impoundments of jurisdictional waters
(4) Wetlands adjacent to jurisdictional waters

Tributaries are defined as "a river, stream, or similar naturally occurring surface water channel that contributes surface water flow to the territorial seas or traditional navigable waters in a typical year either directly or through one or more tributaries, jurisdictional lakes, ponds, and impoundments of

jurisdictional waters, or adjacent wetlands." The tributary category also includes a ditch that "either relocates a tributary, is constructed in a tributary, or is constructed in an adjacent wetland as long as the ditch is perennial or intermittent and contributes surface water flow to a traditional navigable water or territorial sea in a typical year."

Adjacent wetlands are defined as wetlands that:

(i) Abut, meaning to touch at least at one point or side of, a defined WOUS

(ii) Are inundated by flooding from a defined WOUS in a typical year

(iii) Are physically separated from a defined WOUS by a natural berm, bank, dune, or similar natural features or by artificial dike, barrier or similar artificial structures as long as direct hydrological surface connection to defined WOUS are allowed

(iv) Are impounded of WOUS in a typical year through a culvert, flood or tide gate, pump or similar artificial structure

The Navigable Waters Protection Rule states that the following areas not considered to be jurisdictional waters even where they otherwise meet the definitions described above:

(1) Groundwater, including groundwater drained through subsurface drainage systems

(2) Ephemeral features that flow only in direct response to precipitation including ephemeral streams, swales, gullies, rills and pools

(3) Diffuse stormwater runoff and directional sheet flow over uplands

(4) Ditches that are not defined WOUS and not constructed in adjacent wetlands subject to certain limitations

(5) Prior converted cropland

(6) Artificially irrigated areas that would revert to upland if artificial irrigation ceases

(7) Artificial lakes and ponds that are not jurisdictional impoundments and that are constructed or excavated in upland or non-jurisdictional waters

(8) Water-filled depressions constructed or excavated in upland or in non-jurisdictional waters for the purpose of obtaining fill, sand, or gravel

(9) Stormwater control features constructed or excavated in uplands or in non-jurisdictional water to convey, treat, infiltrate, or stormwater runoff

(10) Groundwater recharge, water reuse, and wastewater recycling structures constructed or excavated in upland or in non-jurisdictional waters

(11) Waste treatment systems

The USACE also implements the federal policy embodied in Executive Order 11990, which is intended to result in no net loss of wetland value or acres. In achieving the goals of the CWA, the USACE seeks to avoid adverse impacts and offset unavoidable adverse impacts on existing aquatic resources. Any fill or adverse modification of wetlands that are hydrologically connected to jurisdictional waters would require a permit from the USACE prior to the start of work. Typically, when a project involves impacts to WOUS, the goal of no net loss of wetland acres or values is met through compensatory mitigation involving the creation or enhancement of similar habitats.

U.S. Fish and Wildlife Service

The USFWS implements the federal Migratory Bird Treaty Act (MBTA) (16 United States Code Section 703-711) and the Bald and Golden Eagle Protection Act (16 United States Code Section 668). The USFWS and National Marine Fisheries Service (NMFS) share responsibility for implementing the FESA (16 United States Code Section 153 et seq.). The USFWS generally implements the FESA for terrestrial and freshwater species, while the NMFS implements the FESA for marine and anadromous species. Projects that would result in "take" of any federally-listed threatened or endangered species are required to obtain authorization from the USFWS or NMFS through either Section 7 (interagency consultation with a federal nexus) or Section 10 (Habitat Conservation Plan) of FESA, depending on the involvement by the federal government in permitting and/or funding of the project. "Take" under federal definition means to harass, harm (which includes habitat modification), pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. The permitting process is used to determine if a project would jeopardize the continued existence of a listed species and what measures would be required to avoid jeopardizing the species. Proposed or candidate species do not have the full protection of FESA; the USFWS and NMFS advise project applicants the species could be elevated to listed status at any time.

Migratory Bird Treaty Act

The federal MBTA of 1918 was originally enacted between the United States and Great Britain (acting on behalf of Canada) for the protection of migratory birds between the two countries. The MBTA has since been expanded to include Mexico, Japan, and Russia. Under MBTA provisions, it is unlawful "by any means or manner to pursue, hunt, take, capture (or) kill" any migratory birds as defined by the MBTA except as permitted by regulations issued by the USFWS. The term "take" is defined by the USFWS regulation to mean to "pursue, hunt, shoot, wound, kill, trap, capture or collect" any migratory bird or any part, nest, or egg of any migratory bird covered by the conventions, or to attempt those activities.

State

California Endangered Species Act

The CESA prohibits the take of any plant or animal listed or proposed for listing as rare (plants only), threatened, or endangered. In accordance with CESA, CDFW has jurisdiction over State-listed species (California Fish and Game Code [CFGC] Section 2070). The CDFW regulates activities that may result in take of individuals (i.e., hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill). Habitat degradation or modification is not expressly included in the definition of take under the CFGC. The CDFW has interpreted take, however, to include the killing of a member of a species as the proximate result of habitat modification.

California Fish and Game Code

The CDFW derives its authority from the CFGC. CESA (CFGC Section 2050 et. seq.) prohibits take of State-listed Threatened or Endangered species. Take of fully protected species is prohibited under CFGC Sections 3511, 4700, 5050, and 5515. Section 86 of CFGC defines "take" as hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, capture, or kill. This definition does not include indirect harm by way of habitat modification.

CFGC Sections 3503, 3503.5, and 3511 restrict the take, possession, and destruction of birds, nests, and eggs. Section 3503.5 of the CFGC protects all birds-of-prey and their eggs and nests against

take, possession, or destruction. Fully protected birds may not be taken or possessed except under specific permit (Section 3511).

SSC is a category CDFW uses for those species considered to be indicators of regional habitat changes or considered to be potential future protected species. SSC do not have any special legal status except that which may be afforded by the CFGC, as noted above. CDFW intends the SSC category as a management tool to include these species into special consideration when decisions are made concerning the development of natural lands.

The CDFW also has authority to administer the Native Plant Protection Act (CFGC Section 1900 et seq.). The Native Plant Protection Act requires the CDFW to establish criteria for determining if a species, subspecies, or variety of native plant is endangered or rare. Under Section 1913(c) of the Native Plant Protection Act, the owner of land where a rare or endangered native plant grows is required to notify the department at least 10 days in advance of changing the land use to allow for salvage of plant(s).

Perennial, intermittent, and ephemeral streams and associated riparian vegetation, when present, also fall under the jurisdiction of the CDFW. Section 1600 et seq. of the CFGC (Lake and Streambed Alteration Agreements) gives CDFW regulatory authority over work in the bed, bank, and channel (which could extend to the 100-year floodplain), consisting of, but not limited to, the diversion or obstruction of the natural flow or changes in the channel, bed, or bank of any river, stream or lake.

California Fish and Game Code Section 1602 – Streambed Alteration

All diversions, obstructions, or changes to the natural flow or bed, channel, or bank of any river, stream, or lake in California that supports fish or wildlife resources are subject to regulation by CDFW under Section 1602 of the California Fish and Game Code. Under Section 1602, it is unlawful for any person, governmental agency, or public utility to do any of the following within first notifying CDFW:

- Substantially divert or obstruct the natural flow of, or substantially change or use any material from, the bed, channel, or bank of any river, stream, or lake
- Deposit or dispose of debris, waste, or other materials containing crumbled, flaked, or ground pavement where it may pass into any river, stream, or lake

The regulatory definition of a stream is a body of water that flows at least periodically or intermittently through a bed or channel that has banks and supports fish or other aquatic life. This definition includes watercourses with a surface or subsurface flow that supports or has supported riparian vegetation (California Code of Regulations Title 14, Section 1.72). CDFW jurisdiction within altered or artificial waterways is based on the value of those waterways to fish and wildlife. A streambed alteration agreement must be obtained for any diversion or alteration that would substantially adversely affect a fish or wildlife resource in a river, stream, or lake.

Porter-Cologne Water Quality Act

The State Water Resources Control Board (SWRCB) works in coordination with nine RWQCBs to preserve, protect, enhance, and restore water quality throughout the State. Each RWQCB makes decisions related to water quality for its region, and may approve, with or without conditions, or deny projects that could affect waters of the State. Their authority to regulate activities that could result in a discharge of dredged or fill material comes from the CWA and Porter-Cologne.

Porter-Cologne broadly defines WOUS as "any surface water or groundwater, including saline waters, within the boundaries of the State." Because Porter-Cologne applies to any water, whereas the CWA applies only to certain waters, California's jurisdictional reach overlaps and may exceed the boundaries of WOUS. For example, Water Quality Order No. 2004-0004-DWQ states that "shallow" waters of the State include headwaters, wetlands, and riparian areas. In practice, the RWQCBs may claim jurisdiction over riparian areas. Where riparian habitat is not present, such as may be the case at headwaters and urbanized areas, jurisdiction is taken to the top of bank.

The SWRCB adopted a State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to waters of the State, for inclusion in the forthcoming Water Quality Control Plan for Inland Surface Waters and Enclosed Bays and Estuaries and Ocean Waters of California. The Procedures consist of four major elements: a wetland definition; a framework for determining if a feature that meets the wetland definition is a water of the State; wetland delineation procedures; and procedures for the submittal, review and approval of applications for Water Quality Certifications and Waste Discharge Requirements for dredge or fill activities (SWRCB 2021.

Pursuant to Section 401 of the CWA, projects regulated by the USACE must obtain a Water Quality Certification from the RWQCB. This certification ensures the proposed project will uphold State water quality standards. Because California's jurisdiction to regulate its water resources is much broader than that of the federal government, proposed impacts on waters of the State require Water Quality Certification even if the area occurs outside of USACE jurisdiction.

The SWRCB and the local Santa Ana RWQCB have jurisdiction over waters of the State, with federal authority under the CWA Section 401 and State authority under Porter-Cologne to protect water quality, which prohibits discharges to such waters. WOUS are defined as any surface water or groundwater, including saline waters, in the boundaries of the State.

University of California, Riverside

The LRDP is a general guide that discusses future land use patterns and development of facilities, circulation, open space and infrastructure. To assist in implementation of the LRDP, UCR includes more detailed planning documents, such as the Physical Design Framework and Campus Construction and Design Standards[4] which are considered during the Design Review process. These documents will be kept current with the implementation of the proposed 2021 LRDP. More specifically, as described in the Physical Design Framework, UCR requires all new buildings to include planting that is native, drought-tolerant, low-maintenance, and adapted to xeric conditions. Furthermore, the Tree Preservation and Replacement Guidelines provide the metrics for reestablishing the green canopy lost to new construction.

Regional and Local (Binding)

Western Riverside County Multiple Species Habitat Conservation Plan

The Western Riverside County MSHCP is a comprehensive, multi-jurisdictional habitat conservation plan that focuses on conservation of species and their associated habitats in western Riverside County. The MSHCP Plan Area encompasses approximately 1.26 million acres (1,966 square miles); it includes all unincorporated Riverside County land west of the crest of the San Jacinto Mountains to the Orange County line, and the jurisdictional areas of Temecula, Murrieta, Lake Elsinore, Canyon Lake, Norco, Corona, Riverside, Moreno Valley, Banning, Beaumont, Calimesa, Perris, Hemet,

[4] The Campus Construction and Design Standards is a living document that replaces the 2007 *Campus Design Guidelines*.

Eastvale, Jurupa Valley, Wildomar, Menifee, and San Jacinto. The MSHCP is designed to protect more than 150 species and conserve 500,000 acres of land.

The MSHCP serves as a habitat conservation plan pursuant to Section 10(a)(1)(B) of FESA, as well as a natural communities conservation plan under the Natural Communities Conservation Plan Act of 2001. The MSHCP is used to allow the participating jurisdictions to authorize take of plant and wildlife species identified in the MSHCP Plan Area under specific conditions/measures. Under the MSHCP, USFWS and CDFW will grant "take authorization" for otherwise lawful actions in exchange for the assembly and management of a coordinated MSHCP conservation area.

Regional and Local (Non-Binding)

As noted in Section 4, "University of California Autonomy," UCR, a constitutionally created State entity, is not subject to municipal regulations of surrounding local governments for uses on property owned or controlled by UCR that are in furtherance of the university's educational purposes. However, UCR may consider, for coordination purposes, aspects of local plans and policies of the communities surrounding the campus when it is appropriate and feasible, but not bound by those plans and policies in its planning efforts. Those plans and policies are discussed below.

Stephens' Kangaroo Rat HCP

In response to the federal listing of Stephens' kangaroo rat, the Riverside County Habitat Conservation Agency (RCHCA) was formed. Its purpose is to acquire and manage habitat for the Stephens' kangaroo rat and other associated special-status species. The RCHCA Stephens' Kangaroo Rat Habitat Conservation Plan (HCP) was developed to meet the requirements of the program's federal Endangered Species Act (FESA) Section 10(a) permit. The HCP for this species is managed by the RCHCA. The HCP establishes a Reserve System where activities in the core reserve areas are limited or restricted. UCR does not fall in one of the designated RCHCA reserve areas (RCHCA 2018).

City of Riverside General Plan

The City's General Plan Open Space and Conservation element seek to preserve existing natural resources in the City, including hillsides, arroyos and other open space areas that support wildlife species and plant communities (City of Riverside 2012). General Plan policies focus on protecting the Santa Ana River, Sycamore Canyon, the arroyos, riparian/riverine areas, vernal pools, and other important watershed areas from urban encroachment, urban pollutants, and erosion, and to protect existing open space linkages consistent with the MSHCP. Policies also address MSHCP survey and protection requirements for species such as the burrowing owl and Stephens' kangaroo rat.

4.4.3 Environmental Impacts and Mitigation Measures

Significance Criteria

UCR utilizes the following 2020 CEQA Guidelines Appendix G significance criteria questions related to biological resources.

Would the proposed 2021 LRDP:

a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?

b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?

c) Have a substantial adverse effect on State or federally-protected wetlands (including, but not limited to marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?

d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?

e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?

Issues Not Evaluated Further

Local Policies or Ordinances Protecting Biological Resources (Criterion e)

The Initial Study for the proposed 2021 LRDP (Appendix A) concluded that UCR does not fall in one of the designated RCHCA reserve areas and that potential impacts would be less than significant. Issues related to local policies or ordinances protecting biological resources are not evaluated further.

Conflict with an Adopted Habitat Conservation Plan (Criterion f)

The Initial Study for the proposed 2021 LRDP (Appendix A) noted that UCR is not a permittee to the Western Riverside County MSHCP and therefore is not subject to the conservation efforts established in the plan. However, UCR is still subject to compliance with Sections 6.1.2 (Protection of Species Associated with Riparian/Riverine Areas and Vernal Pools), Section 6.1.3 (Protection of Narrow Endemic Plant Species), Section 6.3.2 (Additional Survey Needs and Procedures), and Section 6.1.4 (Guidelines Pertaining to the Urban/Wildlands Interface) of the MSHCP when specific campus projects are proposed. Given that, the Initial Study (Appendix A) concluded that impacts are considered less than significant, this issue is not discussed further in the analysis below.

Analysis Methodology

The analysis of biological resource impacts is based on information and data contained in the Biological Resources Constraints Report conducted for the proposed 2021 LRDP (Psomas 2019; Appendix D) and previous environmental documentation prepared for projects located in the City of Riverside and the UCR campus.

2021 LRDP Objectives and Policies

The proposed 2021 LRDP contains objectives and policies relevant to biological resources:

Open Space (OS)

- Objective OS5: Demonstrate an increased commitment to preservation and enhancement of the natural environment through the design and placement of future campus landscapes.

- Policy: Consider the ecological and potential stormwater management functions of proposed landscapes. Utilize climate-appropriate, native/drought-tolerant, and/or low maintenance landscape materials outside of signature campus open spaces.
- Policy: Protect the steep and natural hillsides on the southeast campus designated as an Open Space Reserve, to protect cultural resources, wildlife habitat, and provide a visual backdrop to the campus, and protect against erosion.
- Policy: In Open Space Reserve areas where arroyos and other natural features exist, preserve wherever feasible existing landforms, native plant materials, and trees. Where appropriate, restore habitat values.

Campus Utility Infrastructure – Stormwater (SW)

- Objective SW1: Transition the campus lands to manage stormwater in a manner that replicates natural drainage patterns and allow plants to filter pollutants out of runoff and promote infiltration over flowing into waterways, thus meeting regulatory requirements through innovative, attractive, and cost-efficient solutions.
  - Policy: Prepare and maintain a Storm Water Management Plan to account for the additional runoff from the projected new development to meet the requirements of the State of California's mandated Phase II Small Municipal Separate Storm Sewer System (MS4) Section F.5.g. (Post-Construction Storm Water Management Plan), including Section F.5.g.3. (Alternative Post-Construction Storm Water Management Plan) consistent with the Maximum Extent Practicable standard.
  - Policy: To the extent feasible, integrate stormwater infrastructure within the open space framework of campus such that developable campus lands are minimally lost. The Storm Water Management Plan will include planning and design strategies to restore, enhance, and maintain hydrological function on campus and within the regional hydrological system in response to the projected development.

As part of the LRDP process, UCR is also drafting the Tree Preservation and Replacement Guidelines which would be applicable to new development under the 2021 LRDP. This document notes consideration should be made for the timing of tree removal and replanting activities and follow the MBTA to avoid disturbing migratory birds and their nests. Additionally, this document will include the following tree replacement requirements:

- For standard trees that are not identified as mature specimen trees, memorial trees, landmark trees, or historic trees as defined in the Tree Preservation and Replacement Guidelines, removal of standard trees shall be replaced at a minimum 1:1 ratio.
- For "trees of value" which would include mature specimen trees, memorial trees, landmark trees, or historic trees, removal of "trees of value" shall be replaced based on the diameter or breast height and canopy requirements noted in the Tree Preservation and Replacement Guidelines.

Impact Analysis

Impact BIO-1 HAVE A SUBSTANTIAL ADVERSE EFFECT, EITHER DIRECTLY OR THROUGH HABITAT MODIFICATIONS, ON ANY SPECIES IDENTIFIED AS A CANDIDATE, SENSITIVE, OR SPECIAL-STATUS SPECIES IN LOCAL OR REGIONAL PLANS, POLICIES, OR REGULATIONS, OR BY THE CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE OR U.S. FISH AND WILDLIFE SERVICE.

IMPLEMENTATION OF THE PROPOSED 2021 LRDP WOULD RESULT IN DIRECT OR INDIRECT IMPACTS TO SPECIAL-STATUS SPECIES. MITIGATION MEASURES MM BIO-1A THROUGH MM BIO-8, INCLUDING PRECONSTRUCTION SURVEYS, AVOIDANCE MEASURES, AND PROJECT DESIGN STANDARDS, WOULD REDUCE IMPACTS TO LESS THAN SIGNIFICANT.

As shown in Draft EIR Figure 2-1, development under the proposed 2021 LRDP would occur primarily within previously disturbed areas, or adjacent to previously developed areas, surface parking areas, generally along North/South/East/West Campus Drive, and generally along University Avenue, Canyon Crest Drive, Big Springs Road, Aberdeen Drive, and West Linden Street. These new developments would primarily occur in the Academics & Research, University Avenue Gateway, Canyon Crest Gateway, Recreation & Athletics, and Student Neighborhood land use designations. Most development under the 2021 LRDP would primarily be infill development or expansion of already developed areas. Most areas in the undeveloped southeast portion of Campus are designated Open Space Reserve and UCR Botanic Gardens, consistent with existing uses. The proposed 2021 LRDP objectives and policies noted above and the Open Space Reserve LRDP land use designation within the southern and eastern portions of East Campus help preserve and enhance the natural environment.

The undeveloped areas of West Campus are primarily designated Land-based Research, consistent with existing uses. Two northern parcels of West Campus are being designated Agricultural/Campus Research. These northwestern parcels are proposed to be developed with new structures which include interdisciplinary research, education, and support for land-based research activities (e.g., agricultural research). For additional information on these land use designations please see Section 2 of the 2021 LRDP.

The MSHCP requires UCR development to conduct focused surveys for Riverside fairy shrimp and least Bell's vireo, whether UCR elects to be a PSE or not. If these species are present, and UCR elects to act as a PSE, take could be obtained through preparation of a Determination of Biologically Equivalent or Superior Preservation. If a future project under the proposed 2021 LRDP would affect habitat occupied by Riverside fairy shrimp, least Bell's vireo, coastal California gnatcatcher, or Stephens' kangaroo rat, using the MSHCP for take authorization may be beneficial. The MSHCP does not require focused surveys for western spadefoot or Swainson's hawk, and the campus is not within an MSHCP-designated Los Angeles pocket mouse survey area. These three species were therefore excluded from this and Psomas' analysis.

If UCR chooses not to act as a PSE, then the project would be processed under Section 7 or 10 of the FESA. If acting as a PSE, no surveys would be required for coastal California gnatcatcher or Stephens' kangaroo rat, even though they have potential to occur. All other MSHCP requirements would also need to be followed for the project. If not acting as a PSE, and potentially suitable habitat would be affected, focused surveys would be required for coastal California gnatcatcher. If the species is observed, then the project would be processed under Section 7 or 10 of the FESA. The benefit of using the MSHCP would depend on the types of habitat being affected and whether take authorization would be needed; this would be determined on a project-by-project basis.

Criteria Cell 634 is within the proposed 2021 LRDP Open Space Reserve land use designation. The Open Space Reserve land use designation would recognize, protect, and enhance areas that have ecological or aesthetic value to campus, including those subject to special development constraints due to native or endangered species habitats, steep or unique terrain such as arroyos and riparian corridors, or other natural features. The predominant Open Space Reserve uses may include designated hillsides, stormwater management infrastructure, habitat restoration and management activities, trails and minor amenities such as seating and viewing areas, and other features compatible with natural open spaces. For additional information on these land use designations please see Section 2 of the 2021 LRDP.

Since the UCR campus boundary only extends over the western half of Criteria Cell 634, future development of this area as part of the 2021 LRDP would not conflict with the conservation goals for Criteria Cell 634. The portion of the campus that overlaps Criteria Cell 634 is in an additional survey needs area for Criteria Area plant species (i.e., Nevin's barberry, smooth tarplant, and round-leaved filaree [*California macrophylla*]).[5] As discussed above, there is a low potential for habitat for Nevin's barberry, and smooth tarplant is present in the survey area. Although unlikely and not reasonably foreseeable, if a project is planned in this area, focused surveys would be required for these species whether UCR acted as a PSE.

Stephens' Kangaroo Rat

Marginally suitable habitat for Stephens' kangaroo rat occurs in the annual grassland in Natural Areas on campus (see Figure 4.4-2). UCR does not fall within one of the designated RCHCA reserve areas for the Stephens' kangaroo rat, and although portions of East Campus are within a designated Fee Area, focused surveys for the Stephens' kangaroo rat are not required, and development of any parcel used by local, State, or federal entities for governmental purposes (i.e., public works, schools) are not required to pay the mitigation fee unless such development voluntarily participates in order to mitigate the disturbance of occupied Stephens' kangaroo rat habitat per Section 10 Exemptions of Riverside County Ordinance No. 663.10 (County of Riverside 1996). Furthermore, under the proposed 2021 LRDP, most of the natural area annual grasslands will be designated as Open Space Reserve. Potential development in marginally suitable Stephens' kangaroo rat habitat is not considered significant. Impacts would be **less than significant**.

Burrowing Owl

The MSHCP identifies areas of the UCR campus as being located within the designated survey area for burrowing owl, requiring a burrowing owl suitability assessment to be conducted. Major areas include the southeastern portion of East Campus (mainly in lands designated Open Space Reserve) and scattered areas of West Campus, as shown in Figure 4.4-3. While no development is reasonably foreseeable in these areas, if a project were planned in an area with suitable burrowing owl habitat, preconstruction survey and focused surveys (if necessary) would be required. If burrowing owls were present during project construction, there would be the potential to impact the species directly or indirectly from noise or vibration. Furthermore, the northern parcels on West Campus which are designated Agricultural/Campus Research are proposed for development, which would overlap with a small area identified in Figure 4.4-3 as potentially containing habitat for the borrowing owl. Therefore, impacts to the burrowing owl would be significant without mitigation. However, implementation of Mitigation Measures **MM BIO-1A and MM BIO-1B** would reduce

[5] While the MSHCP considers this a Criteria Area plant species, its status has recently changed, and it does not currently have a CRPR.

potential impacts to **less than significant with mitigation incorporated** by requiring a preconstruction survey, and if present, avoidance measures.

Nesting Birds and Raptors

Nesting birds and raptors have the potential to nest on buildings, in culverts, in shrubs and trees, in rocky outcrops, and on bare ground throughout the survey area. The nests of most native birds and raptors are federally- and State-protected. Vegetation within and surrounding the campus has the potential to provide refuge cover from predators, perching sites and favorable conditions for avian nesting that could be affected by projects developed under the proposed 2021 LRDP.

Potential impacts to nesting birds, including common passerine species protected under the MBTA and CFGC, could occur if nests are located on a project site and/or in the immediate vicinity during construction activities. Direct impacts from construction activities may include ground disturbance and removal of trees, which could contain bird nests. Indirect impacts include construction noise, lighting, and fugitive dust. These impacts could lead to individual mortality or harassment that might reduce nesting success.

Additionally, a potential long-term, operational impact of future development concerns bird strike mortality and injury. Ornithologists estimate that up to a billion birds are killed or injured annually by collisions with clear and reflective sheet glass and plastic. It is thought that birds cannot distinguish between the reflection on the glass/plastic surface and the natural landscape. Construction of glass-fronted buildings or other structures using exposed glass (e.g., glass-topped walls) has the potential to result in bird strikes, especially if the structures are located adjacent to natural areas. The use of ultraviolet patterns in the glass are not detectable to humans but can substantially reduce bird strikes (Psomas 2019).

Therefore, impacts to nesting birds and raptors would be considered significant without mitigation. However, implementation of Mitigation Measures **MM BIO-2 and MM BIO-3** would reduce potential impacts to **less than significant** by providing for nesting bird avoidance and bird strike avoidance.

Bats

Several bat species, including the special-status western yellow bat (*Lasiurus xanthinus*) and pallid bat (*Antrozous pallidus*), may forage and roost in areas in the UCR campus, such as in buildings, culverts, mature trees, and rock outcrops. Impacts on a small amount of foraging habitat would not decrease the regional population below self-sustaining levels. Therefore, impacts on foraging habitat would be less than significant. However, construction activities may impact roost structures and mature vegetation during construction of projects developed under the proposed 2021 LRDP. Bats can roost under broad leaves, under exfoliating bark/tree holes, crevices, eaves, attics, Spanish roof tiles, and can fit in any gaps the size of a quarter. They prefer materials that provide some thermo regulation like thick wood or concrete, and there are usually signs of bats with staining and guano that would indicate their presence. Maternity roosts are of most concern; therefore, impacts to special-status bat species would be considered significant without mitigation. However, implementation of Mitigation Measure **MM BIO-4** would reduce potential impacts to **less than significant with mitigation incorporated** by requiring preconstruction bat surveys.

Indirect Impacts

The proposed 2021 LRDP objectives and policies noted above and the Open Space Reserve LRDP land use designation within the southeastern portions of East Campus help preserve and enhance the natural environment.

The MSHCP provides guidelines pertaining to the urban/wildlands interface. These indirect effects (i.e., "edge effects") are associated with locating development in proximity to the MSHCP conservation area. These impacts affect the quality of nearby wildlife habitat resulting from disturbance by construction and/or the long-term use of the site, as described below.

WATER QUALITY

In general, discharges or runoff from project operation may carry pollutants, while runoff from construction may carry excessive silt, petroleum, or other chemical contaminants. Such runoff can affect water quality which in turn can affect habitat quality and the species using the waters. However, as discussed in Section 4.10, *Hydrology and Water Quality*, Best Management Practices (BMPs) would be used to avoid and minimize indirect impacts on water quality during construction and operation of projects developed under the 2021 LRDP.

All construction projects would be required to comply with various regulatory requirements related to storm water runoff during construction and operation to minimize the potential for pollutants to enter receiving waters. All UCR facility design and construction projects must comply with applicable State building code requirements, as well as State and federal agency regulations. All campus projects would be required to comply with the provisions of the Statewide General Construction Activity Stormwater Permit that specifies the implementation of BMPs, which may include, but is not limited to:

- Proper storage, use, and disposal of construction materials
- Watering exposed soils
- Installing sandbags to minimize off-site runoff
- Creating temporary desilting basins
- Construction vehicle maintenance in staging areas to avoid leaks or spills of fuels, motor oil, coolant, and other hazardous materials
- Installation of silt fences and erosion control blankets
- Time grading activities to avoid the rainy season (November through April)
- Stabilization of cleared or graded slopes
- Protection or stabilization of stockpiled soils
- Continual inspection and maintenance of all specified BMPs through the duration of construction

Furthermore, UCR has been and will continue to implement the National Pollutant Discharge Elimination System (NPDES) Phase II requirements through the implementation of a Stormwater Management Program that includes construction site stormwater runoff control for sites greater than 1 acre and post-construction stormwater management in new development and redevelopment. General Construction Storm Water Permit requirements also require inspection, monitoring, and reporting. Corrective action within 72 hours is also required for any issue of non-compliance identified during monitoring and inspections.

Storm drain infrastructure for future campus projects developed under the proposed 2021 LRDP would adhere to UCR requirements under the NPDES Program, including a post-construction site stormwater runoff control program for new development and redevelopment. The proposed 2021 LRDP would direct UCR to create a Storm Water Management Plan to account for the additional runoff from the projected new development to meet the requirements of the Phase II Small MS4 permit, Section F.5.g. (Post-Construction Storm Water Management Plan), including Section F.5.g.3. (Alternative Post-Construction Storm Water Management Plan) consistent with the Maximum Extent Practicable standard.

Under the Storm Water Management Plan, facilities would incorporate Site Design, Source Control, and Treatment BMPs to prevent pollutants from reaching receiving waters. Specific details related to these regional stormwater BMPs would be developed during required project-level design evaluations. Construction and operation of the proposed 2021 LRDP would occur pursuant to applicable water quality standards and waste discharge requirements and would not substantially degrade surface or groundwater quality. Impacts to wildlife habitat from polluted storm water would be **less than significant**.

NOISE

As discussed in Section 4.11, *Noise*, development under the 2021 LRDP would use construction equipment ranging up to 85 dBA at 50 feet, as shown in in Table 4.11-8. Future projects and their construction could increase the noise in adjacent habitat areas. During operation, additional human activity and noise from vehicles and other machinery (generators) would increase the noise level in adjacent habitat. During construction, equipment noise would temporarily increase noise levels in adjacent areas. Increased noise could discourage use by wildlife that are not urban-tolerant and/or has the potential to disrupt foraging, nesting, roosting, and/or denning activities for a variety of wildlife species. This impact would be minimal for construction located in central locations of the campus where ambient noise presently exists, and wildlife is expected to be urban-tolerant.

However, noise could adversely affect wildlife if construction is located adjacent the southeastern portion of East Campus next to areas planned for conservation by the MSHCP (i.e., Criteria Cell 634) and noise impacts would be potential significant. Most development under the 2021 LRDP would primarily be infill development and occur in the Academic Center or northern area of East Campus, away from the MSHCP Criteria Area. A new interpretive center is programmatically assumed in the UCR Botanic Gardens designation on East Campus, but no foreseeable facility development is anticipated in the Open Space Reserve in East Campus. Additionally, it is reasonable to assume no development would occur in Criteria Cell 634. For future development along South Campus Drive and East Campus Drive where development is adjacent to the Open Space Reserve/southeast hills, implementation of Mitigation Measure **MM BIO-2** would reduce construction noise impacts to nesting birds and, in the event of development near Criteria Cell 634, **MM BIO-8** would reduce construction noise impacts to wildlife in MSHCP conservation areas to a level considered **less than significant with mitigation incorporated**.

DUST

In general, grading activities can disturb soils and result in the accumulation of dust on the surface of the leaves of trees, shrubs, and herbs in adjacent open space areas. Such dust can affect the respiratory function of the plants when dust accumulation is excessive. However, as discussed in Section 4.2, *Air Quality*, development under the LRDP would have to comply with SCAQMD District Rule 403 which requires dust suppression measures including watering, application of

environmentally safe soil stabilization materials, and/or roll compaction to prevent the creation of dust. Therefore, impacts from dust would be **less than significant**.

NIGHT LIGHTING

The campus is currently characterized by a moderate to high level of nighttime illumination, depending on location, that allows for safe and secure nighttime operation of campus facilities and events and on-campus residential life. Depending upon location, night lighting of new facilities, roads, or pathways or during project construction could result in an indirect impact on the behavioral patterns of nocturnal and crepuscular (i.e., active at dawn and dusk) wildlife adjacent to the lighted areas. Of greatest concern is the effect on small ground-dwelling animals that use the darkness to hide from predators (e.g., owls), which are specialized night foragers.

New structures developed under the 2021 LRDP would comply with the Campus Construction and Design Standards which state that "Lighting should focus on providing an even, consistent coverage, softening contrast ratios at edges and thus improving visibility by avoiding excess illumination and brightness…Light illuminating from fixtures should be cast downward with full cut-off shades." Additional night lighting in areas that are currently developed is not expected to adversely impact wildlife species. However, new lighting in areas adjacent to undeveloped open space, particularly in the southern area of East Campus next to areas planned for conservation by the MSHCP, could adversely affect wildlife. Impacts to wildlife habitat from night lighting would be considered significant without mitigation. However, implementation of Mitigation Measures **MM BIO-6A and MM BIO-6B** would reduce potential impacts to **less than significant with mitigation incorporated**. These measures include light avoidance during construction and operation in areas within or adjacent to the Open Space Reserve designation in the LRDP.

HUMAN ACTIVITY

Depending upon location, an increase in human activity may impact wildlife species in adjacent open space as a result of unauthorized public access, illegal dumping, and domestic animal predation. Human disturbance can disrupt normal foraging and breeding behavior of wildlife remaining in the area adjacent to the development, diminishing the value of the habitat. Wildlife stressed by human activity may be extirpated from the natural open space adjacent to development, leaving only wildlife tolerant of human activity. Given the high level of human activity presently on campus under baseline conditions, this impact is not expected to adversely affect wildlife species except when new facilities, roads, or pathways are located adjacent to undeveloped open space, particularly in the southeast portion of UCR campus next to areas planned for conservation by the MSHCP. A substantial increase in human activity near MSHCP Proposed Constrained Linkage 7 has the potential to prevent wildlife from moving between habitat in Sycamore Canyon Wilderness Park and the Box Springs Mountains.

As currently envisioned, development under the proposed 2021 LRDP would occur primarily within previously disturbed areas, adjacent to previously developed areas, surface parking areas, generally along North/South/East/West Campus Drive, and generally along University Avenue, Canyon Crest Drive, Big Springs Road, Aberdeen Drive, and West Linden Street. These new developments would occur in the Academics & Research, University Avenue Gateway, Canyon Crest Gateway, Recreation & Athletics, and Student Neighborhood land use designations. The designated Open Space Reserve is the land use located in the MSHCP Criteria Cell 634. While there may be temporary or small development in Open Space Reserve areas, this area would mainly be used for conservation of natural lands. There are currently no planned or foreseeable development within the Open Space

Reserve areas. Therefore, human activity is not anticipated to impact wildlife species and would be **less than significant**.

Implementation of the proposed 2021 LRDP objectives and policies to limit development in lands designated as Open Space Reserve and incorporation of Mitigation Measures **MM BIO-1A through MM BIO-8** would further reduce potential impacts on candidate, sensitive, or special-status species**.**

Mitigation Measures

The following mitigation measures would be required to address potential impacts to special-status species and habitat.

MM BIO-1A Burrowing Owl Preconstruction Survey

Prior to construction activities, preconstruction presence/absence surveys for burrowing owls shall be conducted in the project survey area where suitable habitat is present prior to ground disturbance in new areas. Preconstruction surveys shall be conducted by a qualified biologist no more than 30 days prior to grading or other significant site disturbance. Surveys shall include the development footprint and consider up to a 500-foot buffer of adjacent areas to the extent feasible (e.g. a visual survey of adjacent areas will suffice for off-site areas not accessible). The surveys shall be conducted in accordance with the MSHCP burrowing owl survey guidelines. A burrow shall be considered occupied when there is confirmed use by burrowing owls based on observations made by a qualified biologist. If owls are not found to be occupying habitat in the survey area during the preconstruction survey, the proposed disturbance activities may proceed. Take of active nests shall be avoided.

MM BIO-1B Burrowing Owl Avoidance Measures

If owls are discovered on and/or within 500 feet of the proposed project site, avoidance measures shall be developed by the qualified biologist in compliance with the MSHCP and in coordination with the CDFW and/or RCA. Such measures will include but not be limited to the following:

- Burrowing owls shall not be disturbed on-site and/or within a 500-foot buffer or as determined by a biologist between February 1 and August 31 to avoid impacting nesting.
- Prior to any ground disturbance, all limits of project construction shall be delineated and marked to be clearly visible to personnel on foot and in heavy equipment. All construction-related activities shall occur inside the limits of construction and designated staging areas. Construction staging and equipment storage shall be situated outside of any occupied burrowing owl burrow locations. All construction-related movement shall be restricted to the limits of construction and staging areas.
- Avoidance measures shall include passive relocation by a qualified biologist to remove the owls between September 1 and January 31, which is outside of the typical nesting season.

MM BIO-2 Nesting Bird Avoidance

Prior to issuance of grading permits, the following measures shall be implemented:

- To avoid disturbance of nesting and special-status bird species protected by the MBTA and California Fish and Game Code, activities related to the project, including but not limited to, vegetation removal, ground disturbance, and construction and demolition shall occur outside of the bird breeding season (February 15 through August 31). If construction must be initiated during the peak nesting season, vegetation removal and/or tree removal should be planned to

occur outside the nesting season (September 1 to February 14) and a preconstruction nesting bird survey shall be conducted no more than 3 days prior to initiation of construction activities. The nesting bird preconstruction survey shall be conducted on foot inside the project site disturbance areas. If an active avian nest is discovered during the preconstruction clearance survey, construction activities shall stay outside of a 50- to 200-foot buffer for common nesting birds around the active nest, as determined by a biologist. For listed and raptor species, this buffer shall be expanded to 500 feet or as determined by a biologist.

- Inaccessible areas shall be surveyed from afar using binoculars to the extent practical. The survey shall be conducted by a qualified biologist familiar with the identification of avian species known to occur in western Riverside County. If nests are found, an appropriate avoidance buffer shall be determined by a qualified biologist and demarcated by a qualified biologist with bright orange construction fencing, flagging, construction lathe, or other means to mark the boundary. Effective buffer distances are highly variable and based on specific project stage, bird species, stage of nesting cycle, work type, and the tolerance of a particular bird pair. The buffer may be up to 500 feet in diameter, depending on the species of nesting bird found and the biologist's observations.
- If nesting birds are located adjacent to the project site with the potential to be affected by construction activity noise above 60 dBA Leq (see Section 4.11, *Noise*, for definitions and discussion of noise levels), a temporary noise barrier shall be erected consisting of large panels designed specifically to be deployed on construction sites for reducing noise levels at sensitive receptors. If 60 dBA Leq is exceeded, an acoustician would require the construction contractor to make operational and barrier changes to reduce noise levels to 60 dBA during the breeding season (February 15 through August 31). Noise monitoring shall occur during operational changes and installation of barriers to ensure their effectiveness. All construction personnel shall be notified as to the existence of the buffer zone and to avoid entering the buffer zone during the nesting season. No parking, storage of materials, or construction activities shall occur within this buffer until the avian biologist has confirmed that breeding/nesting is completed, and the young have fledged the nest. Encroachment into the buffer shall occur only at the discretion of the qualified biologist, if it is determined such encroachment will not adversely impact the nesting birds.

MM BIO-3 Bird Strike Avoidance

To reduce bird strike mortality and injury of special-status bird species from collisions with clear and reflective sheet glass and plastic, construction of glass-fronted buildings or other structures using exposed glass (e.g., glass-topped walls) shall incorporate measures to minimize the risk of bird strikes. This may include: (1) the use of opaque or uniformly textured/patterned/etched glass, (2) angling of glass downward so that the ground instead of the surrounding habitat or sky is reflected, (3) installation of one-way film that results in opaque or translucent covering when viewed from either side of the glass, (4) installation of a uniformly dense dot pattern created as ceramic frit on both sides of the glass, and/or (5) installation of a striped or grid pattern of clear ultraviolet-reflecting and ultraviolet-absorbing film applied to both sides of the glass. It should be noted that single decals (e.g., falcon silhouettes or large eye patterns) are ineffective and are not recommended unless the entire glass surface is uniformly covered with the objects or patterns.

MM BIO-4 Bat Preconstruction Survey

To avoid disturbance of special-status bat species during maternity season (approximately March-September), a preconstruction roosting bat survey shall be conducted by a qualified bat biologist on

potential roost structures identified by the bat biologist and mature vegetation no more than 30 days prior to initiation of construction activities if construction activities must occur during the roosting season. If future projects would impact rocky outcrops, mature vegetation, existing buildings, or other structures that could be used for roosting, a passive acoustic survey shall identify the species using the area for day/night roosting. If special-status roosting bats are present and their roosts would be impacted, a qualified bat biologist should prepare a plan to identify the proper exclusionary methods. Removal of mature trees should be monitored by a qualified bat biologist and occur by pushing down the entire tree (without trimming or limb removal) using heavy equipment and leaving the felled tree on the ground untrimmed and undisturbed for a period of at least 24 hours. To exclude bats from buildings/structures or rocky outcrops, exclusion measures should be installed on crevices by placing one-way exclusionary devices that allow bats to exit but not enter the crevice.

MM BIO-5 Special-Status Species Preconstruction Survey

Focused surveys for special-status plants and wildlife species with potential to occur in or around the project site shall be conducted prior to impacts on areas of suitable habitat for each respective species, including special-status plant species, Riverside fairy shrimp, burrowing owl, coastal California gnatcatcher, and least Bell's vireo. Surveys shall be performed by a qualified biologist with the appropriate federal/State permits, if necessary, and follow approved survey protocol, which includes appropriate timing of surveys. If listed species are observed and habitat areas cannot be avoided, then consultation/permitting would be required to obtain take authorization. Appropriate avoidance, minimization, and compensatory mitigation shall be required for each listed species that could be impacted.

MM BIO-6A Sensitive Communities Indirect Impact Avoidance – Construction

The following measure shall be required for construction activities that are proposed adjacent to the Open Space Reserve or lands supporting sensitive vegetation communities and/or biological resources:

- Prior to commencement of clearing or grading activities, fencing (e.g., silt fencing, orange construction fencing, and/or chain-link fencing as determined by campus planning) shall be installed around the approved limits of disturbance to prevent errant disturbance of sensitive biological resources by construction vehicles or personnel. All movement of construction contractors, including ingress and egress of equipment and personnel, shall be limited to designated construction zones. This fencing shall be removed upon completion of all construction activities.
- No temporary storage or stockpiling of construction materials shall be allowed in Open Space Reserve lands, and all staging areas for equipment and materials shall be located at least 50 feet where space permits on the site, or less as determined appropriate by a qualified biologist from the edge of these areas. This prohibition shall not be applied to facilities that are planned to traverse Open Space Reserve lands (e.g., trails and utilities). Staging areas and construction sites in proximity to the Open Space Reserve lands shall be kept free of trash, refuse, and other waste; no waste dirt, rubble, or trash shall be deposited in these areas.
- Appropriate setbacks or barriers (e.g., fencing) shall be implemented to minimize human activity impacts. Buffer areas shall be vegetated with native species to help screen these indirect effects.
- Active construction areas shall be sprayed with water periodically to minimize dust.

- Equipment to extinguish small brush fires (e.g., from trucks or other vehicles) shall be present on-site during all phases of project construction activities, along with personnel trained in the use of such equipment. Smoking shall be prohibited in construction areas adjacent to flammable vegetation.
- Temporary night lighting shall not be used during construction unless determined to be absolutely necessary (e.g., time sensitive construction activities). If night lighting is necessary, lights shall be directed away from sensitive vegetation communities and lands designated as Open Space Reserve and shielded to minimize temporary lighting of the surrounding habitat.

MM BIO-6B Sensitive Communities Indirect Impact Avoidance – Operation

The following measure shall be required for operation activities adjacent to the Open Space Reserve or lands supporting sensitive vegetation communities and/or biological resources:

- Landscaping adjacent to Open Space Reserve lands shall comply with the following requirements to prevent the introduction of invasive species:
  - Appropriate landscaping shall be selected based on the vegetation communities in the portion of the Open Space Reserve adjacent to the project. In areas supporting native (or disturbed native) vegetation communities, revegetation of impacted slopes shall be with appropriate native plant materials.
- Permanent lighting in or adjacent to Open Space Reserve lands shall be selectively placed, shielded, and directed to minimize potential impacts to sensitive species. In addition, lighting from buildings or parking lots/structures abutting Open Space Reserve lands shall be shielded and/or screened by vegetation to the extent feasible.
- The following best management practices shall be implemented in Open Space Reserve lands and in areas that interface with Open Space Reserve lands to address runoff/water quality impacts from landscaping:
  - Integrated Pest Management principles (UC Integrated Pest Management Program) shall be implemented to the extent practicable for chemical pesticides, herbicides, and fertilizers. Examples of such measures may include, but are not limited to, alternative weed/pest control measures (e.g., removal by hand) and proper application techniques (e.g., conformance to manufacturer specifications and legal requirements).
  - Irrigation for project landscaping shall be minimized and controlled through efforts such as designing irrigation systems to match landscaping water needs, using sensor devices to prevent irrigation during and after precipitation, and using automatic flow reducers/shut-off valves that are triggered by a decrease in water pressure from broken sprinkler heads or pipes.
- Barriers (e.g., fencing or walls) and/or signage directing people away from sensitive vegetation communities and habitat shall be installed on designated pathways and trails in and adjacent to Open Space Reserve lands to minimize unauthorized human activity. Barriers (e.g., fencing or walls) shall consist of an approximately 3-foot-high wooden barrier. Chain-link fencing shall not be used for barrier.
- Projects adjacent to Open Space Reserve lands shall install signage along the boundary of the Open Space Reserve lands, indicating the presence of lands supporting sensitive habitat.
- Projects adjacent to Open Space Reserve lands shall install fencing or other visual/physical barriers (such as appropriate landscaping) to discourage human encroachment into the Open

Space Reserve lands in areas where trespass is likely to occur (gradual slopes; areas of low, open vegetation; areas of previous disturbance, etc.).

MM BIO-7 Sensitive Vegetation Communities Mitigation

Impacts on sensitive vegetation communities shall be avoided to the extent practicable. If an avoidance alternative is not feasible and a practicable alternative is selected instead, a Determination of Biologically Equivalent or Superior Preservation shall be prepared to ensure replacement of any lost functions and values of habitat as it relates to MSHCP Covered Species.

If a future project would result in removal of sensitive vegetation, then compensatory mitigation would be required depending on the amount of vegetation impacted. Mitigation shall ensure no net loss of habitat following implementation of a future project. This mitigation may be in the form of habitat preservation, restoration, enhancement, and/or establishment (i.e., creation).

Compensatory mitigation shall be in the form of permittee-responsible mitigation, in which the permittee maintains liability for the construction and long-term success of the mitigation site, or through mitigation banking or an in-lieu fee program, where liability for project success is transferred to a third party (i.e., a mitigation bank or an in-lieu fee sponsor). For permittee responsible mitigation, preparation of a Habitat Mitigation Monitoring Plan may be required.

MM BIO-8 MSHCP Conservation Area Construction Noise Reduction

The following measures shall be followed during construction of projects adjacent to MSHCP conservation areas (i.e., Criteria Cell 634):

- *Staging Area*. Provide staging areas on-site to minimize off-site transportation of heavy construction equipment. These areas shall be located to maximize the distance between activity and MSHCP conservation areas. This should reduce noise levels associated with most types of idling construction equipment.
- *Avoid Operating Equipment Simultaneously*. Whenever possible, ensure that construction activities are scheduled to avoid operating several pieces of equipment simultaneously, which causes high noise levels.
- *Inspections*. The contractor shall inspect construction equipment to ensure that such equipment is in proper operating condition and fitted with standard factory silencing features. Construction equipment shall utilize all standard factory silencing features, such as equipment mufflers, enclosures, and barriers.
- *Newest Power Construction Equipment*. The newest available power construction equipment with standard recommended noise shielding and muffling devices shall be used.
- *Mufflers*. During project grading and construction, all equipment, fixed or mobile, shall be operated with closed engine doors and shall be equipped with properly operating and maintained mufflers consistent with manufacturers' standards. Use of manufacturer-certified mufflers associated with construction equipment has been shown to reduce noise levels by 8 to 10 dBA.
- *Smart Back-up Alarms*. Mobile construction equipment shall have smart back-up alarms that automatically adjust the sound level of the alarm in response to ambient noise levels. Alternatively, back-up alarms should be disabled and replaced with human spotters to ensure safety when mobile construction equipment is moving the reverse direction.

- *Idling*. All construction vehicles, such as bulldozers and haul trucks, shall be prohibited from idling in excess of 5 minutes, which is consistent with recommended strategies to reduce and/or eliminate diesel idling

Significance After Mitigation

Implementation of Mitigation Measures **MM BIO-1A and MM BIO-1B** would reduce potential impacts to special-status species to less than significant levels by avoiding impacts to individual burrowing owl. Implementation of Mitigation Measures **MM BIO-2 through MM BIO-8** would reduce potential direct and indirect impacts to candidate, sensitive, or special-status species to a less than significant level.

IMPACT BIO-2 HAVE A SUBSTANTIAL ADVERSE EFFECT ON ANY RIPARIAN HABITAT OR OTHER SENSITIVE NATURAL COMMUNITY IDENTIFIED IN LOCAL OR REGIONAL PLANS, POLICIES, REGULATIONS, OR BY THE CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE OR U.S. FISH AND WILDLIFE SERVICE.

CONSTRUCTION AND OPERATION OF PROJECTS DEVELOPED UNDER THE PROPOSED 2021 LRDP WOULD POTENTIALLY HAVE SUBSTANTIAL ADVERSE EFFECTS ON RIPARIAN HABITAT OR OTHER SENSITIVE NATURAL COMMUNITY. IMPLEMENTATION OF MITIGATION MEASURES MM BIO-6A, MM BIO-6B, AND MM BIO-7 WOULD REDUCE IMPACTS TO LESS THAN SIGNIFICANT.

Direct Impacts

Prickly pear scrub is considered sensitive by the CDFW, which occurs naturally on the slopes along the UCR Botanic Gardens Road and in a small patch in West Campus (see Figure 4.4-2). Vasey's prickly pear (*Opuntia vaseyi*) dominates, interspersed with cholla (*Cylindropuntia sp.*) and brittle bush (Psomas 2019). Approximately 8 acres of mixed riparian habitat is also present in the UCR campus, primarily in Gage Basin (the western end of the University Arroyo north of University Avenue) and the tributary of the University Arroyo between Pentland Residence Hall, Lothian Residence Hall, and Glen Mor 1 and Glen Mor 2 (see Figure 4.4-2). CDFW does not consider mixed riparian habitat a sensitive natural community.

The proposed 2021 LRDP would designate the mixed riparian areas in the Gage Basin area and University arroyo, and areas with prickly pear scrub, as Open Space Reserve and development under the 2021 LRDP would avoid direct impacts to these natural communities. The proposed 2021 LRDP also includes policies to protect and enhance signature open spaces, including the Open Space Reserve lands, where these riparian areas and natural communities are located. It is anticipated that significant direct impacts to riparian and sensitive natural communities would be minimal and **less than significant**.

Indirect Impacts

Indirect impacts to riparian habitat or other sensitive natural communities could occur during construction as well as post-construction/operations. The majority of projects anticipated in the proposed 2021 LRDP would be situated in non-sensitive areas of the UCR campus. However, some projects may occur in or adjacent to the prickly pear scrub or mixed riparian areas. These projects have the potential to cause indirect effects on the natural habitats on UCR, and such impacts are further discussed below. The potential indirect impacts that could occur to vegetation communities, including the sensitive plants and animals that occupy those habitats, during implementation of the proposed 2021 LRDP, are described below.

WATER QUALITY

In general, water quality in riparian areas could be adversely affected by potential surface runoff, contamination (especially from petroleum products), and sedimentation during construction. Water quality degradation may adversely affect vegetation and wildlife that depend upon these resources. However, as discussed in Section 4.10, *Hydrology and Water Quality*, construction and operation of new development under the 2021 LRDP would conform to NPDES water quality regulations requiring the capture and treatment of runoff prior to discharge, in addition to attenuation measures to address increases in flow volumes and velocities. Compliance with current stormwater regulations would reduce potential operational water quality impacts on biological resources during the implementation of the 2021 LRDP.

Adherence to the Statewide General Construction Activity Stormwater Permit and continued implementation of the NPDES Phase II requirements, including the implementation of a Stormwater Management Program and BMPs, would minimize indirect water quality and hydromodification impacts from project construction and operation.

FUGITIVE DUST

In general, fugitive dust produced by construction could disperse onto sensitive vegetation adjacent to construction sites. The resulting dust covering could reduce native plant productivity (by reducing the amount of photosynthesis due to dust-covered leaves) and affect species that depend on the vegetation. However, as discussed in Section 4.2, *Air Quality*, development under the LRDP would have to comply with SCAQMD District Rule 403 which requires dust suppression measures including watering, application of environmentally safe soil stabilization materials, and/or roll compaction to prevent the creation of dust. Therefore, impacts from dust would be **less than significant**.

INVASIVE SPECIES

Non-native plants could colonize sites disturbed by construction and could potentially spread into adjacent native vegetation communities. Some non-native plants are highly invasive and can disrupt native habitats by reducing native species diversity, and potentially adversely affect native wildlife that are dependent on native plant species. UCR prefers the landscape that includes landscapes that use native or climate adapted plants. Some of these plant species, however, are listed in Table 6-2 of MSHCP Section 6.1.4 and are therefore considered invasive. The potential exists for the spread of invasive species from new campus development into adjacent habitats and would be considered significant. Implementation of **MM BIO-6B** would reduce this to **less than significant with mitigation incorporated**.

EDGE EFFECTS/HUMAN ACTIVITY

Edge effects occur when blocks of habitat are fragmented, resulting in a higher ratio of development edge to native vegetation communities (i.e., an increase in the urban/wildland interface). These edges increase the potential for non-native plant species to invade native vegetation communities and for native and non-native predators to access prey that may have otherwise been protected within large, contiguous blocks of habitat. Impacts to native vegetation communities and wildlife from edge effects could occur along the edges of the Open Space Reserve, particularly in the eastern areas of East Campus where prickly pear scrub has been documented, and near the University Arroyo and Gage Basin.

As campus population increases, corresponding increases in human activity in and adjacent to these areas could result in degradation of sensitive vegetation communities by fragmenting habitat and forming edges through the creation of unauthorized trails. Indirect impacts include pedestrians and bicyclists that may leave established trails and take short cuts, potentially resulting in erosion and damage to native vegetation. Erosion often inhibits the reestablishment of vegetation even if the unauthorized trail (short cut) is blocked-off, necessitating additional repair measures. Impacts from human activity along the edges and into the Open Space Reserve are significant without mitigation. Implementation of **MM BIO-6A, MM BIO-6B, and MM BIO-7** would reduce **impacts to less than significant with mitigation incorporated**. These measures include installation of signage and fencing to avoid unofficial pedestrian and bike trails.

INADVERTENT ENCROACHMENTS

Inadvertent impacts to sensitive natural vegetation or habitat could occur outside pre-approved development limits (defined during the project-level CEQA process) during construction, such as construction activities occurring outside pre-approved and delimited project limits.

Due to potential direct and indirect impacts, the proposed 2021 LRDP may have a substantial adverse effect on riparian habitat or other sensitive natural community and impacts would be considered significant without mitigation. Implementation of Mitigation Measures **MM BIO-6A, MM BIO-6B, and MM BIO-7** would reduce **impacts to less than significant with mitigation incorporated**.

RIPARIAN/RIVERINE, VERNAL POOL, AND FAIRY SHRIMP HABITAT

Impact BIO-3 below provides an impact analysis to riparian/riverine, vernal pool, and fairy shrimp habitat.

Mitigation Measures

Mitigation Measures **MM BIO-6A**, Sensitive Communities Indirect Impact Avoidance - Construction, **MM BIO-6B**, Sensitive Communities Indirect Impact Avoidance – Operation, and **MM BIO-7**, Sensitive Vegetation Communities Mitigation would reduce impacts to sensitive vegetation communities to a less than significant level.

Significance After Mitigation

There would be a less-than-significant impact to riparian habitat or other sensitive natural community with the implementation of Mitigation Measures MM BIO-6A, MM BIO-6B, and MM BIO-7, which address direct and indirect impacts to sensitive plant species.

Impact BIO-3 HAVE A SUBSTANTIAL ADVERSE EFFECT ON STATE OR FEDERALLY-PROTECTED WETLANDS (INCLUDING, BUT NOT LIMITED TO MARSH, VERNAL POOL, COASTAL, ETC.) THROUGH DIRECT REMOVAL, FILLING, HYDROLOGICAL INTERRUPTION, OR OTHER MEANS.

THE PROPOSED 2021 LRDP MAY RESULT IN SIGNIFICANT ADVERSE EFFECTS ON STATE AND FEDERALLY-PROTECTED WETLANDS. MITIGATION MEASURE MM BIO-9 WOULD REQUIRE A JURISDICTIONAL DELINEATION, AND CONSULTATION AND PERMITTING WITH APPROPRIATE STATE AND FEDERAL AGENCIES, WHICH WOULD REDUCE IMPACTS TO LESS THAN SIGNIFICANT.

Riparian/Riverine, Vernal Pool, and Fairy Shrimp Habitat

Section 6.1.2 of the MSHCP describes the process to protect species associated with riparian/riverine areas and vernal pools. As defined in the MSHCP, riparian/riverine areas are lands which contain habitat dominated by trees, shrubs, persistent emergents, or emergent mosses and lichens, which occur close to or depend on a nearby freshwater source or areas that contain a freshwater flow during all or a portion of the year. These areas may support one or more species listed in Section 6.1.2 of the MSHCP. Vernal pools are seasonal wetlands that occur in depressions, typically have wetland indicators that represent all three parameters (soils, vegetation, and hydrology), and are defined based on vernal pool indicator plant species during the wetter portion of the growing season but normally lack wetland indicators associated with vegetation and/or hydrology during the drier portion of the growing season. Vernal pools typically comprise habitat for fairy shrimp.

The 2019 Psomas report identified the following potential jurisdictional resources on the UCR campus, which may include riverine wetlands and freshwater ponds:

- Four basins in West Campus mapped as freshwater ponds classified as PUBK (i.e., in the Palustrine System with unconsolidated bottom and artificially flooded water regime). These artificial basins were also observed during the field survey and contain surface water.
- The basin in the UCR Botanic Gardens that was artificially created as part of the UCR Flood Control Management Plan for the University Arroyo Watershed
- The basin adjacent to undeveloped open space in southeastern East Campus
- The Box Springs Arroyo in West Campus
- The University Arroyo and tributaries in East Campus
- An arroyo also traverses the northern edge of the UCR Botanic Gardens, along the road leading to the garden, and into the UCR Botanic Gardens basin.
- Additional small drainage features are located in the hills in the southeastern corner of the campus.

Implementation of the proposed 2021 LRDP could result in minor development, such as stormwater management infrastructure, habitat restoration and management activities, trails, pedestrian or bicycle paths, in designated Open Space Reserve areas or other land use areas, including arroyos that may contain federally-protected seasonal wetlands or jurisdictional WOUS. This minor development could result in direct impacts to wetlands, by removal, filling, or hydrological interruption. Therefore, development under the proposed 2021 LRDP would result in a significant impact to State- or federally-protected wetlands.

Securing a Streambed Alteration Agreement from the CDFW, and a Section 404 permit under the CWA, would protect riparian corridors and jurisdictional wetland and non-wetland waters (e.g., stream channels) in the project area. If impacts to these areas would occur, UCR would need to

obtain these permits prior to any grading or construction that may impact a riparian area, stream channel, or wetland, as applicable (**MM BIO-9**). While the final conditions of the permit or agreement will be determined through coordination with these agencies, the provisions of these permits would meet the State and federal "no net loss" wetlands policy. As such, impacts are considered to be **less than significant with mitigation incorporated**.

Mitigation Measures

MM BIO-9 Jurisdictional Delineation of Waters and Wetlands

During the project planning process, if a project has vegetation mapped as potential wetlands or the project site contains or is located immediately adjacent to a natural drainage course, a qualified biologist shall conduct a jurisdictional delineation. The jurisdictional delineation shall use current regulatory guidance to identify the presence of potential regulated waters and wetlands in the project vicinity. If there is potential for the project to adversely affect wetlands or waters, UCR shall conduct a pre-application meeting with appropriate agencies (USACE, the RWQCB, and/or the CDFW) prior to submittal of permit applications to discuss existing conditions, to confirm the agency's jurisdiction over water resources in the survey area, to discuss impacts to these resources that would result from the project, and to discuss the regulatory permitting process.

Following the pre-application meeting, UCR shall prepare and process appropriate permits, which may include a Section 404 Permit, a Section 401 Water Quality Certification, a Report of Waste Discharge, and/or a CDFW Section 1602 Notification of Lake or Streambed Alteration. If there is potential for the project to adversely affect wetlands or waters, impacts shall be avoided and minimized during the project design process, to the extent practicable, and unavoidable impacts shall be mitigated as discussed with each regulatory agency on a project-by-project basis and pursuant to applicable wetland permit conditions.

Compensatory mitigation may include restoration (i.e., re-establishment or rehabilitation), establishment (i.e., creation), enhancement, and/or preservation of jurisdictional resources. Compensatory mitigation may occur through permittee-responsible mitigation, payment to an in-lieu fee program, or purchase of compensatory mitigation credits from an approved mitigation bank. Mitigation ratios (i.e., the amount of mitigation acreage compared to the amount of impacted habitat) shall be negotiated with each regulatory agency on a project-by-project basis.

Significance After Mitigation

Mitigation Measure **MM BIO-9** would reduce impacts to State or federally-protected wetlands to a less than significant level.

Impact BIO-4 INTERFERE SUBSTANTIALLY WITH THE MOVEMENT OF ANY NATIVE RESIDENT OR MIGRATORY FISH OR WILDLIFE SPECIES OR WITH ESTABLISHED NATIVE RESIDENT OR MIGRATORY WILDLIFE CORRIDORS OR IMPEDE THE USE OF NATIVE WILDLIFE NURSERY SITES.

THE PROPOSED 2021 LRDP WOULD NOT LOCATE SUBSTANTIAL DEVELOPMENT NEAR MSHCP CONSERVATION AREAS WITH POTENTIAL FOR WILDLIFE MOVEMENT OR NATIVE NURSERY SITES, AND IMPACTS WOULD BE LESS THAN SIGNIFICANT.

UCR is located at the edge of urban development in the eastern portion of the City. Because of this, there is no regional connection to other open space areas to the north or west. The southeast corner of the campus consists of undeveloped open space linking the Box Springs Mountains to the northeast with Sycamore Canyon Wilderness Park to the southwest. These southeastern portions of campus are designated Open Space Reserve and UCR Botanic Gardens, consistent with existing uses.

Most new development proposed in 2021 LRDP would occur in the Academics & Research and northern areas of East Campus such as Student Neighborhood, University Avenue Gateway, and Canyon Crest Gateway. A new interpretive center is programmatically assumed in the UCR Botanic Gardens designation on East Campus, similar to the existing structures. The designated Open Space Reserve is the land use located in the MSHCP Criteria Cell 634. This area would mainly be used for conservation of natural lands, and there are currently no planned or foreseeable development within the Open Space Reserve areas. Therefore, human activity is not anticipated to substantially impact the movement of native wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites, and impacts would be **less than significant**.

Mitigation Measures

No mitigation measures would be required.

Significance After Mitigation

There would be less than significant impacts without mitigation to wildlife movement, wildlife corridors, or nursery sites.

4.4.4 Cumulative Impacts

The following factors are considered with respect to analyzing cumulative impacts to biological resources:

- The cumulative contribution of other approved and proposed projects to fragmentation of open space in the project vicinity
- The loss of sensitive habitats and species
- The contribution of the project to urban expansion into natural areas
- Isolation of open space in the vicinity by proposed/future projects

Over the last half-century or more, naturally vegetated open areas diminished as the landscape surrounding the UCR campus has been built out with residential, educational, and commercial uses. However, as shown on

Figure 4.4-1, the UCR campus is within one MSHCP criteria cell and within proximity to four MSHCP criteria cells, including those with MSHCP conserved lands. The UCR campus is just west of the Box

Springs Mountain Reserve, Box Springs Park, and many contiguous MSHCP criteria cells north of the City of Moreno Valley.

Most future development and redevelopment under the proposed 2021 LRDP would be infill in existing urban areas. Implementation of the proposed 2021 LRDP would conserve approximately 154.7 acres of land in the Open Space Reserve land use designation, which would be an increase of 24.3 acres over the 2005 LRDP and would direct UCR to protect those areas from major development.

The proposed 2021 LRDP would contribute to natural land and habitat preservation. The project's contribution to cumulative Impact BIO-1 and Impact BIO-2 is considered **cumulatively considerable without mitigation**. However, implementation of Mitigation Measures **MM BIO-1A through MM BIO-8** would reduce direct and indirect impacts to wildlife and sensitive vegetation and habitat to less than significant. If a future project under the proposed 2021 LRDP would result in removal of sensitive vegetation, then compensatory mitigation may be required depending on the amount of vegetation impacted, which would ensure no net loss of habitat following implementation of the project. As described in Impact BIO-3, impacts to sensitive habitats (i.e., jurisdictional wetlands, riparian vegetation, and aquatic habitat) under the proposed 2021 LRDP would be cumulatively considerable without mitigation. Implementation of Mitigation Measure **MM BIO-9**, however, would reduce these cumulative impacts through identification, avoidance, and project-specific permitting requirements through appropriate regulatory agencies (e.g., Section 404 permit, Section 401 certification, CFGC Section 1602 authorization). Mitigation for wetlands would be coordinated with the appropriate regulatory agencies on a project-by-project basis to ensure no net loss of functions and values.

It is anticipated that for other developments that would have significant impacts on these resources, mitigation measures such as preconstruction surveys for sensitive biological resources, mitigation for impacts to sensitive habitats and/or sensitive biological resources, and payment of all MSHCP fees including the Development Mitigation Fee, would be required. Other developments would also be required to comply with all applicable laws and regulations governing biological resources including all MSHCP policies and measures regarding cumulative impacts.

With the proposed mitigation measures, coupled with federal, State, and UCR objectives and policies, development under the proposed 2021 LRDP would have less than significant impacts to sensitive habitats and biological resources. In addition, individual development proposals in the region are reviewed separately by the appropriate jurisdiction and undergo appropriate environmental review when it is determined that the potential for significant impacts exist. If future projects would result in impacts to sensitive habitats and biological resources, impacts to such resources would be addressed on a case-by-case basis. Furthermore, all projects in the MSHCP area are required to comply with the MSHCP. As such, projects would not contribute to cumulative impacts on sensitive habitats and biological resources outside the project site. Therefore, impacts related to sensitive habitats and biological resources **would not be cumulatively considerable**.

4.4.5 References

California Department of Fish and Wildlife (CDFW). 2018. California Natural Diversity Database. https://wildlife.ca.gov/Data/CNDDB

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4.5 Cultural Resources

The analysis in this section has been prepared pursuant to CEQA Guidelines Section 15064.5 and considers potential impacts to archaeological and historic resources. This section includes a summary of cultural resources background information, a review of archaeological, historic resources, human remains, and discussion of the potential impacts to these resources with implementation of the proposed 2021 LRDP. Potential impacts to paleontological resources are addressed in Section 4.7 *Geology and Soils,* while tribal cultural resources are addressed in Section 4.16, *Tribal Cultural Resources*.

The analysis in this section is based in part on the Cultural Resource Constraints Study prepared for the proposed 2021 LRDP by Psomas in 2019 and the UCR Historic Resources Survey Report (HRSR), prepared in 2020 for the proposed 2021 LRDP by Rincon. Both reports are included in Appendix E in this document.

4.5.1 Environmental Setting

Cultural Setting

Prehistory

During the twentieth century, many archaeologists developed chronological sequences to explain prehistoric cultural changes in all or portions of southern California (cf. Jones and Klar 2007; Moratto 1984). Wallace (1955, 1978) devised a prehistoric chronology for the southern California region based on early studies and focused on data synthesis that included four horizons: Early Man, Milling Stone, Intermediate, and Late Prehistoric. Though initially lacking the chronological precision of absolute dates (Moratto 1984: 159), Wallace's (1955) synthesis has been modified and improved using thousands of radiocarbon dates obtained by southern California researchers over recent decades (Byrd and Raab 2007: 217; Koerper and Drover 1983; Koerper et al. 2002; Mason and Peterson 1994). The composite prehistoric chronological sequence for southern California is based on Wallace (1955), Warren (1968), and later studies including Koerper and Drover (1983).

Early Man Horizon (ca. 10,000 – 6,000 BCE)

Numerous pre-8,000 Before Common Era (BCE) sites have been identified along the mainland coast and Channel Islands of southern California (cf. Erlandson 1991; Johnson et al. 2002; Jones and Klar 2007; Moratto 1984; Rick et al. 2001: 609). The Arlington Springs site on Santa Rosa Island produced human femurs dated to approximately 13,000 years ago (Arnold et al. 2004; Johnson et al. 2002). On nearby San Miguel Island, human occupation at Daisy Cave (CA-SMI-261) has been dated to nearly 13,000 years ago and included basketry greater than 12,000 years old, the earliest on the Pacific Coast (Arnold et al. 2004).

Although few Clovis- or Folsom-style fluted points have been found in southern California (e.g., Dillon 2002; Erlandson et al. 1987), Early Man Horizon sites are associated generally with a greater emphasis on hunting than later horizons. Recent data indicate that the Early Man economy was a diverse mixture of hunting and gathering, including a significant focus on aquatic resources in coastal areas (e.g., Jones et al. 2002) and on inland Pleistocene lakeshores (Moratto 1984). A warm and dry 3,000-year period called the Altithermal began around 6,000 BCE. The conditions of the

Altithermal are likely responsible for the change in human subsistence patterns at this time, including a greater emphasis on plant foods and small game.

Milling Stone Horizon (6,000–3,000 BCE)

The Milling Stone Horizon is defined as "marked by extensive use of milling stones and mullers, a general lack of well-made projectile points, and burials with rock cairns" (Wallace 1955: 219). The dominance of such artifact types indicates a subsistence strategy oriented around collecting plant foods and small animals. A broad spectrum of food resources were consumed, including small and large terrestrial mammals, sea mammals, birds, shellfish and other littoral and estuarine species, near-shore fishes, yucca, agave, and seeds and other plant products (Kowta 1969; Reinman 1964). Variability in artifact collections over time and from the coast to inland sites indicates that Milling Stone Horizon subsistence strategies adapted to environmental conditions (Byrd and Raab 2007: 220). Locally available tool stone dominates lithic artifacts associated with Milling Stone Horizon sites; ground stone tools, such as manos and metates, and chopping, scraping, and cutting tools, are common. Kowta (1969) attributes the presence of numerous scraper-plane tools in Milling Stone Horizon collections to the processing of agave or yucca for food or fiber. The mortar and pestle, associated with acorns or other foods processed through pounding, were first used during the Milling Stone Horizon and increased dramatically in later periods (Wallace 1955, 1978; Warren 1968).

Two types of artifacts that are considered diagnostic of the Milling Stone period are the cogged stone and discoidal, most of which have been found on sites dating between 4,000 and 1,000 BCE (Moratto 1984: 149), although possibly as far back as 5,500 BCE (Couch et al. 2009). The cogged stone is a ground stone object that has gear-like teeth on the perimeter and is produced from a variety of materials. The function of cogged stones is unknown, but many scholars have postulated ritualistic or ceremonial uses (cf. Dixon 1968: 64-65; Eberhart 1961: 367), based on the materials used and their location near to burials and other established ceremonial artifacts as compared to typical habitation debris. Similar to cogged stones, discoidals are found in the archaeological record subsequent to the introduction of the cogged stone. Cogged stones and discoidals were often buried purposefully, or "cached." They are most common in sites along the coastal drainages from southern Ventura County southward and are particularly abundant at some Orange County sites, although a few specimens have been found inland as far east as Cajon Pass (Dixon 1968: 63; Moratto 1984: 149). Cogged stones have been collected in Riverside County, and their distribution appears to center on the Santa Ana River basin (Eberhart 1961).

Intermediate Horizon (3,000 BCE – CE 500)

Wallace's Intermediate Horizon dates from approximately 3,000 BCE – Common Era (CE) 500 and is characterized by a shift toward a hunting and maritime subsistence strategy, as well as greater use of plant foods. During the Intermediate Horizon, a noticeable trend occurred toward greater adaptation to local resources including a broad variety of fish, land mammal, and sea mammal remains along the coast. Tool kits for hunting, fishing, and processing food and materials reflect this increased diversity, with flake scrapers, drills, various projectile points, and shell fishhooks being manufactured.

Mortars and pestles became more common during this transitional period, gradually replacing manos and metates as the dominant milling equipment. Many archaeologists believe this change in milling stones signals a change from the processing and consuming of hard seed resources to the increasing reliance on acorn (cf. Glassow et al. 1988; True 1993). Mortuary practices during the

Intermediate Horizon typically included fully flexed burials oriented toward the north or west (Warren 1968: 2-3).

Late Prehistoric Horizon (CE 500–Historic Contact)

During Wallace's (1955, 1978) Late Prehistoric Horizon, the diversity of plant food resources and land and sea mammal hunting increased even further than during the Intermediate Horizon. More classes of artifacts were observed during this period and high quality exotic lithic materials were used for small finely-worked projectile points associated with the bow and arrow. Steatite containers were made for cooking and storage and an increased use of asphalt for waterproofing is noted. More artistic artifacts were recovered from Late Prehistoric sites, where cremation became a common mortuary custom. Larger, more permanent villages supported an increased population size and social structure (Wallace 1955: 223).

Historic Setting

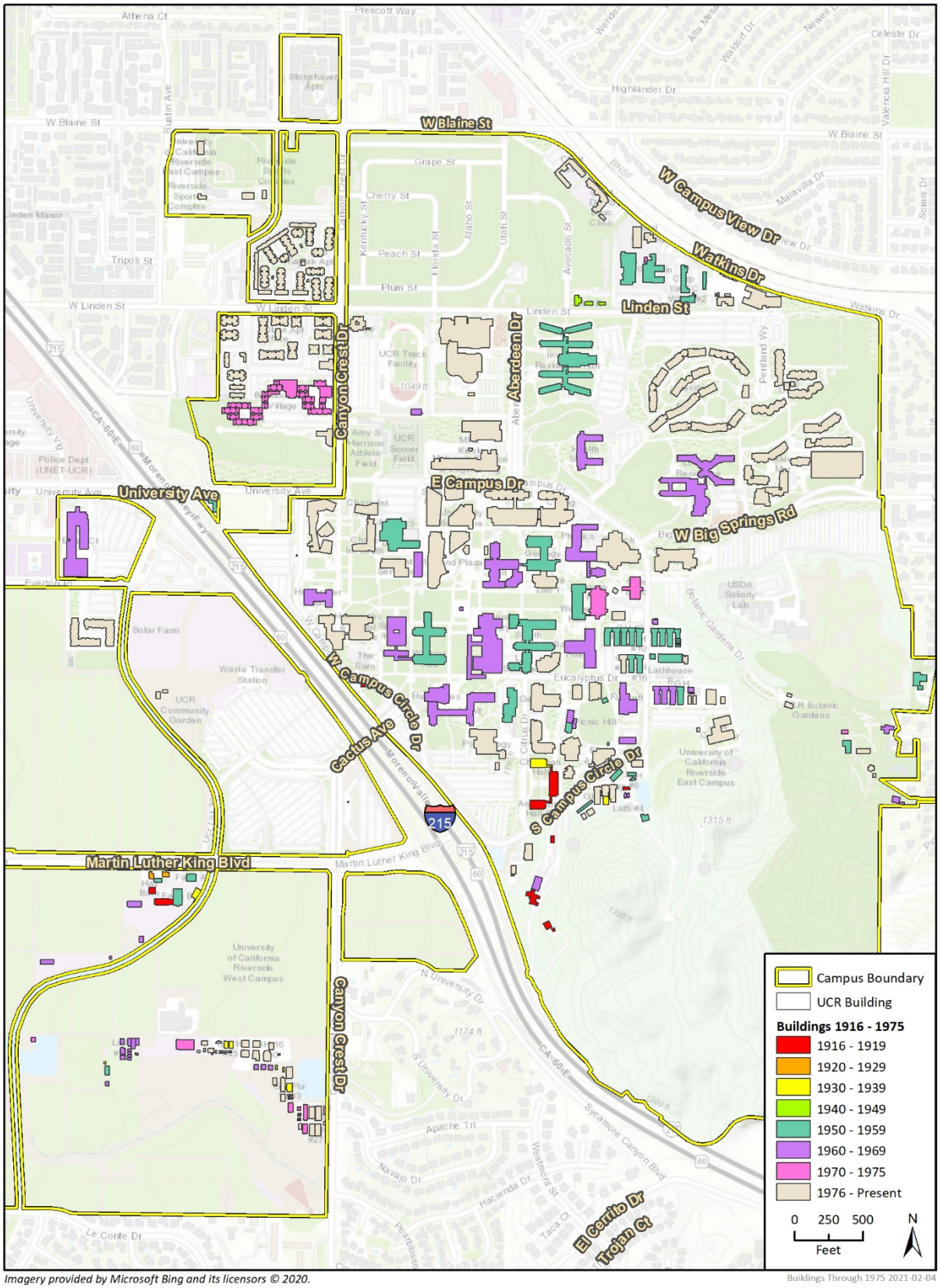
This section outlines the historic-era setting for UCR's extant facilities, campus, and vicinity. To provide a contextual framework for assessments of UCR properties, the historic setting and context provided in this section is divided chronologically and according to significant themes. This context identifies important themes and milestones that are reflected in the built environment at UCR (some aspects of Riverside's history are also included, but this section is not a full historic context statement of the City). Property types that might embody or reflect each context are described below. Figure 4.5-1 provides a map of the campus and depicts the dates of construction for each building and structure, to indicate which context(s) may be applicable.

Additional information including a comprehensive construction chronology for UCR, is provided in Appendix E.

Given UCR's history and built environment, the contexts and themes that apply to the campus include the following four contexts, along with themes and subthemes:

- Context #1: Early Settlement and Development in Riverside
  Theme: Citrus Industry and Citriculture in Riverside
  Subtheme: The UCR Citrus Experiment Station
- Context #2: Riverside's Postwar Boom, 1945-1975
  Theme: Postwar Institutional Expansion in Riverside
  Subtheme: Founding of UCR
- Context #3: Social and Cultural Development, 1954-1975
  Theme: Civil Rights Movement and Student Activism at UCR, 1960-1975
  Theme: Initiatives in Cultural Diversity, Ethnic Studies, and Student Support
- Context #4: Architecture and Design, 1916-1975
  Theme: Mission Revival/Spanish Colonial Revival style
  Theme: Mid-Century Modernism in Riverside

Figure 4.5-1 Overview of UCR Campus and Dates of Construction



Context #1: Early Settlement and Development in Riverside

Theme: Citrus Industry in Riverside
Subtheme: The UCR Citrus Experiment Station

The Citrus Experiment Station – now known as the Citrus Research Center and Agricultural Experiment Station (CRC-AES) – has operated from UCR for over a century. UCR retains facilities and buildings dating to the earliest days of the Citrus Experiment Station.

The area that now encompasses UCR falls within the City's University Neighborhood area, near the slopes of Box Springs Mountain. Situated northeast of Riverside's original townsite, this expanse of the City consisted primarily of agricultural fields and citrus groves at the time of the City's founding in 1870. Adjacent to the University Neighborhood to the west and southwest are two of the City's oldest neighborhoods, Eastside and Victoria, which were the home of expansive citrus groves, packing houses and plants, as well as neighborhoods and communities, as early as the late nineteenth century.

Following Riverside's establishment, the new community needed irrigation for its growing population as well as its acres of groves and fields. One of the earliest and most significant engineering advances in this respect—the Gage Canal—traversed the area now occupied by UCR. In 1884, Matthew Gage constructed the 20-mile canal to bring water to the newly established village of Arlington Heights, another early area of settlement in the City (Figure 4.5-2). The availability of water helped spur Riverside's expansion, not only for new residents, drawn to the emerging employment centers, but also for acres of groves and agricultural fields.

Figure 4.5-2 Citrus fields (left), ca. 1890, and Gage Canal, (right) circa 1900

Source: Los Angeles Public Library and UCR Special Collections and University Archives

During these founding years, one of the most significant events for Riverside was the introduction of the Washington Navel Orange. Imported from Brazil by the U.S. Department of Agriculture, the navel orange was brought to Riverside in 1873 by Eliza and Luther Tibbets. After introduction of the Washington Navel Orange, the crop transformed Riverside and the surrounding region. By 1880, an expansive citrus industry was already well established. Much of Riverside was covered or surrounded by orange, lemon, and lime groves. As of 1882, among the half-million orange trees throughout California, 50 percent were growing in Riverside (Lawton, 1989).

The rise of the citrus industry, along with the establishment of the Southern California Fruit Exchange, helped Riverside expand exponentially through the 1880s. The small town quickly

became one of the state's most prosperous and productive agricultural communities. In addition, as historian Carey McWilliams observed, the citrus boom gave rise to a new social class, the "aristocrats of the orchards," who ultimately dominated political, social, and economic life in Riverside.[1]

With the rise of citrus-culture, the workforce also expanded greatly. From the beginning, citrus work meant long hours, physically demanding work, and low wages. The earliest citrus laborers in Riverside had been the local Native American population. By the 1880s, Chinese immigrants had become the main source of citrus labor, working as pickers, packers, and irrigators. As increasingly restrictive immigration laws first slowed then halted Chinese immigration, Riverside citrus producers turned to Japanese immigrants. Japanese citrus laborers began in the early 1890s. By 1900, nearly 3,000 Japanese laborers were employed in Riverside in the citrus industry alone. Riverside also had a sizable Korean workforce, who participated in citrus work and seasonal labor; the Korean settlement, on the edge of Eastside near Cottage and Pachappa, was one of the earliest Korean settlements on the U.S. mainland. The original site of the Korean settlement, Pachappa Camp, is now a City Point of Cultural Interest, designated in December 2016.

In the early twentieth century, a new wave of anti-immigrant sentiment, this time aimed at the Japanese, drove them out of the citrus labor market throughout California. Mexican laborers came to replace Chinese and Japanese laborers as the majority workforce. By the end of the 1910s, Mexican immigrants had "replaced all other ethnic laborers in California's citrus districts" and became "the nucleus of the industry's workforce from 1919 up to the [late twentieth century]" (Lawton, 1989). New arrivals and workers settled in neighborhoods near the groves and packinghouses, such as the Eastside, Casa Blanca, and Arlington Heights neighborhoods, located west and southwest of UCR. Casa Blanca, which is named for the nearby estate of Harry Lockwood (which was an imposing *casa blanca*, or white house), is one of the oldest Latino communities in California.

Through the years, the presence of expansive, vital ethnic communities, such as the Mexican-American community, continued to exert a significant influence in the cultural, social, and political life of the City. The origins of many of these communities were rooted in this early twentieth century influx as Riverside was in its most rapid period of expansion. Later, in the 1960s, during the Civil Rights Movement, UCR became home to one of the nation's first university-level Chicano studies programs. Some of the first graduates of the program, and pioneering Mexican-American faculty members, grew up in the early citrus *colonia* and neighborhoods of Riverside.

FOUNDING YEARS AND THE CITRUS EXPERIMENT STATION

During these years, the citrus industry experienced rapid, expansive success as well as some daunting challenges. Principal among them was the challenge of invasive pests and diseases that damaged or killed crops.

Riverside's Citrus Experiment Station was created through legislation drafted by State Assembly member Miguel Estudillo and local grower John Henry Reed.[1] For growers statewide, the Citrus Experiment Station became a critically important clearinghouse for citrus-related research, including topics such as how to understand and mitigate plant disease, nutritional deficiencies, insects, pests,

[1] Estudillo was a pioneering Latino attorney in Riverside in the late 1910s. A native of San Bernardino, Estudillo's ancestry went back to the Spanish era of Alta California. Estudillo was born in San Bernardino but educated in San Diego, where he served as Deputy Court Clerk. In 1893, following the establishment of Riverside, Estudillo was appointed Clerk of the Board of Supervisors. Soon thereafter, he became a practicing attorney. In 1904, Estudillo was elected to the California State Assembly, and in 1908 to the California State Senate. See Rincon, 2018, City of Riverside Latino Historic Context Statement, p. 78.

and other challenges to the health and productivity of citrus groves. The research center helped growers remain competitive as the citrus market became more diversified, with increasing citrus trade from Florida, northern California, Puerto Rico, and South Africa in the early twentieth century.

Agricultural research centers emerged in the U.S. in the mid-nineteenth century with federal passage of the Morrill Act, which allowed the government to donate public lands for the establishment of agricultural colleges. In 1887, the Hatch Act further established Agricultural Experiment Stations (AES) in each state. Prior to Reed and Estudillo's legislation, the UC had already established AES branches in Berkeley and Davis.

In 1906, the Regents began construction on the third AES branch in Riverside. A year later, in February 1907, the Riverside Citrus Experiment Station began operations. In 1907, in order to help growers to fight crop diseases, the California State legislature established an experimental orchard and research facility near Riverside's Mt. Rubidoux. Initially administered by the University of California, Berkeley's College of Agriculture, the research center initially focused on citrus crops and how to address and mitigate threats. In 1912, given the industry's importance and the facility's success in its opening years, the UC announced plans to expand the UCR Citrus Experiment Station, to make it "an institution adequate to the great industry whose problems it was established to solve."[2]

Within a few years, however, the need for a larger facility, with a broader scope of study, was already evident. In 1913, an advisory committee was tasked with finding a site that could accommodate more crops, larger orchards, as well as new research and office facilities and housing. When the City of Riverside offered the university a 370-acre site adjacent to Gage Canal, the advisory committee accepted; the Gage Canal continues to traverse the West Campus and the present-day facilities of the Citrus Experiment Station are extant on East Campus (Figure 4.5-3). With facilities designed by Los Angeles architects Lester H. Hibbard and H.B. Cody, the Citrus Experiment Station opened in March 1918. For the signature buildings of the Citrus Experiment Station, Hibbard and Cody opted for a distinctive Spanish/Mission Revival style.

[2] "Will Enlarge Institution: Riverside Citrus Experiment Station Improvement," The Los Angeles Times, 8 November 1912.

Figure 4.5-3 Horticulture Bldg. (Anderson Hall 1) and West Campus orchards, circa 1920

Source: UCR, Library, Special Collections and University Archives

In addition to an expansion of the facilities, this investment included hiring a nationally recognized expert, Dr. H.J. Webber, as the station's director. Webber had served in the U.S. Department of Agriculture and as a faculty member at Cornell University. He was "regarded as among the chief of pomological authorities in the country" and "to get the best man and retain him, it would be necessary to build up an opportunity and an institution commensurable with his talents."[3]

Under Webber's leadership, the Citrus Experiment Station quickly became known as a focal point for research in a range of problems facing farmers and growers. After Webber joined the station as director, he oversaw additional expansions of the facilities, which by 1914 staffed 18 personnel with an annual budget of $60,000. In 1917, Webber moved the facility 4 miles east to its present location—at the time, on an expansive 475-acre parcel. During this time, the Citrus Experiment Station focused its efforts on creating fertilizer that deterred pests, improving citrus rootstocks, cultivating new varieties of citrus, and preventing plant diseases. The center researched topics such as irrigation and soil sciences, breeding and hybridization, diseases and various injuries of trees including citrus, date, avocado, and walnuts, as well as the omnipresent problem of pest and disease control.

In 1917, a new $125,000 complex was added to the station. Designed by Los Angeles architect Lester H. Hibbard, the new facilities included the horticulture building, director's home, and Barn Group. According to the *San Bernardino News,* the architectural character of the new facilities "suggest[ed] the Spanish inheritance of California, through their graceful lines, tiled roofs, plastered façade, and picturesque open arcades from building to building. Everything is planned as part of a group capable of expansion by future generations."[4] With the continuing primacy of the citrus industry in the regional and statewide economies, the UCR Citrus Experiment Station expanded in scope and profile, looking to other countries for solutions to problems faced by local farmers and

[3] "Will Enlarge Institution: Riverside Citrus Experiment Station Improvement," The Los Angeles Times, 8 November 1912.
[4] "Plans Adopted for South's Citrus Station Near City of Riverside," San Bernardino News, 21 January 1916.

publishing research results and guidance. In the 1920s, faculty conducted research and advised growers on how to address an invasive fungus that precipitated the decay of lemon crops, for example.

In 1930, station professor Dr. H.S. Reed, a plant physiologist, took a year to travel to Spain to study the citrus industry, North Africa and Sicily to "investigate conditions," and to the University of Geneva, where he served as a guest faculty member.[5] During the Great Depression, the station continued to expand; in 1930/1931, a new Soils/Plant Nutrition Wing (now Chapman Hall, one of three signature landmarks for the Citrus Experiment Station) as well as an Insectary Building and Entomology Building were constructed.

The station quickly became renowned as a center for citrus research around the world, with its three principal objectives: (1) to conserve and evaluate citrus types and relatives, (2) to provide a resource of citrus genetic diversity for research, and (3) to extend knowledge about citrus diversity (University of California, Riverside, n.d.).

As the region suffered the effects of the Great Depression, the health of the citrus industry partially helped buoy the local economy. During the Great Depression, the UCR Citrus Experiment Station did its part to support the industry by offering classes in citriculture to local growers. Through these courses, the facility presented the latest recommendations of the college of agriculture of the UC, concerning orchard management problems and practices. Subjects discussed include fertilization, soil management, irrigation, and soil values. The station also sought to develop a satisfactory pest control program.

The multidisciplinary faculty and associates at the time included facility director L.D. Batchelor, J.B. Brown, irrigation specialist at the College of Agriculture at Davis, W. Eberling and Stanley Flanders from the station's entomology division (Flanders would later serve as Director of the station). The team also included specialists in soil technology (with Professor C.F. Shaw from UC Berkeley), entomology (with Professor H.J. Quayle), physiology (with Professor P.H. Rohrbaugh of the UCR Citrus Experiment Station), as well as farm advisors and county assessor officials. A campus map from 1951 illustrates the Citrus Experiment Station footprint and facilities prior to the establishment of UCR in 1954.

By 1953, for its part, the Citrus Experiment Station had also grown from 30 to 1,000 acres and from 18 to 265 staff members and faculty (University of California, Riverside, 2020). At the time of its development, agricultural fields, mostly planted with citrus, still characterized much of the land to the north, west, and south of the school.

As of 1953, 1 year prior to the opening of the new College of Letters and Sciences, the station employed a cross-disciplinary team of scientists studying invasive insects and diseases hampering the citrus crop and mitigation methods (Figure 4.5-4). One area of research involved identifying "predator parasites" that would overtake the insects plaguing citrus crops.[6] Scientists in the biological control department travelled to North Africa, Japan, and Italy, for example, in order to study citrus diseases and find (and bring home) parasites capable of reducing insect populations. In this way, by the time UCR was founded in 1954, the institution already enjoyed a national and international reputation for its work across several disciplines.

[5] "Our Neighbors: A Weekly Review of Agricultural Activities in the Southwest," Los Angeles Times Farm and Garden Magazine, 23 February 1930.
[6] Harbison, Robert L., "Tiny Insects Aid in Fight against Citrus Enemies," San Bernardino County Sun, 30 April 1953.

Figure 4.5-4 Dr. Stanley E. Flanders, UCR Citrus Experiment Station, 1953

Source: The San Bernardino Sun, 30 April 1953

As the postwar building boom began eroding former agricultural lands throughout California, the Citrus Experiment Station began leasing over 11 acres of farmland of the Limoneira Company, a long-time citrus producer in Santa Paula, County of Ventura. As groves gave way to housing, researchers at the station used the Limoneira farmland to explore and address "the production and marketing problems that will be created by the shift of citrus away from coastal areas in the next 10 to 20 years."[7] This of course was prescient; Santa Paula was selected for this work for its climatic zone, which represented a departure from the subtropical areas that had been the focus of the citrus industry.

Through subsequent decades, the Citrus Experiment Station continued to respond to evolving challenges, with an increasingly diversified team of specialists and scientists. Drawing on decades of work by the Citrus Experiment Station, UCR's entomology department became one of the top five such departments in the U.S.

With its experimental orchards and collections primarily spanning an over 22-acre site in UCR's West Campus, the Citrus Experiment Station has conducted its work under the auspices of the College of Natural and Agricultural Sciences since 1974; the college was created through a merger of physical sciences and biological/agricultural sciences.

The Citrus Experiment Station, now known as the CRC-AES, is still home to "one of the world's most extensive citrus diversity collections," with approximately 1,000 types of citrus trees (two trees per type) on over 22 acres of the UCR campus.[8] In a testament to its continuing significance for citrus growers around the world, the CRC-AES received a $3.5 million grant in early 2019 to fund research

[7] "Limoneira Provides Land for Citrus Research," Redlands Daily Facts, 20 July 1961.
[8] University of California Riverside News. 14 March 2019. "3.5 Million Givaudan Gift Will Protect Citrus Collection." https://news.ucr.edu/articles/2019/03/14/35-million-givaudan-gift-will-protect-citrus-collection. (Accessed 10 June 2020).

into an invasive disease known as citrus greening disease (Figure 4.5-5). The CRC-AES still occupies the same swath of fields it has for over half a century, with an eclectic variety of buildings and support structures, through UCR. The Gage Canal still cuts a diagonal swath through the area, as it has since the late 19th century.

Figure 4.5-5 Chancellor Rivera celebrating the Citrus Experiment Station's 75th anniversary, 1982, with Bob Soost (left) and James Cameron (right); Tracy Kahn, Citrus Variety Collection curator, with a Valentine pummelo, a grapefruit-like hybrid developed at UCR, 2019

Source: UCR Library, Special Collections/University Archives and UCR News, 14 March 2019

Context #2: Riverside's Postwar Boom, 1945-1975

Theme: Postwar Institutional Expansion in Riverside
Subtheme: Founding of the University of California, Riverside, 1954-1975

In the postwar period, as noted previously, the Citrus Experiment Station continued to expand its research mission as well as its faculty and facilities. Although in Riverside and throughout Southern California, the shortage of university spaces and higher education opportunities had reached acute levels. The population boom as well as the influx of returning G.I.s, ready and able to study under the American G.I. Bill, tested these limits.

For the UC system, the postwar years strained already overburdened schools. In 1944, U.S. President Franklin D. Roosevelt established the Servicemen's Readjustment Act, commonly known as the G.I. Bill of Rights. One major component of this bill was a stipend for college tuition:

> [The bill] gives servicemen and women the opportunity of resuming their education or technical training after discharge, or of taking a refresher or retrainer course, not only without tuition charges up to $500 per school year, but with the right to receive a monthly living allowance while pursuing their studies.[9]

The bill funded 7.8 million veterans total, with many of them enrolled in higher education programs in California (UCR 2010). Four hundred universities and colleges in California were approved for the program, with over 50 percent of veterans attending 50 of the approved schools. The presence of the Citrus Experiment Station provided a logical location for a new university; its expansion to a

[9] President Franklin D. Roosevelt's Statement on Signing the G.I. Bill. 1944. "History and Timeline." U.S. Department of Veteran Affairs. https://www.benefits.va.gov/gibill/history.asp (accessed 6 August 2019).

satellite College of Letters and Sciences of the UC system also reflected a broad expansion of institutions/educational facilities throughout the City.

This founding of the College of Letters and Sciences in Riverside was significant news not just for the City but also for the region and state. Throughout California's institutions of higher learning, demand far outpaced availability in the postwar period. The problem was even more severe in the Inland Empire, with only a small handful of 4-year universities in the extended region. A new 4-year, research-focused university affiliated with the UC system was a significant step toward answering the increased demand for higher education.

Given the level of growth and expansion in Riverside itself, the community came together in the postwar period to form the "Citizens University Committee," a booster group that brought together members of the Chamber of Commerce, local teachers, political organizations, and Riverside citizens, in order to advocate for expanded higher-education offerings in Riverside. The group worked to convince the Regents and state officials that Riverside should house a new campus. In 1948, California Governor (and future US Supreme Court justice) Earl Warren granted $2 million in funding for the new liberal arts college on the grounds surrounding the Citrus Experiment Station.

In February 1954, as the new College of Letters and Sciences prepared to welcome students, the *Riverside Daily Press and Enterprise* published a special supplemental edition celebrating the new school. With messages from the presidents of universities and institutions throughout California—including Stanford University, the Henry E. Huntington Libraries, Pomona College, University of Redlands, and Occidental College in Los Angeles—the supplement reflected the wider significance of a new 4-year College of Letters and Sciences. In his message, Chief Justice Warren noted that he had signed the original legislation for Riverside's new university when he was California's governor.

In Riverside, UCR's opening also had great importance for the local community. At the time, Riverside County residents had only a few nearby universities to attend, such as The University of Redlands and Pomona College. In a community that had formed around the region's citriculture economy, having a local university was invaluable.

University of Redlands President George Armacost noted this belief, writing "We believe the opening of the College of Letters and Sciences on the University of California campus at Riverside will stimulate many young people from Riverside and San Bernardino counties to attend college who otherwise would neglect further educational training after high school. Having another institution of higher learning in our vicinity will stimulate a great interest in and appreciation of cultural activities."[10]

In 1948, as noted above, Govern Earl Warren signed a $2 million plan for a new, undergraduate liberal arts college in Riverside. The first UCR Provost, Gordon Watkins, established four divisions of the College of Letters and Sciences: Humanities, Social Sciences, Physical Sciences, and Life Sciences, and the college was born.

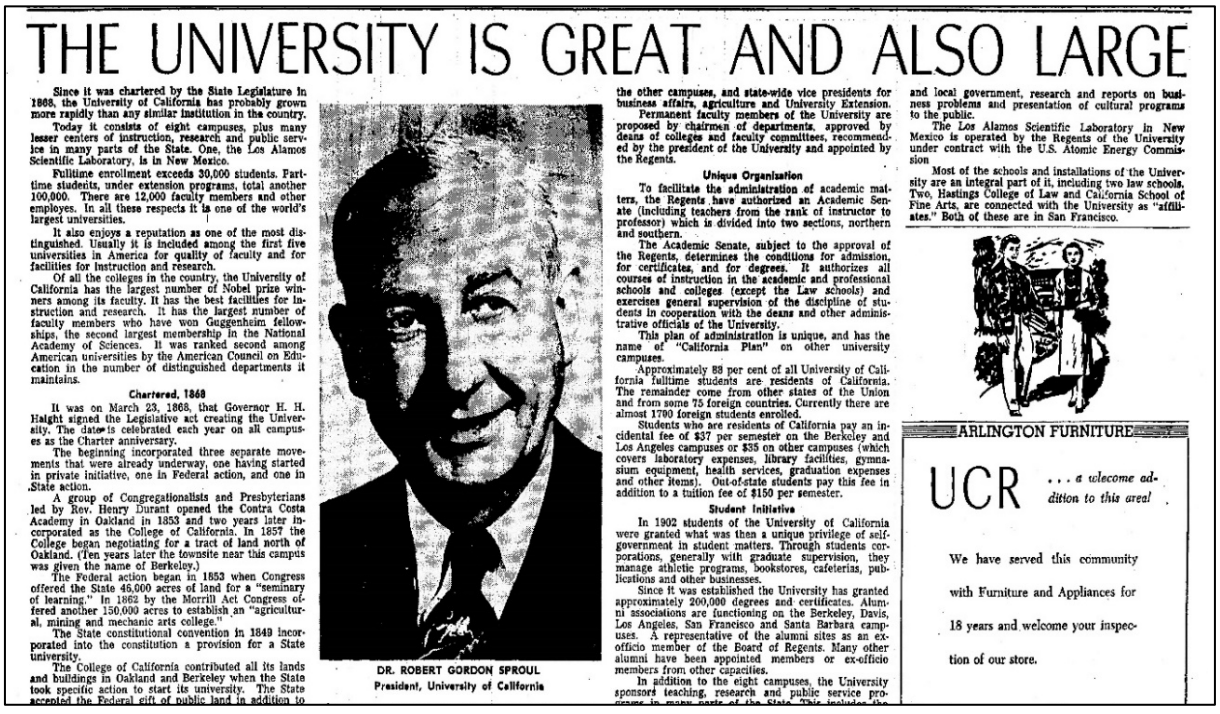
Development of the main campus at UCR was initiated in 1952. Between 1953 and 1955, six new buildings were added to the campus, mostly situated north of the extant Horticulture Building. These buildings served the newly established UCR School of Agricultural Sciences. On February 15, 1954, the school officially opened with 65 faculty members and 127 students, as illustrated in a yearbook photograph and newspaper article from that year (Figure 4.5-6; Figure 4.5-7). During UCR's first year, the college had a total of 127 enrolled students (as of 2018, student enrollment stood at approximately 24,000).

[10] Riverside Daily Press and Enterprise, "Greetings to UC's College at Riverside," 15 February 1954. http://genealogybank.com.

Figure 4.5-6 First class at UCR, Tartan Yearbook, 1954

Source: UCR, Library, Special Collections and University Archives

Figure 4.5-7 R*iverside Daily Press* supplement, February 1954, celebrating the inaugural semester at the new College of Letters and Sciences



THE UNIVERSITY IS GREAT AND ALSO LARGE

Since it was chartered by the State Legislature in 1868, the University of California has probably grown more rapidly than any similar institution in the country.

Today it consists of eight campuses, plus many lesser centers of instruction, research and public service in many parts of the State. One, the Los Alamos Scientific Laboratory, is in New Mexico.

Fulltime enrollment exceeds 30,000 students. Part-time students, under extension programs, total another 100,000. There are 12,000 faculty members and other employes. In all these respects it is one of the world's largest universities.

It also enjoys a reputation as one of the most distinguished. Usually it is included among the first five universities in America for quality of faculty and for facilities for instruction and research.

Of all the colleges in the country, the University of California has the largest number of Nobel prize winners among its faculty. It has the best facilities for instruction and research. It has the largest number of faculty members who have won Guggenheim fellowships, the second largest membership in the National Academy of Sciences. It was ranked second among American universities by the American Council on Education in the number of distinguished departments it maintains.

Chartered, 1868

It was on March 23, 1868, that Governor H. H. Haight signed the Legislative act creating the University. The date is celebrated each year on all campuses as the Charter anniversary.

The beginning incorporated three separate movements that were already underway, one having started in private initiative, one in Federal action, and one in State action.

A group of Congregationalists and Presbyterians led by Rev. Henry Durant opened the Contra Costa Academy in Oakland in 1853 and two years later incorporated as the College of California. In 1857 the College began negotiating for a tract of land north of Oakland. (Ten years later the townsite near this campus was given the name of Berkeley.)

The Federal action began in 1853 when Congress offered the State 46,000 acres of land for a "seminary of learning." In 1862 by the Morrill Act Congress offered another 150,000 acres to establish an "agricultural, mining and mechanic arts college."

The State constitutional convention in 1849 incorporated into the constitution a provision for a State university.

The College of California contributed all its lands and buildings in Oakland and Berkeley when the State took specific action to start its university. The State accepted the Federal gift of public land in addition to

DR. ROBERT GORDON SPROUL
President, University of California

the other campuses, and state-wide vice presidents for business affairs, agriculture and University Extension.

Permanent faculty members of the University are proposed by chairmen of departments, approved by deans of colleges and faculty committees, recommended by the president of the University and appointed by the Regents.

Unique Organization

To facilitate the administration of academic matters, the Regents have authorized an Academic Senate (including teachers from the rank of instructor to professor) which is divided into two sections, northern and southern.

The Academic Senate, subject to the approval of the Regents, determines the conditions for admission, for certificates, and for degrees. It authorizes all courses of instruction in the academic and professional schools and colleges (except the Law schools) and exercises general supervision of the discipline of students in cooperation with the deans and other administrative officials of the University.

This plan of administration is unique, and has the name of "California Plan" on other university campuses.

Approximately 89 per cent of all University of California fulltime students are residents of California. The remainder come from other states of the Union and from some 75 foreign countries. Currently there are almost 1700 foreign students enrolled.

Students who are residents of California pay an incidental fee of $37 per semester on the Berkeley and Los Angeles campuses or $35 on other campuses (which covers laboratory expenses, library facilities, gymnasium equipment, health services, graduation expenses and other items). Out-of-state students pay this fee in addition to a tuition fee of $150 per semester.

Student Initiative

In 1902 students of the University of California were granted what was then a unique privilege of self-government in student matters. Through students corporations, generally with graduate supervision, they manage athletic programs, bookstores, cafeterias, publications and other businesses.

Since it was established the University has granted approximately 200,000 degrees and certificates. Alumni associations are functioning on the Berkeley, Davis, Los Angeles, San Francisco and Santa Barbara campuses. A representative of the alumni sites as an ex-officio member of the Board of Regents. Many other alumni have been appointed members or ex-officio members from other capacities.

In addition to the eight campuses, the University sponsors teaching, research and public service pro-

and local government, research and reports on business problems and presentation of cultural programs to the public.

The Los Alamos Scientific Laboratory in New Mexico is operated by the Regents of the University under contract with the U.S. Atomic Energy Commission.

Most of the schools and installations of the University are an integral part of it, including two law schools, Two, Hastings College of Law and California School of Fine Arts, are connected with the University as "affiliates." Both of these are in San Francisco.

Source: Riverside Daily Press and Enterprise, 15 February 1954

Context #3: Social and Cultural Development, 1954-1975

This context, covering social and cultural development, provides a framework for identifying and evaluating buildings, landscapes, spaces and places at UCR that might have an association with the identified themes. This section describes the framework—in terms of the context, themes, subthemes, and eligibility standards—that should be applied in evaluations.

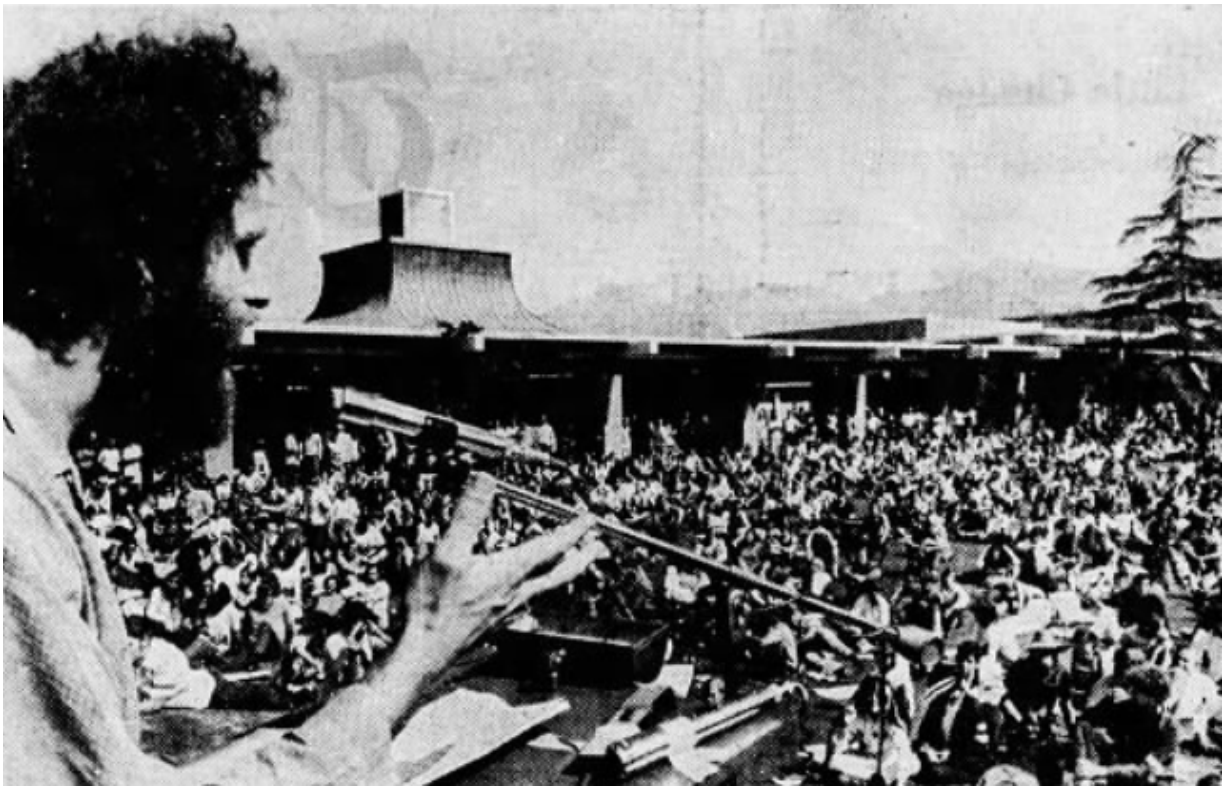
Theme: Civil Rights Movement and Student Activism at UCR, 1960-1975

During the 1960s and into the 1970s, American universities were the site of widespread activism, protest, and organizing during the Civil Rights Movement. Properties examined under this context and theme/subtheme will be considered for potential eligibility as reflections of this significant pattern of events and sociocultural development in Riverside.

ANTI-WAR AND POLITICAL PROTESTS

In the mid-to-late 1960s, students at several UC schools engaged in activism, particularly in protesting the war in Vietnam. Whereas some of these protests were met with force, such as when California Governor Ronald Reagan ordered State and City police to break up a protest at UC Berkeley's People Park in May 1969, many others were peaceful.[11] In 1968, UCR students organized the "Riverside Student Mobilization Committee," which was a group dedicated to holding vigils and public demonstrations against the Vietnam War. It appears the committee was active through the late 1960s. In the fall of 1969, more UCR students joined the debate. On October 15, 1969, over 3,000 students and faculty attended an anti-war rally on UCR's mall. The moratorium included a speech by activist Mario Savio of the 1964 UC Berkeley Free Speech Movement (Figure 4.5-8).

Figure 4.5-8 Mario Savio gives speech in front of the Commons Building at UCR, 1969



Source: San Bernardino County Sun, 1969

On March 10, 1970, California Governor Ronald Reagan launched a re-election bid for the governorship, with the "fight against smog" as part of his platform. He visited UCR a day later, on March 11, 1970, to learn about the school's air pollution research center at the Fawcett Laboratory. That spring day, over 300 students met the governor's arrival on campus by holding signs that read

[11] J.D. Warren, "The day the '60s protest movement came to UCR," UCR News, 11 March 2020.

"Four years is enough," and "Keep UC Free." [12] A handful of students laid down in the access road to the lab to immobilize the governor's procession. A reported group of over 50 Riverside police officers, campus police, and Riverside County sheriff's deputies cleared the road, purportedly using physical force to remove students (Figure 4.5-9). Four students were reported to have pushed police back and were later suspended.

The governor was transported to the laboratory where he attended an hour-long presentation before leaving the campus. The 1970 *Tartan* yearbook later recounted the event in an article titled, "Of Stereotypes, Of Tarnish," exploring the event from the viewpoints of police, students, and faculty. The article ends with the assertion that "Fawcett proved—really as no other incident this year—what happens when stereotypes are allowed to juggernaut, when poor planning feeds on itself."[13]

Figure 4.5-9 Police during Protest, 1970

Source: Tartan Yearbook, 1970

[12] J.D. Warren, "The day the '60s protest movement came to UCR," UCR News, 11 March 2020.
[13] "Of Stereotypes, of Tarnish," Tartan Yearbook, 1970.

However, social activism did not end on the UCR campus with the departure of Governor Reagan. A little over a month later, on April 30, 1970, President Nixon announced the U.S. invasion of Cambodia. UCR responded to this declaration by organizing a "cultural revolution" with rock bands starting on May 4th on the campus Mall. Organizer and graduate student Irv Hall was recorded as saying "we are going to liberate the University…we are going to take it over and turn it into a commune."[14] The event included numerous speeches and, ultimately, a march from the campus to the Riverside County Court House, where police escorted students holding a banner that read "Liberated Territory" (Figure 4.5-10).

The following day, on May 5th, a large demonstration occurred as an estimated 300 to 400 students marched through Robert G. Sproul Hall (Sproul Hall), Social Sciences-Humanities Building (Watkins Hall), the Humanities Building, the Cafeteria, and the Administration Building (Hinderaker Hall). The group of students eventually marched to the City Council chambers, where at the time, students felt that local councilmen "refused to take an official stand" regarding the invasion (Figure 4.5-11).[15] In response to the student protests at various UC schools, Governor Reagan shut down all campuses for 4 days. At UCR, students, professors, non-students, and townspeople all gathered to answer phones and petition the signatures of people on anti-war petitions.

Figure 4.5-10 Students hold "Liberated Territory" sign at Riverside County Court House, 1970

Source: Tartan Yearbook, 1970

[14] "Cambodia Days: Action as Cement," Tartan Yearbook, 1970.
[15] "Cambodia Days: Action as Cement," Tartan Yearbook, 1970.

Figure 4.5-11 Students before the City Council and holding signs on UCR campus, 1970

Source: Tartan Yearbook, 1970

Theme: Initiatives in Cultural Diversity, Ethnic Studies, and Student Support

As has been well documented, the Civil Rights Movement signaled an era of change across American society, with universities serving as important centers for activism. One focal point for student and faculty activism was establishing programs for ethnic studies that provided scholarship and focused curricula as well as student support programs. Ultimately, this movement was national, but it had its origins in Californian universities.[16] UCR's ethnic studies and student support programs were among the earliest to emerge in California.

After their inception in California, many ethnic studies programs were cut back or disbanded in the 1970s when schools experienced budget reductions. Most recovered, and by the 1990s there were over 700 ethnic studies programs and departments in the U.S. (Hu-DeHart, 1993). While a number of Californian universities were launching programs in the late 1960s, Riverside's specific history vis-à-vis its long-time communities of color, as well as the student population once the university was founded, were powerful catalysts for change and the establishment of enduring ethnic studies and student support programs at UCR.[17]

BACKGROUND FOR ETHNIC STUDIES IN RIVERSIDE

From its earliest years, Riverside has long been home to large, cohesive Latino and African-American communities, among other communities of color. In the pre-1945 era, these communities faced entrenched discrimination and segregation. This extended to all areas of life, employment

[16] See, for example, Hu-DeHart, Evelyn, "The History, Development, and Future of Ethnic Studies," The Phi Delta Kappan, vol. 75, no. 1 (Sept. 1993): pp. 50-54. http://www.JSTOR.org/stable/20405023.

[17] For additional historic context on the topic, see "The City of Riverside Latino Historic Context Statement," 2018, prepared by Rincon Consultants, Inc., for the City of Riverside's Community and Economic Development Department. As of August 2020, the City is finalized a similar study on the experience of the African-American community.

opportunities, housing options, as well as public places such as parks and pools, theaters and schools, restaurants, and restrooms.

By the postwar period, advances made during and after World War II brought new opportunities for communities of color. Efforts to organize and advocate for civil rights, equal access and opportunities gained momentum. While a generational divide existed, with young people more open to and comfortable with vocal activism and, when necessary, active confrontation, this broader sense of empowerment took hold. This shift ended up affecting all areas of life for Riverside's communities of color in the postwar era.

In terms of UCR, from its earliest years, the school had a significant proportion of first-generation college students. In the late 1960s, when UCR joined the UC system as a "General Campus," Chancellor Ivan Hinderaker brought together a committee, including scholars and professors of color, to discuss and design an ethnic studies curriculum for UCR. As a result of these meetings, the committee recommended the establishment of two separate programs: Black Studies and Mexican-American Studies. In the spring of 1970, the Academic Senate approved both programs.

At present these programs, as well as others, have been expanded by UCR. The African Student Programs, Asian Pacific Student Programs, Chicano Student Programs, Women's Resource Center, Native American Student Programs, LGBT Resource Center, and Undocumented Student Programs are housed in Costo Hall. The Middle Eastern Student Center is in the Highlander Union Building. In 1993, UCR was the first campus in California to have a professionally-staffed LGBT resource office.

These programs, and the rich diversity of UCR, continue to this day. UCR has the highest African-American student population in the UC system, and "about half of UCR's first-year students—and nearly 80 percent of Latinos—were first-generation college students in 2009"[18] In 2010, nearly 40 percent of undergraduates were Asian, 31 percent Latino, 16 percent white, and 8 percent black (Olson, 2010).

These sections provide a brief introduction to the Black Studies Department (and associated student group, the Black Student Union [BSU]), the Chicano Studies Department (with its student group, Chicano Student Programs), and the Native American Studies Department.

While there are other related departments, this section is intended as a primer to the topic, to provide a starting point for evaluating properties in the context of the Civil Rights Movement and UCR initiatives in cultural diversity, ethnic studies, and student support.

BLACK STUDIES DEPARTMENT

As noted above, the Black Studies Department was created in late 1969 by a special committee led by Chancellor Ivan Hinderaker. Although the program did not constitute an Ethnic Studies Program, they were both grassroots efforts led by students and faculty. At the time, ethnic studies programs were beginning to emerge, as students and faculty members capitalized on the momentum of the Civil Rights Movement to address the long-time policies of segregation and the exclusion of African American studies from the national curriculum. With the establishment of new programs in ethnic studies—in this case, Black Studies—new faculty created varied course offerings and programs of study, spanning the disciplines of political science, history, literature, culture, politics, and the arts.

Maurice Jackson, a member of the Sociology Department, served as the first chairman of the Black Studies Department. Another early faculty member, and chair, of the Black Studies Program was Dr.

[18] David Olson, "UC Riverside: Diversity is more than numbers," Press-Enterprise, 8 November 2010. Accessed on August 7, 2020. https://www.pe.com/2010/11/08/uc-riverside-diversity-is-more-than-numbers.

Carlton Rowland Bovell, a professor of microbiology and the first tenured African-American professor at UCR and among the first in the UC system (UCR 2019).

In the fall of 1969, shortly after creation of the department, a BSU coalition petitioned the Chancellor for creation of a funded program for the department that could be controlled by its students and faculty directly. The Chancellor denied the request, although he is recorded as acknowledging that increased self-control over newly established departments "was a recent pattern followed on some other college and university campuses."[19]

In 1970, Hinderaker announced the "metamorphosis" of Black Studies into an interdisciplinary program and the resignation of Jackson. Faculty and student responses to the change were mixed. An article in the 1970 Tartan yearbook recounts the dissolution of the department and ends with: "At the end of the summer, there still hung in the Social Sciences-Humanities Building (Watkins Hall) a sign announcing BLACK STUDIES DEPARTMENT. May it hang there until the reality approximates the fiction."[20] In 1979, under the leadership of founding Director Kathryn Jones and Vice Chancellor for Student Affairs Louis Leo, the Black Student Programs was created, prior to its inclusion in the Ethnic Studies Program. As former Chair of the Chicano Studies Department Dr. Carlos Cortés recounts:

> In 1984, Black and Chicano Studies were merged by the Academic Senate into a new Ethnic Studies Program. This occurred despite opposition by the entire Black and Chicano Studies faculty. That summer I was asked to chair the committee that created a structure for the new Ethnic Studies initiative. I did so because I wanted to salvage Ethnic Studies, even though I had opposed the forced merger. The Ethnic Studies department continues to this day with a full graduate program.[21]

MAURICE JACKSON, FOUNDING CHAIR OF THE BLACK STUDIES PROGRAM, 1969-1970

Maurice Jackson was an internationally renowned black scholar in the field of sociology who served as the first Chair of the Black Studies Program from 1969 to 1970, prior to its transfer to an interdisciplinary program. Jackson received his BA, MA, and PhD from the University of California at Los Angeles prior to beginning his career as a Lecturer at UCR in July 1965. He became a full-time professor in 1980. A scholarship fund dedicated in Jackson's honor recounts his "life-long passion [for] the elimination of racism in society."[22] Jackson taught classes in Social Psychology, Ethnic Relations, and Sociological Theory of Ethnicity and Racism. After serving as founding Chair of UCR's Black Studies Department, Jackson serves as the first executive specialist for women and minorities for the American Sociological Association, Chair of UCR's Ethnic Studies, and Vice President of the National Council on Aging (Figure 4.5-12).

CARLTON ROWLAND BOVELL, CHAIR, PROFESSOR, AND VICE CHANCELLOR

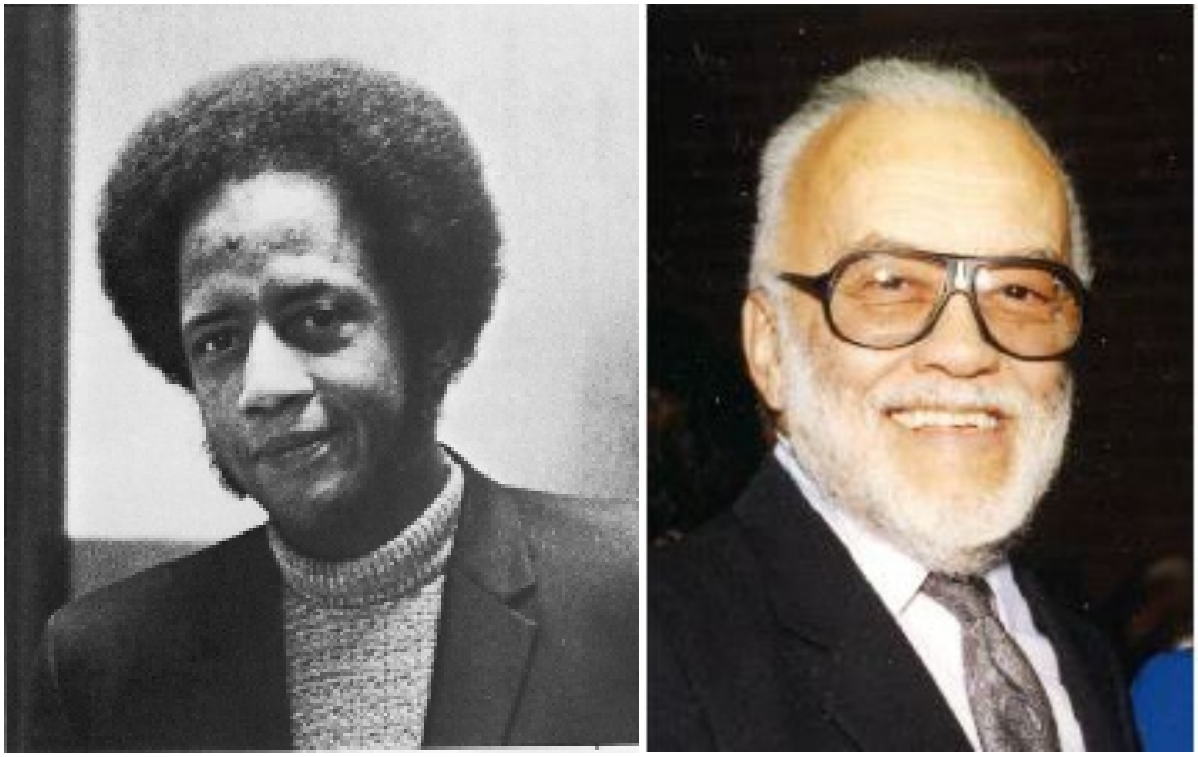
Through his long career at UCR, Professor Bovell "was a champion of increasing diversity and representation of racial and ethnic minorities at UCR."[23] In addition to serving as the Chair of the Black Studies Program, Professor Bovell "was instrumental in the establishment of the first Chair for American Indian studies in the UC system at UCR in 1986, the third such program in the country at

[19] "All Fall Down: The Crisis in Black Studies," Tartan Yearbook, 1970.
[20] "All Fall Down: The Crisis in Black Studies," Tartan Yearbook, 1970.
[21] Email communication with Dr. Carlos Cortés, Emeritus Professor, UCR, 5 August 2020, with Debi Howell-Ardila, Rincon Consultants, Inc. On file with Rincon Consultants, Inc.
[22] "Professor Maurice Jackson Endowed Scholarship Fund," UCR Advancement Services, Accessed on August 7, 2020. https://advancementservices.ucr.edu/Scholarship/ScholarshipFundInfo.aspx?fund=600276.
[23] Ibid.

that time."[24] When he began teaching at UCR in 1957, Professor Bovell quickly earned a reputation as one of UCR's most dynamic teachers. When he won the Distinguished Teaching Award in 1969, his colleagues in the Academic Senate noted that his lecture courses "terminate with spontaneous student ovation." In 1981, then Chancellor Tomás Rivera said of Professor Bovell's teaching: "He has demonstrated teaching excellence…and he offers a humanistic perspective on educational issues. He has been among the most respected teachers and faculty leaders in UCR's short history."[25]

Bovell left UCR to become an assistant vice president for the UC but returned in 1981 as the school's new vice chancellor (*The Desert Sun* 1981). In 1984, when Chancellor Tomás Rivera passed away, Professor Bovell served as Acting Chancellor. He was a nationally renowned scholar and served as Chair of the UC Academic Council for many years, among his many contributions (Figure 4.5-12).

Figure 4.5-12 UCR Professors Maurice Jackson (left, 1925-1987) and Carlton Rowland Bovell (right, 1924-2019)



Source: Tartan Yearbook, 1970; *Press-Enterprise,* 2019

BLACK STUDENT UNION

In 1968, graduate student Charles Jenkins and approximately 60 students founded the BSU. Led by Jenkins, the BSU was officially recognized by UCR circa 1972 (Figure 4.5-13 and Figure 4.5-14). It appears in archival newspapers as "Black Students United" and "Black Student Activities," during this time.

The group met at a university-owned house located off campus, known as the "Black House." The house was burned by arson on March 14, 1972.[26] That same year, students started a newspaper titled Black Voice News. Dr. Paulette Brown-Hinds, a graduate student who served as a publisher of

[24] Ibid.
[25] The Riverside Press-Enterprise, 4 April 2019, "Obituary, Carlton Rowland Bovell."
[26] "Chairman Sees UCR's Black Students' Union 'Coming Back,'" San Bernardino County Sun, 12 April 1972.

the newspaper remembers that "it was created by students on campus…they wanted to take control of their own narrative."[27] The newspaper's mission statement echoes this sentiment, claiming that since its creation it has "given voice to the voiceless and shined a light on systemic inequalities and disparities."[28]

The BSU created the Black Student Theatre and adopted five National Pan-Hellenic Council organizations (fraternities and sororities) in the mid-1970s. It remains an active part of the university community to present.[29]

Figure 4.5-13 Black Student Union Central Committee Members, 1969

Source: Tartan Yearbook, 1970

[27] Chris Fleming, "African-American Studies has a long history and legacy at UC Riverside," UCR, 20 September 2019. https://chass.ucr.edu/press/2019/09/20/african-american-studies-has-long-history-and-legacy-uc-riverside.
[28] "About: Black Voice News," BVN, Accessed on August 7, 2020. https://www.blackvoicenews.com/about-bvn.
[29] Email communication with Dr. Carlos Cortés, Emeritus Professor, UCR, 5 August 2020, with Debi Howell-Ardila, Rincon Consultants, Inc. On file with Rincon Consultants, Inc.

Figure 4.5-14 Black Student Union President Charles Jenkins addresses group, N.D.

Source: African Student Programs, N.D.

CHICANO STUDIES DEPARTMENT

The Chicano Studies Department (originally the Mexican-American Studies Department) was founded in late 1969 as a sister department to Black Studies. In this era, as noted above, calls had been increasing for the establishment of an ethnic studies curriculum and department. UCR had become a center for early Chicano student activism, in a movement that gained momentum in the mid-1960s. The UCR chancellor at the time, Ivan Hinderaker, took note of this mounting pressure nationwide and at UCR; calls for an ethnic studies department had also been made by the local chapter of the United Mexican American Students. By 1969, the time had arrived to move forward. On July 1, 1969, the new Mexican-American Studies program at UCR was officially launched, with classes beginning in the fall semester. With this, UCR became one of the first universities in the U.S. to establish a Mexican-American Studies program.

An early faculty member and department chair was Dr. Carlos E. Cortés.[30] A scholar of Brazilian history, Dr. Cortés joined UCR in January 1968.[31] Born in 1934 to a Mexican-American father and Anglo-American mother, Cortés grew up in Kansas. His grandfather came to the U.S. in the 1910s to escape the Mexican Revolution. During his college career, Cortés completed degrees at the University of California, Berkeley (Bachelor of Arts in Communications and Public Policy, 1956), Columbia University (Master of Science in Journalism, 1957), The American Institute for Foreign Trade (Bachelor's Degree, 1962), and the University of New Mexico (Master of Arts Degree in Portuguese and Spanish and doctoral degree in History in the late 1960s). In January 1968, when he

[30] Cortés has authored a number of books, plays, and educational materials and served as the creative/cultural advisor for the popular Nickelodeon television programs, "Dora the Explorer," "Go, Diego, Go!," and "Dora and Friends: Into the City." As of 2018, he serves as emeritus faculty of history at UCR, as well as a scholar-in-residence with Univision Communications.
[31] Biographical information on Dr. Cortés is drawn from an interview with Dr. Cortés and Debi Howell-Ardila, 23 May 2018. Community and Economic Development Department, Riverside, California. On file with Rincon Consultants, Inc.

accepted the faculty position at UCR, Cortés became one of two Mexican-American faculty members at the university, along with Eugenio Cota-Robles, a microbiologist hired in 1958.

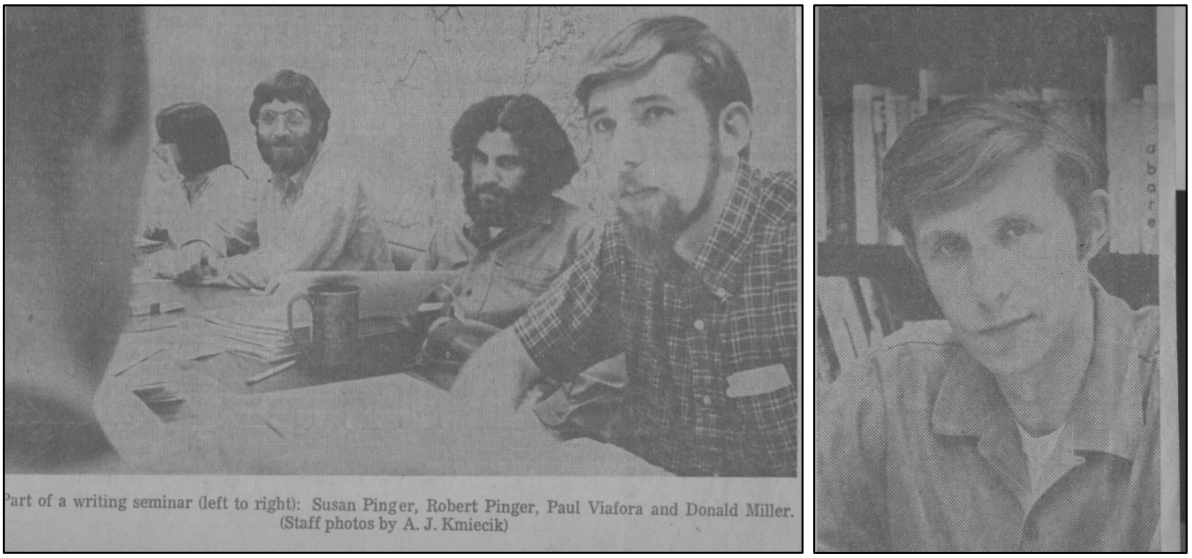
When the department began, Cortés recalled, the broader field was still in its infancy. There was no Chicano studies field per se, no classic texts or literature, on which to establish a new curriculum. This tabula rasa presented an opportunity to fashion an original approach. As designed by Cortés and his colleagues, the objective became providing a collaborative, cross-departmental program, with units, courses, and perspectives by a wide range of scholars and specialties, including historians, sociologists, writers, and psychologists. Cortés and other faculty and administrators also looked to pioneering Chicano studies departments in California (in San Diego, California State University, Los Angeles, and California State University, Northridge). In the early 1970s, Cortés designed UCR's first Ethnic and Area Studies requirement for the College of Humanities and later participated in the establishment of the Costo Chair on Native-American Studies and Tomás Rivera Chair.

With a student body drawn primarily from the Inland Empire and surrounding desert communities and with Riverside's rich, century-old Mexican-American heritage to draw on, the timing and place for UCR's Chicano Studies Program were ideal. The department at UCR became a hub for Chicano scholarship and activism. Student work and faculty research recuperated the myriad stories of the Latino experience in the region. For his Chicano history course, Cortés assigned a project for students to explore and document their own family histories, including oral histories with family members, photographs, and background research.

Under the leadership of Cortés and other faculty, the output of undergraduate and graduate students in the UCR Chicano Studies Department was as voluminous as it was influential. Where there had been little or no scholarship on topics specific to the Latino experience throughout (and beyond) the Inland Empire, students and faculty of the Chicano Studies, ethnic studies, and other departments explored a range of topics on the Mexican-American experience in the region, not only contributing to but helping define the broader field of Chicano studies. The first Chicano Studies chair was Dr. Cota-Robles, who served in the role from 1969 to 1970. Dr. Alfredo Castaneda served as chair from 1970 to 1972. In 1972, Dr. Cortés was named chairperson of the department, a role he held until 1979 (Figure 4.5-15). His goal was to "provide service to students, community at large, not only local; and to the university. We want to prepare students to learn and develop skills to work in the community."[32] Cortés clarified that "the department is not an ideological builder but that student activism can tie in with their area of study."[33]

[32] "UCR Chicano Studies: Cortes Replaces Castaneda." 1972. El Chicano, 26 July 1972 (Colton, CA).
[33] "UCR Chicano Studies: Cortes Replaces Castaneda." 1972. El Chicano, 26 July 1972 (Colton, CA).

Figure 4.5-15 Carlos Cortés and UCR graduate students, 1971



Source: Courtesy of Riverside Public Library

CHICANO STUDENT PROGRAMS

UCR's Chicano Student Programs department was founded in 1972, at the request of new Chicano Studies Department chair, Dr. Cortés. When Cortés was appointed as department chair, he recalled, his one condition was that a dedicated staff and department be established for an accompanying Chicano student services division.[34] At the time, UCR had 345 Latino students; by 2012, that number had grown to over 6,100 Latino students, or approximately one-third of the total student population.[35]

Chancellor Hinderaker agreed, and UCR Assistant Dean of Students, Alberto Richard Chavez, was selected to establish and run the Chicano Student Programs department (Figure 4.5-16). Chavez went on to lead the program, which provided a "home away from home" for Chicano students for 15 years until 1986.[36] For nearly 50 years, Chicano Student Programs has sponsored a wide variety of outreach and community building events and houses over 20 student-run organizations. In the early years, the Chicano Studies Department and Chicano Student Programs occupied adjacent office spaces in the second floor Library South Wing of the Rivera Library. One remnant of the early offices of the Chicano Studies Department and Chicano Student Programs is a 1975 wall-length mural by local artist Chano Gonzalez. Funded through a National Council of Arts grant, the mural is a rare surviving work reflecting the early years of the Chicano Civil Rights Movement in Riverside.

[34] Interview with Carlos Cortés and Debi Howell-Ardila, 23 May 2018. City of Riverside. See also Ramirez, Marcela. 2018. "Schoolhouse of Resistance: Critical Counterstories of Grassroots Organizers and Change Agents in California Cultural Centers." Doctoral dissertation, University of California, Riverside, Department of Education. https://escholarship.org.
[35] French, Ross. 2012. "Chicano Student Programs to Celebrate 40th Anniversary on March 2 and 3." University of California, Riverside, 24 February 2012. https://ucrtoday.ucr.edu/3464. Accessed 17 June 2018.
[36] "Our History, Directors." N.d. UC Riverside Chicano Student Programs. http://students473.ucr.edu/vcsa-csp/csphistory/index.html. Accessed 12 May 2018.

Figure 4.5-16 Alberto Chavez, UCR Chicano Student Programs director, circa 1975 (left); Chicano Student Programs mural (right)

Source: "Chicano Leaders Seek Probe into City Hiring," n.d. and UCR Chicano Student Programs

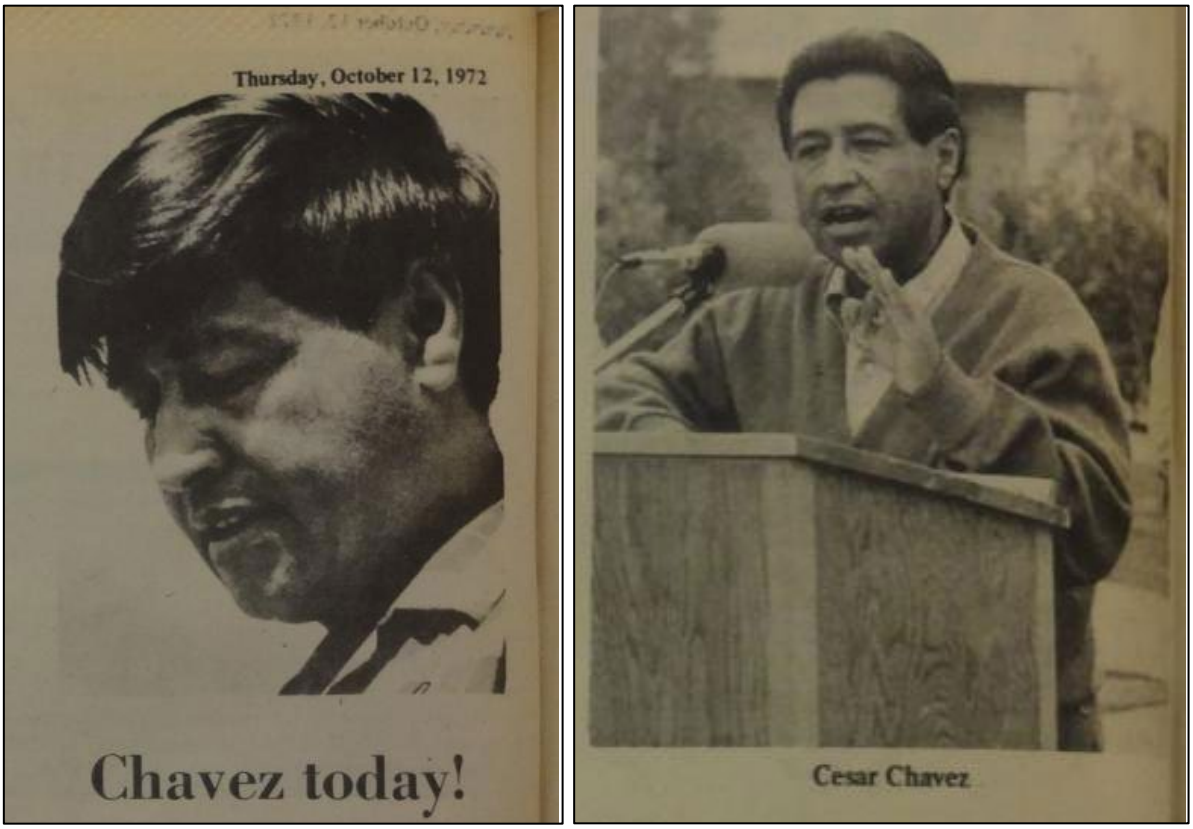
After the Chicano Student Programs office relocated, the mural was preserved, removed, and reinstalled at the current program offices in UCR's Costo Hall. Together, the Chicano Studies Department and Chicano Student Programs have provided an important academic and social network that has supported and nurtured generations of UCR Latino scholars. Other Latino faculty members who participated in these early years were Dr. Cota-Robles and Dr. Marigold Linton. Drs. Cota-Robles and Linton were cofounders of the Society for the Advancement of Chicanos and Native Americans in Science.

Since its founding in 1972, the Chicano Student Programs and affiliated Movimiento Estudiantil Chicano de Aztlan (MEChA) has produced a student newspaper, *Nuestra Cosa* (Our Thing); newspaper archives are housed in the Rivera Library.

One enduring symbol of the Chicano Student Program's work over the years is Radio Aztlán at KUCR. Founded in 1982 and still broadcasting out of one of the 1941 Canyon Crest properties, Radio Aztlán features a wide range of Chicano music and artists. The show began in 1982 when the UCR radio station manager Louis Van Den Berg approached then-director of Chicano Student Programs, Alberto Chavez, with a plan to diversify the station's programming. This is one of a handful of surviving buildings/places on campus that embody this contextual theme. Radio Aztlán (88.3 FM in Riverside) continues to broadcast throughout the greater Inland Empire.

In the 1960s, UCR became a center not just for Chicano scholarship but also Chicano civil rights. In November 1968, Cesar Chavez spoke at UCR (Figure 4.5-17). Chavez again visited UCR for a talk on October 12, 1972 on the Carillon Mall, in opposition to a proposition on the state ballot at the time to establish restrictions for agricultural workers strikes and boycotting activities.

Figure 4.5-17 Cesar Chavez at UCR'S Carillon Mall, October 1972, in MEChA-sponsored event



Source: *The Highlander*, October 12 and October 19, 1972, cited from Ramirez, 2018, pp. 228-229

TOMÁS RIVERA, CHANCELLOR, UNIVERSITY OF CALIFORNIA, RIVERSIDE, 1979 TO 1984

UCR was home to another major milestone for the UC system. In 1979, the UC system appointed its first non-Anglo-American chancellor, Tomás Rivera, who led UCR until his death (at the age of 49) in 1984. A native of Texas born in 1935, Rivera was the son of Mexican migrant farm workers. He received his education at Southwest Texas State University, where he received a Bachelor of Science and Master of Science in Education and at University of Oklahoma, where he received a doctorate in Romance Literatures. The Rivera Library served as the first home to the Chicano Studies Department and Chicano Student Programs office.

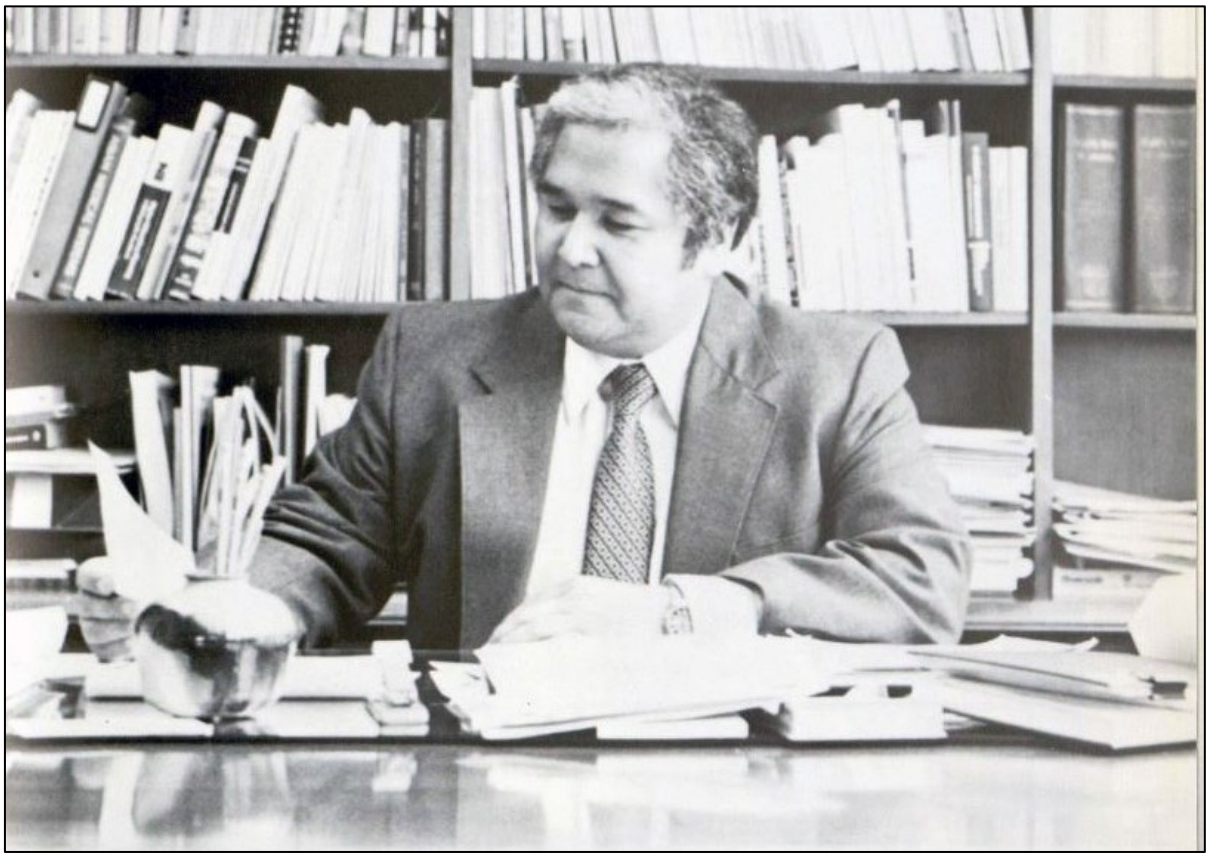
In 1979, Tomás Rivera was appointed chancellor of the university, becoming the first Mexican-American, or member of a marginalized group, to hold such a position in the UC system (Figure 4.5-18 and Figure 4.5-19). He was also the university's youngest chancellor at 43 years old. Rivera was described by UC President David Saxon as a "poet, teacher, and an administrator with a very impressive record of achievement."[37]

[37] Paegel, Tom. "Texas Educator is Choice as UC Riverside Chancellor," Los Angeles Times, 23 March 1979.

Figure 4.5-18 Tomás and Concepción Rivera, ca. 1980 (left); Rivera (second from right), speaking to President Ronald Reagan, Committee on Higher Education, 1983 (right)

Source: University of California, Riverside, Special Collections and Calisphere

Figure 4.5-19 In 1985, UCR renamed the main library to Rivera Library, in honor of Chancellor Rivera, the university's first Mexican-American chancellor



Source: University of California, Riverside, Special Collections

NATIVE AMERICAN STUDIES

Although a more recent addition than Black Studies and Chicano Studies, the Native American Studies programs at UCR were pioneering in their own way. Native American scholars, activists, and

husband and wife, Rupert (a Cahuilla descendent) and Jeannette Costo (a Cherokee descendent) were instrumental in founding and financing the Native American Studies program. Rupert Costo was a national figure in the Native American Civil Rights movement and founder, along with Jeannette, of the San Francisco-based American Indian Historical Society in 1964. A group dedicated to improving education and cultural development for American Indians, Rupert Costo served as president of the historical society until it was dissolved in 1986.[38]

In 1987, the Rupert Costo Endowed Chair in American Indian History became the world's first such chair endowment devoted to Native American scholarship. A donation from the Costos established UCR's Costo Library of the American Indian, which UCR credits as "one of the collection's paramount strengths, consisting of about 7,000 volumes and more than 9,000 documents, pamphlets, tape recordings, slides, and artwork."[39] The Costo Historical and Linguistics Research Center was also made possible by the Costos' support. UCR was the first in the UC system to establish an office dedicated to Native American student support, known as the Native American Student Programs. It hosts a pow wow each year (Figure 4.5-20).

In 1990, the Native American studies program was a concentration area, and students could earn a B.A. in ethnic studies with an emphasis in Native American studies. In 1995, a B.A. in Native American studies in the ethnic studies department was made available to students. By 1998, Ph.D. and M.A. degrees in Native American History were established through the history department.[40] UCR is the only school in the UC system to offer this PH.D. degree.[41] The student services building (1965), was renamed "Costo Hall" in honor of Jeanette and Rupert Costo in 1994.[42]

[38] Rose Soza War Solider "'To Take Positive and Effective Action': Rupert Costo and the California Based American Indian Historical Society," Doctoral Dissertation, Tempe, AZ: Arizona State University, 2013.
[39] "Native American Studies: Collection Overview," UCR Library. Accessed on August 7, 2020. https://library.ucr.edu/collections/native-american-studies.
[40] Ian Chambers, "The History of Native American Studies at the University of California Riverside," Indigenous Nations Studies Journal, vol. 2, no. 2 (Fall 2001): 83-94.
[41] "Native American Student Experience," UCR Undergraduate Admission. Accessed on August 7, 2020. https://admissions.ucr.edu/native-american-student-experience.
[42] "Indians Honored," San Bernardino County Sun, 23 March 1994.

Figure 4.5-20 UCR Pow Wow, 2012

Source: UCR Today

Existing Conditions

Cultural Resources Survey & Archaeological Resource Sensitivity

Psomas conducted a pedestrian field survey of the UCR campus on December 7 and 11, 2018. The survey was conducted by walking open spaces and outcrops throughout the main campus, the UCR Botanic Gardens, west campus agricultural fields, and the south campus hillside. Ground visibility ranged from 25 to 75 percent depending on location. Psomas identified and considered 17 previously conducted cultural resources studies that contained portions of the UCR campus and five previously recorded cultural resources on the UCR campus. Of the resources recorded on the UCR campus, three were prehistoric bedrock milling sites and two were built environment resources, the Gage Canal and the Barn Group. None of the previously recorded prehistoric resources were relocated during the 2018 survey, and no new resources were identified; however, physical indicators of human occupation and use could be disguised by the natural weathering of the granitic outcrops and the historical use and development that has occurred on the UCR campus (Psomas 2019).

Psomas indicated that The Barn Group lacked integrity, original design, and location due to structural changes to accommodate changes in building functions and, therefore, did not constitute a historic resource. Psomas inferred that the Gage Canal did retain design, workmanship, integrity, setting, and association, which qualify as a historic resource.

Psomas concluded their study with an assessment of overall sensitivity of the LRDP area and indicated the south eastern portion of the LRDP area, is considered to have a high sensitivity for encountering archaeological resources.

Historic Resources Survey

Rincon completed a campus-wide historic resources survey in support of the project. The objective of this survey is providing substantial evidence and baseline information to UCR on qualifying historical resources. Results were presented in a Historic Resources Survey Report, included as Appendix E, and a summary is presented below in Table 4.5-1. The survey included built-environment properties 45 years of age and older. Work efforts included archival research, literature review, and an intensive-level field survey. The survey considered buildings, structures, objects, sites, as well as potential historic districts and cultural landscapes pursuant to National Park Service best practice and guidance. The following summarizes the survey findings:

- Among the approximately **165 properties** surveyed, a **total of nearly 40 buildings/structures and landscape features** appear eligible for the National Register of Historic Places (NRHP) and/or California Register of Historical Resources (CRHR) either individually or as contributors to a historic district.
- **One historic district and one cultural landscape** were also identified: (1) the Mid-Century Modern Core Historic District, which has 15 contributing buildings as well as associated site plan features, circulation corridors, and landscaping, and (2) the Citrus Variety Collection Cultural Landscape, which has 11 contributing buildings and ancillary structures as well as associated agricultural fields.
- All **15 contributors** to the Mid-Century Modern Core Historic District also appear individually eligible under Criteria A/1 and C/3 as indicated below.

The full historic resources survey report, provided in Appendix E, includes an illustrated table with all survey results, along with applicable criteria and contexts/themes conferring eligibility. Table 4.5-1 summarizes results, with an overview of the properties recommended as eligible. Following the table, Figure 4.5-21 provides an overview of survey results with eligible and noneligible properties.

Table 4.5-1 Evaluation Results, UCR Facilities Constructed through 1975

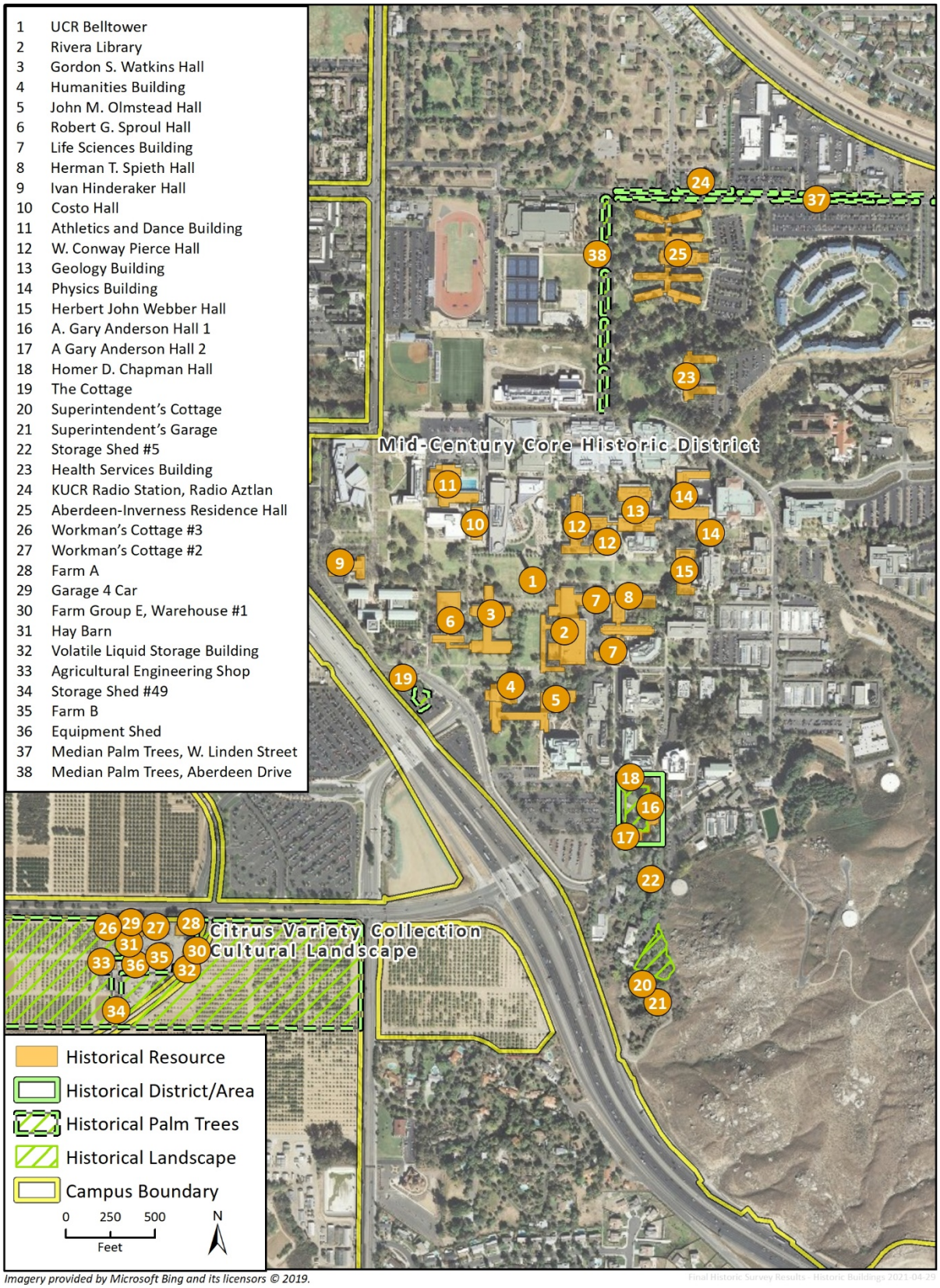
#	Current Building Name Architect (if known)	Original Building Name	Year	Historical Resource?	Criteria	Contributor to Historic District?
1-15	Mid-Century Modern (MCM) Core Historic District		1953-1966	Yes	A/1, C/3	
1	UCR Bell Tower Architects: Jones & Emmons		1966	Yes	A/1, C/3	Yes (MCM Core Historic District)
2	Rivera Library Architects: Latta & Denny	Library	1954	Yes	A/1, C/3	Yes (MCM Core Historic District)
3	Gordon S. Watkins Hall Architects: Clark & Frey	Social Sciences-Humanities Building	1953	Yes	A/1, C/3	Yes (MCM Core Historic District)
4	Humanities Building Architects: Matchem, Granger & Russell		1963	Yes	A/1; C/3	Yes (MCM Core Historic District)

#	Current Building Name Architect (if known)	Original Building Name	Year	Historical Resource?	Criteria	Contributor to Historic District?
5	John M. Olmstead Hall Architects: Allison & Rible		1963	Yes	A/1; C/3	Yes (MCM Core Historic District)
6	Robert G. Sproul Hall		1965	Yes	A/1; C/3	Yes (MCM Core Historic District)
7	Life Sciences Building Architects: Pereira & Luckman		1958	Yes	A/1; C/3	Yes (MCM Core Historic District)
8	Herman T. Spieth Hall		1958	Yes	A/1; C/3	Yes (MCM Core Historic District)
9	Ivan Hinderaker Hall Architects: Clark, Frey & Chambers	Administration Building	1960	Yes	A/1; C/3	Yes (MCM Core Historic District)
10	Costo Hall (includes Daniel Gonzalez 1975 Chicano Civil Rights Era mural)		1965	Yes	A/1; C/3	Yes (MCM Core Historic District)
11	Athletics and Dance Building	Physical Education Building	1953	Yes	A/1; C/3	Yes (MCM Core Historic District)
12	W. Conway Pierce Hall	Chemistry Building	1966	Yes	A/1; C/3	Yes (MCM Core Historic District)
13	Geology Building Architects: Bennett & Bennett	Physical Sciences Building	1953	Yes	A/1; C/3	Yes (MCM Core Historic District)
14	Physics Building		1965	Yes	A/1; C/3	Yes (MCM Core Historic District)
15	Herbert John Webber Hall		1953	Yes	A/1; C/3	Yes (MCM Core Historic District)
16	A. Gary Anderson Hall 1; includes landscaping and site (Anderson Hall 1) Architects: Lester H. Hibbard and H.B. Cody	Horticulture Building, Citrus Experiment Station	1916	Yes	A/1; C/3	No
17	A. Gary Anderson Hall 2; includes landscaping and site (Anderson Hall 2) Architects: Lester H. Hibbard and H.B. Cody	Irrigation Building, Citrus Experiment Station	1916	Yes	A/1; C/3	No
18	Homer D. Chapman Hall; includes landscaping and site (Chapman Hall)	Soils/Plant Nutrition Wing, Citrus Experiment Station	1931	Yes	A/1; C/3	No

#	Current Building Name Architect (if known)	Original Building Name	Year	Historical Resource?	Criteria	Contributor to Historic District?
19	The Cottage (includes adjacent Palm Grove)	University Cottage/ Teamster's Cottage	1916	Yes	A/1	No
20	Superintendent's Cottage (includes Director's Garden)		1916	Yes	1; 3 (CRHR only)	No
21	Superintendent's Garage (includes Director's Garden)		1916	Yes	1; 3 (CRHR only)	No
22	Storage Shed #5		1916	Yes	1 (CRHR only)	No
23	Health Services Building Architects: Herman Ruhnau		1961	Yes	1/3 (CRHR only)	No
24	KUCR Radio Station, Radio Aztlán (Canyon Crest Housing, 691/693 Linden Street)		1941	Yes	1 (CRHR only) site of pioneering Chicano radio station, Radio Aztlán	No
25	Aberdeen-Inverness Residence Hall Architects: Allison & Rible		1959	Yes	A/1; C/3	No
26-36	Citrus Variety Collection Cultural Landscape (includes 11 buildings/structures and associated fields)		1916 - 1975	Yes	1 (CRHR only)	Yes (Citrus Variety Collection Cultural Landscape)
26	Workman's Cottage #3		1922	Yes	1 (CRHR only)	Yes (Citrus Variety Collection Cultural Landscape)
27	Workman's Cottage #2		1922	Yes	1 (CRHR only)	Yes (Citrus Variety Collection Cultural Landscape)
28	Farm A		1955	Yes	1 (CRHR only)	Yes (Citrus Variety Collection Cultural Landscape)
29	Garage 4 Car		1955	Yes	1 (CRHR only)	Yes (Citrus Variety Collection Cultural Landscape)
30	Farm Group E, Warehouse #1		1932	Yes	1 (CRHR only)	Yes (Citrus Variety Collection Cultural Landscape)

#	Current Building Name Architect (if known)	Original Building Name	Year	Historical Resource?	Criteria	Contributor to Historic District?
31	Hay Barn		1917	Yes	1 (CRHR only)	Yes (Citrus Variety Collection Cultural Landscape)
32	Volatile Liquid Storage Building		1974	Yes	1 (CRHR only)	Yes (Citrus Variety Collection Cultural Landscape)
33	Agricultural Engineering Shop		1960	Yes	1 (CRHR only)	Yes (Citrus Variety Collection Cultural Landscape)
34	Storage Shed #49		1965	Yes	1 (CRHR only)	Yes (Citrus Variety Collection Cultural Landscape)
35	Farm B		1955	Yes	1 (CRHR only)	Yes (Citrus Variety Collection Cultural Landscape)
36	Equipment Shed		1916	Yes	1 (CRHR only)	Yes (Citrus Variety Collection Cultural Landscape)
37	Median Palm Trees, West Linden Street		1955ca	Yes	1 (CRHR only)	No
38	Median Palm Trees, Aberdeen Drive		1955ca	Yes	1 (CRHR only)	No

Figure 4.5-21 Historic Resources Survey Results, UCR Campus



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Summary of Historic District/Cultural Landscape Eligibility

#1: Mid-Century Modern Core Historic District

Criteria A/1 eligibility: The Mid-Century Modern Core Historic District is eligible as an intact, cohesive collection of institutional buildings constructed during the university's founding years. The historic district exemplifies institutional/educational facility expansion in Riverside during the City's postwar transformation.

Context/Theme: Riverside's Postwar Boom, 1945-1975 | Postwar Institutional Expansion in Riverside

Period of significance: 1953-1966

Criteria C/3 eligibility: The Mid-Century Modern Core Historic District is also eligible as a distinctive, outstanding example of the Mid-Century Modern/New Formalist architectural style, applied to institutional buildings/educational facilities. The district represents one of the most expansive and intact collections of Mid-Century Modern/New Formalist architecture in Riverside.

Context/Theme: Architecture and Design | Mid-Century Modernism in Riverside

Period of Significance: 1953 – 1966

The Mid-Century Modern Core Historic District is a cohesive, distinctive grouping of the earliest buildings designed for UCR during its most active construction phase. The district exemplifies the rapid, widespread postwar expansion of Riverside, both in terms of population growth and new construction (Criteria A/1).

In addition, with its unified site plan, distinctive architectural style, associated landscaping and hardscaping features, the Mid-Century Modern Core Historic District represents one of Riverside's most extensive and intact collections of Mid-Century Modern/Late Modern architecture (Criteria C/3).

#2: Citrus Variety Collection Cultural Landscape, West Campus (CRHR eligible only; includes 11 buildings/structures and associated fields)

Criterion 1 eligibility: The Citrus Variety Collection Cultural Landscape, West Campus is eligible as an intact, cohesive collection of buildings, landscape features, agricultural fields and support buildings (including a portion of the Gage Canal), built over time in support of the Citrus Experiment Station.

While the UCR campus retains a number of resources related to the Citrus Experiment Station, this grouping is the most cohesive and most expansive in terms of building types and a span of decades. The cultural landscape exemplifies institutional/educational facility expansion in Riverside during the City's postwar transformation.

Context/Theme: Early Settlement and Development in Riverside | Citrus Industry and Citriculture in Riverside | The UCR Citrus Experiment Station

Period of significance: 1917-1966

With dates of construction ranging from 1916 to 1974, this grouping of related buildings, structures, and agricultural fields represents the most complete and intact collection of over a century of Citrus Experiment Station operations. Located in UCR's West Campus, the Citrus Variety Collection Cultural Landscape is defined by Martin Luther King Boulevard to the north and a curved section of the 1884 Gage Canal along the east and south. This location was selected for the Citrus Experiment Station for its proximity to the Gage Canal and emerging citrus fields in Riverside.



4.5.2 Regulatory Setting

Federal

National Historic Preservation Act

The National Historic Preservation Act (NHPA) is the federal law that establishes the nation's policy for historic preservation and governs the treatment of cultural resources. Under Section 106 of the NHPA, when a federal agency is involved in an undertaking, it must account for the effects of the undertaking on historic properties. Historic properties are those that meet criteria for inclusion on the National Register of Historic Places (NRHP). Federal agencies issuing permits for the project are required to comply with NHPA requirements.

National Register of Historic Places

The NHPA of 1966 established the NRHP as "an authoritative guide to be used by federal, State, and local governments, private groups, and citizens to identify the Nation's cultural resources and to indicate what properties should be considered for protection from destruction or impairment" (CFR 36, CFR 60.2). To be eligible for listing in the NRHP, a resource must be significant in American history, architecture, archaeology, engineering, or culture. Districts, sites, buildings, structures, and objects of potential significance must also possess integrity of location, design, setting, materials, workmanship, feeling, and association. A property is eligible for the NRHP if it is significant under one or more of the following criteria:

Criterion A: It is associated with events that have made a significant contribution to the broad patterns of our history.

Criterion B: It is associated with the lives of persons who are significant in our past.

Criterion C: It embodies the distinctive characteristics of a type, period, or method of construction, or represents the work of a master, or possesses high artistic values, or represents a significant and distinguishable entity whose components may lack individual distinction.

Criterion D: It has yielded, or may be likely to yield, information important in prehistory or history.

Section 106 of the National Historical Preservation Act

Federal protection of cultural resources is legislated by (a) the NHPA of 1966 as amended by 16 U.S. Code 470, (b) the Archaeological Resource Protection Act of 1979, and (c) the Advisory Council on Historical Preservation. Section 106 of the NHPA and accompanying regulations (36 Code of Federal Regulations [CFR] Part 800) constitute the main federal regulatory framework guiding cultural resources investigations and require consideration of effects on properties that are listed in, or may be eligible for listing in the NRHP. These laws and organizations maintain processes for determination of the effects on historical properties that are listed or determined to be eligible for listing in the NRHP. For UCR, listing on the NRHP and compliance with Section 106 is relevant to future projects requiring federal permitting.

Secretary of the Interior's Standards

The "Secretary of the Interior's Standards for the Treatment of Historic Properties" (Secretary's Standards), codified in 36 CFR 67, provide guidance for making changes to historic properties. As stated in CEQA Guidelines Section 15064.5(b)(3), "Generally, a project that follows the Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings or the Secretary of the Interior's Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings (1995), Weeks and Grimmer, shall be considered as mitigated to a level of less than a significant impact on the historical resource."

The Secretary's Standards define the following four distinct treatment approaches to guide changes to historic properties: Preservation, Rehabilitation, Restoration, and Reconstruction. The four distinct treatments are defined as follows:

- **Preservation** focuses on the maintenance and repair of existing historic materials and retention of a property's form as it has evolved over time.

- **Rehabilitation** acknowledges the need to alter or add to a historic property to meet continuing or changing uses while retaining the property's historic character.
- **Restoration** depicts a property at a particular period of time in its history, while removing evidence of other periods.
- **Reconstruction** re-creates vanished or non-surviving portions of a property for interpretive purposes.

The Secretary's Standards illustrate how to apply the four treatment approaches detailed above. The purpose of the Secretary's Standards is to provide guidance to historic building owners and building managers, preservation consultants, architects, contractors, and project reviewers prior to beginning work. The Guidelines address both exterior and interior work on historic buildings.

The Guidelines and recommended approaches described in the Secretary's Standards are not prescriptive, they are rather a set of approaches that, taken together, help manage changes to historically significant properties. As noted in the Secretary's Standards, the guidelines provide various "options" and are "depend[ent] upon the property's significance, existing physical condition, the extent of documentation" and must "consider[] the economic and technical feasibility of each project" (Secretary of the Interior's Guidelines, page 19; 36 CFR § 68.3.). As also noted in the Secretary's Standards, "latitude is given in the Standards for Rehabilitation and Guidelines for Rehabilitation to replace extensively deteriorated, damaged, or missing features using either traditional or substitute materials."

Cultural Landscapes

Under the NRHP, historic properties may be defined as sites, buildings, structures (such as bridges or dams), objects, or districts, including cultural landscapes. A cultural landscape differs from a historic building or district in that it is understood through the spatial organization of the property, which is created by the landscape's cultural and natural features. Some features may create viewsheds or barriers (such as a fence), and others may create spaces or "rooms" (such as an arrangement of buildings and structures around a lawn area). Some features, such as grading and topography, underscore the site's development in relationship to the natural setting. To be listed in the NRHP, a cultural landscape must meet one of the four evaluation criteria and must retain its integrity.

Cultural landscapes include residential gardens and community parks, scenic highways, rural communities, institutional grounds, cemeteries, battlefields, zoological gardens, religious sacred sites, and massive geological structures. They are composed of character-defining features that individually or collectively contribute to the landscape's physical appearance as they have evolved over time. In addition to vegetation and topography, cultural landscapes may include water features, such as ponds, streams, and fountains, circulation features, such as roads, paths, steps, and walls, buildings, and furnishings, including fences, benches, lights, and sculptural objects.

A cultural landscape is defined as "a geographic area, including both cultural and natural resources and the wildlife or domestic animals therein, associated with a historic event, activity, or person or exhibiting other cultural or aesthetic values" (Birnbaum 1994). There are four general types of cultural landscapes—historic sites, historic designed landscapes, historic vernacular landscapes, and ethnographic landscapes—and they are not mutually exclusive:

- A historic site is a landscape significant for its association with a historic event, activity, or person. Examples include battlefields and a president's house properties.

- A historic designed landscape is a landscape that was consciously designed or laid out by a landscape architect, master gardener, architect, or horticulturist according to design principles or by an amateur gardener working in a recognized style or tradition. The landscape may be associated with a significant person, trend, or event in landscape architecture, or it may illustrate an important development in the theory and practice of landscape architecture. Aesthetic values play a significant role in designed landscapes. Examples include parks, campuses, and estates.
- A historic vernacular landscape is a landscape that evolved through use by the people whose activities or occupancy shaped that landscape. Such a landscape reflects the social and cultural attitudes of an individual, a family, or a community, as well as the physical, biological, and cultural character of everyday lives. Function plays a significant role in vernacular landscapes. They can be a single property, such as a farm, or a collection of properties, such as a district of historic farms along a river valley. Examples include rural villages, industrial complexes, and agricultural landscapes.
- An ethnographic landscape is a landscape containing a variety of natural and cultural resources that associated people define as heritage resources. Examples are contemporary settlements, religious sacred sites, and massive geological structures. Small plant communities, animals, subsistence, and ceremonial grounds are often components of such landscapes.

State

California Register of Historical Resources

CEQA requires that a lead agency determine whether a project could have a significant effect on historical resources and tribal cultural resources (PRC Section 21074 [a][1][A]-[B]). A historical resource is one listed in or determined to be eligible for listing in the California Register of Historical Resources (CRHR, PRC Section 21084.1), a resource included in a local register of historical resources (PRC Section 15064.5[a][2]), or any object, building, structure, site, area, place, record, or manuscript that a lead agency determines to be historically significant (PRC Section 15064.5[a][3]).

PRC Section 5024.1 establishes a list of properties that are to be protected from substantial adverse change, which requires an evaluation of historical resources to determine their eligibility for listing in the CRHR. The purpose of the register is to maintain listings of the State's historical resources and to indicate which properties are to be protected from substantial adverse change.

A historical resource may be listed in the CRHR if the historical resource meets any of the following criteria:

(1) Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage

(2) Is associated with the lives of persons important in our past

(3) Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values

(4) Has yielded, or may be likely to yield, information important in prehistory or history

The CRHR includes properties that are listed or have been formally determined to be eligible for listing in the NRHP, State Historical Landmarks and eligible Points of Historical Interest. Other

resources require nomination for inclusion in the Register. These may include resources contributing to the significance of a local historic district, individual historical resources, historical resources identified in historic resource surveys conducted in accordance with State Historic Preservation Office procedures, historic resources or districts designated under a local ordinance consistent with State Historic Resources Commission procedures, and local landmarks or historic properties designated under local ordinance.

Public Resources Code (PRC) 15064.5(a)(4). The fact that a resource is not listed in or determined to be eligible for listing in the CRHR, not included in a local register of historical resources (pursuant to Section 5020.1(k) of the PRC), or identified in an historical resources survey (meeting the criteria in section 5024.1(g) of the Public Resources Code) does not preclude a lead agency from determining that the resource may be an historical resource as defined in PRC sections 5020.1(j) or 5024.1. Two other programs are administered by the State: California Historical Landmarks and California "Points of Historical Interest." California Historical Landmarks are buildings, sites, features, or events that are of statewide significance and have anthropological, cultural, military, political, architectural, economic, scientific or technical, religious, experimental, or other historical value. California Points of Historical Interest are buildings, sites, features, or events that are of local (City or county) significance and have anthropological, cultural, military, political, architectural, economic, scientific or technical, religious, experimental, or other historical value.

> *"PRC Section 15064.5(b*). A project with an effect that may cause a substantial adverse change in the significance of an historical resource is a project that may have a significant effect on the environment."

If a project can be demonstrated to cause damage to a unique archaeological resource, the lead agency may require reasonable efforts to permit any or all these resources to be preserved in place or left in an undisturbed state. To the extent that resources cannot be left undisturbed, mitigation measures are required if feasible (PRC, Section 21083.2[a], [b], and [c]).

PRC Section 21083.2(g) defines a unique archaeological resource as an artifact, object, or site about which it can be demonstrated clearly that, without merely adding to the current body of knowledge, there is a high probability that it does one or more of the following:

1. Contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information
2. Has a special and particular quality such as being the oldest of its type or the best available example of its type
3. Is directly associated with a scientifically recognized important prehistoric or historic event or person

Impacts to significant cultural resources that substantially affect the characteristics of any resource that qualify it for the NRHP or adversely alter the significance of a resource listed in or eligible for listing in the CRHR are considered a significant effect on the environment. These impacts could result from physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of an historical resource would be materially impaired (*CEQA Guidelines* Section 15064.5 [b][1]). Material impairment is defined as demolition or alteration in an adverse manner [of] those characteristics of an historical resource that convey its historical significance and that justify its inclusion or eligibility for inclusion in the CRHR (*CEQA Guidelines* Section 15064.5[b][2][A]).

Codes Governing Human Remains

The disposition of human remains is governed by Health and Safety Code Section 7050.5 and PRC sections 5097.94 and 5097.98 and falls within the jurisdiction of the Native American Heritage Commission (NAHC). If human remains are discovered, the County Coroner must be notified within 48 hours, and there should be no further disturbance to the site where the remains were found. If the Coroner determines the remains are Native American, the Coroner is responsible to contact the NAHC within 24 hours. Pursuant to PRC Section 5097.98, the NAHC will immediately notify those persons it believes to be most likely descended from the deceased Native Americans so they can inspect the burial site and make recommendations for treatment or disposal.

Section 5097.5 of the California PRC states:

> No person shall knowingly and willfully excavate upon, or remove, destroy, injure or deface any historic or prehistoric ruins, burial grounds, archaeological or vertebrate paleontological site, including fossilized footprints, inscriptions made by human agency, or any other archaeological, paleontological or historical feature, situated on public lands, except with the express permission of the public agency having jurisdiction over such lands. Violation of this section is a misdemeanor.

As used in this PRC section, "public lands" means lands owned by or under the jurisdiction of the State or any City, county, district, authority, or public corporation, or any agency thereof. Consequently, local agencies are required to comply with PRC 5097.5 for their own activities, including construction and maintenance, as well as for permit actions (e.g., encroachment permits) undertaken by others.

Assembly Bill 275

AB 275 was designed to strengthen the California Native American Graves Protection and Repatriation Act of 2001 by revising various definitions including, among others, "the definition of 'California Indian tribe' to include both a tribe that meets the federal definition of Indian tribe and a tribe that is not recognized by the federal government, but that is a native tribe located in California that is on the list maintained by the Native American Heritage Commission," as well as the "definition of 'museum' to specify it receives state funds." AB 275 requires every state agency, as defined, with significant interaction with tribal issues, peoples, or lands, and request the Regents of the University of California, to designate one or more liaisons for the purpose of engaging in consultation with California Native American tribes on the tribal contact list and educating the agency on topics relevant to the state's relationship with those tribes. AB 275 also revises and recasts the process by which a direct lineal descendent or a California Indian tribe can request the return of human remains or cultural items.

University of California

UC's Native American Cultural Affiliation and Repatriation Policy

The UC is currently working on revising its Native American Cultural Affiliation and Repatriation Policy to incorporate new California Native American Graves Protection and Repatriation Act (CalNAGPRA) requirements as specified in AB 275. Key changes include (UC 2021):

- Definitions have been added or revised where needed to align with CalNAGPRA.

- As required by CalNAGPRA, deference to tribal traditional knowledge, oral histories, documentation, and testimonies is now indicated when determining State cultural affiliation, identifying cultural items under CalNAGPRA, and making decisions related to the CalNAGPRA repatriation process.
- In consultation with California Native American tribes, campuses must prepare preliminary inventories/summaries for submission to the NAHC.
- The AB 275 dispute procedures have been added.
- The AB 275 procedures for submissions of claims under CalNAGPRA have been incorporated.
- Updated flowcharts and corresponding narratives.

Regional and Local (Non-Binding)

As noted in Section 4, "University of California Autonomy," UCR, a constitutionally-created State entity, is not subject to municipal regulations of surrounding local governments for uses on property owned or controlled by UCR that are in furtherance of the university's educational purposes.

City of Riverside General Plan

The City of Riverside General Plan contains the following policy:

Policy LU-4.6: Ensure protection of prehistoric resources through consultations with the Native American tribe(s) identified by the Native American Heritage Commission pursuant to Government Code Section 65352.3 and as required by CEQA.

4.5.3 Environmental Impacts and Mitigation Measures

Significance Criteria

UCR utilizes the following 2020 CEQA Guidelines Appendix G significance criteria questions related to Cultural Resources.

Would the proposed 2021 LRDP:

a) Cause a substantial adverse change in the significance of a historical resource as defined in *CEQA Guidelines* Section 15064.5?

b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to *CEQA Guidelines* Section 15064.5?

c) Disturb any human remains, including those interred outside of dedicated cemeteries?

Issues Not Evaluated Further

All issues applicable to cultural resources listed under the significance criteria above are addressed in this section.

Analysis Methodology

To evaluate the potential impacts of the proposed 2021 LRDP on archaeological and historical resources, the proposed activities with implementation of the proposed 2021 LRDP were analyzed according to known and potential eligible resources. The impact analysis also considers the potential for previously undocumented resources, including human remains. The analysis of cultural resources impacts is based on substantial research presented in the Cultural Resource Constraints

Study conducted by Psomas in 2019 (Appendix E) and the UCR Historic Resources Survey Report prepared by Rincon in 2020-2021 (Appendix E) prepared for the project. Section 4.16, *Tribal Cultural Resources*, provided further details regarding archaeological resources and cultural resources of potential Native American origin.

For purposes of the impact discussion, "historical resource" is used to describe built-environment historic period resources. Archaeological resources (both prehistoric and historic period), which may qualify as "historical resources" pursuant to CEQA, are analyzed separately from built-environment historical resources. Section 15064.5 of the CEQA Guidelines defines "substantial adverse change" as physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of the resource would be materially impaired. Material impairment includes changes to the physical characteristics that make a historical resource eligible for listing in the CRHR such that the resource would no longer be eligible for the NRHP, CRHR, or local historical registers (CEQA Guidelines, Title 14, Section 15064.5(b)(2)).

PCR Section 21083.2 defines "unique archaeological resource" as an archeological artifact, object, or site about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that it meets one or more of the following CRHR-related criteria: (1) that it contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information, (2) that it has a special and particular quality, such as being the oldest of its type or the best available example of its type, or (3) that it is directly associated with a scientifically recognized important prehistoric or historic event or person. An impact on a "non-unique resource" is not a significant environmental impact under CEQA (CEQA Guidelines Section 15064.5[c][4]). If an archaeological resource qualifies as a resource under CRHR criteria, then the resource is treated as a unique archaeological resource for the purposes of CEQA.

In addition, according to CEQA Guidelines Section 15126.4(b)(1), if a project adheres to the "Secretary of the Interior's Standards for the Treatment of Historic Properties," the project's impact "will generally be considered mitigated below the level of a significance and thus is not significant."

2021 LRDP Objectives and Policies

There are no objectives or policies in the proposed 2021 LRDP related to archaeological or historic resources or human remains.

Impact Analysis

Impact CUL-1 Impacts to Historical Resources.

The proposed 2021 LRDP would adversely affect historical resources through the full and partial demolition of historical resources, renovation/rehabilitation of historical resources, and new construction adjacent to historical resources. This impact would be significant and unavoidable. Following mitigation, impacts would still be significant and unavoidable.

UCR is considering the long-term (through 2035) demolition and potential redevelopment opportunities on-campus. For purposes of the EIR analysis, the areas of campus that UCR considers for demolition and potential redevelopment include, but are not limited to, the following: Boyden Labs; Fawcett Laboratory, Stored Product Insecticide Building; Lathhouses #1, #4, and #8; campus facilities along South Campus Drive (e.g., Genomics shed, Bio Control Building, Plant Drying Building, Herbarium, Botany Screenhouse, Storage Shed #6, Headhouse Storage Building, Growth Chamber

Building, Glasshouse #51, Facilities Services Annex A, and College Building North and South), campus facilities east/west of East Campus Drive (e.g., Fawcett Laboratory, University Office Building, Campbell Hall, Facilities Services Annex B, Greenhouses #7-14, Greenhouses #18-21, Computing & Communications Center, and associated accessory structures), the Health Services Building; Bannockburn Village, the Plaza Apartments, Oban Apartments, Falkirk Apartments, the Corporation Yard, the softball and soccer fields, Advanced Neuroimaging Building (formerly FMRI), Costo Hall, and the Police Facility. Buildings considered for repurposing include Chapman Hall, Spieth Hall, Life Sciences, and Watkins Hall.

Table 4.5-1 identifies 38 qualifying historical resources. Among these 38 resources is one eligible historic district (the Mid-Century Modern Core Historic District, with 15 contributing buildings and associated site plan features, circulation corridors, and landscapes), and one cultural landscape (the Citrus Variety Collection Cultural Landscape, with 11 contributing buildings and ancillary structures and associated agricultural fields). Appendix E includes the complete evaluations of each eligible historical resource.

The proposed 2021 LRDP proposes new campus development, facilities, housing, and upgrades to support potential projected population growth, and to enable new and expanded educational program initiatives. The proposed 2021 LRDP proposed general types of campus development and land uses to support projected campus population growth and to enable expanded and new program initiatives. This development would be related to academic, research, academic support, student life, and other support functions, and would include various levels of ground disturbance.

Implementation and full build-out of the proposed 2021 LRDP would be expected to result in:

1. Full or partial demolition/replacement of historical resources, including, but not limited to, the possible demolition of historical resources such as the Health Services Building and Costo Hall
2. Renovations, conversion, rehabilitation, or alteration of historical resources that could potentially substantially impair the integrity of the resources, including the possible repurposing of historical resources such as Chapman Hall, Spieth Hall, Life Sciences, and Watkins Hall
3. Changes to the immediate surroundings of a historical resource (including Historic Districts) that materially impairs the significance of the resource (through new construction adjacent to historical resources)

There are additional on-campus buildings that have not been identified as historic resources but may become eligible for historic designation during the proposed 2021 LRDP planning period. There is the potential for new development to adversely affect additional buildings, structures, or other resources that are not identified at the present time.

Implementation and build-out of the proposed 2021 LRDP could result in substantial adverse changes in the significance of historical resources as there is the potential for new development to adversely affect buildings, structures, or other resources that are known to be or could be historically significant. Future projects implemented under the proposed 2021 LRDP would cause damage to or destruction of historical resources or potential historical resources. Therefore, impacts on historical resources are considered **significant**. Mitigation Measure **MM CUL-1** is proposed to help reduce impacts on historical resources, however, not to a level below significance.

Mitigation Measures

MM CUL-1 Protection of Historical Resources

For purposes of MM CUL-1, "major exterior alterations" indicates a significant alteration/change to the exterior character-defining features or setting of a building or structure. Such projects might include, but not be limited to, additions, partial or complete demolition, relocation, window frame replacement different from existing, modifications to wall sheathing materials, changes to the roof shape, pitch, eaves, and other features, installment of wheelchair access ramps, and/or changes to the overall design configuration and composition of the building and the spatial relationships that define it. Major exterior alterations would require consultation to determine if these alterations noted above constitutes a major exterior alteration requiring further review from an architectural historian or whether the proposed alterations would qualify as a minor exterior alteration.

For purposes of MM CUL-1, "minor exterior alterations" indicates a minor alteration/change to the exterior of a building or structure and its setting that would not be likely to significantly alter its appearance. Such projects might include, but not be limited to, repainting, in-kind landscaping or hardscaping replacement, window pane replacement, reversible installation of HVAC units that does not obstruct or destroy character-defining features, installation of fencing, signage, or artwork that does not obstruct or destroy character-defining features. Minor exterior alterations are exempt from further review from an architectural historian.

During project-specific environmental review of development under the proposed 2021 LRDP, UCR shall define the project's area of effect for historic buildings and structures as early as possible. UCR shall implement the following procedures:

- Conduct project-specific surveys for buildings or structures (e.g., proposed for demolition, major exterior alterations, additions) that are 50 years of age or older that have (1) not been subject to an evaluation within the past 5 years, or (2) were not previously evaluated in the UCR Historic Resources Survey Report.
    - UCR shall retain a qualified architectural historian to record the property at professional standards and assess its significance under CEQA Guidelines Section 15064.4. The evaluation process shall include the historic context framework included in the UCR Historic Resources Survey Report as well as the development of additional background research as needed in order to assess the significance of the building, structure, district, or cultural landscape in the history of the UC system, the campus, and the region. For historic buildings, structures or features that do not meet the CEQA criteria as a historical resource, no further mitigation is required, and the impact would be less than significant.
    - The assessment of the potential historical resource and its character-defining features shall be documented on the appropriate California Department of Parks and Recreation (DPR) 523 forms by a qualified architectural historian meeting the Secretary of the Interior's Professional Qualifications Standards (as codified in 36 CFR Part 61).
- For projects affecting any eligible historic buildings identified in the UCR Historic Resources Survey Report or determined to be eligible during the project-specific surveys, for a building or structure that qualifies for listing on the NRHP and/or CRHR, UCR shall implement the following procedures:
    - For major exterior repairs, alterations including but not limited to those described in the definition above, or building additions of buildings that are eligible historic resources, UCR shall retain a qualified architectural historian meeting the Secretary of the Interior's

Professional Qualifications Standards (as codified in 36 CFR Part 61) to conduct Character-Defining Features and Impacts Screening in coordination with the design team to consider project design features and/or measures that would enable the project to avoid direct or indirect impacts to the building or structure. Conclusion of the screening consultation process shall be documented in a memorandum, including a statement of compliance with the Secretary's Standards. The purpose of the memorandum shall document avoidance/reduction of significant adverse impacts to historical resources, where feasible, through (1) identifying and documenting character-defining features, noncontributing elements/additions, and (2) providing historic preservation project review and preliminary impacts analysis screening to UCR as early as possible in the design process. The memorandum shall review preliminary and/or conceptual project objectives early in the design process and describe various project options capable of reducing and/or avoiding significant adverse direct or indirect impacts through compliance with the Secretary's Standards and/or application of the State Historic Building Code or any subsequent design guidelines prepared by UCR for the treatment of historic resources.

If major modifications, renovations, or relocation of a determined historic resource is proposed and the project is unable to comply with the *Secretary's Standards* or when a historic resource is to be demolished, then UCR shall ensure that documentation shall be carried out by a qualified architectural historian, as follows:

- UCR shall commission the preparation of HABS-like documentation of the building, structure, district, feature, and its associated landscaping and setting prior to construction activities. The HABS-like package will document in photographs and descriptive and historic narrative the historical resources slated for modification/demolition. Documentation prepared for the package will draw upon primary- and secondary-source research and available studies previously prepared for the project.
- The specifications for the HABS-like package follow:
  - Photographs: Photographic documentation will focus on the historical resources/features slated for demolition, with overview and context photographs for the campus and adjacent setting. Photographs will be taken of the building using a professional-quality single lens reflex (SLR) digital camera with a minimum resolution of 10 megapixels. Photographs will include context views, elevations/exteriors, architectural details, overall interiors, and interior details (if warranted). Digital photographs will be provided in electronic format.
  - Descriptive and Historic Narrative: The architectural historian will prepare descriptive and historic narrative of the historical resources/features slated for demolition. Physical descriptions will detail each resource, elevation by elevation, with accompanying photographs, and information on how the resource fits within the broader campus during its period of significance. The historic narrative will include available information on the campus design, history, architect/contractor/designer as appropriate, area history, and historic context. In addition, the narrative will include a methodology section specifying the name of researcher, date of research, and sources/archives visited, as well as a bibliography. Within the written history, statements shall be footnoted as to their sources, where appropriate.
  - Historic Documentation Package Submittal: The electronic package will be assembled by the architectural historian and submitted to UCR for review and comment.

- A copy of the HABS-like package shall be offered to the Special Collections and University Archives at the Tomás Rivera Library and the California Historical Resources Information System. The record shall be accompanied by a report containing site-specific history and appropriate contextual information. This information shall be gathered through site-specific and comparative archival research, and oral history collection as appropriate.
- If preservation and reuse at the site are not feasible, the historical building shall be documented as described above.

For new infill construction within the Mid-Century Modern Core Historic District that does not involve building demolition:

- Infill projects outside of the Mid-Century Modern Core Historic District would not need review by an architectural historian.
- Infill projects within the Mid-Century Modern Core Historic District will require review by an architectural historian for elements such as form, massing, and scale, to ensure visual compatibility with the historic district, and the review shall be conducted in compliance with the *Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings* (Weeks and Grimmer 1995).

Significance After Mitigation

Implementation of Mitigation Measure **MM CUL-1** would reduce, mitigate, or avoid significant impacts to historic resources to the maximum extent feasible, as actions would be taken to identify, avoid, retain, or treat the resource in accordance with pertinent laws and regulations, including the *Secretary's Standards for the Treatment of Historical Resources*.

At the program level, however, development under the proposed 2021 LRDP would affect the identified historical resources, or presently unknown historical resources through demolition, construction, and reconstruction activities associated with buildout. Thus, mitigation measures that reduce impacts to less than significant cannot be assured in all cases and demolition or removal of a historically significant built-environment resource typically cannot be mitigated to below a level of significance under CEQA. Therefore, impacts to historical resources would remain **significant and unavoidable**.

Impact CUL-2 Impacts to Archaeological Resources.

Implementation of the proposed 2021 LRDP has the potential to cause a significant impact on archaeological resources, including those that qualify as historical resources. This impact would be Less than Significant with the implementation of mitigation.

The proposed 2021 LRDP includes general types of campus development and land uses to support projected campus population growth and to enable expanded and new program initiatives. This development would be related to academic, research, academic support, student life, and other support functions, and would include various levels of ground disturbance. As currently envisioned, development under the proposed 2021 LRDP would occur primarily within previously disturbed areas, adjacent to previously developed areas, surface parking areas, generally along North/South/East/West Campus Drive, and generally along University Avenue, Canyon Crest Drive, Big Springs Road, Aberdeen Drive, and West Linden Street. A new interpretive center is programmatically assumed in the UCR Botanic Gardens designation on East Campus. New

development on West Campus would generally occur on undeveloped infill parcels primarily used for agricultural activities. This includes sites designated in the proposed 2021 LRDP as Agricultural/Campus Research, Student Neighborhood, Campus Support, and University Avenue Gateway.

New development under the proposed 2021 LRDP would generally avoid disturbance in the areas of the recorded historic-age or prehistoric archaeological resources on campus. Nonetheless, ground-disturbing activities associated with development facilitated by the proposed 2021 LRDP have the potential to damage or destroy unrecorded historic-age or prehistoric archaeological resources that may be present on or below the ground surface, particularly in areas of undisturbed soils or when excavation depths exceed those attained previously for past development. As noted above in the environmental setting areas in the southern portions of East Campus are sensitive to archaeological resources or buried historic resources. Each of the areas likely to be developed under the proposed 2021 LRDP, as noted above, has the potential to contain archaeological resources or buried historic resources, including the new potential interpretative center in the Botanic Gardens. Consequently, damage to or destruction of known or previously unknown, archaeological resources or buried historic resources could occur during implementation of the proposed 2021 LRDP, and impacts are considered significant. Implementation of **MM CUL-2 through MM CUL-4** would reduce impacts to **less than significant with mitigation incorporated**.

Mitigation Measures

MM CUL-2 Tribal Cultural Resources/Archaeological Monitoring

Prior to commencement of ground disturbing activities into an area with a medium or high potential to encounter undisturbed native soils including Holocene alluvium soils, as determined by UCR, UCR shall hire a qualified archaeological monitor meeting the Secretary of the Interior's Professional Qualification Standards for archaeology (National Park Service 1983) to identify archaeological resources and cultural resources of potential Native American origin. Where development occurs in the southeastern quadrant of campus, and in areas containing Val Verde Pluton geologic features considered highly sensitive to prehistoric archaeological resources, UCR shall hire a qualified archaeologist and a Native American monitor to reduce impacts to potential archaeological and/or tribal cultural resources. The monitor(s) shall be on-site during any construction activities that involve ground disturbance. The on-site monitoring shall end when project-related ground disturbing activities are completed, or, in consultation with the lead agency and tribes as appropriate and based on observed conditions, monitoring may be reduced or eliminated prior to completion of ground-disturbing activities, when the monitor(s) has indicated that the project site has a low potential to encounter tribal cultural resources (TCR)/archaeological resources. Consolidated monitoring efforts (e.g., archaeological monitoring/tribal cultural/paleontological monitoring) may occur if the individual monitor meets the applicable qualifications, except for development in the southeastern quadrant as detailed above.

MM CUL-3 Construction Worker Training

For projects requiring TCR/archaeological monitoring, the monitor shall provide preconstruction training for all earthmoving construction personnel prior to the start of any ground disturbing activities, regarding how to recognize the types of TCRs and/or archaeological resources that may be encountered and to instruct personnel about actions to be taken in the event of a discovery. UCR Planning, Design & Construction Project Manager/contractor shall retain documentation showing when training of personnel was completed.

MM CUL-4 Unanticipated Discovery of Tribal Cultural Resources/Archaeological Resources

If previously undiscovered TCRs and/or archaeological resources are identified during construction, all ground disturbing activities within 100 feet of the resource shall halt, UCR Planning, Design & Construction staff shall be notified, and the find shall be evaluated by a qualified archaeologist meeting the Secretary of the Interior standards to determine whether it is a unique archaeological resource, as defined by CEQA. If the discovery appears to be Native American in origin, a tribal representative will be contacted within 24 hours of discovery to determine whether it is a TCR, as defined by CEQA. If the find is neither a unique archaeological resource nor a TCR, work may resume. If the find is determined to be a unique archaeological resource or TCR, the archaeologist and the tribal representative, as appropriate, shall make recommendations to UCR Planning, Design & Construction staff on the measures that will be implemented, including, but not limited to, preservation in place, excavation, relocation, and further evaluation of the discoveries pursuant to CEQA. Preservation in place (i.e., avoidance) is the preferred method of mitigation for impacts to TCRs/archaeological resources. If UCR determines that preservation in place is not feasible, the archaeologist shall design and implement a treatment plan, prepare a report, and salvage the material, as appropriate. Any important artifacts recovered during monitoring shall be cleaned, catalogued, and analyzed, with the results presented in a report of findings that meets professional standards. Work on-site may commence upon completion of any fieldwork components of the treatment plan.

Significance After Mitigation

Implementation of Mitigation Measures **MM CUL-2 through MM CUL-4** would reduce potential impacts to archaeological resources to **less-than-significant** levels because mitigation would be developed in coordination with the appropriate federal, State, and/or local agency and tribes to avoid, move, record, or otherwise treat the archaeological resource appropriately, in accordance with pertinent laws and regulations.

Impact CUL-3 Impacts to Human Remains.

Ground disturbance associated with development facilitated by the proposed 2021 LRDP has a low potential to disturb or damage known or unknown human remains. This impact would be less than significant with adherence to existing regulations.

No formal cemeteries are known to have occurred on the UCR main campus; therefore, the likelihood of encountering human remains is considered low. Ground-disturbing construction activities could uncover previously unknown human remains, which could be archaeologically or culturally significant. The proposed 2021 LRDP anticipates new development and building improvements involving construction activities that may potentially disturb native terrain, including excavation, grading, and soil removal; therefore, the potential exists for previously undiscovered human remains to be discovered. California law recognizes the need to protect Native American human burials, skeletal remains, and items associated with Native American burials from vandalism and inadvertent destruction. The procedures for the treatment of Native American human remains are contained in California Health and Safety Code Sections 7050.5 and 7052 and California PRC Section 5097. If human remains are discovered during any construction activities, potentially damaging ground-disturbing activities in the area of the remains and a 100-foot-buffer area shall be halted immediately, and UCR shall notify the Riverside County Coroner and the NAHC immediately, according to PRC Section 5097.98 and Section 7050.5 of California's Health and Safety Code. If the

remains are determined by the NAHC to be Native American, the guidelines of the NAHC shall be adhered to in the treatment and disposition of the remains. Following the Coroner's findings, UCR and the NAHC-designated most likely descendant shall recommend the ultimate treatment and disposition of the remains and take appropriate steps to ensure that additional human interments are not disturbed. The responsibilities for acting upon notification of a discovery of Native American human remains are identified in California PRC Section 5097.94. Compliance with California Health and Safety Code Sections 7050.5 and 7052 and California PRC Section 5097 would provide an opportunity to avoid or minimize the disturbance of human remains, and to appropriately treat any remains that are discovered. Therefore, this impact would be **less than significant**.

Mitigation Measures

Because impacts would be less than significant, mitigation measures would not be required.

Significance After Mitigation

Compliance with existing regulations and archaeological resources mitigation measures would reduce project impacts to human remains to **less-than-significant** levels by ensuring proper identification and treatment of any human remains that may be present.

4.5.4 Cumulative Impacts

Buildout of the project, in conjunction with other nearby past, present, and reasonably foreseeable probable future projects in the region could adversely impact cultural resources. Cumulative development in the region would continue to disturb areas with the potential to contain historical resources, archaeological resources, and human remains. For other developments that would have significant impacts on cultural resources, similar conditions and mitigation measures described herein would be imposed on those other developments consistent with the requirements of CEQA, along with requirements to comply with all applicable laws and regulations governing said resources.

Buildout of the proposed 2021 LRDP, in conjunction with cumulative projects surrounding the UCR campus, would result in potentially significant cumulative impacts to unknown historical resources, in addition to know UCR Historic Resources, and structures which may become historic subsequently. Therefore, cumulative impacts are considered significant under Impact CUL-1, and the project's contribution is cumulatively considerable.

Development facilitated by the proposed 2021 LRDP would implement Mitigation Measure **MM CUL-1** to ensure impacts to historical resources are mitigated to the extent feasible. Similarly, cumulative projects are reviewed separately by the appropriate jurisdiction and undergo environmental review when it is determined that the potential for significant impacts exists. While impacts to such resources would be addressed on a case-by-case basis and would likely be subject to mitigation measures, similar to those imposed for development facilitated by the proposed 2021 LRDP, cumulative development may result in the destruction or impairment of historic resources. As such, cumulative historical impacts would be significant and unavoidable, and even after implementation of Mitigation Measure **MM CUL-1**, the proposed 2021 LRDP's contribution **would remain cumulatively considerable**.

Buildout of the proposed 2021 LRDP, in conjunction with cumulative projects surrounding the UCR campus, would result in significant cumulative impacts to unknown archaeological resources and buried historic resources, and the project's contribution is cumulatively considerable, as described

above under Impact CUL-2. However, development would implement Mitigation Measures **MM CUL-2 through MM CUL-4** to ensure impacts to archaeological resources and buried historic resources are adequately mitigated. Similarly, cumulative projects are reviewed separately by the appropriate jurisdiction and undergo environmental review when it is determined that the potential for significant impacts exists. If future cumulative projects would result in impacts to cultural resources, impacts to such resources would be addressed on a case-by-case basis and would likely be subject to mitigation measures similar to those imposed for development facilitated by the project. As such, cumulative archaeological/buried historic impacts would be less than significant with mitigation. After implementation of Mitigation Measures **MM CUL-2 through MM CUL-4**, the proposed 2021 LRDP's contribution **would not be cumulatively considerable**.

Future projects and cumulative projects on the UCR campus would involve ground-disturbing activities which could encounter human remains. If human remains are found, the proposed campus projects and cumulative projects would be required to comply with California Health and Safety Code Sections 7050.5 and 7052 and California PRC Section 5097.98. With adherence to existing regulations relating to human remains, cumulative impacts would be less than significant, and the proposed 2021 LRDP's impacts would not be cumulatively considerable. Similarly, nearby past, present, and reasonably foreseeable probable future projects would be required to comply the State of California Health and Safety Code Section 7050.5 and 7052 and California PRC Section 5097.98, as described in Impact CUL-3, above, and thus**, impacts would not be cumulatively considerable**.

4.5.5 References

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4.6 Energy

This section analyzes whether implementation of the proposed 2021 LRDP would result in wasteful, inefficient, or unnecessary consumption on energy resources during construction or operation and conflict or obstruct an applicable plan for renewable energy or energy efficiency. The analysis in this section is based upon energy modeling outputs that are included in Appendix F, Energy Supporting Information.

4.6.1 Environmental Setting

Energy Fundamentals

Energy is generally transmitted either in the form of electricity, measured in kilowatts (kW) or megawatts (MW), or natural gas measured in British thermal units (BTU), cubic feet, or therms. Fuel, such as gasoline or diesel, is measured in gallons or liters.

Electricity

Electricity is used primarily for lighting, appliances, cooking purpose, HVAC equipment, and other uses associated with building and vehicle operations. Electricity sources range from renewable (hydroelectric, solar, wind, geothermal, biomass) to nonrenewable (natural gas, oil, nuclear, coal).

Natural Gas

Natural gas is used primarily for heating, water heating, and cooking purpose and is typically associated with building operations.

Fuel

Fuel is used primarily for powering off-road equipment and vehicles (commercial trucks and other vehicles). The typical fuel types used are diesel and gasoline.

Electricity Generation, Distribution, and Use

California

GENERATION

According to the California Energy Commission (CEC), California generated approximately 285,448 gigawatt-hours (GWh) of electricity in 2018. As shown in Table 4.6-1, approximately 35 percent of this electricity was sourced from natural gas, 31 percent from renewable sources, 11 percent from large hydroelectric sources, and the remaining 23 percent was sourced from coal, nuclear, oil, other and unspecified sources. Specifically, the 31 percent of California's 2018 retail electric sales that were served by renewable resources included sources from wind, solar, geothermal, biomass, and small hydroelectric. (CEC 2019a).

Table 4.6-1 California 2018 Total System Electric Generation

Fuel Type	In-State Generation (GWh)	Percent of In-State Generation	Northwest Imports (GWh)	Southwest Imports (GWh)	State Energy Mix (GWh)	State Power Mix
Coal	294	0.15%	399	8,740	9,433	3.30%
Large Hydro	22,096	11.34%	7,418	985	30,499	10.68%
Natural Gas	90,691	46.54%	49	8,904	99,644	34.91%
Nuclear	18,268	9.38%	0	7,573	25,841	9.05%
Oil	35	0.02%	0	0	35	0.01%
Other (Petroleum/ Waste Heat)	430	0.22%	0	9	439	0.15%
Renewables	63,028	32.35%	14,074	12,400	89,502	31.36%
Biomass	5,909	3.03%	772	26	6,707	2.35%
Geothermal	11,528	5.92%	171	1,269	12,968	4.54%
Small Hydro	4,248	2.18%	334	1	4,583	1.61%
Solar	27,265	13.99%	174	5,094	32,533	11.40%
Wind	14,078	7.23%	12,623	6,010	32,711	11.46%
Unspecified	N/A	N/A	17,576	12,519	30,095	10.54%
Total	**194,842**	**100.00%**	**39,516**	**51,130**	**285,488**	**100.00%**

GWh = gigawatt-hours

Source: CEC 2019a

DISTRIBUTION

Electricity is distributed through the various electric load-serving entities (LSEs) in California. These entities include investor-owned utilities, publicly owned LSEs, rural electric cooperatives, community choice aggregators, and electric service providers (CEC 2021a).

USE

According to the U.S. Energy Information Administration (USEIA), total electricity direct consumption within California in 2018 was 12,859.245 GWh, up 0.5 percent, or 64.385 GWh, from 2017. California electricity consumption in 2018 represented approximately 9 percent of total U.S. electricity consumption in 2018 (USEIA 2020).

Riverside County

Riverside County is serviced by two electrical utilities: Riverside Public Utilities (RPU) and Southern California Edison (SCE). However, the UCR main campus is located solely in the RPU service territory. Therefore, this discussion is limited to RPU.

GENERATION

RPU electricity generation consists of renewable and nonrenewable sources. The renewable sources include geothermal, hydroelectric, solar, wind, and other renewables. RPU internal electricity

generation includes coal, large hydroelectric, natural gas, nuclear, and other generic power. Table 4.6-2 indicates RPU composition from both internal generation and renewables.

According to the 2018 Power Content Label, which discloses power sources from retail electricity suppliers, RPU receives its energy from renewables, hydroelectric, natural gas, nuclear, and unspecific sources. Table 4.6-2 shows the breakdown of energy resources from RPU compared to California's breakdown of energy sources. Both RPU's General Power Mix and 100 Percent Renewable Energy Mix have a higher share of renewable energy compared to Statewide (RPU 2019). RPU has also reported that it was likely to achieve 44 percent renewable power mix by 2020. RPU does not offer customers, including UCR, the option to purchase 100 percent renewable-sourced electricity. In addition, there is no separate community choice aggregation available to UCR.

Table 4.6-2 RPU and California 2018 Power Mix

Source	RPU General Power Mix[1]	2018 California Power Mix[1]
Eligible Renewable Resources		
Biomass & biowaste	0	2
Geothermal	18	5
Eligible Hydroelectric	0	2
Solar	12	11
Wind	4	11
Coal	29	3
Large Hydroelectric	1	11
Natural Gas	4	35
Nuclear	4	9
Other	0	<1
Unspecified sources of power[2]	28	11
Eligible Renewable Resources Percent of Power Mix	**34**	**31**
Non-Renewable Resources Percent of Power Mix	**66**	**69**
Total	**100**	**100**

[1] Percent of Total Power. Percentages are estimated annually by the CEC based on the electricity sold to California consumers during the identified year.

[2] "Unspecified sources of power" means electricity from open market transactions that are not traceable to specific generation sources.

Numbers are rounded.

Sources: RPU 2019; RPU 2021

DISTRIBUTION

RPU provides electricity to many of the cities and entities throughout Riverside County, including UCR. Riverside County consumed approximately 15,877.5 GWh of electricity (CEC 2018a). RPU owns 13,912 distribution transformers, more than 1,300 circuit miles of distribution cables connecting them with more than 22,000 poles overhead and more systems underground. The transmission system has almost 100 miles of cable.

RPU operates the Riverside Energy Resource Center, a power generation plant on 16 acres in the City of Riverside (City) and provides 192-megawatt (MW) gas-fired power used to offset power shortages during times of peak demand. All of RPU imported energy comes through a single power connection via the SCE Vista Substation, located in the City of Grand Terrace. RPU owns 13,912

distribution transformers, 14 substations, 65 transformers, 54 switchgears, and 1,300 circuit miles of distribution cables (RPU 2021).

USE

RPU serves approximately 317,000 people in a 90 square-mile area with 109,327 metered electric customers (RPU 2021). Table 4.6-3 shows the breakdown of 2018 electricity consumption within the RPU service area by sector. Commercial and residential uses constitute the greatest users of electricity. As shown in Table 4.6-3, RPU provided approximately 2,186 GWh of electricity in 2018 which equates to 6,900 kWh per capita.

Table 4.6-3 RPU Service Area 2018 Electricity Consumption

Consumption (kWh)	2018 Service Area Population	RPU Service Area Consumption Per Capita (kWh)
2,186,000,000	317,000	6,900

kWh = kilowatt hour

Sources: RPU 2021; CEC 2018b

UCR Main Campus

GENERATION

In addition to obtaining electricity from RPU, UCR campus solar power is generated from SunPower photovoltaic (PV) systems. UCR purchases such solar-powered electricity through a power purchase agreement for on-site generation that on average annually produces approximately 11.6 megawatt-hours (MWh) of electricity, or almost 10 percent of the campus's total annual energy needs. Specifically, in 2018 electricity was generated by the following solar facilities on the UCR campus:

- 5,734 annual MWh system via solar panel canopies at UCR Parking Lot 30;
- 1,099 MWh system via solar panel canopies at UCR Parking Lot 32; and
- 5,040 MWh Solar Farm Tracking System scattered throughout the campus, including
  - a solar farm adjacent to agricultural research land and
  - a smaller system above the parking lot of the College of Engineering's Center for Environmental Research and Technology (CE-CERT).

CE-CERT's solar PV array feeds into a 500 kWh battery. In addition, the campus produces solar hot water on the rooftops of the Glen Mor student housing facility (UCR 2021a). Furthermore, eight chillers provide 12,250 tons of chilled water capacity and utilize an innovative system of three thermal energy storage (TES) tanks that hold seven million gallons of chilled water. The TES tanks allow the University to implement demand management strategies to purchase electricity during off-peak hours, to produce and store chilled water for use during daytime on-peak hours (UCR 2005). The TES tanks provide cooling for 65 percent of the campus, reducing peak energy load of the campus by 2.5 MW (UCR 2021a).

DISTRIBUTION

Electricity used on the UCR campus to provide power for space cooling, heating and ventilation, lighting, research activities, office equipment, and refrigeration is distributed via an extensive network of power distribution infrastructure. The UCR Sustainable Integrated Grid Initiative (SIGI)

was designed as a smart, flexible, micro-grid capable of responding to the critical needs of the electrical grid. There is 0.5 MW of PV power capacity distributed between the three buildings at CE-CERT. The administration building has an energy scheduling system installed that controls large loads and 0.1 MW of the PV capacity. The multidisciplinary research building has a 500-kW stationary electrical energy storage system that will store or discharge energy in response to a remote command or to a scheduling algorithm and 100 kW of the PV capacity. The remaining 260 kW PV capacity is allocated to the Atmospheric Processes Laboratory. Additionally, 500 kW of battery energy storage is installed in a trailer for mobile deployment (UCR 2021b).

Heat waves challenge local utilities to satisfy record-breaking peak energy demands. During a previous heat wave in 2014, RPU requested that their largest customers reduce electricity use in the afternoon. UCR responded to this request by utilizing its SIGI battery system, PV generation, and smart demand management controllers. The combined effect not only curtailed 265 kW of power consumption but also provided 225 kW back to the grid, resulting in a 590 kW energy swing for the critical-period during the afternoon hours. In addition to the demonstration of these functionalities, UCR CE-CERT's SIGI test-bed has the ability to supply reactive power and voltage support, efficiency evaluation of system components, and islanding operations. The other capacity of UCR SIGI is fast electric-vehicle charging, along with vehicle-to-grid energy transfer capability (UCR 2021c).

USE

Table 4.6-4 provides a summary of UCR electricity sources, data type, and activity data for 2018. As shown in Table 4.6-4, total UCR main campus electricity use in 2018 was 118,960,675 kWh. Approximately 11,872,475 kWh is produced on campus through solar SunPower and used by UCR. Therefore, 107,088,200 kWh were purchased from RPU in 2018. In addition, non-UCR fleet/department vehicles traveling to and from the UCR main campus generated passenger vehicle miles traveled (VMT) some of which used electricity and accounted for 75,551 kWh of electricity consumed for mobile vehicles in 2018 (see Appendix F).

Table 4.6-4 UCR 2018 Electricity Consumption

Source	Data Type	Use (kWh)	Campus Population (2018)	UCR Consumption Per Capita (kWh)
Stationary Electricity Use				
Riverside Public Utility	Usage summarized by RPU	107,088,200	28,661	3,736
SunPower Lot 30	Production/usage summarized by SunEdison	5,733,909		200
SunPower Lot 32	Production/usage summarized by SunEdison	1,098,690		38
Solar Farm	Production/usage summarized by SunEdison	5,039,876		175
Mobile Electricity Use				
Non-UCR Fleet mobile	Daily VMT, vehicle class, and fuel distribution	75,551	28,661	2.6

kWh = kilowatt hour; RPU = Riverside Public Utilities; UCR = University of California, Riverside; VMT = vehicle miles traveled

All presented data was provided by UCR and is based on 2018 calendar year.

A summary of the electricity purchased from RPU and generated by on-site solar was provided by UCR Energy Manager in the form of an Annual Utilities Summary Spreadsheet.

All data and calculations presented are rounded to the nearest whole number.

Source: Appendix F compiled by Rincon Consultants.

Natural Gas Distribution and Use

California

DISTRIBUTION

According to the California Public Utilities Commission (CPUC), natural gas from out-of-state production basins is delivered into California via the interstate natural gas pipeline system. The major interstate pipelines that deliver out-of-state natural gas to California gas utilities are Gas Transmission Northwest Pipeline, Kern River Pipeline, Transwestern Pipeline, El Paso Pipeline, Ruby Pipeline, Mojave Pipeline, and Tuscarora (CPUC 2021). Because natural gas is a dispatchable energy resource that provides load when the availability of hydroelectric power generation and/or other energy sources decrease, distribution varies greatly from year to year. The availability and distribution of hydroelectric-sourced energy, increasing renewable-source energy, and overall consumer demand are the variables that shape the need for natural gas.

USE

In 2018, total California natural gas demand for industrial, residential, commercial, and electric power generation was 2,137,920 million cubic feet per year (MCF/year).

Riverside County

Riverside County, including UCR, is located within the natural gas utility service territory of Southern California Gas (SCG), which covers the majority of southern California. This discussion below is limited to SCG natural gas distribution and use within Riverside County.

DISTRIBUTION

SCG obtains more than 90 percent of its natural gas from basins in Texas and New Mexico and is the nation's largest natural gas distribution utility with 21.8 million consumers across approximately 24,000 square miles throughout central and southern California (SCG 2021). Riverside County is serviced via SCG high-pressure distribution lines under roadways and transmission pipelines throughout the County. The high-pressure distribution lines operate at pressures above 60 pounds per square inch (psi) and deliver gas in smaller volumes to the lower pressure distribution system. Transmission lines are generally large diameter pipelines that operate at pressures above 200 psi and transport gas from supply points to the gas distribution system.

USE

Riverside County consumed approximately 398.5 millions of therms of natural gas in 2018 (CEC 2018). According to the California Department of Finance (DOF), Riverside County population in 2018 was 2,400,762 persons. As such, Table 4.6-5 indicates that Riverside County had a 2018 per capita natural gas consumption of approximately 166 therms.

Table 4.6-5 Riverside County 2018 Natural Gas Consumption

County Population	County Consumption (Therms)	County Consumption Per Capita (Therms)
2,400,762	398,500,000	166

Sources: DOF 2020; CEC 2018c

UCR Main Campus

DISTRIBUTION

Natural gas for UCR is exclusively distributed from Shell Energy.[1] UCR privately distributes medium pressure gas throughout East and West Campus. Distribution lines exist under Iowa Avenue and Martin Luther King Boulevard, and under a portion of West Campus. East Campus is served by a distribution line under Blaine Street (SCG 2016). UCR purchases natural gas, 95 percent of which is combusted in four steam boilers at the UCR Central Plant to generate steam for distribution. The Central Plant has the capability to produce up to 150,000 pounds per hour (lbs/hour) of steam that is distributed to most buildings in the Academic Center primarily for heating. Some natural gas is also used in the residential dining hall kitchens; on-campus restaurant kitchens; and science, research and teaching laboratories (UCR 2005). One high-pressure natural gas distribution line runs north-south under West Campus between Martin Luther King Boulevard and Le Conte Drive (SCG 2016).

USE

In 2018, UCR collected energy activity data, measured in million British Thermal Unit (MMBtu), of natural gas used in facilities and buildings; gallons of diesel used for portable generators, heaters, etc.; and gallons of fuel used by the UCR vehicle fleet. UCR disaggregated the source data in order to provide activity data for solely the main campus included in the proposed 2021 LRDP area. Table 4.6-6 provides a summary of UCR natural gas sources, data type, and activity data for 2018. As shown in Table 4.6-6, total UCR main campus natural gas use in 2018 was 3,466,942 therms.

Table 4.6-6 UCR 2018 Natural Gas Consumption

Source	Data Type	Use (therms)	Campus Population (2018)	UCR per Capita Consumption (therms)
Natural Gas Use				
Natural Gas (Shell Energy) [1]	Annual utility data	3,466,942	28,661	121

[1] Natural gas is transported to the UCR main campus by Southern California Gas and is procured through Shell Energy.

Notes:

All presented data was provided by UCR and is based on 2018 calendar year.

All data and calculations presented in this report are rounded to the nearest whole number.

Source: Appendix F compiled by Rincon Consultants.

Fuel Distribution and Use

State of California

DISTRIBUTION

According to the 2015 CEC market share data, California consists of distributors of gasoline, which include companies or individuals who make the first distribution of gasoline in California. Aircraft manufacturers and certificated or licensed carriers by air may be included within the definition of

[1] Natural gas is transported to the UCR main campus by Southern California Gas and is procured through Shell Energy.

distributor. Distributors can also be "Brokers," which includes every person, other than a distributor or a retailer, who deals in lots of 200 or more gallons of gasoline (CEC 2015).

Based on the California Transportation of Petroleum Second Northern California Refinery Safety Forum, output from the refineries is usually placed in intermediate tanks before blending finished products. Most gasoline is shipped from refinery by pipeline, which serves over 60 distribution terminals, which is then transported to retail and nonretail stations by tanker trucks (Schremp 2015).

USE

The main category of fuel use in California is transportation fuel, specifically gasoline and diesel. Gasoline is the most used transportation fuel in California: 97 percent of all gasoline sold in California is consumed by light-duty cars, pickup trucks, and sport utility vehicles. In 2018, an estimated 143,080 million gallons of gasoline annually were used (i.e. 392 million gallons gasoline per day), marking a record level of consumption between 1997 and 2020 (CEC 2021b). Diesel is the second largest transportation fuel used in California. Many heavy duty-trucks, delivery vehicles, buses, trains, ships, boats and barges, farm, construction, and heavy-duty military vehicles and equipment have diesel engines. According to the 2019 California Annual Retail Fuel Outlet Report Results (CEC-A15), in 2018, 1,752 million gallons of diesel annually (i.e. 4.8 million gallons of diesel per day), including off-road diesel, was sold (CEC 2021c).

Riverside County

DISTRIBUTION

Riverside County distributes gasoline through retail and non-retail gas stations throughout the County. In 2018, Riverside County had an estimated total of 582 retail gasoline stations (CEC 2021d).

USE

According to the California Annual Retail Fuel Outlet Report Results (CEC-A15), retail gasoline sales in Riverside County totaled approximately 1.05 billion gallons (CEC 2021d) and retail diesel sales totaled approximately 132 million gallons in 2018 (CEC 2021c). County consumption of compressed natural gas (CNG) is unknown. Table 4.6-7 indicates that Riverside County had a per capita gasoline consumption of approximately 437 gallons and per capita diesel consumption of approximately 55 gallons.

Table 4.6-7 Riverside County 2018 Gasoline and Diesel Consumption

Fuel Type	County Consumption (gallons per year)	2018 County Population	County Per Capita Consumption (gallons)
Gasoline	1,050,000,000	2,400,762	437
Diesel	132,000,000		55

Sources: DOF 2020; CEC 2018c; CEC 2021d

UCR Main Campus

Unleaded gasoline, CNG, and diesel are the fuels used by the UCR vehicle fleet and department vehicles. It is assumed that these same fuels are utilized by non-UCR vehicles and transit vehicles traveling to and from the campus.

DISTRIBUTION

UCR fleet and department vehicle services have three gasoline fuel dispensers with unleaded 87 octane gasoline and one CNG fuel dispenser. Diesel fuel is not available at the UCR Fleet fueling station and must be purchased at an off-campus fueling station (UCR 2021d).

USE

In addition to diesel fuel use by emergency back-up power generators on the UCR main campus, unleaded gasoline, CNG, and diesel are the fuels used by the UCR vehicle fleet and department vehicles. In 2018, UCR had a couple of electric vehicles used by campus staff and a couple hundred electric carts. In 2018, 135,192 gallons of unleaded gasoline, 4,321 gallon-equivalents of CNG, and 7,306 gallons of diesel were consumed by this UCR fleet for a total of 146,819 gallons of fuel used (see Appendix F). In addition, non-UCR fleet/department vehicles traveling to and from the UCR main campus generated an annual passenger VMT of 81,662,018, which translates into 2,100,859 gallons of gasoline and 247,811 gallons of diesel as fuel in 2018 (see Appendix F). Furthermore, in 2018, UCR campus population traveled 407,912 revenue miles on transit buses, which translates to 125,126 gallons of gasoline equivalents of CNG consumed in 2018 (see Appendix F).[2] Finally, based on 8,273,344 air passenger miles traveled in 2018, 182,979 gallons of aviation gasoline were consumed in 2018 due to UCR faculty and staff air travel.

Table 4.6-8 provides a summary of UCR mobile and stationary fuel sources, data type, and consumption data for 2018. As shown in Table 4.6-8, total UCR main campus fuel use in 2018 was 263,120 gallons of diesel, 2,419,030 gallons of gasoline, and 129,447 gallon-equivalents of CNG.

[2] CNG fuel consumption received by UCR is expressed as gallon equivalents. CNG = 1 gasoline equivalent gallons, and there are 1027 BTUs/standard cubic foot (SCF).

Table 4.6-8 UCR 2018 Fuel Consumption

Source	Data Type	Use (gallons)	Baseline Campus Population	Consumption Per Capita (gallons)
Stationary Fuel Use				
Diesel	Invoice Summary	8,003	28,661	0.3
Mobile Fuel Use				
On-campus Non-UCR Vehicles (campus commuters, commercial vendors, etc.)[3]				
Unleaded Gasoline	Daily VMT, vehicle class, and fuel distribution	2,100,859	28,661	73.3
Diesel	Daily VMT, vehicle class, and fuel distribution	247,811	28,661	8.6
Public Transit Vehicles (Attributed to UCR)				
Transit Vehicle Transportation (RTA/UPASS)[1]	Annual trips, vehicle class, and fuel distribution	125,126 (gallons equivalents)[2]	28,661	4.4
UCR Vehicles (Fleet/Department)				
Unleaded Gasoline	Fleet vehicle, fuel, and mileage data	135,192	28,661	4.7
Compressed Natural Gas	Fleet vehicle, fuel, and mileage data	4,321 (gallon equivalent)[2]	28,661	0.2
Diesel	Fleet vehicle, fuel, and mileage data	7,306	28,661	0.3
UCR Business Air Travel				
Faculty/Staff Air Travel	Air passenger miles and aviation energy use factor	182,979	28,661	6.4

[1] Based on provided fleet information from RTA in email correspondence on August 21, 2020, the transit fleets are operated using only gasoline and compressed natural gas (CNG), therefore does not include diesel fuel usage.

[2] CNG fuel consumption received by UCR is expressed as gallon equivalents. CNG = 1 gasoline equivalent gallons, and there are 1027 BTUs/standard cubic foot (SCF).

[3] Non-UCR fleet mobile fuel combustion calculated using VMT data provided by vehicle class by Fehr & Peers (Appendix J) and has been converted into total fuel consumption for all vehicle classes.

Total fuel usage presented are rounded to the nearest whole number while consumption per capita is rounded to the tenths.

UCR = University of California, Riverside; VMT = vehicles miles traveled; RTA = Riverside Transit Agency

Source: Appendix F compiled by Rincon Consultants.

Available Alternative Vehicle Fuels

Various Statewide regulations and plans encourage alternative fuel use to reduce GHG emissions and criteria pollutant emissions. These include the Low Carbon Fuel Standard and SB 32, as well as myriad other Statewide and local air district regulations. Conventional gasoline and diesel may be replaced with different alternative fuels, depending on the capability of the vehicle. Descriptions of the most widely used alternative fuels include the following:

- **Electricity** can power electric and plug-in hybrid electric vehicles directly from the power grid. Generally, these vehicles draw from the electricity grid and store the energy in their batteries. UCR has 36 electric vehicle charging stations on campus:

  Existing Level II (240 Volt/40 Amp)

  - Lot 1: 4 ports

- Lot 6: 4 ports
- Lot 9: 4 ports
- Lot 15: 4 ports
- Lot 20: 2 ports
- Lot 24: 12 ports
- Lot 30: 2 ports
- Lot 50: 4 ports

- **Biodiesel** is a renewable alternative fuel that can be manufactured from vegetable oils, animal fats, or recycled restaurant grease. Biodiesel is biodegradable and cleaner-burning than petroleum-based diesel fuel. Generally, biodiesel can run in any diesel engine without alterations, but fueling stations have been slow to make it available. There are eleven biodiesel refueling stations in California, but none in the City. According to the U.S. Department of Energy (USDOE), the closest biodiesel stations to UCR are in the cities of Corona and Ontario (USDOE 2019a). UCR does not have any biodiesel stations on campus or use biodiesel as part of UCR's fleet.
- **Compressed natural gas (CNG) and liquefied natural gas (LNG)** is currently being used in vehicles. CNG is used in light-, medium-, and heavy-duty vehicles and gets about the same fuel economy. LNG is costly to produce and therefore is used in limited applications, typically in medium- and heavy-duty vehicles. There are three CNG stations near the UCR main campus: GNG CNG Station located approximately 3.4 miles southeast of UCR in the City of Moreno Valley; Clean Energy Riverside County CNG Station located approximately 3.9 miles northwest of UCR in the City; and Riverside CNG Station located approximately 5.9 miles southwest of UCR in the City (USDOE 2019b). There is one LNG station approximately 1.3 miles west of UCR in the City (USDOE 2019c). UCR does not have any CNG or LNG stations on campus but does use CNG as part of UCR's fleet.
- **Hydrogen** is being explored for use in combustion engines and fuel cell electric vehicles. The interest in hydrogen as an alternative transportation fuel stems from its clean-burning qualities, its potential for domestic production, and the fuel cell vehicle's potential for high efficiency: hydrogen is two to three times more efficient than gasoline. The closest station to UCR is in Diamond Bar, approximately 27.8 miles west of UCR (USDOE 2019d). Fuel cells are being explored as a way to use electricity generated on-board the vehicle to power electric motors. UCR does not have any hydrogen stations on campus or use hydrogen as part of UCR's fleet.

4.6.2 Regulatory Setting

Additional regulatory information related to energy efficiency standards is included throughout the other resource sections including Section 4.17, *Utilities and Service Systems*, which includes discussion of water use efficiency standards, solid waste standards, and wastewater standards, Section 4.3, *Air Quality*, which includes discussion of air quality related regulations, and Section 4.8, *Greenhouse Gas Emissions*, which includes discussion of greenhouse gas related regulations.

Federal

Energy Policy and Conservation Act

Enacted in 1975, this legislation established fuel economy standards for new light-duty vehicles (autos, pickups, vans, and sport-utility vehicles). The law placed responsibility on the National

Highway Traffic and Safety Administration, a part of the U.S. Department of Transportation (USDOT), for establishing and regularly updating vehicle standards. The U.S. Environmental Protection Agency (US EPA) administers the Corporate Average Fuel Economy (CAFE) program, which determines vehicle manufacturers' compliance with existing fuel economy standards. Since the inception of the program, the average fuel economy for new light-duty vehicles steadily increased from 13.1 miles per gallon (mpg) for the 1975 model year to 30.7 mpg for the 2014 model year and can increase to 54.5 by 2025.

On August 2, 2018, the NHTSA and US EPA, operating under the direction of the Trump Administration, proposed the Safer Affordable Fuel-Efficient Vehicles Rule (SAFE Rule). This rule addresses emissions and fuel economy standards for motor vehicles and is separated in two parts as described below.

- Part One, "One National Program" (84 FR 51310) revokes a waiver granted by US EPA to the State of California under Section 209 of the CAA to enforce more stringent emission standards for motor vehicles than those required by US EPA for the explicit purpose of GHG reduction, and indirectly, criteria air pollutants and ozone precursor emission reduction. This revocation became effective on November 26, 2019, potentially restricting the ability of CARB to enforce more stringent GHG emission standards for new vehicles and set zero emission vehicle mandates in California.
- Part Two addresses CAFE standards for passenger cars and light trucks for model years 2021 to 2026. This rulemaking proposes new CAFE standards for model years 2022 through 2026 and would amend existing CAFE standards for model year 2021. The proposal would retain the model year 2020 standards (specifically, the footprint target curves for passenger cars and light trucks) through model year 2026. The proposal addressing CAFE standards was jointly developed by NHTSA and US EPA, with US EPA simultaneously proposing tailpipe CO_2 standards for the same vehicles covered by the same model years.

US EPA and NTHSA published final rules to amend and establish national CO^2 and fuel economy standards on April 30, 2020 (Part Two of the SAFE Vehicles Rule) (85 FR 24174). California and 22 other states are currently challenging this new rule in the court system, and it is reasonably foreseeable that the State will be successful in its legal challenges, for the reasons outlined in the State's lawsuit[3] and on the CARB website (CARB 2021). Furthermore, on January 20, 2021, President Biden signed an executive order directing the Government to revise fuel economy standards with the goal of further reducing emissions (US White House 2021). In February 2021 the Biden administration Department of Justice also asked courts to put the litigation on hold while the administration "reconsidered the policy decisions of a prior administration." Most Recently, on April 22, 2021 the Biden Administration proposed to formally roll back portions of the SAFE Rule thereby restoring California's right to enforce more stringent fuel efficiency standards (USDOT 2021).

It is, however, legally infeasible for individual agencies (in this case, the UC system) to adopt more stringent fuel efficiency standards for commuter vehicles. The CAA (42 United States Code [USC] Section 7543[a]) states that "no state or any political subdivision therefore shall adopt or attempt to enforce any standard relating to the control of emissions from new motor vehicles or new motor vehicle engines subject to this part." Therefore, UCR abides by federal and State transportation fuel efficiency standards related to commuter vehicles.

[3] *State of California et al. v. Chao et al.* (Case 1:19-cv-02826) available at: https://oag.ca.gov/system/files/attachments/press_releases/California%20v.%20Chao%20complaint%20%2800000002%29.pdf

Construction Equipment Fuel Efficiency Standard

US EPA sets emission standards for construction equipment. The first federal standards (Tier 1) were adopted in 1994 for all off-road engines over 50 horsepower (hp) and were phased in by 2000. A new standard was adopted in 1998 that introduced Tier 1 for all equipment below 50 hp and established the Tier 2 and Tier 3 standards. The Tier 2 and Tier 3 standards were phased in by 2008 for all equipment. The current iteration of emissions standards for construction equipment are the Tier 4 efficiency requirements are contained in 40 Code of Federal Regulations Parts 1039, 1065, and 1068 (originally adopted in 69 Federal Register 38958 [June 29, 2004], and most recently updated in 2014 [79 Federal Register 46356]). Emissions requirements for new off-road Tier 4 vehicles were to be completely phased in by the end of 2015.

Energy Policy Act

The Energy Policy Act of 1992 was passed to reduce the U.S.'s dependence on foreign petroleum and improve air quality. The act includes several parts intended to build an inventory of alternative fuel vehicles (AFVs) in large, centrally fueled fleets in metropolitan areas. The act requires certain federal, State, and local government and private fleets to purchase a percentage of light-duty AFVs capable of running on alternative fuels each year. In addition, financial incentives are also included in the act. Federal tax deductions are allowed for businesses and individuals to cover the incremental cost of AFVs. States are also required by the act to consider a variety of incentive programs to help promote AFVs. The Energy Policy Act of 2005 provides renewed and expanded tax credits for electricity generated by qualified energy sources, such as landfill gas; provides bond financing, tax incentives, grants, and loan guarantees for clean renewable energy and rural community electrification; and establishes a federal purchase requirement for renewable energy.

Energy Independence and Security Act

The Energy Independence and Security Act of 2007 was designed to improve vehicle fuel economy and help reduce nationwide dependence on foreign oil. It expands the production of renewable fuels, reducing dependence on oil, and confronting global climate change. Specifically, it increases the supply of alternative fuel sources by setting a mandatory Renewable Fuel Standard by requiring fuel producers to use at least 36 billion gallons of biofuel in 2022 and reduces U.S. demand for oil by setting a national fuel economy standard of 35 mpg by 2020.

The Act also set energy efficiency standards for lighting (specifically light bulbs) and appliances. Development would also be required to install photosensors and energy-efficient lighting fixtures consistent with the requirements of 42 USC Section 17001 et seq.

U.S. Executive Order (EO) 13693 (Energy Independence and Security Act Expansion)

In March 2015, EO 13693 *Planning for Federal Sustainability in the Next Decade* was signed into action. The goal of this EO is to expand on the Energy Independence and Security Act of 2007 and maintain federal leadership in sustainability and GHG emission reductions. The EO includes the following goals related to energy:

- 25 percent reduction in energy use intensity (2015 baseline).
- 30 percent of electricity supply from renewable energy by 2025.
- 25 percent of total building energy (electric and alternative energy) from renewable energy by 2025.

Energy Star Program

In 1992, the US EPA introduced Energy Star© as a voluntary labeling program designed to identify and promote energy-efficient products to reduce GHG emissions. The program applies to major household appliances, lighting, computers, and building components such as windows, doors, roofs, and heating and cooling systems. Under this program, appliances that meet specification for maximum energy use established under the program are certified to display the Energy Star© label. In 1996, the US EPA joined with the Energy Department to expand the program, which now also includes qualifying commercial and industrial buildings, as well as homes.

State

California Energy Action Plan (Increase Efficient Use of Fuel Supplies)

The CEC, in collaboration with CPUC, is responsible for preparing the California Energy Action Plan, which identifies emerging trends related to energy supply, demand, conservation, public health and safety, and maintenance of a healthy economy. The 2003 Energy Action Plan calls for the State to assist in transformation of the transportation system to improve air quality, reduce congestion, and increase efficient use of fuel supplies with the least environmental and energy costs. The Energy Action Plan identifies strategies including assistance to public agencies and fleet operators in implementing incentive programs for zero-emission vehicles and addressing their infrastructure needs, and encourages urban designs that reduce VMT and accommodate pedestrian and bicycle access.

In the 2005 Energy Action Plan, the CEC and CPUC updated the energy policy vision by adding dimensions to the policy areas, such as information on the emerging importance of climate change, transportation-related energy issues, and research and development activities. The CEC adopted an update to the 2005 Energy Action Plan in 2008 that supplements the earlier Energy Action Plans and examines the State's ongoing actions in the context of global climate change.

California Energy Code (Building Energy Efficiency Standards)

The Building Energy Efficiency Standards were first adopted in 1976 and have been updated periodically since then. The standards contain energy and water efficiency requirements (and indoor air quality requirements) for newly constructed buildings, additions to existing buildings, and alterations to existing buildings. The goal is to reduce energy costs for owners, increase reliability and availability of electricity for the State, improve building occupant comfort, and reduce environmental impact.

Senate Bill 1389 (Integrated Energy Policy)

SB 1389 (Chapter 568, Statutes of 2002) required the CEC to conduct assessments and forecasts of all aspects of energy industry supply, production, transportation, delivery and distribution, demand, and prices. The CEC uses these assessments and forecasts to develop energy policies and recommendations to conserve resources, protect the environment, ensure energy reliability, enhance the State's economy, and protect public health and safety.

Senate Bills 350 and 100 (Renewable Portfolio/Clean Energy and Pollution Reduction Act)

The Clean Energy and Pollution Reduction Act of 2015 (SB 350) requires the amount of electricity generated and sold to retail customers per year from eligible renewable energy resources to be increased to 50 percent by December 31, 2030. This act also requires doubling of the energy efficiency in existing buildings by 2030.

Adopted on September 10, 2018, SB 100 supports the reduction of GHG emissions from the electricity sector by accelerating the State's Renewables Portfolio Standard Program, which was last updated by SB 350 in 2015. SB 100 requires electricity providers to increase procurement from eligible renewable energy resources to 33 percent of total retail sales by 2020, 44 percent by 2024, 60 percent by 2030, and 100 percent by 2045.

Assembly Bill 1493 (Reduce GHG Emissions from Vehicle Use)

AB 1493 (Chapter 200, Statutes of 2002), known as the Pavley Bill, amended Health and Safety Code Sections 42823 and added 43018.5 requiring the California Air Resources Board (CARB) to develop and adopt regulations that achieve maximum feasible and cost-effective reduction of GHG emissions from passenger vehicles, light-duty trucks, and other vehicles used for noncommercial personal transportation in California.

Assembly Bill 1007 (State Alternative Fuels Plan)

AB 1007 (Chapter 371, Statutes of 2005) required the CEC to prepare a State plan to increase the use of alternative fuels in California. The CEC prepared the State Alternative Fuels Plan (SAF Plan) in partnership with CARB and in consultation with other federal, State, and local agencies. The SAF Plan presents strategies and actions California must take to increase the use of alternative non-petroleum fuels in a manner that minimizes costs to California and maximizes the economic benefits of in-state production. The SAF Plan assessed various alternative fuels and developed fuel portfolios to meet California's goals to reduce petroleum consumption, increase alternative fuels use, reduce GHG emissions, and increase in-State production of biofuels without causing a significant degradation of public health and environmental quality.

Executive Order S-06-06 (Bioenergy Action Plan)

On April 25, 2006, Governor Schwarzenegger signed EO S-06-06 that established targets for the use and production of biofuels and biopower, and directs State agencies to work together to advance biomass programs in California, while providing environmental protection and mitigation. The EO establishes the following target to increase the production and use of bioenergy, including ethanol and biodiesel fuels made from renewable resources: produce a minimum of 20 percent of its biofuels in California by 2010, 40 percent by 2020, and 75 percent by 2050. EO S-06-06 also calls for the State to meet a target for use of biomass electricity. The 2011 Bioenergy Action Plan identifies those barriers and recommends actions to address them so that the State can meet its clean energy, waste reduction, and climate protection goals. The 2012 Bioenergy Action Plan updates the 2011 Plan and provides a more detailed action plan to achieve the following goals:

- Increase environmentally and economically sustainable energy production from organic waste.
- Encourage development of diverse bioenergy technologies that increase local electricity generation, combined heat and power facilities, renewable natural gas, and renewable liquid fuels for transportation and fuel cell applications.

- Create jobs and stimulate economic development, especially in rural regions of the State.
- Reduce fire danger, improve air and water quality, and reduce waste.

CARB In-Use On-Road and Off-Road Diesel Rules

The CARB rule imposes limits on idling, restricts the addition of older vehicles, and requires the retirement or replacement of older engines depending on their fleet size category. This policy indirectly impacts energy consumption.

More specifically, the California Air Resources Board (ARB) is also charged with developing air pollution control regulations based upon the best available control measures and implementing every feasible control measure under the State and Federal Clean Air Act. (Health & Saf. Code, §§ 39602.5, 39667, 43013, subds. (a) and (h), 43018, 40600, 40601, 40612(a)(2) and (c)(1)(A).) Pursuant to these directives, stringent emission standards were adopted in 2004 for off-road construction equipment (i.e. "Tier 4" standards) (40 Code of Federal Regulations Parts 1039, 1065, and 1068; Cal. Code Regs., tit. 13, § 2025; AR 2854). ARB also adopted emission standards for on-road heavy duty diesel vehicles (i.e. haul trucks). (Cal. Code Regs., tit. 13, § 1956.8.) These haul truck regulations mandate fleet turn-over to ensure that by January 1, 2023 nearly all on-road diesel trucks will have 2010 model year engines or equivalent [i.e. Tier 4]. In addition, interim steps are incorporated into the regulations (e.g., vehicles older than 1999 will be replaced with newer engines by 2020).

California Advance Clean Trucks Program

In June 2020, CARB approved the Advanced Clean Trucks regulation, which requires manufacturers who certify Class 2b-8 chassis or complete vehicles with combustion engines to sell zero-emission trucks as an increasing percentage of their annual California sales from 2024 to 2035. In addition, the regulation requires company and fleet reporting for large employers and fleet owners with 50 or more trucks. By 2045, all new trucks sold in California must be zero-emission. Implementation of this regulation would reduce consumption of nonrenewable transportation fuels as trucks transition to alternative fuel sources.

CARB Advanced Clean Cars Plan

This CARB policy coordinates regulating smog-causing pollutants and GHG emissions through developing more stringent emissions standards for vehicles and improving the number of zero-emission vehicles on the roadways. This policy indirectly impacts energy consumption.

Executive Order B-48-18: Zero-Emission Vehicles

On January 26, 2018, Governor Brown signed Executive Order B-48-18 requiring all State entities to work with the private sector to have at least 5 million zero-emission vehicles (ZEVs) on the road by 2030, as well as install 200 hydrogen fueling stations and 250,000 electric vehicle (EV) charging stations by 2025. It specifies that 10,000 of the EV charging stations should be direct current fast chargers. This order also requires all State entities to continue to partner with local and regional governments to streamline the installation of ZEV infrastructure. The Governor's Office of Business and Economic Development is required to publish a Plug-in Charging Station Design Guidebook and update the 2015 Hydrogen Station Permitting Guidebook to aid in these efforts. All State entities are required to participate in updating the 2016 Zero-Emissions Vehicle Action Plan, along with the 2018 ZEV Action Plan Priorities Update, which includes and extends the 2016 ZEV Action Plan (Governor's Interagency Working Group on Zero-Emission Vehicles 2016, 2018), to help expand private

investment in ZEV infrastructure with a focus on serving low-income and disadvantaged communities.

Executive Order N-79-20

Governor Gavin Newsom signed Executive Order N-79-20 in September 2020, which sets a statewide goal that 100 percent of all new passenger car and truck sales in the State will be zero-emissions by 2035. It also sets a goal that 100 percent of statewide new sales of medium- and heavy-duty vehicles will be zero emissions by 2045, where feasible, and for all new sales of drayage trucks to be zero emissions by 2035. Additionally, the Executive Order targets 100 percent of new off-road vehicle sales in the State to be zero emission by 2035. CARB is responsible for implementing the new vehicle sales regulation.

California Code of Regulations Title 24 (California Building Code)

Updated every three years through a rigorous stakeholder process, Title 24 of the California Code of Regulations requires California homes and businesses to meet strong energy efficiency measures, thereby lowering their energy use. Title 24 contains numerous subparts, including Part 1 (Administrative Code), Part 2 (Building Code), Part 3 (Electrical Code), Part 4 (Mechanical Code), Part 5 (Plumbing Code), Part 6 (Energy Code), Part 8 (Historical Building Code), Part 9 (Fire Code), Part 10 (Existing Building Code), Part 11 (Green Building Standards Code), Part 12 (Referenced Standards Code). The California Building Code is applicable to all development in California. (Health and Safety Code §§ 17950 and 18938(b).)

The regulations receive input from members of industry, as well as the public, with the goal of "[r]educing of wasteful, uneconomic, inefficient, or unnecessary consumption of energy." (Pub. Res. Code § 25402.) These regulations are carefully scrutinized and analyzed for technological and economic feasibility (Pub. Res. Code § 25402(d)) and cost effectiveness (Pub. Res. Code § 25402(b)(2) and (b)(3)).

PART 6 – BUILDING ENERGY EFFICIENCY STANDARDS

CCR Title 24 Part 6 is the Building Energy Efficiency Standards. This code, originally enacted in 1978, establishes energy-efficiency standards for residential and non-residential buildings in order to reduce California's energy demand. The Building Energy Efficiency Standards is updated periodically to incorporate and consider new energy-efficiency technologies and methodologies as they become available. New construction and major renovations must demonstrate their compliance with the current Building Energy Efficiency Standards through submission and approval of a Title 24 Compliance Report to the local building permit review authority and the CEC. Under the 2019 standards, nonresidential buildings will be 30 percent more energy efficient compared to the 2016 standards, and residential homes will be 7 percent more energy efficient. When accounting for the electricity generated by the solar photovoltaic system, residences would use 53 percent less energy compared to homes built to the 2016 standards.

The 2019 Building Energy Efficiency Standards, adopted on May 9, 2018, became effective on January 1, 2020. The 2019 Standards move toward cutting energy use in new homes by more than 50 percent and will require installation of solar photovoltaic systems for single-family homes and multi-family buildings of three stories and less. The 2019 Standards focus on four key areas: 1) smart residential photovoltaic systems; 2) updated thermal envelope standards (preventing heat transfer from the interior to exterior and vice versa); 3) residential and nonresidential ventilation requirements; 4) and nonresidential lighting requirements. Under the 2019 Standards,

nonresidential buildings will be 30 percent more energy-efficient compared to the 2016 Standards, and single-family homes will be seven percent more energy-efficient. When accounting for the electricity generated by the solar photovoltaic system, single-family homes would use 53 percent less energy compared to homes built to the 2016 standards.

PART 11 – CALIFORNIA GREEN BUILDING STANDARDS

The California Green Building Standards Code, referred to as CALGreen, was added to CCR Title 24 as Part 11 first in 2009 as a voluntary code, which then became mandatory effective January 1, 2011 (as part of the 2010 CBC). The 2016 CALGreen institutes mandatory minimum environmental performance standards for all ground-up new construction of non-residential and residential structures. It also includes voluntary tiers (I and II) with stricter environmental performance standards for these same categories of residential and non-residential buildings. Local jurisdictions must enforce the minimum mandatory Green Building Standards and may adopt additional amendments for stricter requirements.

The mandatory standards require:

- 20 percent reduction in indoor water use relative to specified baseline levels;
- 50 percent construction/demolition waste diverted from landfills;
- Inspections of energy systems to ensure optimal working efficiency;
- Low-pollutant emitting exterior and interior finish materials such as paints, carpets, vinyl flooring, and particleboards;
- Dedicated circuitry to facilitate installation of EV charging stations in newly constructed attached garages for single-family and duplex dwellings; and
- Installation of EV charging stations at least three percent of the parking spaces for all new multi-family developments with 17 or more units.

Similar to the compliance reporting procedure for demonstrating Building Energy Efficiency Standards compliance in new buildings and major renovations, compliance with the CalGreen water-reduction requirements must be demonstrated through completion of water use reporting forms for new low-rise residential and non-residential buildings. Buildings must demonstrate a 20 percent reduction in indoor water use by either showing a 20 percent reduction in the overall baseline water use as identified in CalGreen or a reduced per-plumbing-fixture water use rate.

University of California

UC Policy on Sustainable Practices

UC's official sustainability commitment began in 2003 with a Regental action that led to the adoption of a Presidential Policy on Green Building Design and Clean Energy Standards in 2004. Since adopting that policy, UC expanded its sustainability policies to address climate protection, transportation, building operations, waste, procurement, food, water, and health care facilities. The policy was subsequently renamed the UC Policy on Sustainable Practices, which is updated periodically. In the 2007 revision of the UC Policy on Sustainable Practices, the University of California Office of the President (UCOP) committed UC to implementing actions to achieve a reduction in GHG emissions from UC operations and activities to 2000 levels by 2014 and 1990 levels by 2020. Today, UC's official commitment to sustainability across the above-listed sectors is integrated into the UC Policy on Sustainable Practicesupdated in July 2020 (UC 2020). The following

UCR existing policies pertain to direct or indirect energy-related operations of UCR. The following policies are noted from the UC Policy on Sustainable Practices:

- Policy A.1: All new building projects, other than acute care facilities, shall be designed, constructed, and commissioned to outperform the CBC energy-efficiency standards by at least 20 percent or meet the whole-building energy performance targets listed in Table 1 of Section V.A.3 of the UC Policy on Sustainable Practices. The University will strive to design, construct, and commission buildings that outperform CBC energy efficiency standards by 30 percent or more, or meet the stretch whole-building energy performance targets listed in Table 1 of Section V.A.3 of the UC Policy on Sustainable Practices, whenever possible within the constraints of program needs and standard budget parameters.
- Policy A.3: No new building or major renovation that is approved after June 30, 2019 shall use on-site fossil fuel combustion (e.g., natural gas) for space and water heating (except those projects connected to an existing campus central thermal infrastructure). Projects unable to meet this requirement shall document the rationale for this decision, as described in Section V.A.4 of the UC Policy on Sustainable Practices.
- Policy A.4: All new buildings will achieve a U.S. Green Building Council (USGBC) LEED "Silver" certification at a minimum. All new buildings will strive to achieve certification at a USGBC LEED "Gold" rating or higher, whenever possible within the constraints of program needs and standard budget parameters.
- Policy A.5: The UC will design, construct, and commission new laboratory buildings to achieve a minimum of LEED "Silver" certification as well as meeting at least the prerequisites of the Laboratories for the 21st Century (Labs21) Environmental Performance Criteria (EPC). Laboratory spaces in new buildings also shall meet at least the prerequisites of Labs21 EPC. Design, construction, and commissioning processes shall strive to optimize the energy efficiency of systems not addressed by the CBC energy efficiency standards.
- Policy A.7: Major Renovations of buildings are defined as projects 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) shall at a minimum comply with III.A.4 or III.A.5 of the UC Policy on Sustainable Practices. Such projects shall outperform CBC Title 24, Part 6, currently in effect, by 20 percent. This does not apply to acute care facilities.
- Policy A.8: Renovation projects with a project cost of $5 million or greater that do not constitute a Major Renovation as defined in Policy A.7 shall, at a minimum, achieve a LEED-ID+C Certified rating and register with the utilities' Savings by Design program, if eligible. This does not apply to acute care facilities.
- Policy B.1: Each location will implement energy efficiency actions in buildings and infrastructure systems to reduce the location's energy use intensity by an average of least 2 percent annually.
- Policy B.2: Campuses and health locations will install additional on-site renewable electricity supplies and energy storage systems whenever cost-effective and/or supportive of the location's Climate Action Plan or other goals.
- Policy B.3: By 2025, each campus and health location will obtain 100 percent clean electricity. By 2018, the University's Wholesale Power Program will provide 100 percent clean electricity to participating locations.[4]

[4] UCR is not currently a participating location under the Wholesale Power Program.

- Policy B.4: By 2025, at least 40 percent of the natural gas combusted on-site at each campus and health location will be biogas.
- Policy D.1: Each location will reduce GHG emissions from its fleet and report annually on its progress. Locations shall implement strategies to reduce fleet emissions and improve the fuel efficiency of all university-owned or operated fleet vehicles and equipment where practical options exist through acquisition and fleet operation protocols.
    - By 2025, zero-emission vehicles or hybrid vehicles shall account for at least 50 percent of all new light-duty vehicle acquisitions. Lawrence Berkeley National Laboratory will follow federal fleet requirements in the case where federal and UC fleet requirements conflict.
- Policy D.2: The University recognizes that single-occupant vehicle (SOV) commuting is a primary contributor to commute GHG emissions and localized transportation impacts.
    - By 2025, each location shall strive to reduce its percentage of employees and students commuting by SOV by 10 percent relative to its 2015 SOV commute rates;
    - By 2050, each location shall strive to have no more than 40 percent of its employees and no more than 30 percent of all employees and students commuting to the location by SOV.
- Policy D.3: Consistent with the State of California goal of increasing alternative fuel – specifically electric – vehicle usage, the University shall promote purchases and support investment in alternative fuel infrastructure at each location.
    - By 2025, each location shall strive to have at least 4.5 percent of commuter vehicles be ZEV.[5]
    - By 2050, each location shall strive to have at least 30 percent of commuter vehicles be ZEV.

University of California, Riverside

UCR Transportation Demand Management

UCR's Transportation Demand Management (TDM) programs include multi-pronged efforts such as marketing, incentives, expanded vanpool offerings, on- and near-campus housing amenities, parking pricing, and more. UCR encourages students to use designated bike paths to commute to and travel within the campus. Registered bicyclists or walkers are eligible to receive a complimentary bicycle parking allotment and are eligible to utilize the day-use locker and shower facilities at the SRC without charge. UCR has also encouraged ride-sharing services, and the average vehicle ridership has increased from approximately 1.36 to 1.57 occupants per vehicle over the last 15 years. However, it is legally infeasible to mandate ridesharing. (See Health and Safety Code § 40717.9; *Merced Alliance for Responsible Growth v. City of* Merced 2012 WL 5984917.)

Regional and Local (Non-Binding)

As noted in Section 4, "University of California Autonomy," UCR, a constitutionally created State entity, is not subject to municipal regulations of surrounding local governments for uses on property owned or controlled by UCR that are in furtherance of the university's educational purposes. However, UCR may consider, for coordination purposes, aspects of local plans and policies of the communities surrounding the campus when it is appropriate and feasible, but is not bound by those

[5] ZEV stands for a zero-emissions vehicle.

plans and policies in its planning efforts. No regional or local plans related to energy apply to the proposed 2021 LRDP.

4.6.3 Environmental Impacts and Mitigation Measures

Significance Criteria

UCR utilizes the following 2020 CEQA Guidelines Appendix G significance criteria questions related to Energy.

Would the proposed 2021 LRDP:

a) Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?
b) Conflict with or obstruct a State or local plan for renewable energy or energy efficiency?

Issues Not Evaluated Further

All issues applicable to energy listed under the CEQA significance criteria above are addressed in this section.

Analysis Methodology

The approach to analysis related to energy is based on Public Resources Code Section 21100(b)(3) states that an EIR shall include "mitigation measures proposed to minimize significant effects on the environment, including, but not limited to, measures to reduce the wasteful, inefficient, and unnecessary consumption of energy." Guidance for implementing this section is provided in CEQA Guidelines Appendix F (Energy Conservation). Guidelines § 15126.2(b) further explains that "This [energy] analysis may be included in related analyses of air quality, greenhouse gas emissions, transportation or utilities in the discretion of the lead agency." Consistent with that approach, additional discussion of physical environmental impacts associated with production of energy is also included in the other resource chapters of this EIR included but not limited to Greenhouse Gases, Air Quality, Transportation, and Alternatives. The Alternatives discussion includes an overview of whether the project should be implemented (i.e. the No Project Alternative), and discussion of alternative locations.

Energy consumption associated with the proposed 2021 LRDP construction and operation was calculated with regard to stationary and mobile energy demand. The input data and energy demand estimates related to the proposed 2021 LRDP are discussed below.

Construction Energy Consumption

Campus construction stationary and mobile energy demand (related to fuel [diesel, gasoline, and CNG]) associated with the proposed 2021 LRDP was calculated. Construction energy demand considers diesel fuel consumption associated with operation of construction equipment and vendor/hauling truck trips, as well as gasoline fuel consumption associated with worker trips to and from construction sites. Construction stationary and mobile energy consumption (related to diesel and gasoline) from the proposed 2021 LRDP construction were calculated using activity data and assumptions from the CalEEMod output files utilized for the proposed 2021 LRDP's Air Quality analysis and are included in Section 4.3, *Air Quality,* and Appendix C of the EIR. CalEEMod uses activity data (e.g., trip lengths, equipment specifications) provided by the various California air districts to account for local requirements and conditions, and/or user-defined inputs. Construction

equipment estimates are based on surveys of construction projects within California conducted by members of the California Air Pollution Control Officers Association (CAPCOA) (CAPCOA 2017). Construction input data for CalEEMod included but were not limited to: (1) the anticipated construction activity; (2) inventories of construction equipment to be used; (3) areas to be excavated and graded; and (4) volumes of materials to be exported from and imported to the campus.

The manufacturing of construction materials would also involve energy use. However, the California Natural Resources Agency (CNRA) acknowledges that a full lifecycle analysis that would account for energy used in building materials and consumer products will generally not be required (CNRA 2018). Additionally, consistent with CEQA Guidelines Section 15145, this analysis does not evaluate upstream energy use as it is too speculative.

STATIONARY ENERGY DEMAND

Construction stationary energy demand for off-road construction equipment is based on anticipated equipment, usage hours, horsepower, load factors, and construction phase duration provided in the CalEEMod output files from the proposed 2021 LRDP's Air Quality analysis (Appendix C). Fuel consumption is calculated based on compression-ignition engine brake-specific fuel consumption factors in *Exhaust and Crankcase Emission Factors for Nonroad Compression Ignition Engines* (US EPA 2018).

MOBILE ENERGY DEMAND

Construction mobile energy demand considers diesel fuel consumption associated with vendor/hauling truck trips, as well as gasoline fuel consumption associated with worker trips to and from construction sites. According to the USDOT, hauling, vendor, and worker trip fuel consumption considers anticipated daily trips, default trip lengths, and average fuel efficiency values obtained from the Bureau of Transportation Statistics (USDOT 2018).

Operational Energy Consumption

Campus operational stationary and mobile energy demand (related to electricity, natural gas, and fuel [diesel, gasoline, and CNG]) associated with the proposed 2021 LRDP was calculated as explained in detail below.

STATIONARY ENERGY DEMAND

Operational stationary energy demand from new building construction under the proposed 2021 LRDP was determined using specific growth factors. Indicator growth rates were developed from 2018 baseline activity (i.e., energy use) levels, existing building square footage, and campus population. Energy use from existing buildings (i.e., natural gas and electricity consumption) is based on actual energy data provided by UCR from the respective utilities, RPU, and Shell Energy. Energy use in the form of diesel consumption for diesel generators is also based on gallons of diesel consumption provided by UCR. The developed growth rates were then multiplied by the anticipated building square footage growth in the proposed 2021 LRDP to develop the anticipated energy demand projection that is representative of future operational energy demand (i.e., natural gas, electricity, and diesel) for buildings. While the UC Policy on Sustainable Practices requires all new buildings to be fully electric and not heated using natural gas (UC 2020), it was conservatively assumed that natural gas consumption on campus would increase following the same growth rates as determined for the 2018 baseline year.

The energy use intensity (EUI) factors and building gross square footage provided by UCR were utilized to estimate annual natural gas and electricity use by building type for both existing buildings and future building (see Appendix F for details). Energy use for existing buildings was based on the EUI associated with the current level of energy performance at the time of the study, while energy use for future buildings was based on the EUI for the escalating California Title 24 code. UCR distinguished existing and future buildings by building or land use type allowing for the application of the appropriate EUI. Existing building EUIs and EUIs for new buildings built to the current code were determined by UCR in the Brightworks Study for four building types. Existing and new building EUIs by building type utilized for the operational energy calculations are as follows:

- Academic/Administrative
  - Existing EUI: 107 thousands of British thermal units per square foot per year (kBtu/sf-yr)
  - New EUI: 65 kBtu/sf-yr
- Lab/Complex
  - Existing EUI: 253 kBtu/sf-yr
  - New EUI: 149 kBtu/sf-yr
- Residential
  - Existing EUI: 83 kBtu/sf-yr
  - New EUI: 57 kBtu/sf-yr
- Social
  - Existing EUI: 180 kBtu/sf-yr
  - New EUI: 107 kBtu/sf-yr

EUIs for existing and future buildings were applied to the 2021 LRDP buildings gross square feet based on building type defined as academic/admin, lab/complex, residential, or social. See Appendix F for details regarding designation of the proposed 2021 LRDP buildings by type and calculations of energy use based on EUI. Additional energy efficiency improvements from State legislation (i.e., Title 24) were incorporated under the legislative-adjusted scenario as described in detail in Appendix F.

MOBILE ENERGY DEMAND

Operational mobile energy demand would be related to the UCR vehicle fleet/department vehicles, as well as fuel consumption due to VMT associated with student, faculty, commercial vendor and visitor populations commuting to campus via their own vehicle or using transit. In addition, mobile energy consumption also occurs from UCR business air travel activity.

UCR Vehicle Fleet

Fuel consumption by the UCR vehicle fleet are based on fuel consumption data tracked by UCR for the 2018 baseline year. Unleaded gasoline, CNG, and diesel are the fuels used by the vehicle fleet and department vehicles.

Indicator growth factors were developed from this 2018 baseline activity (i.e., fuel use) levels and existing campus population. The growth factor was multiplied by the anticipated campus population growth in the proposed 2021 LRDP to develop the projected fuel demand, which is representative of future operational fuel demand (i.e., unleaded gasoline, CNG and diesel) for the UCR fleet.

Non-UCR Vehicles

With respect to non-UCR fleet, non-transit mobile sources, daily VMT for the 2018 baseline year and for future buildout years under the proposed 2021 LRDP are based on the TIA prepared by Fehr & Peers (Appendix J). Project-generated VMT was estimated using the Origin/Destination method and was categorized by the following vehicle categories: passenger, light-heavy duty, medium-heavy duty, and heavy-heavy duty.[6] Daily VMT were adjusted to annual VMT using a conversion factor of 315 which accounts for UCR's academic schedule, holidays, and enrollment levels during summer and regular academic quarters. EMFAC2017 was used to determine the percent distribution of fuel type (i.e., gasoline, diesel, electric) across the above-mentioned vehicle categories. EMFAC2017 incorporated the latest data on California's vehicle fleet and travel activity at the time of publication, including vehicle age distributions and turn-over assumption, as well as changes in emission standards due to federal and State rulemaking and projected technology penetration in the vehicle market including projected ZEV sales based on State goals and policies. The projected fuel distribution percentage by vehicle category was multiplied by the VMT traveled by the corresponding vehicle class to determine the mileage traveled by fuel type by vehicle class. This was then divided by the average fuel efficiency values for the fuel type and vehicle class to determine the fuel consumed (i.e., gasoline, diesel, electricity) for non-UCR fleet, non-transit vehicle trips attributed to UCR (USDOE 2020a; 2020b). Fuel efficiency values were conservatively based on current average fuel economy by vehicle class (USDOT 2018; USDOE 2021a).

Transit Vehicles

Fuel consumption due to UCR staff and student travel on transit systems were calculated based on the UCR population that rides bus transit lines that stop, originate, or terminate on the UCR campus. UCR provided ridership data for the Riverside Transit Agency (RTA) bus routes that are subsidized through the UPASS bus subsidy program for the 2018 baseline year. UPASS ridership data indicates the number of rides taken under a UPASS and affiliated with UCR. Indicator growth factors were developed from this 2018 baseline activity (i.e., UCR transit VMT) levels and existing campus population. The growth factor was multiplied by the anticipated campus population growth in the proposed 2021 LRDP to estimate the annual total VMT traveled on transit buses attributed to UCR. Transit VMT was divided by the average fuel efficiency (miles per gasoline gallon equivalent [GGE]) for transit buses obtained from the USDOE to estimate the gallons of gasoline equivalent consumed for transit buses (USDOE 2020a; 2021a). Fuel efficiency values were conservatively based on current average fuel economy for transit vehicles (USDOE 2020a; 2021b).

Aviation Travel

Fuel consumption due to UCR faculty business travel via aviation were calculated based on the passenger miles traveled by air by UCR staff in 2018. UCR tracks faculty and staff air travel through an invoice tracking system (Balboa Carbon Emission Air Detail). Recorded passenger air miles by UCR faculty and staff does not include other faculty travel booked separately outside the UCR travel booking system. Indicator growth factors were developed from this 2018 activity (i.e., UCR air-line passenger miles) levels and existing campus population. The growth factor was multiplied by the anticipated faculty/staff population growth in the proposed 2021 LRDP to estimate the annual passenger miles traveled via aviation attributed to UCR. Passenger miles were converted to energy use in British Thermal Units (BTU) based on the Federal Aviation Administration (FAA) energy

[6] Origin-Destination Model includes 50 percent of trips from internal-external and external internal, 100 percent of internal-internal trips, and excludes external-external trips.

intensity factor of 2,654 BTU per passenger mile (FAA 2015). Energy use was converted to gallons of aviation gasoline based on the fuel's standard heat content of 0.120 MMBtu per gallon of aviation gasoline (TCR 2020).

For a detailed description of all aforementioned energy model input and output parameters, and assumptions, see Appendix F.

To determine whether the proposed 2021 LRDP would result in significant impacts related to energy under criterion "a" above, the following methodology would apply.

- Utilize larger amounts of operational per capita energy use compared to:
  - UCR existing baseline (2018) per capita energy use; or
  - Annualized regional (2018) per capita energy use

A comparison is first provided in terms of UCR per capita energy use in 2035 against existing UCR per capita energy use in 2018. If UCR per capita energy use in 2035 shows to be higher than UCR per capita energy use in 2018 for a particular energy type, then UCR per capita energy use in 2035 for that energy type is also compared to annualized regional energy use for that energy type. UCR has decided to utilize the comparative change in per capita energy use. In addition, UCR has jurisdiction over campus land uses and the associated energy efficiency and renewable energy use levels.

To determine whether the proposed 2021 LRDP would result in significant impacts related to energy under significance criterion "b," the following methodology would apply.

- Result in an inconsistency with any of the following applicable regulations for increased energy efficiency and increased renewable energy use:
  - CBC Title 24 (including CALGreen and State Energy Efficiency Standards)
  - SB 100 – State 2045 100 percent clean energy goal
  - UC Policy on Sustainable Practices

The proposed 2021 LRDP is considered consistent with the provisions of the identified plans if it will further the objectives and policies of the plans and not obstruct their attainment. A given plan or project need not be in perfect conformity with every policy nor does State law require precise conformity of a proposed plan or project with every policy. Courts have also acknowledged that plans attempt to balance a range of competing interests, and that it is nearly, if not absolutely, impossible for a plan or project to be in perfect conformity with each and every policy set forth in applicable plans.

2021 LRDP Objectives and Policies

The proposed 2021 LRDP contains objectives and policies relevant to energy:

Mobility (M)

- Objective M1: Reduce future vehicular traffic, parking demand, and GHG emissions, by increasing student housing on campus up to 40 percent of the projected enrollment in 2035.
  - Policy: Continue to grow and support on-campus residency by focusing on more affordable student housing options, as well as the capacity for returning students (upperclassmen) and graduate students.
  - Promote public transit as a convenient and preferred mode of commuting to campus and connecting campus residents to the community and regional destinations.

  - Policy: Develop the University Avenue and Canyon Crest Drive Gateway streetscapes to support increased use and functional efficiency of the RTA system, improved clarity of drop-off and pick-up locations for ride-sharing services, reduced conflict, and improved safety for cyclists, pedestrians, and emerging micro-mobility[7] solutions in these increasingly busy mixed-mode circulation areas.
  - Policy: Improve access to public transit on campus by providing connectivity to access points via pathways or shuttles, as well as comfortable waiting facilities, proximate to commuter related services, where appropriate.
  - Policy: Advocate and support the development of a Metrolink train platform along Watkins Drive adjacent to campus to provide direct access and significantly reduce commute times. Consider dedicated vanpools or shuttles to nearby stations in the interim.
- Objective M2: Invest in infrastructure to increase bicycle use and support other active transportation modes to integrate desired routes with the campus' and City's circulation framework.
  - Policy: Support and facilitate City-led initiatives to extend bikeways to campus from every direction, including routes proposed along Canyon Crest Drive, Martin Luther King Boulevard, and the Gage Canal.
  - Policy: Develop wayfinding systems to interconnect preferred bicycle routes and invest in safe and secure pathways along all bicycle routes.
  - Policy: Provide adequate support amenities to facilitate and encourage the use of bicycles and other alternative transportation modes.
  - Policy: Develop a comprehensive improvement plan for Campus Drive to improve function, safety and utility for each mode of travel, as incremental growth occurs.
- Objective M3: Emphasize safe and pleasing passage for pedestrians and bicycle riders through the careful, continued development and integration of the campus' multi-modal circulation framework and its extensions into the immediate community.
  - Policy: Identify and address gaps within the existing non-motorized circulation network, both on-campus and within the adjacent community.
  - Policy: Implement University policies to improve pedestrian safety and encourage social interaction in zones of high pedestrian activity.

Campus Utility Infrastructure (INF) – Energy (E)

- Objective INF E1: Prioritize redundancy and overall reliability in the campus' power distribution network.
  - Policy: Ensure infrastructure services and demands are regularly monitored and expanded as needed to meet applicable planned campus development.
- Objective INF E2: Emphasize high-performance new construction and building retrofits in support of the UC Policy on Sustainable Practices and minimize the need to purchase carbon offsets.

[7] Micro-mobility is a category of modes of transport that are provided by very light vehicles such as electric scooters, electric skateboards, shared bicycles and electric pedal assisted bicycles. The primary condition for inclusion in the category is a gross vehicle weight of less than 500 kg.

  - Policy: For mechanical systems in existing facilities, a 30 percent reduction in electrical energy use is projected, inclusive of a 30 percent reduction in electrical energy usage in existing facilities' mechanical systems.
  - Policy: Take the fullest possible advantage of RPU's clean energy plans and the City's "greening of the grid" initiatives.
  - Policy: Achieve a 5 percent improvement in energy performance for new building mechanical systems through retro-commissioning.
- Objective INF E3: Support alternative measures (e.g. alternative fuels, energy sources, practices, carbon offsets, etc.) and mixed energy source portfolios in support of green sustainability practices.
  - Policy: Continuously explore the potential to use alternative fuels over time as they become feasibly available.
  - Policy: Evaluate procurement options for alternative energy while considering long-term financial viability for the University.
  - Policy: Incorporate solar panels on the roofs of new construction to the maximum feasible extent.
  - Policy: Incorporate solar panels as integral elements of new construction design and applicable green building certifications to the maximum feasible extent.

Campus Utility Infrastructure (INF) – Natural Gas (NG)

- Objective INF NG1: Reduce reliance on natural gas in conformance with UC policies.
  - Policy: Future projects shall not employ or expand demand for natural gas as an energy source.
  - Policy: Continue to work with RPU and UCOP to reduce current natural gas demand through efficiency improvements to the existing system, conversion of steam boilers to electricity as they are replaced over time, and, rigorous pursuit of obtaining sources for biogas, or renewable energy credit purchases to fully offset GHG emissions in conformance with UC policies.
  - Policy: Take the fullest possible advantage of RPU's clean energy plans, and the City's "greening of the grid" initiatives.

Campus Utility Infrastructure (INF) – Potable Water, Wastewater and Irrigation (WWI)

- Objective INF WWI1: Commit to a multi-prong approach to conserving potable water use.
  - Policy: Reduce potable water use in an existing building in the Academic Center by 20 percent.
  - Policy: Reduce potable water use in student residential buildings by 30 percent.
  - Policy: Reduce potable water use in new facilities by exceeding applicable codes by a minimum of 20 percent.
  - Policy: Retrofit existing urinals, toilets, showerheads, and faucets for existing buildings with higher water efficiency rated equipment.
- Objective INF WWI2: Explore options to shift away from potable water use where feasible.
  - Policy: Design new building irrigation and efficient toilet flushing systems for use with future non-potable water sources.

- Policy: Achieve a further 20 percent reduction of potable water use for irrigation by extending Gage Canal water to also irrigate the UCR Botanic Gardens and reducing turf on campus and replacing with lower use landscaping.

Campus Sustainability (CS)

- Objective CS1: Continue to build on this commitment to environmental stewardship to account for the impacts of development and expansion of campus infrastructure. Major planning and policy issues of the University will be subject to include the following:
  - Policy: Carbon Neutrality Initiative: Carbon Neutral by 2025 – Climate neutrality from Scope 1 & Scope 2 sources by 2025.
  - Policy: Climate neutrality from specific Scope 3 sources by 2050 or sooner - At a minimum, meet the UC intermediate goal in pursuit of climate neutrality (See Assembly Bill [AB 32], and California Global Warming Solutions Act of 2006: emission limit [SB 32].
  - Policy: Energy Efficiency: UC Annual 2 percent Energy Use Intensity (EUI) Reduction Policy (Energy Efficiency) – Each location will implement energy efficiency actions in buildings and infrastructure systems to reduce the location's energy use intensity by an average of at least 2 percent annually.
  - Policy: On-Campus Renewable Electricity – Campuses and health locations will install additional on-site renewable electricity supplies and energy storage systems whenever cost-effective and/or supportive of the location's Climate Action Plan or other goals.
  - Policy: Off-Campus Clean Electricity: 100% Renewable Electricity by 2025 – By 2025, each campus and health location will obtain 100% clean electricity.
  - Policy: On-Campus Combustion – By 2025, at least 40 percent of the natural gas combusted on-site at each campus and health location will be biogas.

Impact Analysis

Impact E-1 RESULT IN WASTEFUL, INEFFICIENT, AND UNNECESSARY USE OF ENERGY.

THE PROPOSED 2021 LRDP WOULD CONSUME ELECTRICITY, NATURAL GAS, AND FUEL DURING CONSTRUCTION AND OPERATION THAT WOULD EXCEED THE UCR 2018 PER CAPITA ENERGY USE AND ANNUALIZED REGIONAL 2018 PER CAPITA ENERGY USE THRESHOLD. IMPACTS WOULD BE LESS THAN SIGNIFICANT WITH THE IMPLEMENTATION OF MITIGATION.

Construction Energy Demand

During construction of projects under the proposed 2021 LRDP, energy would be primarily consumed in the form of petroleum-based fuels used to operate heavy equipment, light-duty vehicles, machinery, power off-road construction vehicles and equipment on the campus, construction worker travel to and from the campus, and vehicles used to deliver construction materials to the campus. Other types of energy consumption expended during construction (i.e., temporary lighting during winter hours) would be negligible. Therefore, only gasoline and diesel fuels are included in the construction energy analysis.

Construction equipment use and associated energy consumption would be typical of that associated with construction of new residential and educational land uses on campus. In other words, there are no unusual project characteristics that would necessitate the use of construction equipment that

would be less energy efficient than those used at comparable construction sites in other parts of the region. Idling of on-site equipment during construction would be limited to no more than five minutes in accordance with California Code of Regulations Title 13, Section 2485, Airborne Toxic Control Measure to Limit Diesel-Fueled Commercial Motor Vehicle Idling. CALGreen includes specific requirements related to recycling, construction materials, and energy efficiency standards that would apply to future development envisioned by the proposed 2021 LRDP. As discussed in greater detail in Section 4.17, *Utilities and Service Systems,* UCR has a successful solid waste diversion program for construction materials which will continue to be implemented.

Construction equipment would also be required to comply with federal and State fuel efficiency standards for on-road and off-road construction equipment. As discussed in the Regulatory Setting discussion, stringent emission standards were adopted for off-road construction equipment (i.e. "Tier 4" standards) (40 Code of Federal Regulations Parts 1039, 1065, and 1068; Cal. Code Regs., tit. 13, § 2025; AR 2854). ARB also adopted emission standards for on-road heavy duty diesel vehicles (i.e. haul trucks). (Cal. Code Regs., tit. 13, § 1956.8.) These haul truck regulations mandate fleet turn-over to ensure that by January 1, 2023 nearly all on-road diesel trucks will have 2010 model year engines or equivalent [i.e., Tier 4]. In addition, interim steps are incorporated into the regulations (e.g., vehicles older than 1999 will be replaced with newer engines by 2020). ARB regularly evaluates and updates these regulations to implement the best available control measures and implementing every feasible control measure.

Further, on-site construction equipment may include alternatively-fueled vehicles (such as natural gas) where feasible. Finally, the selected construction contractors would use the best available engineering techniques, construction and design practices, and equipment operating procedures, thereby ensuring that the wasteful consumption of fuels and use of energy would not occur. Energy efficiency is also expected for the off-site production of construction materials, based on the economic incentive for efficiency and cost savings. Furthermore, such construction energy expenditures are necessary to implement the UC's constitutional obligations and are necessary to meet the project objectives.

As such, the proposed 2021 LRDP would not **r**esult in a wasteful, inefficient, or unnecessary use of energy during construction. Therefore, the proposed 2021 LRDP impacts related to construction energy consumption would **be less than significant**.

Operational Energy Demand

Operation of the proposed 2021 LRDP would include consumption of fuel (gasoline, diesel, and CNG) related to on-road vehicle travel and UCR business air travel. In addition, operation of campus buildings and other facilities anticipated under the proposed 2021 LRDP would require electricity and natural gas usage for lighting, space and water heating, appliances, lab equipment, water conveyance, and landscaping maintenance equipment. Furthermore, emergency operation of backup energy generators (when applicable) would require diesel fuel consumption.

Operational Mobile Energy Consumption

The proposed 2021 LRDP operation would entail mobile energy consumption (electricity, natural gas, and fuel [gasoline, diesel, and CNG]) related to VMT associated with UCR operation.

Taking the State operational energy standards and requirements into account, Table 4.6-9 shows mobile energy types and amounts that would be consumed during the proposed 2021 LRDP operational activities.

Table 4.6-9 Proposed 2021 LRDP Operational Mobile Energy Consumption

Mobile Fuel Source (Units)[1]	Baseline Annualized Fuel Use (2018)	Baseline Per Capita Fuel Use (2018)[2]	Total 2021 LRDP Fuel Use (2022-2035) [3]	2021 LRDP Annualized Fuel Use	2021 LRDP per Capita Annualized Fuel Use (2035)[4]	Regional Baseline per Capita Fuel Use (2018)[5]
UCR Vehicles (fleet/department)						
Unleaded Gasoline (gallons)	135,192	4.72	2,458,971	175,641	4.13	See total below
Diesel (gallons)	7,306	0.25	132,887	9,492	0.22	See total below
CNG (gallon equivalents)[6]	4,321	0.15	78,594	5,614	0.13	N/A
On-Campus Non-UCR Vehicles (campus commuters, commercial vendors, etc.)						
Unleaded Gasoline (gallons)	2,100,859	73	40,448,937	2,889,210	68	See total below
Diesel (gallons)	247,811	9	2,356,454	168,318	4	See total below
Mobile Electricity (kwh)	75,551	3	10,276,772	734,055	17	N/A
Public Transit Vehicles (attributed to UCR)						
CNG (gallon equivalents)[6]	125,126	4	2,275,891	162,564	4	N/A
Air travel (attributed to UCR)						
Aviation Gasoline (gallons)	182,979	6	3,498,459	249,890	6	N/A
Total Use by Fuel Type (gallons)[5]						
Unleaded Gasoline	**2,236,051**	**78**	**42,907,908**	**3,064,851**	**72**	**437**
Diesel	**255,117**	**8.9**	**2,489,341**	**177,810**	**4.2**	**55**

[1] Mobile fuel use attributed to UCR is based on type of activity (i.e., UCR fleet, transit, air travel and non-UCR fleet), vehicle type, fuel use and activity data provided by UCR and described in above sections.

[2] Based on 2018 campus population of 28,661.

[3] Total fuel consumption of LRDP is based on buildout starting in 2022 and ending in 2035 (i.e., 14 years). Vehicle fuel usage is based on EMFAC2017 data which accounts for federal and State emission standards, forecasts ZEV penetration based on State goals, and incorporates State regulations as time of publication including SB 1 and therefore intrinsically accounts for changes in fuel distribution, vehicle turn-over, and vehicle activity. EMFAC2017 does not account for the SAFE rule.

[4] Based on 2021 LRDP academic year 2035 campus population of 42,545.

[5] Regional totals don't include mobile electricity, transit, or air travel, as there is not a regional equivalent.

[6] CNG fuel consumption by fleet vehicles received by UCR is expressed as gallon equivalents. CNG = 1 gasoline equivalent gallons and there are 1027 BTUs/standard cubic foot (SCF).

Totals may not add up due to rounding.

CNG = compressed natural gas; kWh = kilowatt hour

Sources: CARB 2018; Data and calculations compiled by Rincon Consultants (see Appendix F)

As shown in Table 4.6-9, with annualization over 14 years of the proposed 2021 LRDP development, operational per capita gasoline fuel use in 2035 would be approximately 72 gallons, and operational per capita mobile diesel fuel use in 2035 would be approximately 4.2 gallons.

Comparatively, operational per capita gasoline fuel use for 2018 baseline was approximately 78 gallons, and operational per capita mobile diesel fuel use for 2018 baseline was approximately 8.9 gallons. And while per capita 2035 electricity consumption by commuter vehicles is estimated to be greater than UCR per capita 2018 electricity consumption by commuter vehicles, such electricity consumption by commuter vehicles would be in lieu of comparable gasoline fuel use. Thus, UCR per

capita 2035 operational mobile energy use would be less than UCR per capita 2018 (i.e., baseline) operational mobile energy use for gasoline and diesel.

For informational purposes, UCR per capita 2035 operational mobile energy use would also be less than annualized regional (2018) per capita operational mobile energy use for gasoline and diesel. While mobile operation would also entail consumption of some CNG fuel by UCR fleet/department vehicles and some electricity by commuter vehicles, there are no respective mobile CNG and mobile electricity annualized regional (2018) numbers for comparison purposes. In addition, UCR would incorporate the VMT reduction and mobile energy efficiency strategies discussed immediately below as part of the UC Policy on Sustainable Practices and its TDM Program. However, UCR-specific operational energy policies were not incorporated into the operational mobile energy modeling to provide a conservative estimate related to operational mobile energy consumption.

UC Policy D.2 focuses upon reducing VMT by reducing personal vehicles use. More specifically that policy provides that by 2025, each location shall strive to reduce its percentage of employees and students commuting by SOV by 10 percent relative to its 2015 SOV commute rates; By 2050, each location shall strive to have no more than 40 percent of its employees and no more than 30 percent of all employees and students commuting to the location by SOV. However, as noted in the Regulatory Setting, it is legally infeasible to mandate ridesharing, however the UCR TDM program has been successful in reducing SOV trips. Over the last 15 years this program has increased average ridership per vehicle from approximately 1.36 to 1.57 occupants per vehicle. Furthermore, to further reduce VMT, UCR has proposed to substantially increase the amount of on-campus housing to avoid commuter trips. More specifically, the 2021 LRDP proposed to house approximately 40 percent of the eligible student population on campus (approximately 68 percent of the increase in students). Additional discussion of increased on-campus housing alternatives is provided in Section 7.5.3, *Alternative 3: Increased Student Housing.*

As discussed in Section 4.6.2, *Regulatory Setting*, federal and State law control fuel efficiency standards for cars and light-duty trucks. While the Trump Administration sought to relax those standards through recission of California's Clean Air Act waiver, California will likely retain the ability to enforce its more stringent fuel economy standards through the lawsuit the State filed, or through the Biden Administrations formal proposal to reissue California's waiver. It is, however, legally infeasible for individual agencies to adopt more stringent fuel efficiency standards for members of the public. The CAA (42 USC Section 7543[a]) states that “no State or any political subdivision therefore shall adopt or attempt to enforce any standard relating to the control of emissions from new motor vehicles or new motor vehicle engines subject to this part.” However, UCR is subject to several Executive Orders and UC Policies designed to increase the number of electric vehicles owned by UCR, thereby reducing fossil fuel demand. More specifically, EO N-79-20 targets 100 percent of new off-road vehicle sales in the State to be zero emission by 2035. Similarly, UCOP Policy D.1 provides “By 2025, zero-emission vehicles or hybrid vehicles shall account for at least 50 percent of all new light-duty vehicle acquisitions.”

As such, the proposed 2021 LRDP would not result in a wasteful, inefficient, or unnecessary consumption of energy during operation compared to UCR 2018 (i.e., baseline) per capita energy use and annualized regional 2018 per capita energy use regarding gasoline and diesel. Therefore, the proposed 2021 LRDP impacts related to operational mobile energy consumption would be **less than significant**.

Operational Stationary Energy Consumption

The proposed 2021 LRDP operation would entail stationary energy consumption (electricity, natural gas, and fuel [gasoline, diesel, and CNG]) related to increased University capacity and overall building square footage. All newly constructed buildings under the proposed 2021 LRDP would comply with all building design standards set in the CBC Title 24, which are statutorily adopted to avoid the wasteful, inefficient, or unnecessary consumption of energy resources during operation**.** CALGreen (California Code of Regulations, Title 24, Part 11) requires implementation of energy efficient light fixtures and building materials into the design of new construction projects. Furthermore, the 2019 Building Energy Efficiency Standards (CBC Title 24, Part 6) requires newly constructed buildings to meet energy performance standards set by the CEC. As the name implies, these standards are specifically crafted for new buildings to result in energy efficient performance so that the buildings do not result in wasteful, inefficient, or unnecessary consumption of energy. The standards are updated approximately every three years and each iteration is more energy efficient than the previous standards. Future campus projects would be required to comply with the most current CBC Title 24 requirements.

UCR would incorporate other green building strategies as part of the UC Policy on Sustainable Practices into new development including energy consumption reduction targets and water use reduction. However, UCR-specific operational energy policies were not incorporated into the operational stationary energy modeling to provide a conservative estimate related to operational stationary energy consumption.

Table 4.6-10 shows stationary energy types and amounts that would be consumed during the proposed 2021 LRDP operational activities.

Table 4.6-10 Proposed 2021 LRDP Operational Stationary Energy Consumption

Energy Source (Units)	Baseline Energy Use (2018)	Baseline Per Capita Energy Use (2018)[1]	Total 2021 LRDP Energy Use (2022-2035)[2]	2021 LRDP Annualized Energy Use	2021 LRDP per Capita Annualized Energy Use (2035)[3]	Regional Baseline per Capita Energy Use (2018)
Stationary and Mobile Electricity Use[4] (kWh)	119,036,226	4,153	3,734,880,755	266,777,197	6,270	6,900[5]
Natural Gas (therms)	3,466,942	121	105,251,203	7,517,943	177	166[6]
Diesel (gallons)	8,003	0.28	226,586	16,185	0.38	N/A[7]

[1] Based on 2018 campus population of 28,661.

[2] Total 2021 LRDP energy use is based on buildout starting in 2022 and ending in 2035 (i.e., 14 years)

[3] Based on 2021 LRDP academic year 2035 campus population of 42,545.

[4] Mobile electricity usage is based on the VMT assumed to be traveled by EVs given the EMFAC2017 forecasted fuel distribution associated with EV penetration included in the model based on State ZEV goals. VMT was converted to electricity usage using the conversion factor of 25 kWh per 100 miles (USDOE 2020b).

[5] RPU service area per capita energy use is used for comparison in terms of electricity use.

[6] Riverside County (SoCalGas) per capita energy use is used for comparison in terms of natural gas use.

[7] There is no regional per capita stationary diesel gas use equivalent.

kWh = kilowatt hour

Source: Data and calculations compiled by Rincon Consultants (see Appendix F).

As shown in Table 4.6-10, with annualization over 14 years of the proposed 2021 LRDP development, operational per capita stationary and mobile electricity use in 2035 would be approximately 6,270 kWh, operational per capita stationary natural gas use for the LRDP in 2035 would be approximately 177 therms, and operational per capita stationary diesel use for LRDP in 2035 would be approximately 0.38 gallon. Comparatively, operational per capita stationary and mobile electricity use for 2018 (i.e., baseline) was approximately 4,153 kWh, operational per capita stationary natural gas use for 2018 baseline was approximately 121 therms, and operational per capita stationary diesel use for 2018 baseline was approximately 0.28 gallon. Thus, UCR per capita 2035 operational stationary energy use would be greater than UCR per capita 2018 (i.e., baseline) operational stationary energy use for all energy types (electricity, natural gas, and diesel).

And while UCR per capita 2035 stationary electricity use would be less than annualized regional (2018) per capita stationary electricity use, UCR per capita 2035 mobile natural gas use would still be greater than annualized regional (2018 baseline) per capita stationary natural gas use. Furthermore, while emergency operation of backup diesel generators (when applicable) is estimated to be greater than UCR per capita 2018 backup diesel generator use, emergency generator use is unpredictable, uncommon in occurrence, and has no comparative annualized regional per capita amount. Nevertheless, the proposed 2021 LRDP would result in a potentially significant environmental impact due to consumption of energy during operation (stationary) compared to UCR 2018 (i.e., baseline) per capita operational (stationary) energy use with regard to all energy types and compared to annualized regional 2018 per capita operational (stationary) energy use with regard to natural gas. Therefore, impacts would be **significant** related to operational stationary energy consumption.

Overall, the 2021 LRDP would result in potentially significant impact related to operational energy consumption. Implementation of Mitigation Measure **MM GHG-1** (Measures EN3 and EN5) would be required to reduce the proposed 2021 LRDP operational stationary consumption related to electricity and natural gas to **less than significant levels**.

Mitigation Measures

Implementation of Mitigation Measure **MM GHG-1** (Measures EN3 and EN5) is required for operational (stationary) energy impacts. Refer to Mitigation Measure **MM GHG-1** in Section 4.8, *Greenhouse Gas Emissions.* No mitigation is required for operational (mobile) energy impacts. No mitigation is required for construction (stationary and mobile) energy use impacts.

MM GHG-1 Implement On-Campus GHG Emissions Reduction Measures

UCR shall implement the following GHG emissions reduction measures by scope emissions category:

SCOPE 2 (ELECTRICITY CONSUMPTION AND GENERATION)

Energy (EN)

- Measure EN3: UCR shall work to obtain 100 percent clean-sourced electricity through either Riverside Public Utilities (RPU) and/or through the installation of on-site clean-sourced electricity sources for all new buildings by 2025. In addition, UCR shall establish annual budgets that include funding to purchase 100 percent clean energy. Furthermore, all newly constructed building projects, other than wet lab research laboratories, shall be designed, constructed, and commissioned to outperform the California Building Code (Title 24 portion of the California Code of Regulations) energy efficiency standards by at least 20 percent. Finally, UCR shall

incorporate solar PV as feasibly possible for newly constructed and majorly-renovated buildings with the maximum system size, highest solar panel efficiency, and greatest system performance.[8]

- Measure EN5 (Parts A, B, C): In order to prioritize energy efficiency and green building initiatives for building/facility upgrades and new construction as well as reduced energy use, UCR shall identify aging equipment throughout the campus such as equipment associated with the UCR Central Plant, electrical distribution system, and building HVAC systems and develop a strategy and schedule to upgrade such equipment with high-energy efficiency systems and optimize HVAC systems through heat zoning, high-efficiency filters, and shut-down times expansion. The strategy shall include an evaluation and cost analysis related to upgrading/retrofitting equipment versus retirement of equipment if no longer needed with future initiatives (i.e., Central Plant boiler retirement). The schedule and upgrade strategy must meet a 2 percent energy efficiency improvement annually through 2035. In addition, UCR shall require new buildings to incorporate occupancy sensors and controls such that lighting of shared spaces is on occupancy sensors, building temperature set points are widened and aligned with occupancy schedules, and ventilation systems are converted from constant volume to variable so ventilation rates are occupancy-based. Furthermore, UCR shall develop a plan to identify existing buildings and projects that could undergo upgrades to the control systems and establish a schedule for upgrade incorporation. Finally, UCR shall develop a tracking program to monitor and share campus energy efficiency activities and progress towards increased energy efficiency.

Significance After Mitigation

While implementation of the proposed 2021 LRDP will increase energy use at UCR above UCR 2018 (i.e., baseline) conditions, as detailed in Table 4.6-11, incorporation of energy saving measures would reduce energy consumption under the proposed 2021 LRDP to below regional 2018 (i.e., baseline) conditions. This demonstrates the University's efficient and non-wasteful or unnecessary use of energy in relation to the surrounding community.

Table 4.6-11 Proposed 2021 LRDP Mitigated Operational Stationary Energy Consumption

	Operational Stationary Energy Use (Units)		
	Electricity Use (kWh)[1]	**Natural Gas (therms)**	**Diesel (gallons)**
Before Mitigation			
2021 LRDP Annualized Energy Use Before Mitigation	266,777,197	7,517,943	16,185
2021 LRDP per Capita Annualized Use Before Mitigation (2035)[2]	**6,270**	**177**	**0.38**
UCR Baseline Per Capita Consumption[2]	4,153	121	0.28
Regional Baseline Per Capita Consumption	6,900	166	N/A
Exceeds UCR Baseline per Capita?	***Yes***	***Yes***	***Yes***
Exceeds Regional Baseline per Capita?	***No***	***Yes***	**–**

[8] The EIR GHG modeling effort assumes clean energy is in line with California-defined renewable sources.

	Operational Stationary Energy Use (Units)		
	Electricity Use (kWh)[1]	**Natural Gas (therms)**	**Diesel (gallons)**
With Implementation of Mitigation Measures MM GHG-1, Measures EN3 and EN5			
Annual Mitigation Reduction[4]	52,748,273	1,134,115	0
2021 LRDP Annualized Energy Use with Mitigation[5]	214,028,924	6,383,828	16,185
2021 LRDP per Capita Annualized Use with Mitigation (2035)[3]	**5,031**	**150**	**0.38**
UCR Baseline Per Capita Consumption[2]	4,153	121	0.28
Regional Baseline Per Capita Consumption	6,900	166	N/A
Exceeds UCR Baseline per Capita?	***Yes***	***Yes***	Yes
Exceeds Regional Baseline per Capita?	***No***	***No***	**–**

[1] Includes stationary and mobile energy consumption.

[2] Based on 2018 campus population of 28,661.

[3] Based on 2021 LRDP academic year 2035 campus population of 42,545.

[4] Includes GHG Mitigation Measure MM GHG-1 (Measures EN3 and EN5) that reduce energy use that includes increase energy efficiency by 2 percent each year for existing buildings, replacing aging equipment, exceeding Title 24 by 20 percent for new buildings, and incorporating room-sensors for new buildings.

[5] Based on buildout ending in 2035

kWh = kilowatt hour

Source: Data and calculations compiled by Rincon Consultants (see Appendix F).

Mitigation Measure **MM GHG-1** (Measures EN3 and EN5) requires increased energy efficiency by 2 percent each year for existing buildings, replacement of aging equipment, exceedance of CBC Title 24 standards by 20 percent for new buildings, and incorporation of room-sensors for new buildings. Measures EN3 and EN5 under Mitigation Measure **MM GHG-1** would reduce the proposed 2021 LRDP annual electricity and natural gas consumption resulting in 2021 LRDP per capita 2035 energy use of approximately 5,031 kWh in terms of electricity, which is greater than UCR baseline per capita energy usage but less than regional baseline per capita energy usage, and approximately 150 therms in terms of natural gas, which is also greater than UCR baseline per capita energy usage but less than regional baseline per capita energy use.

Mitigation Measure **MM GHG-1** (Measures EN3 and EN5) does not affect the proposed 2021 LRDP estimated annual diesel consumption related to emergency generator use, which is unpredictable and uncommon in occurrence. The increase in diesel fuel usage is directly related to the increased need for emergency generators due to the proposed campus growth. Backup generators would be used only in the case of an emergency which would not be considered inefficient, wasteful, or unnecessary.

As such, with implementation of Mitigation Measure **MM GHG-1** (Measures EN3 and EN5), the proposed 2021 LRDP would not involve the inefficient, wasteful, and unnecessary use of energy during operation compared to regional baseline per capita energy usage with the help of various on-site energy reduction and increased energy efficiency measures for both new and renovated buildings under the proposed 2021 LRDP as well as existing buildings that exist and would remain in operation throughout campus through 2035. Therefore, impacts would be **less than significant** with mitigation incorporated.

IMPACT E-2 CONFLICT, OR CREATE AN INCONSISTENCY, WITH ANY APPLICABLE PLAN, POLICY, OR REGULATION ADOPTED FOR THE PURPOSE OF AVOIDING OR MITIGATING ENVIRONMENTAL EFFECTS RELATED TO ENERGY.

THE CONSTRUCTION AND OPERATION OF NEW AND RENOVATED BUILDINGS UNDER THE PROPOSED 2021 LRDP ARE REQUIRED TO COMPLY WITH APPLICABLE STATE AND UC ENERGY POLICIES AND REGULATIONS. ACCORDINGLY, THE 2021 LRDP WOULD COMPLY WITH THE CBC TITLE 24, SB 100, AND THE UC POLICY ON SUSTAINABLE PRACTICES AND WOULD NOT CONFLICT WITH OR OBSTRUCT APPLICABLE PLANS RELATED TO RENEWABLE ENERGY AND ENERGY EFFICIENCY. IMPACTS WOULD BE LESS THAN SIGNIFICANT. NO MITIGATION IS REQUIRED.

The proposed 2021 LRDP was evaluated for consistency with applicable State and UC plans that were developed with the intent of increasing use of renewable energy as well as energy efficiency. Applicable State and UC plans are discussed separately below.

Consistency with State Plans (CBC Title 24 [CalGreen Code and State Energy Efficiency Standards] and SB 100)

Energy Efficiency

All newly constructed buildings under the proposed 2021 LRDP would comply with all building design standards set in CBC Title 24. CALGreen Code (CBC Title 24, Part 11) requires implementation of energy efficient light fixtures and building materials into the design of new construction project, and the State Building Energy Efficiency Standards (CBC Title 24, Part 6) require newly constructed buildings to meet energy performance standards set by the CEC. As the name implies, these standards are specifically crafted for new buildings to result in energy efficient performance, so that the buildings do not result in inefficient consumption of energy. The standards are updated every three years and each iteration is more energy efficient than the previous standards. For example, according to the CEC, nonresidential buildings built with the 2019 standards will use about 30 percent less energy due mainly to lighting upgrades (CEC 2019b). LEED certified buildings enable projects to achieve zero net energy consumption by requiring integrative designs that help reduce overall energy consumption and efficiently monitor energy consumption levels (Blackwelder 2018). As such, the 2021 LRDP buildings would be subject to the latest energy efficiency standards pursuant to CALGreen Code (CBC Title 24, Part 11) and State Building Energy Efficiency Standards (CBC Title 24, Part 6).

Renewable Energy

SB 100 mandates 100 percent clean electricity for California by 2045. The proposed 2021 LRDP would further reduce its use of nonrenewable energy resources as the electricity generated by renewable resources provided by RPU continues to increase to comply with State requirements through SB 100, which requires electricity providers to increase procurement from eligible renewable energy resources to 60 percent by 2030 and 100 percent by 2045. Because the proposed 2021 LRDP would be powered by the existing State electricity grid, it would be powered by renewable energy as mandated by SB 100.

Therefore, the proposed 2021 LRDP impacts related to consistency with applicable State plans for increased energy efficiency and renewable energy use would be **less than significant**.

Consistency with UC Policy on Sustainable Practices

Energy Efficiency

As part of the UC system, UCR is required to abide by the UC Policy on Sustainable Practices regarding energy efficiency and renewable energy. While UCR is not currently a participating location under the Wholesale Power Program, UCR must abide by UC Policy on Sustainable Practices A.1 in terms of design, construction, and commission of all new buildings to outperform the CBC Title 24, Part 6 energy-efficiency standards by at least 20 percent and meet a minimum of LEED Silver certification principles. In addition, UCR must abide by UC Policy on Sustainable Practices B.1 in terms of implementation of energy efficiency actions in buildings and infrastructure systems to reduce campus energy use intensity by an average of least 2 percent annually. As such, the 2021 LRDP buildings would be subject to the latest energy efficiency standards pursuant to UC Policy on Sustainable Practices requirements.

Renewable Energy

UCR must abide by UC Policy on Sustainable Practices B.2 and B.4 in terms of installation of additional on-site renewable electricity supplies/energy storage systems and replacement of at least 40 percent of natural gas combusted on campus by biogas. Because the proposed 2021 LRDP would increase on-campus renewable electricity supplies and replace a large portion of its natural gas use with biogas, UCR would increase its renewable energy sources.

Therefore, the proposed 2021 LRDP impacts related to consistency with applicable UC plans for increased energy efficiency and renewable energy use would be **less than significant**.

Mitigation Measures

No mitigation measures are required.

Significance After Mitigation

Impacts would be less than significant without mitigation.

4.6.4 Cumulative Impacts

The geographic scope of the cumulative energy analysis is the RPU service area and Riverside County. Cumulative projects considered as part of this cumulative analysis include those assumed under buildout of the proposed 2021 LRDP plus the cumulative projects listed in Table 4-1.

All cumulative projects would be required to comply with CBC Title 24 minimum 2019 Building Energy Efficiency standards (CBC Title 24, Part 6) and CALGreen Code requirements (CBC Title 24, Part 11). The cumulative buildings would be designed in accordance with these minimum State energy efficiency standards for residential and nonresidential buildings. These standards include minimum energy efficiency requirements related to building envelope, mechanical systems (e.g., heating, ventilation, and air conditioning [HVAC] and water heating systems), and indoor and outdoor lighting. The incorporation of CBC Title 24 standards into the design of the cumulative projects, including the proposed 2021 LRDP, would not result in reduced wasteful, inefficient, or unnecessary use of energy.

As determined, the proposed 2021 LRDP would exceed the applicable UCR 2018 per capita energy use and annualized regional per capita energy use threshold and therefore, would result in a

cumulatively significant impact; however, implementation of Mitigation Measure **MM GHG-1** (Measures EN3 and EN-5) would reduce impacts related to the proposed 2021 LRDP's consumption of energy to a less-than-significant level (represented by a comparatively lower per capita energy use). As such, the proposed 2021 LRDP would not contribute to a significant environmental impact related to the wasteful, inefficient, or unnecessary consumption of energy resources. Therefore, the proposed 2021 LRDP, in conjunction with other existing, planned, and foreseeable future projects, would be **cumulatively less than significant with mitigation incorporated** related to energy use and be consistent with applicable increased energy efficiency and increased renewable energy use plans.

4.6.5 References

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4.7 Geology and Soils

This section describes the geology and soils geography present at the UCR campus and in the larger region and how the regulatory framework addresses these resources. This section then analyzes the potential impacts related to geology, soils, and paleontological resources that could result from implementation of the proposed 2021 LRDP. Potential effects of soil conditions on air and water quality because of construction-related activities are discussed in Section 4.3, *Air Quality* and Section 4.10, *Hydrology and Water Quality*.

4.7.1 Environmental Setting

Geologic Setting

Riverside County is geographically and topographically diverse. It encompasses mountains, hills, and riparian valleys. UCR is located in the City of Riverside (City), which is in the northwest portion of Riverside County, with the Santa Ana Mountain ranges approximately 20 miles south and southwest of the campus and the San Bernardino Mountains approximately 20 miles north and northeast of the campus. The Box Springs Mountains lie north, northeast, east, southeast, and south of East Campus. The City lies in the northern end of the Peninsular Ranges geomorphic province of California, south of its intersection with the Transverse Ranges. The Peninsular Ranges extend into Baja California and are bound on the east by the Colorado Desert (California Geology Survey [CGS] 2002). Most of the City's planning areas consist of granite, adamellite, Mesozoic granitic rock, granodiorite, Mesozoic basic intrusive rocks, and alluvium (located around the Santa Ana River). Most are dated from the Mesozoic period, except for the alluvium, which dates from the Quaternary (City of Riverside 2012). Alluvial deposits weathered and eroded from the surrounding mountain ranges comprise most of the geologic components of the project area.

Mountains and hills typically have slopes of 15 to 50 percent, and valley and basin areas usually have slopes of less than 15 percent. In the City, most natural slopes are very flat, generally less than 15 percent, with some slopes ranging from 15 to 25 percent in eastern and southern portions of the City. Many slopes in the City's planning area are steeper than the topography of the City as a whole. For example, areas around Lake Mathews and the Box Springs Mountains are much steeper than the terrain in which the campus is situated. Slopes along a substantial portion of the area west and south of Lake Mathews and along the northeastern line exceed 30 percent (City of Riverside 2012).

The City lies in the 92-square-mile Upper Santa Ana Valley Groundwater Basin, Riverside-Arlington Sub-basin (Groundwater Basin Number 8-2.03) (California Department of Water Resources 2004). The Riverside-Arlington Sub-basin encompasses both northwest Riverside County and southwest San Bernardino County, with groundwater stored primarily in clay, silt, and gravel alluvium deposited by the Santa Ana River and its tributaries. The 1969 Western-San Bernardino Judgment (*Western Municipal Water District of Riverside County et al. v. East San Bernardino County Water District et al.*, Case No. 78426) settled extraction rights throughout the Upper Santa Ana River watershed to meet flow obligations to lower reaches of the river (Riverside Public Utilities 2016). The judgment resulted in adjudication of a portion of the sub-basin (the "Riverside Sub-basin"), with the remainder of the sub-basin (the "Arlington Sub-basin") remaining non-adjudicated.

UCR Campus

The UCR campus is in the adjudicated Riverside South basin in Riverside County. Two watermasters, one appointed by the San Bernardino Valley Municipal Water District and one appointed by Western Municipal Water District, oversee groundwater extractions in the adjudicated portions of the basin and ensure compliance with the terms of the judgment.

The UCR campus is within the Perris Block in the northern portion of the Peninsular Ranges geomorphic province (CGS 2002). The Perris Block is a roughly-rectangular area of relatively low relief that has remained relatively stable and undeformed during the Neogene (Norris and Webb 1990; Morton and Miller 2006). It is bound by the Cucamonga Fault Zone to the north, the San Jacinto Mountains to the east, the Elsinore Fault Zone to the southwest, and the Chino Basin to the west. According to Morton and Miller, the Perris Block is underlain by lithologically diverse prebatholithic metasedimentary rocks, intruded by Cretaceous plutons of the Peninsular Ranges Batholith, which are subsequently overlain by thin to relatively thick, discontinuous sections of nonmarine Quaternary sediments. Quaternary deposits in the Perris Block consist of Pleistocene and Holocene alluvial fan deposits emanating from the nearby San Gabriel Mountains to the north and fluvial deposits from the Santa Ana River, which bisects the Perris Block and flows southward.

Elevations on campus range from approximately 1,000 to 1,400 feet above sea level. Most of the surface of the campus represents the valley floor as it existed during the Pleistocene epoch (greater than 11,000 years ago), which was incised by two active washes, the University Arroyo and the Box Springs Arroyo, during Holocene time (the last 11,000 years). This resulted in the current landform of the campus. The geologic materials that underlie the campus include granitic bedrock that is part of the Val Verde tonalite, older alluvium (deposited during the Pleistocene), and younger alluvium (deposited during the Holocene) (UCR 2005).

The UCR campus and the Riverside area are surrounded by the Santa Ana Mountains on the west, San Bernardino Mountains on the north and northeast, and the San Jacinto Mountains on the east. The San Jacinto and Santa Ana Mountains consist mainly of Mesozoic metamorphic and volcanic rocks, Cretaceous plutonic rocks, and Mesozoic to Cenozoic sediments. The main components of the San Bernardino Mountains are also Mesozoic and Cretaceous rock. The Box Spring Mountains, located north, northeast, east, southeast, and south of East Campus, are composed mainly of Cretaceous-age granitic rock from the southern California batholith. The Quaternary-aged alluvial fill currently beneath the Riverside area is generated by erosion of the southern California batholith.

Geologic units in Riverside County are mapped at a scale of 1:100,000 (Morton and Miller 2006). The five mapped units in UCR (i.e., Qaf, Qyf, Qya, Qof, Qvof) consist mainly of Quaternary-aged alluvial deposits, differentiated by age, with the oldest dating from early Pleistocene. The majority of the West Campus is mapped as Quaternary old (late to middle Pleistocene) alluvial fan deposits (Qof), consisting of moderately to well-consolidated silt, sand, and gravel, with a small portion of Quaternary very old (early Pleistocene) alluvial fan deposits (Qvof) along the southeastern portion of West Campus. The drainage channel that runs through West Campus is mapped as Quaternary young (Holocene to late Pleistocene) axial channel deposits (Qya), consisting of slightly to moderately consolidated silt, sand, and gravel deposits. East Campus is composed mainly of Quaternary very old (early Pleistocene) alluvial fan deposits (Qvof), consisting of moderately to well consolidated orange to reddish brown silt, sand, gravel, and conglomerate. The western portion of East Campus also is mapped as Quaternary old (late to middle Pleistocene) alluvial fan deposits (Qof). The drainage channel that runs through East Campus is mapped as Quaternary young (Holocene to late Pleistocene) axial channel deposits (Qya), consisting of slightly to moderately consolidated silt, sand, and gravel deposits. Artificial fill (Qaf) , mapped within a small portion of the

southern area of West Campus, consists of sand, gravel, and bedrock from pits, quarries, and excavations related to previous construction, mining or quarrying activities (Morton and Miller 2006). Figure 4.7-1 depicts the geologic units mapped within UCR.

Young alluvial fan deposits (Qyf) were deposited in the Holocene and late Pleistocene and consist of gray-hued sand and gravel deposits derived mainly from the rocks of Peninsular Ranges batholith. Young axial channel deposits (Qya) were also deposited in the Holocene and late Pleistocene and is comprised of gray, unconsolidated alluvium consisting of medium- to fine-grained sand and silt flooring several low relief valleys and their tributaries. Old alluvial fan deposits (Qof) were deposited in the late to middle Pleistocene and consist of indurated, sandy alluvial fan deposits developed extensively in the western part of the quadrangle. Most of the old alluvial fan deposits are reddish-brown. Very old alluvial fan deposits (Qvof) were deposited in the early Pleistocene and are mostly well-dissected, well-indurated, reddish-brown sand deposits. The very old alluvial fans commonly contain duripans and locally silcretes.

Paleontological Resources

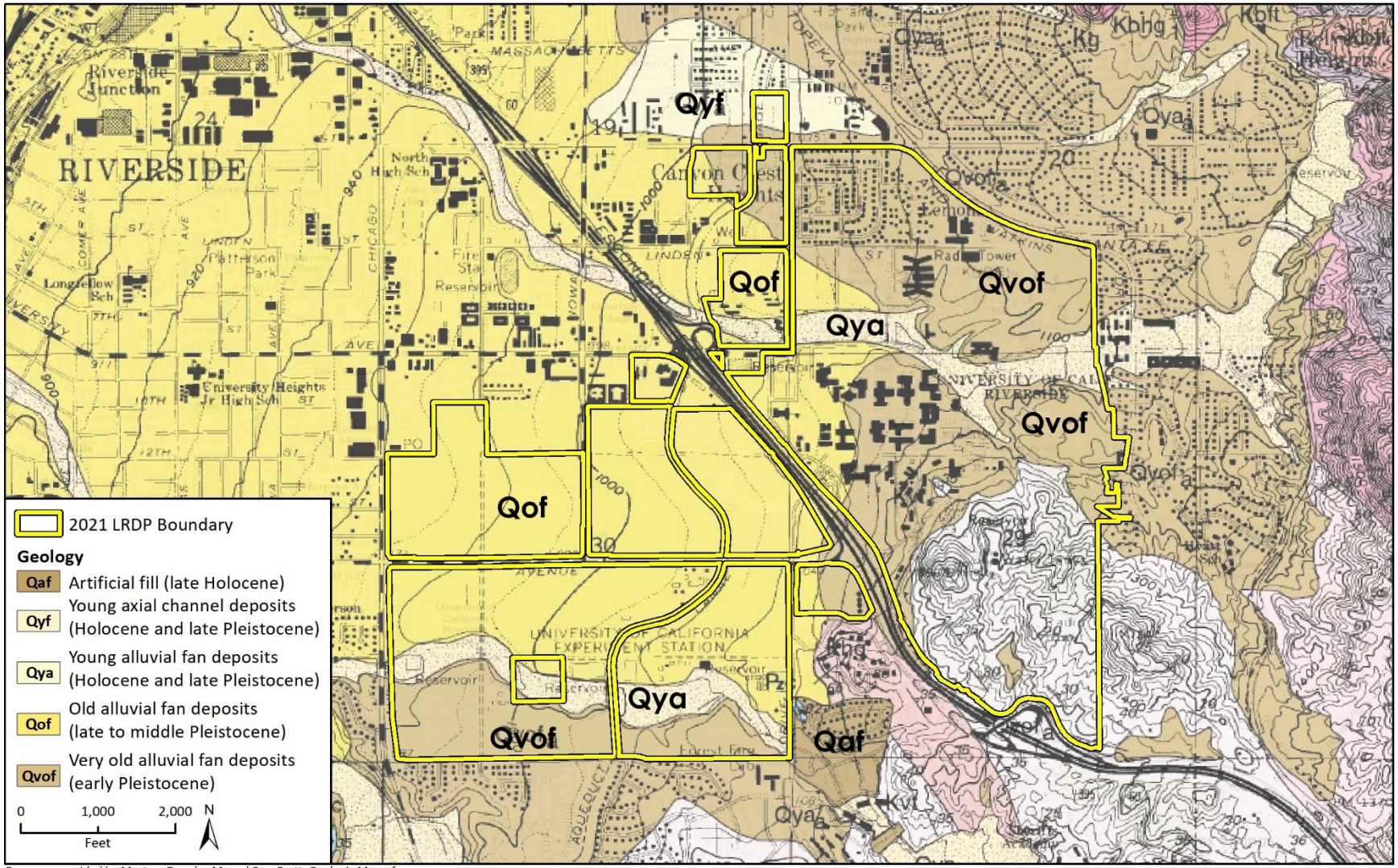
Paleontological resources (fossils) are the remains and/or traces of prehistoric life. Fossils are typically preserved in layered sedimentary rocks and the distribution of fossils is a result of the sedimentary history of the geologic units in which they occur. Fossils occur in a non-continuous and often unpredictable distribution in some sedimentary units, and the potential for fossils to occur in sedimentary units depends on several factors. Although it is not possible to determine whether a fossil will occur in any specific location, it is possible to evaluate the potential for geologic units to contain scientifically significant paleontological resources.

The paleontological sensitivity of the UCR campus has been evaluated according to the following Society of Vertebrate Paleontology (SVP) (2010) categories, which are presented below.

High Potential (Sensitivity)

Rock units from which significant vertebrate or significant invertebrate fossils or significant suites of plant fossils have been recovered are considered to have a high potential for containing significant non-renewable fossiliferous resources. These units include but are not limited to, sedimentary formations and some volcanic formations, which contain significant non-renewable paleontological resources anywhere in their geographical extent, and sedimentary rock units temporally or lithologically suitable for the preservation of fossils. Sensitivity comprises both: (a) the potential for yielding abundant or significant vertebrate fossils or for yielding a few significant fossils, large or small, vertebrate, invertebrate, or botanical and (b) the importance of recovered evidence for new and significant taxonomic, phylogenetic, ecologic, or stratigraphic data. Areas which contain potentially datable organic remains older than recent, including deposits associated with nests or middens, and areas that may contain new vertebrate deposits, traces, or trackways are also classified as significant. Full-time monitoring is typically recommended during any project-related ground disturbance in geologic units with high sensitivity.

Figure 4.7-1 Geologic Units Underlying UCR Campus and Adjacent Areas



Basemap provided by Morton, Douglas M. and Cox, Brett, Geologic Map of the Riverside East 7.5' Quadrangle, Riverside County, California, 1988.

Low Potential (Sensitivity)

Sedimentary rock units that are potentially fossiliferous but have not yielded fossils in the past or contain common and/or widespread invertebrate fossils of well documented and understood taphonomic (processes affecting an organism following death, burial, and removal from the ground), phylogenetic species (evolutionary relationships among organisms), and habitat ecology. Reports in the paleontological literature or field surveys by a qualified vertebrate paleontologist may allow determination that some areas or units have low potentials for yielding significant fossils prior to the start of construction. Generally, these units will be poorly represented by specimens in institutional collections and will not require protection or salvage operations.

Undetermined Potential (Sensitivity)

Specific areas underlain by sedimentary rock units for which little information is available are considered to have undetermined fossiliferous potentials. Field surveys by a qualified vertebrate paleontologist to specifically determine the potentials of the rock units are required before programs of impact mitigation for such areas may be developed.

No Potential

Rock units of metamorphic or igneous origin are commonly classified as having no potential for containing significant paleontological resources. For geologic units with no sensitivity, a paleontological monitor is not required.

A review of the museum records maintained in the University of California Museum of Paleontology (UCMP) online collections database reports at least four vertebrate fossil localities in geologic types located within the UCR Campus, including Quaternary old (late to early Pleistocene) alluvial deposits (e.g., Qvof, Qof). Quaternary old (late to early Pleistocene) alluvial deposits (Qof, Qvof), mapped in the majority of West Campus and large portions of the East campus, have a well-documented record of abundant and diverse vertebrate fauna recorded throughout California (Paleobiology Database 2021; UCMP 2020). Numerous vertebrate fossil taxa from Riverside County including horse, tapir, bison, camelid, deer, mastodon, mammoth, ground sloth, canine, rabbit, and rodent have been noted in the region (Jefferson 2010). Therefore, Quaternary old (late to early Pleistocene) alluvial deposits (Qof, Qvof), have a high paleontological sensitivity, pursuant to SVP standards (SVP 2010). Other geologic types that occur on the UCR campus, including Quaternary young (late to middle Holocene) alluvial deposits (Qyf, Qya) mapped in the northern portion of East Campus and throughout most of West Campus, respectively, are likely too young to preserve paleontological resources. These areas are considered to have low paleontological sensitivity. The closest UCMP vertebrate locality on record is V65248, which yielded fossil specimens of a mammoth (*Mammuthus*) near the City (UCMP 2020).

While this section provides an overview of the underlying paleontological sensitivity based upon the underlying sediments, existing developed sites within the UCR Campus have been subject to grading, excavation, and artificial fill, which reduces the site-specific paleontological sensitivity to the depth of previous soil disturbance. This type of site-specific information is not captured in regional geologic unit diagrams, such as Figure 4.7-1.

Soils

Expansive soils are a geologic hazard because an increase in soil volume can exert force on structures and damage building foundations, walls, and floors. Areas underlain by compressible sediments are susceptible to differential settlement, and these include poorly engineered artificial fill or loose unconsolidated alluvial sediments. When these soils dry out and shrink, structural damage can occur.

The City's General Plan acknowledges that Riverside has the following general soil associations, or types: Cajalco-Temescal-Las Posas, Traver-Domino-Willows, Cieneba-Rock Land-Fallbrook, Monserate-Arlington-Exeter and Hanford-Tujunga-Greenfield associations. Soil associations are generally well-drained sandy loams that are moderately deep (City of Riverside 2012). The City is underlain by areas susceptible to varying degrees of erosion, ranging from slight to very high. Most soils are described as being well-drained with slow to moderate runoff and slow to moderate permeability (City of Riverside 2012).

Most of the UCR campus is underlain by older alluvium consisting of sands and silty sands, along with moderate amounts of clay in the upper 2 to 5 feet of the soil (Figure 4.7-1). In-situ weathering and the formation of an argillic soil profile associated with granitic rocks have given rise to the clay content, which in turn helped impart a reddish-brown color to the alluvial deposits. Younger alluvium and fill are found in and around the channels of the University Arroyo and Box Springs Arroyo, which have incised the elevated geomorphic surface (UCR 2005). Because portions of the UCR campus have been subject to grading operations associated with the construction activities, fill materials are at various locations on campus, particularly in areas on East Campus.

On the UCR campus, the Cieneba-Rockland-Fallbrook soils are found on the southeast portion of campus in steeper bedrock areas, while the Monserate-Arlington-Exeter soils comprise the flatter alluvial areas in most of the campus (UCR 2005). Soil types or associations can be defined further by series. The steeper bedrock areas of campus include the Cieneba and Vista series, which are characterized as being minimally developed and relatively thin soils. These soils are found at the southeastern portion of the campus, which has relatively steeper slopes than other parts of the campus. Both soils have low shrink-swell characteristics, but their erosion hazard ranges from moderate to high.

The flatter alluvial areas include Arlington, Buren, Hanford, Madera, and Monserate series, which derive from erosion of granite rocks. The Arlington and Hanford soils are primarily found on the relatively flat-sloped West Campus and have a low shrink-swell characteristic. These soils consist of silty fine to coarse sands, with deeper layers of silt and relatively clean sand. Erosion hazards for these soils range from slight to moderate. The Buren series, located on the East Campus, has a moderate to low shrink-swell potential and is relatively thick and well developed, with an argillic horizon and hardpan layer. The Monserate soils are found on most of the northeastern part of the campus and consist of sandy loams over sandy clay loams. Monserate soils are well-drained and the shrink-swell potential is low to moderate. Most soils on campus have low to moderate shrink-swell characteristics, and, thus, the potential for water uptake after rainfall that causes soils to expand and damage building foundations is considered low. Discussion of existing soil stability hazards including subsidence, liquefaction, lateral spreading, landslide, and collapse are provided below.

Subsidence

Subsidence occurs when a large portion of land is displaced vertically, usually due to the withdrawal of groundwater, oil, or natural gas. Natural subsidence occurs from shifting of tectonic plates and

dissolution of limestone and can produce sinkholes. Human-induced subsidence can occur from pumping water, oil, or gas from underground reservoirs; collapse of underground mines; drainage of wetlands; and soil compaction. Subsidence can be problematic because it threatens the stability of roads, bridges, canals, and other infrastructure. Soils particularly subject to subsidence include those with high silt or clay content. Soils with high shrink-swell potential can be particularly susceptible to subsidence during a loss of soil moisture.

Most soils on the campus have low to moderate shrink-swell characteristics and would not be susceptible to subsidence during a loss of soil moisture (UCR 2005). Therefore, risks associated with natural subsidence is unlikely to occur on the UCR campus. Activities related to human-induced subsidence such as pumping, mining, and draining are not expected to occur on campus.

Liquefaction

Liquefaction describes a phenomenon in which loose, saturated, relatively cohesionless soil deposits lose shear strength during strong ground motions. Primary factors controlling liquefaction include intensity and duration of ground motion, gradation characteristics of the subsurface soils, on-site stress conditions, and the depth to groundwater. Liquefaction is typified by a loss of shear strength in the liquefied layers due to rapid increases in pore water pressure generated by earthquake accelerations. Liquefaction typically occurs in areas where the soils below the water table are composed of poorly consolidated, fine- to medium-grained, primarily sandy soil. In addition to the requisite soil conditions, the ground acceleration and duration of the earthquake must also be of a sufficient level to induce liquefaction. Liquefaction may also lead to lateral spreading.

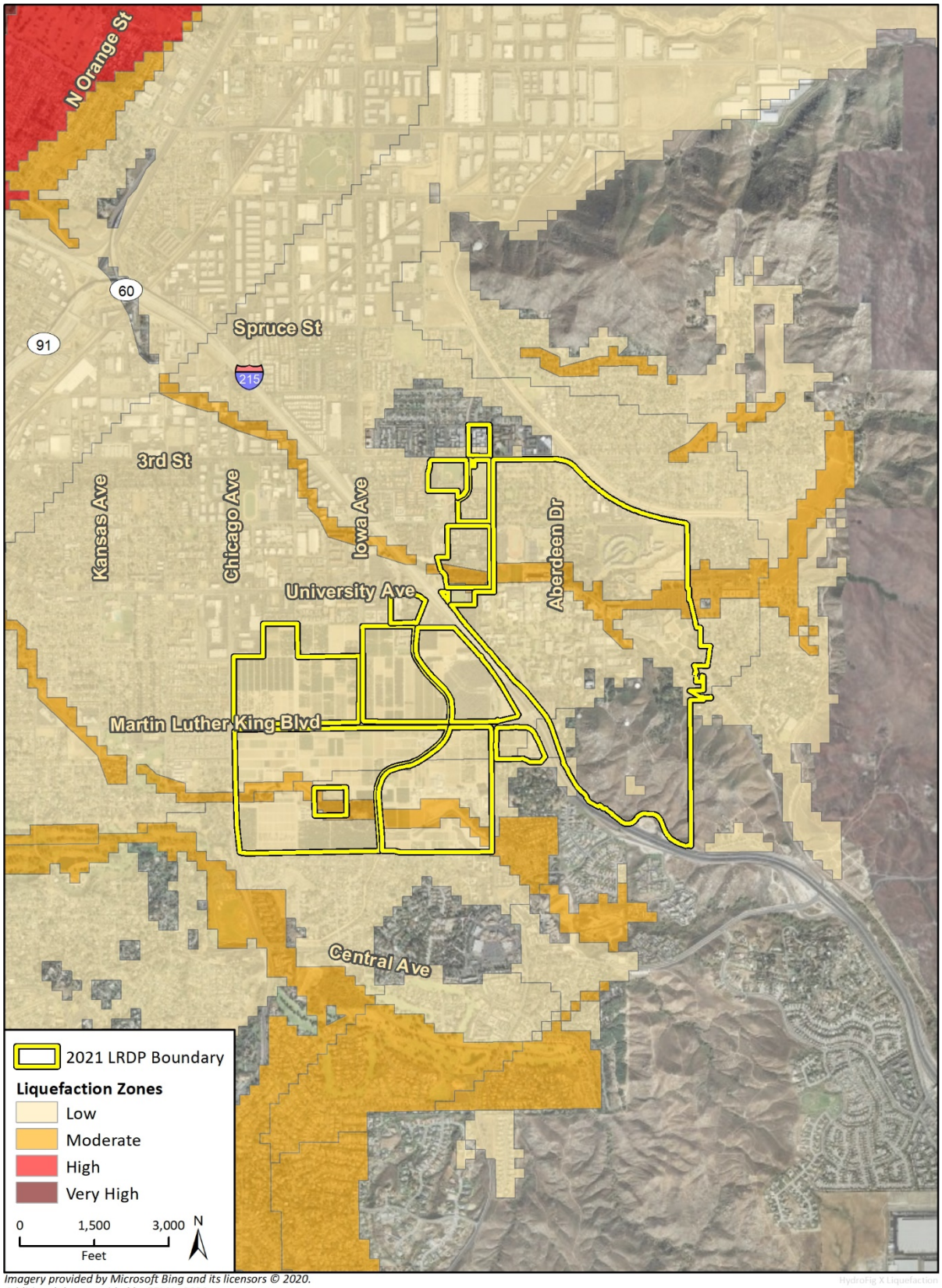
Liquefaction historically has been responsible for substantial damage to bridges, buildings, buried pipes, and underground storage tanks throughout the Country. According to Figure PS-2 of the City's General Plan Public Safety Element, the UCR main campus has mostly low potential for liquefaction, with narrow areas considered moderate risk for liquefaction along the southern portion of West Campus between Martin Luther King Boulevard and Le Conte Drive and the portion of East Campus, adjacent to the I-215/SR 60 freeway between Blaine Street and University Avenue and from University Avenue east to the Box Springs Mountains (City of Riverside 2018). Figure 4.7-2 illustrates the liquefaction zones found underlying the campus. The older alluvium and bedrock that underlies large portions of the campus are non-liquefiable regardless of groundwater depth (UCR 2005).

Lateral Spreading

Lateral spreading (also known as expansion) is the horizontal movement or spreading of soil toward an "open face," such as a streambank, the open side of fill embankments, or the sides of levees. It often occurs in response to liquefaction of soils in an adjacent area. The potential for failure from lateral spreading is highest in areas where there is a high groundwater table, where there are relatively soft and recent alluvial deposits, and where creek banks are relatively high.

Because portions of the campus are in areas with low to moderate risk of liquefaction, the potential for lateral spreading in those areas, and in areas with drainage features, should be considered low to moderate as well.

Figure 4.7-2 Liquefaction Zones Underlying the UCR Campus



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Additional data provided by FEMA, 2020.

Landslide

Landslides occur when slopes become unstable and masses of earth material move downslope. Landslides are generally considered to be rapid events, often triggered during periods of rainfall or by earthquakes. Mudslides and slumps are a shallower type of slope failure compared to landslides. Lateral spreading may occur when potentially liquefiable soils are present and exposed in conjunction with a sloping ground surface. If soils in the slope liquefy, temporary instability could result in movement of sediments and slope failure.

The UCR campus is not in an area susceptible to landslides. Elevations on campus range from approximately 1,000 to 1,400 feet above sea level. The topography at the campus is relatively flat due to previous grading and existing development. Additionally, the campus is not in the path of any known or potential landslides. West Campus and most of East Campus are relatively flat and not subject to landslides.

Collapse

Soil collapse typically occurs following the wetting and loading of unsaturated materials, but soils with higher moisture content such as quick clays may undergo collapse as well. Collapsible soils also include those sediments that contain perennial ice or permafrost that has subsequently melted. UCR does not contain soils with high-moisture content and is unlikely to undergo soil collapse.

Seismicity

The term *seismicity* describes the effects of seismic waves that are radiated from an earthquake fault in motion. While most of the energy released during an earthquake results in the permanent displacement of the ground, as much as 10 percent of the energy may dissipate immediately in the form of seismic waves. Seismicity can result in seismic-related hazards such as fault rupture, ground shaking, and liquefaction. Faults form in rocks when stresses overcome the internal strength of the rock, and fault rupture occurs when movement on a fault breaks through to the surface and can result in damage to infrastructure and persons. Ground movement during an earthquake can vary depending on the overall magnitude, distance to the fault, focus of earthquake energy, and type of geologic material. The composition of underlying soils, even those relatively distant from faults, can intensify ground shaking.

The numerous faults in southern California include active, potentially active, and inactive faults. The criteria for these major groups are based on measures developed by California Geological Survey (CGS) for the Alquist-Priolo Earthquake Fault Zone Program. An active fault is one that has had surface displacement within Holocene time (about the last 11,000 years). A potentially active fault has demonstrated surface displacement during Quaternary time (approximately the last 1.6 million years) but has had no known Holocene movement. Faults that have not moved in the last 1.6 million years are considered inactive. The major seismic-related hazards associated with earthquakes include ground rupture, major seismic ground shaking, seismic-related ground failure (include liquefaction), and landslides.

In the Riverside area, several faults have the potential to produce seismic impacts (City of Riverside 2018). Alquist Priolo Earthquake Fault Zones have been designated for the Elsinore, San Jacinto, and San Andreas fault zones in Riverside County. Several recent earthquakes in southern California have been of a sufficiently high magnitude to be felt in Riverside. These earthquakes include the 1971 San Fernando (6.5 magnitude [M]), the 1988 Pasadena (4.9M), the 1987 Whittier Narrows (5.9M), the

1989 Sierra Madre (5.9M), the 1992 Landers (7.3M) and Big Bear (6.2M), and the 1994 Northridge (6.7M) earthquakes. Figure 4.7-3 depicts the regional faults and fault zones in the county.

Seismic-induced Ground Rupture and Ground Shaking

Ground rupture and strong ground shaking from an earthquake can result in damage, with buildings shifted off their foundations and underground pipes being broken. The campus is not in an Alquist-Priolo Earthquake Fault Zone and has no active faults that pass directly beneath it (City of Riverside 2012). However, the campus is subject to seismic ground shaking due to the proximity and potential earthquake magnitude of nearby faults. Table 4.7-1 lists the regional faults in relation to UCR. Figure 4.7-3 shows the faults and fault zones near UCR.

Table 4.7-1 Regional Faults in Relation to UCR Campus

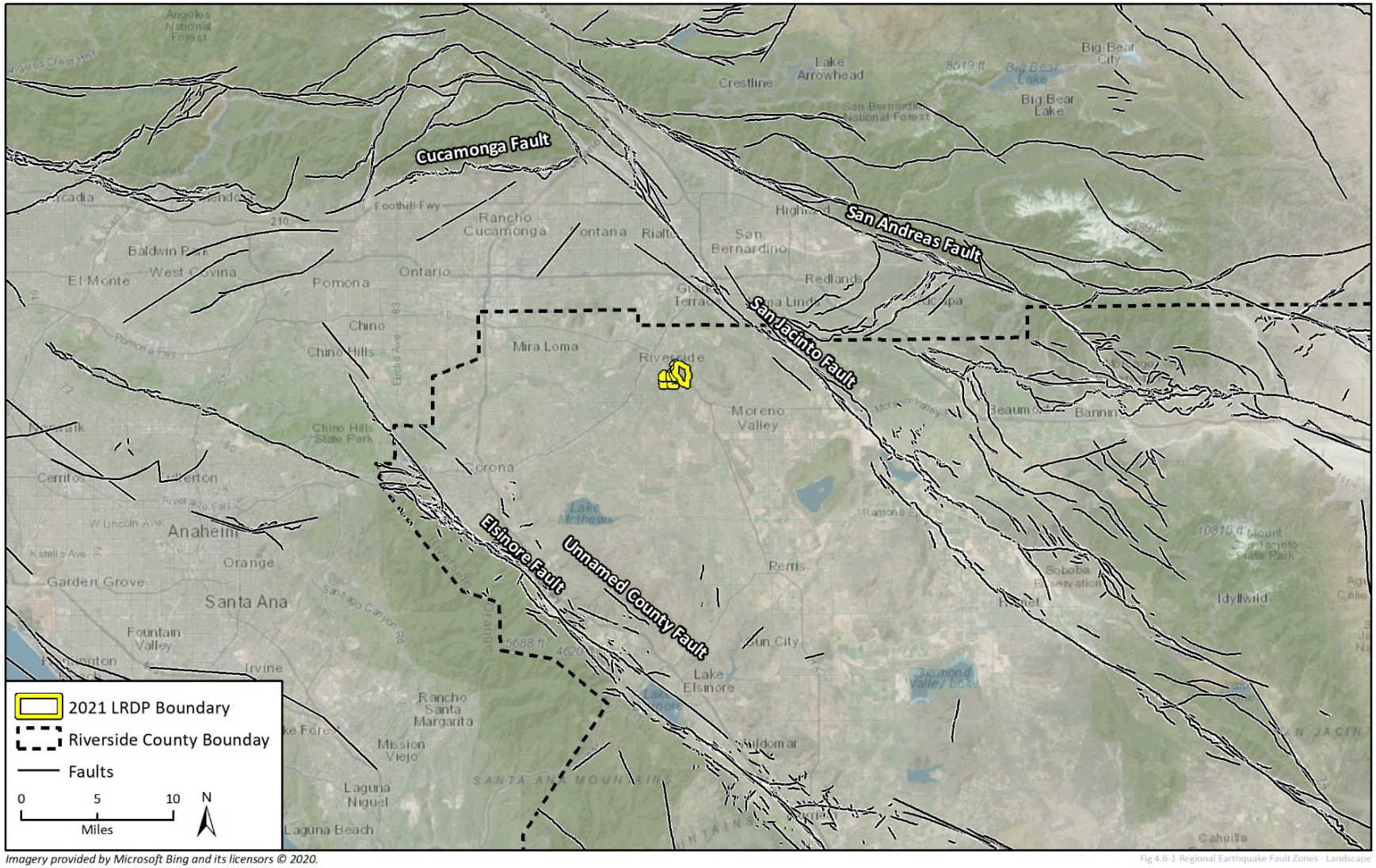
Fault Name	Approximate Distance from UCR to Fault	Potential Magnitude	Approximate Length of Fault (miles)
San Jacinto Fault	5 miles	7.0	130
San Andreas Fault	13.5 miles	8.3	600
Elsinore Fault	15 miles	6.0	110
Cucamonga Fault	20 miles	7.0	19

Source: CGS 2015

The San Jacinto Fault is northeast of UCR, approximately 5 miles from the border of the East Campus. The San Jacinto Fault traverses approximately 130 miles, from northwest of El Centro in Imperial County to northwest of San Bernardino, passing through the intersection of Interstates 10 and 215, the city of Loma Linda and the Box Springs Mountains. The fault has the capability of producing up to a 7.0M earthquake. The San Andreas Fault at its closest point is approximately 13.5 miles northeast of the border of the East Campus. The San Andreas Fault extends 600 miles, from Eureka in northern California's Humboldt County south to the U.S./Mexico border near Calexico and beyond. The San Andreas Fault is estimated to be capable of producing up to an 8.3M earthquake. The Elsinore Fault is approximately 15 miles southwest of the West Campus, extending approximately 4 miles west of Lake Mathews and Corona and south into the city of Lake Elsinore. The northwest-southwest trending fault has the capability of producing up to a 6.0M earthquake. The Cucamonga Fault is located approximately 20 miles northwest of the East Campus and West Campus. The Cucamonga Fault is approximately 19 miles long and has the capability of producing a maximum earthquake of 7.0M.

Historically, earthquakes that have occurred in the region have mostly resulted from the San Jacinto Fault, which has the greatest potential for causing the greatest extent of ground shaking at the campus. Each of the nearby major fault systems near UCR can produce a large earthquake that would result in severe earthshaking on the campus, but no surface rupture is likely.

Figure 4.7-3 Regional Earthquake Fault Lines



Imagery provided by Microsoft Bing and its licensors © 2020.
Additional data provided by Riverside County, 2020 and USGS, 2020.

Fig 4.6-1 Regional Earthquake Fault Zones - Landscape

Seismic-induced Landslide and Liquefaction

Seismically induced liquefaction occurs when an earthquake causes ground shaking that results in saturated soil losing shear strength, deforming, and acting like a liquid. Specifically, liquefaction occurs when ground shaking causes water-saturated soils to become fluid and lose strength. When liquefaction occurs, it can result in ground failure that can result in damage to roads, pipelines, and buildings.

The UCR campus is not in an area subject to earthquake-induced landslide, but the campus is in an area where earthquake-induced liquefaction could occur. Elevations on campus range from approximately 1,000 feet to 1,400 feet above sea level. The topography at the campus is relatively flat due to previous grading and existing development, and the campus is not in the path of any known or potential landslide areas. UCR's main campus is characterized primarily by low potential for liquefaction and narrow areas that are considered moderate risk for liquefaction along the southern portion of West Campus between Martin Luther King Boulevard and Le Conte Drive and the portion of East Campus adjacent to the I-215/SR 60 freeway between Blaine Street and University Avenue and from University Avenue east to the Box Springs Mountains (City of Riverside 2018). Figure 4.7-2 illustrates the liquefaction zones found underlying the campus. The older alluvium and bedrock that underlies large portions of the campus are non-liquefiable regardless of groundwater depth (UCR 2005).

Existing UCR Structures

In area where seismic events are possible and expected, such as much of California, buildings are constructed to withstand ground shaking and other geological hazards associated with earthquakes. As technology developers and human understanding of engineering and earthquakes evolves, new building standards are developed to help buildings better withstand and survive earthquakes. For this reason, newer buildings incorporate more recent design and engineering standards to prevent failure during earthquakes compared to older buildings. As listed in Table 4.5-1 in Section 4.5, *Cultural Resources*, there are 38 existing buildings on the UCR campus that were constructed prior to 1975.

4.7.2 Regulatory Setting

Federal

National Earthquake Hazards Reduction Act

U.S. Congress passed the National Earthquake Hazards Reduction Act in 1977 to reduce the risks to life and property from future earthquakes through the establishment and maintenance of an effective earthquake hazards reduction program. To accomplish this goal, the act established the National Earthquake Hazards Reduction Program. This program was substantially amended in November 1990 by the National Earthquake Hazards Reduction Program Act, which refined the description of agency responsibilities, program goals, and objectives to focus on minimizing loss from earthquakes after they occur. The National Earthquake Hazards Reduction Program promotes the adoption of earthquake hazard reduction activities by all scales of government and works to develop national building standards and model codes for use by engineers, architects, and all others involved in the planning and construction of buildings and infrastructure.

Occupational Safety and Health Act

OSHA (29 CFR 1910) is intended to ensure that employers provide their workers with a work environment free from recognized hazards to safety and health, such as exposure to toxic chemicals, excessive noise levels, mechanical dangers, or unsanitary conditions. Operation of this program is delegated to the State and operated by the Division of Occupational Safety and Health, known as Cal/OSHA. Standards are created by the National Institute for Occupational Safety as the research institution for the federal Occupational Safety and Health Act (Fed/OSHA). These standards are adopted at the State and local level and are enforced on campus by Cal/OSHA and other agencies.

OSHA requires employers with specified activities to prepare and implement emergency action plans (EAPs), provides guidance for EAPs, and recommends that all employers prepare these plans. Employers can use this structure to prepare for earthquakes. OSHA also provides guidance to prepare for workplace hazards resulting from earthquakes. OSHA recommends training workers on preparing for earthquake by proactively training workers, as well as development a response plan to implement in the event of an earthquake. Employers whose workers will be involved in emergency response operations for releases of, or substantial threats of releases of, hazardous substances regardless of the location of the hazard must comply with OSHA's Hazardous Waste Operations and Emergency Response (HAZWOPER) standard, 29 CFR 1910.120. This may include emergency response following an earthquake. Instruction CPL 02-02-073 describes OSHA enforcement procedures under the relevant provisions of the HAZWOPER standard.

State

Alquist-Priolo Earthquake Fault Zoning Act

The Alquist-Priolo Earthquake Fault Zoning Act of 1972 (Alquist-Priolo Act; Public Resources Code Sections 2621-2630) was passed into law following the destructive February 9, 1971 San Fernando earthquake that had a magnitude of 6.6. The Alquist-Priolo Act provides a mechanism for reducing losses from surface fault rupture on a statewide basis. The intent of the Alquist-Priolo Act is to ensure public safety by prohibiting the siting of most structures for human occupancy across traces of active faults that constitute a potential hazard to structures from surface faulting or fault creep. Generally, siting of structures for human occupancy must be set back from the fault by approximately 50 feet. Therefore, if a project site is in an active earthquake fault zone, the local agency must withhold development permits until geologic investigations demonstrate that the sites are not threatened by surface displacement from future faulting. No portion of the campus is included in an Alquist-Priolo Earthquake Fault Zone designated by the State of California.

Seismic Safety Act

The Seismic Safety Act established the California Seismic Safety Commission in 1975 with the intent of providing oversight, review, and recommendations to the Governor and State legislature regarding seismic issues. The Commission's name was changed to Alfred E. Alquist Seismic Safety Commission in 2006. Since then, the Commission has prepared several documents[1] based on

[1] Some of these documents are listed as follows:
- Research and Implementation Plan for Earthquake Risk Reduction in California 1995 to 2000, report dated December 1994
- Seismic Safety in California's Schools, 2004, "Findings and Recommendations on Seismic Safety Policies and Requirements for Public, Private, and Charter Schools," report dated December 1994
- Findings and Recommendations on Hospital Seismic Safety, report dated November 2001
- Commercial Property Owner's Guide to Earthquakes Safety, report dated October 2006
- California Earthquake Loss Reduction Plan 2007–2011, report dated July 2007

recorded earthquakes, such as the 1933 Long Beach earthquake, the 1971 Sylmar earthquake, and the 1994 Northridge earthquake.

Seismic Hazards Mapping Act

The Seismic Hazards Mapping Act of 1990 was enacted, in part, to address seismic hazards not included in the Alquist-Priolo Act, including strong ground shaking, landslides, and liquefaction. Under this Act, the State Geologist is assigned the responsibility of identifying and mapping seismic hazards. CGS Special Publication 117, adopted in 1997 by the State Mining and Geology Board, constitutes guidelines for evaluating seismic hazards other than surface faulting and for recommending mitigation measures under Public Resources Code Section 2695(a). In accordance with the mapping criteria, the CGS seismic hazard zone maps identifies areas with the potential for a ground shaking event that corresponds to 10 percent probability of exceedance in 50 years.

The purpose of the Seismic Hazards Mapping Act is to reduce the threat to public health and safety and to minimize the loss of life and property by identifying and mitigating seismic hazards. Cities, counties, and State agencies are directed to use seismic hazard zone maps developed by CGS in their land-use planning and permitting processes. Cities and counties shall require a geotechnical report defining and delineating any seismic hazard pursuant to Public Resources Code Section 2697.

California Building Code

The California Building Code (CBC) Title 24, Part 2, provides building codes and standards for the design and construction of structures in California. The purpose of the CBC is to establish minimum standards to safeguard the public health, safety, and general welfare through structural strength, means of egress facilities, and general stability by controlling the design, construction, quality of materials, use and occupancy, location, and maintenance of building and structures. The CBC contains specific requirements for seismic safety, excavation, foundations, retaining walls, and site demolition. It also regulates grading activities, including drainage and erosion control. Chapter 16 of the CBC contains definitions of seismic sources and the procedure used to calculate seismic forces on structures.

In addition, the CBC contains necessary California amendments, which are based on the American Society of Civil Engineers (ASCE) Minimum Design Standards 7-05. ASCE 7-05 provides requirements for general structural design and includes means for determining earthquake loads as well as other loads (flood, wind, etc.) for inclusion into building codes. The provisions of the CBC apply to the construction, alteration, movement, replacement, and demolition of every building or structure or any appurtenances connected or attached to such buildings or structures throughout California. The earthquake design requirements of the CBC take into account the occupancy category of the structure, site class, soil classifications, and various seismic coefficients, which are used to determine a Seismic Design Category (SDC) for a project. The SDC is a classification system that combines the occupancy categories with the level of expected ground motions at the site and ranges from SDC A (very small seismic vulnerability) to SDC E/F (very high seismic vulnerability and near a major fault). Design specifications are then determined according to the SDC.

Development under the LRDP would be required to comply with the CBC, including Part 2, Volume 2, Chapter 18, Soils and Foundations, which outlines the minimum standards for structural design and construction. This includes geotechnical evaluations, which among other requirements, includes a record of the soil profile, regulation of active faults, recommendations for foundation type and design criteria that address issues, as applicable, such as, but not limited to, bearing capacity of soils, provisions to address expansive soils, settlement, and varying soil strength. If a building

department or other appropriate enforcement agency, determines that recommended action(s) presented in the geotechnical evaluations are likely to prevent structural damage, the approved recommended action(s) must be made a condition to the building permit (Section 1803.1.1.3 of Chapter 18).

The CBC provides standards for various aspects of construction, including, but not limited to, excavation, grading, and earthwork construction, preparation of the site prior to fill placement, specification on fill materials and fill compaction and field testing, retaining wall design and construction, foundation design and construction, and seismic requirements. It includes provisions to address issues such as, but not limited to, construction on expansive soils and soil strength loss. Pursuant to California law, project design and construction would be required to comply with provisions of the CBC.

The CBC is updated every 3 years by order of the legislature, with supplements published in intervening years. State law mandates that local government enforce the CBC. In addition, a city and/or county may establish more restrictive building standards reasonably necessary because of local climatic, geological, or topographical conditions. The 2019 CBC is based on the 2018 International Building Code and adds more extensive structural seismic provisions. Projects implemented under the proposed 2021 LRDP would adhere to the most current CBC.

Natural Hazards Disclosure Act

The Natural Hazards Disclosure Act, as codified in California Civil Code Sections 1103-1103.14, requires real estate sellers and brokers to prepare Natural Hazards Disclosure Statements upon transfer of real property if such property is located in a number of federally or State-mapped natural hazard areas. Hazard areas covered under the disclosure form include special flood hazard areas, areas of potential flooding due to dam failure inundation, fire hazard severity zones, wildland areas, earthquake fault zones, and seismic hazard zones. The natural hazard areas most relevant to geology and soils are earthquake fault zones and seismic hazard zones.

California Environmental Quality Act

Paleontological resources are protected under CEQA, which states, in part, that a project will "normally" have a significant effect on the environment if it, among other things, will disrupt or adversely affect a paleontological site except as part of a scientific study. Specifically, Appendix G of the State CEQA Guidelines, the Environmental Checklist Form, asks, "Will the project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?" To determine the uniqueness of a given paleontological resource, it must first be identified or recovered (i.e., salvaged). Therefore, CEQA mandates mitigation of adverse impacts, to the extent practicable, to paleontological resources.

CEQA does not define "a unique paleontological resource or site." However, the Society of Vertebrate Paleontology does define a "significant paleontological resource" in the context of environmental review as follows:

> Fossils and fossiliferous deposits, here defined as consisting of identifiable vertebrate fossils, large or small, uncommon invertebrate, plant, and trace fossils, and other data that provide taphonomic, taxonomic, phylogenetic, paleoecologic, stratigraphic, and/or biochronologic information. Paleontological resources are typically to be older than recorded human history and/or older than middle Holocene (i.e., older than about 5,000 radiocarbon years) (SVP 2010).

The loss of paleontological resources meeting the criteria outlined above (i.e., a significant paleontological resource) would be a significant impact under CEQA, and the CEQA lead agency is responsible for ensuring that impacts to paleontological resources are mitigated, where practicable, in compliance with CEQA and other applicable statutes.

California Public Resources Code

Section 5097.5 of the California Public Resource Code states "no person shall knowingly and willfully excavate upon, or remove, destroy, injure or deface" any "vertebrate paleontological site" on public lands without the "permission of the public agency having jurisdiction over such lands". Violation of this section is a misdemeanor.

As used in this Public Resource Code section, "public lands" means lands owned by or under the jurisdiction of the State or any city, county, district, authority, or public corporation, or any agency thereof. Consequently, public agencies are required to comply with Public Resource Code Section 5097.5 for their own activities, including construction and maintenance, as well as for permit actions (e.g., encroachment permits) undertaken by others.

University of California

UC Seismic Safety Policy

The UC Seismic Safety Policy was established to implement Seismic Policy set by the Capital Asset Strategies & Finance. The UC Seismic Policy applies to all buildings and structures in a UC campus. All facilities must be evaluated to provide "An acceptable level of earthquake safety for students, employees, and the public who occupy University Facilities and Leased Facilities." Planning for all projects included in the 2021 LRDP should address the options considered to improve seismic performance beyond minimally required code performance (UC 2017).

UC Facilities Manual Seismic Program Guidelines

The procedures and guidelines located in the UC Facilities Manual are a current and central source of information regarding guidance for UC Seismic Safety Policy compliance. The purpose of the UC Facilities Manual Seismic Program Guidelines is to highlight and clarify portions of the policy. These guidelines should not be used as a substitute for the policy. Where information in the policy and the Facilities Manual varies, campuses are to follow the most conservative approach for immediate and long-term safety and preservation of life. The UC Facilities Manual Seismic Program Guidelines will serve as a resource for development under the 2021 LRDP to maintain compliance with the UC Seismic Safety Policy.

University of California, Riverside

UCR Earthquake Plan

The Earthquake Plan is a component of UCR's Emergency Operations Plan and provides guidance and direction in response to an earthquake event that possibly affects the campus. The objectives of the Earthquake Plan are to evaluate and determine if there is damage or an impact to the campus following an earthquake, define the strategies UCR will use in response to an earthquake that affects the campus community and disrupts normal campus operations, and to provide direction to emergency response activities by identifying key response objectives and actions. To facilitate planning efforts and develop appropriate response strategies, two specific earthquake scenarios

(moderate earthquake and major earthquake) are identified in the Earthquake Plan with appropriate response phases (e.g., immediate response; ongoing response) and responsible parties.

Regional and Local (Non-Binding)

As noted in Section 4, "University of California Autonomy," UCR, a constitutionally-created State entity, is not subject to municipal regulations of surrounding local governments for uses on property owned or controlled by UCR that are in furtherance of the university's educational purposes. However, UCR may consider, for coordination purposes, aspects of local plans and policies of the communities surrounding the campus when it is appropriate and feasible but not bound by those plans and policies in its planning efforts.

City of Riverside General Plan

CITY OF RIVERSIDE PUBLIC SAFETY ELEMENT

The City's General Plan Public Safety Element includes policies to minimize potential damage to existing and new structures and loss of life that may result from geologic and seismic hazards. These include ensuring that all new development in the City abides by the most recently adopted City and State seismic and geotechnical requirements.

CITY OF RIVERSIDE HISTORIC PRESERVATION ELEMENT

The City's General Plan Historic Preservation element includes the objective of using historic preservation principles as an equal component in the planning and development process. The City expressed policy commitments to protect sites of archeological and paleontological significance and ensure compliance with all applicable State and federal cultural resources protection and management laws in its planning and project review process.

4.7.3 Environmental Impacts and Mitigation Measures

Significance Criteria

UCR utilizes the following 2020 CEQA Guidelines Appendix G significance criteria questions related to Geology and Soils.

Would the proposed 2021 LRDP:

a) Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:
   i. Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42?
   ii. Strong seismic ground shaking?
   iii. Seismic-related ground failure, including liquefaction?
   iv. Landslides?

b) Result in substantial soil erosion or the loss of topsoil?

c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse?

d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?

e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?

f) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

Issues Not Evaluated Further

Soil Erosion or Topsoil Loss (Criterion b)

The Initial Study for the 2021 LRDP (Appendix A) concluded that campus construction activities would comply with the UCR Plan Review and Building Permit Program, which specifies requirements for new construction on campus, as well as inspections protocol for existing buildings. Adherence to applicable rules under the UCR Plan Review and Building Permit Program would be necessary to reduce and/or prevent erosion during construction activities. Therefore, no further evaluation is required.

Expansive Soil (Criterion d)

The Initial Study for the 2021 LRDP (Appendix A) concluded that implementation of the proposed 2021 LRDP would not be located on expansive soil. Therefore, no further evaluation is required.

Soil Adequacy to Support Alternative Wastewater Disposal Systems (Criterion e)

The Initial Study for the 2021 LRDP (Appendix A) concluded that the proposed 2021 LRDP would be served by the municipal sewer system and would not entail the construction or use of septic tanks or other alternative wastewater disposal systems. Therefore, projects implemented under the proposed 2021 LRDP would result in no impact related to soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems. No further evaluation is required.

Analysis Methodology

To evaluate the potential 2021 LRDP impacts, resource conditions that could pose a risk to development of projects under the proposed 2021 LRDP were identified through review of documents pertaining to these topics within the LRDP boundary. Sources consulted include the City's General Plan, U.S. Geological Survey and CGS technical maps and guides, the Natural Resources Conservation Service Soil Survey (available through the Soil Survey Geographic Database), previous campus project CEQA documents, background reports prepared for nearby plans and projects, and published geologic literature. The information obtained from these sources was reviewed and summarized to establish the existing conditions (provided above) and identify potential environmental hazards based on proximity of the hazards to growth and land uses envisioned in the 2021 LRDP. In determining level of significance, the analysis assumes that the 2021 LRDP would comply with relevant laws, regulations, and guidelines.

2021 LRDP Objectives and Policies

There are no objectives or policies in the proposed 2021 LRDP related to geology, soils, and paleontological resources.

Impact Analysis

IMPACT GEO-1 INCREASE THE RISK OF EXPOSURE OF PEOPLE OR BUILDINGS TO SEISMIC-RELATED HAZARDS.

THE CAMPUS IS NOT LOCATED IN AN ALQUIST-PRIOLO FAULT ZONE AND NO FAULT LINES TRAVERSE DIRECTLY UNDER THE CAMPUS. HOWEVER, THERE IS POTENTIAL FOR BOTH EARTHQUAKES AND GROUND SHAKING IN THE CAMPUS AREA, AS WELL AS ASSOCIATED GROUND FAILURE AND LANDSLIDES. PROJECTS UNDER THE PROPOSED 2021 LRDP WOULD BE REQUIRED TO COMPLY WITH CBC BUILDING REQUIREMENTS AS WELL AS THE UC SEISMIC SAFETY POLICY AND UC FACILITIES MANUAL SEISMIC PROGRAM GUIDELINES. IMPACTS WOULD BE LESS THAN SIGNIFICANT. NO MITIGATION MEASURES ARE REQUIRED.

Construction

Generally, construction workers would be within partially complete to nearly complete structures designed and constructed to comply UC Facilities Manual Seismic Program Guidelines, the UC Seismic Safety Policy, and CBC, Title 24, Part 2. Compliance with the CBC would ensure that all new and modified buildings would be capable of withstanding anticipated levels of ground shaking. Construction workers performing earthwork activity, such as grading or excavating would be subject to potential ground shifts and collapse, such a utility trench collapsing while they are within the trench. However, the CBC also establishes grading requirements that apply to excavation and fill activities and requires the implementation of erosion control measures. Additionally, applicable OSHA requirements that address earthquake hazards, such as HAZWOPER standards for cleanup of diesel fuel following an earthquake during construction, would be required. Therefore, construction workers would not be exposed to substantial hazards of strong seismic ground shaking, such as excavation or building collapse. Impacts during construction would be **less than significant**.

Operation

FAULT RUPTURE

UCR is in the seismically active region of southern California and is in the vicinity of earthquake faults and fault zones where large earthquakes may originate. However, UCR is not directly located in an Alquist-Priolo Fault Zone, and, according to the California Earthquake Hazards Zone Map, the UCR campus is located approximately 5 miles southwest of the San Jacinto Fault Zone, 13.5 miles southwest of the San Andreas Fault, 15 miles northeast of the Elsinore Fault Zone, and 20 miles southeast of the Cucamonga Fault. At this distance, it is unlikely that ground rupture would occur on the UCR campus. Thus, implementation of the proposed 2021 LRDP would not expose people or structures to substantial adverse effects associated with fault rupture. Therefore, impacts associated with fault rupture are **less than significant**.

STRONG SEISMIC GROUND SHAKING

The campus and proposed 2021 LRDP components would be subject to ground shaking generated from regional fault activities from the various fault zones located near the campus including the San Jacinto, San Andreas, Cucamonga, and Elsinore Fault Zones, which have the potential to cause

moderate to large earthquakes (DOC 2020). Ground shaking has the potential to dislodge objects from walls, ceilings, and shelves, and to damage and destroy buildings and other structures. People and property located within the LRDP boundary would be exposed to these potential hazards. The campus minimizes these seismic-induced risks through several requirements as described below.

Proposed 2021 LRDP implementation would include the addition of approximately 3.7 million asf (approximately 5.5 million gsf) of academic buildings and support facilities on the UCR main campus. Renovations of existing campus buildings may also occur during implementation of the proposed 2021 LRDP. Development of new and retrofitted campus building projects would be required to conduct a site-specific geotechnical study and comply with the provided engineering design recommendations. Additionally, 2021 LRDP campus projects would be required to comply with the UC Facilities Manual Seismic Program Guidelines, the UC Seismic Safety Policy, and CBC, Title 24, Part 2. In cases of UCR retrofitted structures and redevelopment which replaces older campus structures, the proposed 2021 LRDP would improve seismic safety in comparison to baseline conditions.

Projects under the proposed 2021 LRDP would comply with the UC Seismic Safety Requirements and the latest CBC, to ensure that all new and modified buildings would be capable of withstanding anticipated levels of ground shaking. The UC Seismic Safety Policy establishes that University policy is "to the extent feasible by present earthquake engineering practice, to provide an acceptable level of earthquake safety for students, employees, and the public who occupy University Facilities and Leased Facilities" (UC 2017). The UC Seismic Safety Policy addresses interior and exterior building elements that may fall or slide during an earthquake and requires anchorage for seismic resistance of nonstructural building elements such as furnishings, fixtures, material storage facilities, and utilities that could dislodge, fall, or rupture during an earthquake.

The CBC, Title 24, Part 2 provides building codes and standards for the design and construction of structures in California. The CBC requires, among other things, seismically resistant construction, and foundation. The CBC also establishes grading requirements that apply to excavation and fill activities and requires the implementation of erosion control measures. California's building codes are published in their entirety every 3 years. Half of the 2019 CBC, California Code of Regulations, Title 24 were approved and adopted by the Commission in December 2018. The recently updated 2019 CBC are based on the International Building Code with the addition of more extensive structural seismic provisions. Chapter 16 of the CBC contains definitions of seismic sources and the procedure used to calculate seismic forces on structures.

The purpose of the CBC is to establish minimum standards to safeguard the public health, safety, and general welfare through structural strength, means of egress, and general stability by regulating and controlling the design, construction, quality of materials, use and occupancy, location, and maintenance of all building and structures in its jurisdiction. In addition, the CBC contains necessary California amendments, which are based on the ASCE Minimum Design Standards 7-05. ASCE 7-05 provides requirements for general structural design and includes means for determining earthquake loads as well as other loads (flood, wind, etc.) for inclusion into building codes. The provisions of the CBC apply to the construction, alteration, movement, replacement, and demolition of every building or structure or any appurtenances connected or attached to such buildings or structures throughout California.

The earthquake design requirements of the CBC consider the occupancy category of the structure, site class, soil classifications, and various seismic coefficients, which are used to determine a SDC for a project. The SDC is a classification system that combines the occupancy categories with the level of expected ground motions at the site and ranges from SDC A (very small seismic vulnerability) to

SDC E/F (very high seismic vulnerability and near a major fault). Design specifications are then determined according to the SDC. Development under the proposed 2021 LRDP would be required to comply with the CBC, including Part 2, Volume 2, Chapter 18, Soils and Foundations, which outlines the minimum standards for structural design and construction. This includes geotechnical evaluations, which among other requirements, includes a record of the soil profile, regulation of active faults, recommendations for foundation type and design criteria that address issues, as applicable, such as, but not limited to, bearing capacity of soils, provisions to address expansive soils, settlement, and varying soil strength. If a building department or other appropriate enforcement agency (in this case, the Campus Building Official), determines that recommended action(s) presented in the geotechnical evaluations are likely to prevent structural damage, the approved recommended action(s) must be made a condition to the building permit (Section 1803.1.1.3 of Chapter 18).

The CBC provides standards for various aspects of construction, including, but not limited to, excavation, grading, and earthwork construction, preparation of the site prior to fill placement, specification on fill materials and fill compaction and field testing, retaining wall design and construction, foundation design and construction, and seismic requirements. It includes provisions to address issues such as, but not limited to, construction on expansive soils and soil strength loss. Pursuant to California law, project design and construction would be required to comply with provisions of the CBC.

While proposed development under the 2021 LRDP would not increase the risk of seismic hazards on campus, it would increase the UCR campus population. However, the majority of the existing residential structures in the region are substantially older than the new development proposed under buildout of the 2021 LRDP. Approximately 76 percent of the region's housing stock was built prior to 1990 (City of Riverside 2017). Therefore, the existing housing in the region does not incorporate modern Building Code safety requirements. The rest of the state's housing stock follows similar trends. Consequently, individuals moving from older residences into new structures proposed under the 2021 LRDP would likely benefit from increased seismic safety. Consistent with changes to the UC Seismic Safety Policy in 2017, UCR has an ongoing program to upgrade or replace existing buildings not adequately prepared to withstand currently assessed seismic hazards, which includes an evaluation of each structure located within the LRDP boundary and a determination as to the need for further structural improvements. Furthermore, seismically reduced risks would be minimized through compliance with the CBC, which, as discussed above, includes specific structural seismic safety provisions. The campus would also adhere to the UC Seismic Safety Policy which requires anchorage for seismic resistance of nonstructural building elements that could create a hazard if dislodged during an earthquake. Thus, compliance with the UC Seismic Safety Policy and CBC would reduce the potential operational impact related to seismic ground shaking to **less than significant**.

SEISMIC-RELATED GROUND FAILURE AND LIQUEFACTION

Ground failure can include an entire suite of affects ranging from simple ground cracking to complex lateral spreading landslides. Failures may be associated with saturated deposits (liquefaction) or unsaturated deposits (densification). Three key factors which indicate whether an area is potentially susceptible to liquefaction include severe ground shaking, shallow groundwater, and cohesionless sands.

According to Figure PS-2 of the City's General Plan Public Safety Element, the majority of the UCR campus is characterized by low potential for liquefaction, with narrow areas considered moderate

risk for liquefaction along the southern portion of West Campus between Martin Luther King Boulevard and Le Conte Drive and the portion of East Campus adjacent to the I-215/SR 60 freeway between Blaine Street and University Avenue and from University Avenue east to the Box Springs Mountains. Elevations on campus range from approximately 1,000 feet to 1,400 feet above sea level. Liquefaction-induced ground failure can involve a complex interaction among seismic, geologic, soil, topographic, and groundwater factors. Failures can include ground fissures, sand boils, ground settlement, loss of bearing strength, buoyancy effects, ground oscillation, flow failure, and lateral spread (Bartlett and Youd 1992). These can influence surface and subsurface structures.

Development of new and retrofitted campus building projects would be required to conduct a site-specific geotechnical study and comply with the provided engineering design recommendations. Additionally, LRDP campus projects would be required to comply with the UC Facilities Manual Seismic Program Guidelines, the UC Seismic Safety Policy, and CBC, Title 24, Part 2.

The CBC provides standards for various aspects of construction, including, but not limited to, excavation, grading, and earthwork construction, preparation of the site prior to fill placement, specification on fill materials and fill compaction and field testing, retaining wall design and construction, foundation design and construction, and seismic requirements. It includes provisions to address issues such as, but not limited to, construction on expansive soils and soil strength loss. Pursuant to California law, project design and construction would be required to comply with provisions of the CBC.

While development under the proposed 2021 LRDP would not increase the risk of seismic hazards on campus, it would increase UCR campus population. However, the majority of the existing residential structures in the region are substantially older than the new development proposed under buildout of the 2021 LRDP. Approximately 76 percent of the region's housing stock was built prior to 1990 (City of Riverside 2017). Therefore, most the region's housing stock does not incorporate modern Building Code safety requirements. The rest of the state's housing stock follows similar trends. Consequently, individuals moving from older residences into new structures proposed under the 2021 LRDP would likely benefit from increased safety. Furthermore, these seismically reduced risks would be minimized through compliance with the CBC, which, includes specific structural seismic safety provisions as well as implementation of recommendations in a site-specific geotechnical investigation. Thus, compliance with CBC, the UC Facilities Manual Seismic Program Guidelines and the UC Seismic Safety Policy would ensure operational impacts related to seismic ground failure, including liquefaction, would be **less than significant**.

LANDSLIDES

According to the Geologic and Seismic Technical Background Report for the City's General Plan EIR, a few areas of the City could be prone to seismically induced landslides and rockfalls (City of Riverside 2007). Seismically induced landslides and rockfalls are common during large earthquakes. Structures located below this hazard area could be subject to severe damage. According to the DOC Earthquake Zones of Required investigation, there are no areas with the UCR campus that are prone to landslides (2020). The proposed 2021 LRDP would potentially provide for some development in the southeastern area of East Campus adjacent to natural hillsides, such as the UCR Botanic Gardens interpretive center, but the geologic materials on the campus render the risk for deep-seated landslides to be very low, even on natural slopes. This is due to the sturdy nature of the alluvial materials and bedrock underlying most of the campus, as these have no weak planar structures developed that could trigger a large, deep-seated landslide.

All structures to be constructed or redeveloped under the proposed 2021 LRDP would be required by the UC Seismic Safety Policy to undergo an independent review of the structural seismic design in compliance with the latest CBC requirements to ensure structural design of all new and modified buildings would not result in adverse effects such as on- or off-site landslides, lateral spreading, subsidence, liquefaction, or collapse. All new campus facilities built as part of the proposed 2021 LRDP would be required to conduct a project-specific geotechnical study pursuant to the CBC prior to construction to assess potential for displacement caused by landslides or other earth movements or soil constraints. These reports would inform the type of building foundations and pre-construction stabilization necessary for proposed development under the 2021 LRDP. While development under the proposed 2021 LRDP would not increase the risk of seismic related landslides on campus, it would expose more people to potential risks associated with damage from landslides. These seismically reduced risks would be minimized through compliance with the CBC, which, as discussed above, includes specific structural seismic safety provisions. Therefore, operational impacts associated with landslides would be **less than significant**.

Mitigation Measures

No mitigation is required.

Significance After Mitigation

Impacts would be less than significant without mitigation.

IMPACT GEO-2 INCREASE THE RISK OF EXPOSURE OF PEOPLE OR BUILDINGS TO SEISMIC-RELATED GROUND FAILURE, INCLUDING LANDSLIDE, LATERAL SPREADING, SUBSIDENCE, LIQUEFACTION, OR COLLAPSE.

UCR IS UNDERLAIN BY SOILS WITH LOW POTENTIAL FOR LIQUEFACTION OR OTHER SOIL-RELATED HAZARDS. FURTHERMORE, THE OLDER ALLUVIUM AND BEDROCK THAT UNDERLIES LARGE PORTIONS OF THE CAMPUS ARE NON-LIQUEFIABLE REGARDLESS OF GROUNDWATER DEPTH. PROJECTS DEVELOPED UNDER THE PROPOSED 2021 LRDP WOULD BE REQUIRED TO COMPLY WITH CBC BUILDING REQUIREMENTS AS WELL AS THE UC SEISMIC SAFETY POLICY. IMPACTS WOULD BE LESS THAN SIGNIFICANT. NO MITIGATION MEASURES ARE REQUIRED.

Construction

Construction of new campus facilities built as part of the proposed 2021 LRDP would require connections to underground utilities, such as water and sanitary sewer. Installation of utility connections would require construction workers to excavate temporary utility trenches and stockpile materials. Construction on the UCR campus must comply with the CBC. The CBC establishes grading requirements that apply to excavation and fill activities and requires the implementation of erosion control measures. Additionally, applicable OSHA requirements that address earthquake hazards, such as HAZWOPER standards for cleanup of diesel fuel following an earthquake during construction, would be required. Compliance with the CBC and OSHA would reduce impacts of construction hazards to **less than significant**.

Operation

SUBSIDENCE

Dry to partially saturated sediments not susceptible to liquefaction may be susceptible to dynamic consolidation and local ground subsidence. This consolidation or densification occurs in loose cohesionless sediments as the void spaces are diminished due to intense seismic shaking. Hazard

maps are not normally created for this condition, and there are no specific data in the City, which allow prediction of the locations or magnitudes of potential consolidation and subsidence (City of Riverside 2007). In general, Qya soils would be most susceptible to dynamic consolidation effects. Qof could also be susceptible but less so due to its higher in-place density and some cementation. Areas where artificial fill (Qaf) placed without proper engineering controls and inspections are also susceptible to dynamic consolidation and subsidence. Subsidence due to groundwater withdrawal is possible in the City due to substantial pumping. No subsidence in the City, which includes the UCR campus, was noted in the City's General Plan Public Safety Element (2018).

All new campus facilities built as part of the proposed 2021 LRDP would be required to conduct a project-specific geotechnical study prior to construction to assess potential for displacement caused by lateral spreading and subsidence, or other earth movements or soil constraints. If future development under the proposed 2021 LRDP occurs in an area susceptible to subsidence, the project-specific geotechnical study would include project specific measures to address subsidence. UCR would be required to adhere to the measures outlined in the geotechnical report and impacts would be **less than significant**.

LIQUEFACTION

Potential liquefaction hazards of the proposed 2021 LRDP were discussed above in Impact GEO-1. As discussed therein, impacts associated with liquefaction hazards would be **less than significant**.

LATERAL SPREADING

Liquefaction-induced ground failure can involve a complex interaction among seismic, geologic, soil, topographic, and groundwater factors. Failures can include lateral spreading. Lateral spread is a liquefaction-induced landslide of a fairly coherent block of soil and sediment deposits that moves laterally (along the liquefied zone) by gravitational force, sometimes on the order of 10 feet, often toward a topographic low such as a depression or valley area. Considering past earthquake experience from other areas, lateral spreads caused significant damage to critical facilities during the 1971 San Fernando earthquake with a magnitude of 6.5.

As discussed under *Liquefaction*, all structures to be constructed or redeveloped under the proposed 2021 LRDP would be required to comply with the UC Seismic Safety Policy and the latest CBC requirements, to ensure structural design of all new and modified buildings would not result in adverse effects such as on- or off-site landslides, lateral spreading, subsidence, liquefaction, or collapse. All new campus facilities built as part of the proposed 2021 LRDP would be required to conduct a project-specific geotechnical study in compliance with the CBC prior to construction to assess potential for displacement caused by lateral spreading or other earth movements or soil constraints. These reports would inform the type of building foundations and pre-construction stabilization necessary for proposed development under the proposed 2021 LRDP. Therefore, operational impacts associated with lateral spreading would be **less than significant**.

LANDSLIDES

According to the Geologic and Seismic Technical Background Report for the City's General Plan EIR, a few areas of the City could be prone to seismically induced landslides and rockfalls (City of Riverside 2007). Seismically induced landslides and rockfalls are common during large earthquakes. Structures located below this hazard area could be subject to severe damage. According to the DOC Earthquake Zones of Required investigation, no areas on the UCR campus are prone to landslides (DOC 2020). Slope instability under non-earthquake (static) conditions are not considered to be a

significant hazard in the City. The slope stability hazard in the City is rated as negligible because the topography is very flat to moderately flat, and no bedded sedimentary bedrock is exposed. Projects implemented under the proposed 2021 LRDP could develop in the southeastern area of East Campus, adjacent to natural hillsides. The risk for deep-seated landslides is very low, even on natural slopes because of the sturdy nature of the alluvial materials and bedrock underlying most of the campus, and these have no weak planar structures developed that could trigger a large, deep-seated landslide.

All structures to be constructed or redeveloped under the proposed 2021 LRDP would be required to comply with the UC Seismic Safety Policy and the latest CBC requirements, to ensure structural design of all new and modified buildings would not result in adverse effects such as on- or off-site landslides, lateral spreading, subsidence, liquefaction, or collapse. All new campus facilities built as part of the proposed 2021 LRDP would be required to conduct a project-specific geotechnical study in compliance with the CBC prior to construction to assess potential for displacement caused by landslides or other earth movements or soil constraints. These reports would inform the type of building foundations and pre-construction stabilization necessary for proposed development under the 2021 LRDP. Therefore, operational impacts associated with landslides would be **less than significant**.

COLLAPSE

Soil collapse typically occurs following the wetting and loading of unsaturated materials, but soils with higher moisture content such as quick clays may undergo collapse as well. Collapsible soils also include those sediments that contain perennial ice or permafrost that has subsequently melted. Because the campus is primarily composed of soils with low to moderate shrink-swell characteristics, it is unlikely for proposed development under the 2021 LRDP to undergo soil collapse.

Development would be subject to site-specific geotechnical evaluations to further examine the soil type and moisture content at potential planned project locations. These reports would inform the risks relating to soil collapse and provide recommendations to minimize impacts. Therefore, operational impacts related to soil collapse would be considered **less than significant**.

OVERALL

Construction of facilities and structures under the proposed 2021 LRDP would comply with the CBC and UC Seismic Safety policy. Compliance with the CBC and UC Seismic Safety policy would reduce effects to a less-than-significant level. Planned development under the proposed 2021 LRDP would be subject to site-specific geotechnical evaluations to further examine the potential risks relating to unstable geologic units or soils. These reports would inform the type of building foundations and pre-construction stabilization necessary for development under the proposed 2021 LRDP. Therefore, overall operational impacts related to unstable geologic units or soils becoming unstable because of project development under the proposed 2021 LRDP is considered **less than significant**.

Mitigation Measures

No mitigation is required.

Significance After Mitigation

Impacts would be less than significant without mitigation.

IMPACT GEO-3 DIRECTLY OR INDIRECTLY DESTROY UNIQUE PALEONTOLOGICAL RESOURCES.

REASONABLY FORESEEABLE DEVELOPMENT UNDER THE 2021 LRDP COULD CAUSE A SUBSTANTIAL ADVERSE CHANGE IN OR DISTURB KNOWN OR UNKNOWN PALEONTOLOGICAL RESOURCES AS DEFINED IN CEQA GUIDELINES SECTION 15064.5. HOWEVER, MITIGATION MEASURES MM GEO-1 AND MM GEO-2 WOULD MINIMIZE POTENTIAL IMPACTS DURING EXCAVATION ACTIVITIES. IMPACTS TO PALEONTOLOGICAL RESOURCES WOULD BE LESS THAN SIGNIFICANT WITH MITIGATION INCORPORATED.

Construction

Based on a paleontological literature review and existing fossil locality information available on the Paleobiology Database and UCMP database, the paleontological sensitivity of the geologic units underlying the UCR campus were determined in accordance with criteria established by the SVP (2010).

Quaternary old (late to early Pleistocene) alluvial deposits (Qof, Qvof), mapped in the majority of West Campus and large portions of the East campus, have a well-documented record of abundant and diverse vertebrate fauna recorded throughout California (Paleobiology Database 2021; UCMP 2021). Numerous vertebrate fossil taxa from Riverside County including horse, tapir, bison, camelid, deer, mastodon, mammoth, ground sloth, canine, rabbit, and rodent have been noted in the region (Jefferson 2010). Therefore, Quaternary old (late to early Pleistocene) alluvial deposits (Qof, Qvof), have a high paleontological sensitivity, pursuant to SVP standards (SVP 2010).

Quaternary young (late to middle Holocene) alluvial deposits (Qyf, Qya) mapped in the northern portion of East Campus and throughout most of West Campus, respectively, are likely too young to preserve paleontological resources (i.e., deposits that are less than 5,000 years old cannot, by definition, contain fossils). Late to middle Holocene sedimentary deposits (i.e., Qyf, Qya) are assigned a low paleontological sensitivity at the surface; however, these units grade downward into older, potentially fossiliferous deposits of early Holocene to Pleistocene age (e.g., Qof, Qvof) at unknown depths, that can only be estimated, based on regional geologic setting in the absence of additional data. Accurately assessing the boundaries between younger and older units in the UCR campus generally requires site-specific stratigraphic data, some form of radiometric dating, or fossil analysis from nearby sites. Conservative estimates of the depth at which paleontologically sensitive units may occur reduces potential for impacts to paleontological resources. The depths at which these units become old enough to yield fossils is highly variable but generally does not occur at depths of less than 3 to 5 feet. Sensitive units could occur at depths shallower than 5 feet near contact points with high sensitivity units. As discussed above, early Holocene to Pleistocene sedimentary deposits have the potential to preserve buried intact paleontological resources because these units have proven to yield scientifically significant vertebrate fossils in Riverside County and throughout California (Jefferson 2010; Paleobiology Database 2021; UCMP 2021). Consequently, areas mapped as Quaternary young (late to middle Holocene) sedimentary deposits (Qya, Qyf) are assigned a high paleontological sensitivity at depths greater than 5 feet.

Artificial fill (Qaf), mapped in the southern portion of the UCR campus, consists of recently compacted sediments related to prior development and as such, it is assigned no paleontological sensitivity.

As currently envisioned, development under the proposed 2021 LRDP would occur primarily in previously disturbed areas, adjacent to previously developed areas, surface parking areas, generally along North/South/East/West Campus Drive, and generally along University Avenue, Canyon Crest Drive, Big Springs Road, Aberdeen Drive, and West Linden Street. Additionally, development under

the 2021 LRDP would primarily be infill development or expansion of already developed areas. New development may occur within the Agricultural/Campus Research, Student Neighborhood, Campus Support, and University Avenue Gateway designations.

However, paleontological resources may be encountered during any ground-disturbing activities associated with construction (e.g., grading, excavation, or other ground disturbing construction activity) in areas with high paleontological sensitivity and undisturbed soils. Construction activities may result in the destruction, damage, or loss of undiscovered scientifically important paleontological resources.

Therefore, development associated with the implementation of the proposed 2021 LRDP, including construction-related and earth-disturbing activities, could potentially damage or destroy fossils in these geologic units.

Adverse effects to unknown paleontological resources can only be determined once a specific project has been proposed, because the effects are highly dependent on both the individual project site conditions (in this case, the geologic setting) and the characteristics of the proposed ground-disturbing activity and whether the site has previously been developed. Ground-disturbing activities associated with development facilitated by the 2021 LRDP, particularly in areas that have not previously been developed, have the potential to damage or destroy paleontological resources that may be present on or below the ground surface in previously undisturbed areas of high paleontological sensitivity. Consequently, potential damage to or destruction of fossils could occur due to development under 2021 LRDP and impacts are considered **significant**.

Operation

Impacts related to the proposed 2021 LRDP potential to cause substantial adverse change in the significance of a unique paleontological resource or unique geologic feature are limited to construction associated with the implementation of the proposed 2021 LRDP, as analyzed above. **No operational impact** would occur.

Mitigation Measures

The following mitigation measures are recommended to reduce adverse construction impacts related to paleontological resources and unique geologic features to a less-than-significant level. These mitigation measures have been developed pursuant to CEQA and are proposed for construction activities occurring under the proposed 2021 LRDP.

MM GEO-1 Inadvertent Discovery of Paleontological Resources

If any paleontological resources are encountered during ground-disturbing activities, the contractor shall ensure that activities in the immediate area of the find are halted and that UCR is informed. UCR shall retain a qualified paleontologist to evaluate the discovery and recommend appropriate treatment options pursuant to guidelines developed by the Society of Vertebrate Paleontology, including development and implementation of a paleontological resource impact mitigation program by a qualified paleontologist for treatment of the particular resource, if applicable. These measures may include, but not limited to, the following:

- Salvage of unearthed fossil remains and/or traces (e.g., tracks, trails, burrows)
- Washing of screen to recover small specimens
- Preparation of salvaged fossils to a point of being ready for curation (e.g., removal of enclosing matrix, stabilization and repair of specimens, and construction of reinforced support cradles)

- Identification, cataloging, curation, and provisions for repository storage of prepared fossil specimens

MM GEO-2 Paleontological Resources Monitoring

UCR shall implement the following measures if projects are proposing earth-moving activities exceeding 5 feet below previously undisturbed alluvial-fan soils within "high paleontological sensitivity" (i.e., Qof and Qvof):

- Retain a qualified professional paleontologist to prepare and implement a Paleontological Resources Impact Mitigation Plan for the project. A qualified paleontologist is an individual who meets the education and professional experience standards as established by the SVP (2010), which recommends the paleontologist shall have at least a master's degree or equivalent work experience in paleontology, shall have knowledge of the local paleontology, and shall be familiar with paleontological procedures and techniques. The Paleontological Resources Impact Mitigation Plan shall describe mitigation recommendations in detail, including paleontological monitoring procedures; communication protocols to be followed in the event that an unanticipated fossil discovery is made during project development; and preparation, curation, and reporting requirements. Consolidated monitoring efforts (e.g., archaeological monitoring/tribal cultural/paleontological monitoring) may occur if the individual monitor has the applicable qualifications.
- Prior to the commencement of ground disturbing activities, the qualified paleontologist or their designee, shall conduct training for grading and excavation personnel regarding the appearance of fossils and the procedures for notifying paleontological staff if unanticipated fossils are discovered by construction staff. The Paleontological Worker Environmental Awareness Program shall be fulfilled at the time of a pre-construction meeting. In the event a fossil is discovered by construction personnel anywhere in the project area, all work in the immediate vicinity of the find shall cease and a qualified paleontologist shall be contacted to evaluate the find before re-starting work in the area. If it is determined that the fossil(s) is (are) scientifically significant, the qualified paleontologist shall complete the mitigation outlined below to mitigate impacts to significant fossil resources
- If paleontological resources are encountered during ground-disturbing activities, MM GEO-1 shall apply.

Significance After Mitigation

Mitigation Measures **MM GEO-1 and MM GEO-2** would reduce impacts to paleontological resources to a less-than-significant level by including an implementation program requiring paleontological resource studies for projects that involve ground disturbance in project areas mapped as high paleontological sensitivity at the surface (i.e., Qof, Qvof) or subsurface (i.e., Qyf, Qya) and implementation of further requirements to avoid or reduce impacts to such resources on a project-by-project basis.

4.7.4 Cumulative Impacts

Geologic and soils impacts are site-specific rather than regional in nature and any development on campus would be subject to, at minimum, uniform site development and construction and regulatory standards relative to seismic and other geologic conditions that are prevalent in the region, such as the CBC standards. As such, the geographic context for the analysis of cumulative geology and soils impacts is the cumulative project sites underlying soils and geologic units, as well

as adjacent geologic features. The cumulative projects (see Table 4-1 in Section 4, *Environmental Impact Analysis*) include those that may occur as part of future development in accordance with the various jurisdictional General Plans, community plans, or specific plans that includes ground disturbance or construction of structures.

Seismic-related Hazards

Development in the City, as well as other area jurisdictions, is required to undergo analysis of geological and soil conditions applicable to the development in question, and restrictions on development would be applied in the event that conditions pose a risk to safety. As described above, UCR is not located in an Alquist-Priolo Earthquake Fault Zone, and all proposed campus development would be required to comply with the CBC and UC Seismic Safety Policy. Most of the existing residential structures in the region are substantially older than the new development proposed under buildout of the 2021 LRDP. Approximately 76 percent of the region's housing stock was built prior to 1990 (City of Riverside 2017). Therefore, most the region's housing stock does not incorporate modern Building Code safety requirements. The rest of the state's housing stock follows similar trends. Consequently, individuals moving from older residences into new structures proposed under the 2021 LRDP and under cumulative development projects would likely benefit from increased safety. Furthermore, any future development under the proposed 2021 LRDP would be subject to analysis and site-specific soil studies, which would minimize seismic risk associated with new buildings and other structures. Therefore, site-specific campus development would not compound the cumulative effect of geologic impacts with other cumulative projects due to the localized nature of impacts. The Project's contribution to cumulative effects associated with exposing people and property to ground shaking effects (Impact GEO-1) would be **less than significant (not cumulatively considerable)**.

Soil Stability Hazards

Development projects are required to undergo analysis of geological and soil conditions applicable to each development in question, and restrictions on development would be applied if conditions pose a risk to safety. As described above, UCR contains areas that could be subject to soil related hazards such as subsidence and liquefaction. Risks related to landslides and soil collapse are considered very low in the UCR campus. All proposed development would be required to comply with the CBC and UC Seismic Safety Policy. Most of the existing residential structures in the region are substantially older than the new development proposed under buildout of the 2021 LRDP. Approximately 76 percent of the region's housing stock was built prior to 1990 (City of Riverside 2017). Therefore, most the region's housing stock does not incorporate modern Building Code safety requirements. The rest of the state's housing stock follows similar trends. Consequently, individuals moving from older residences into new structures proposed under the 2021 LRDP and under cumulative development projects would likely benefit from increased safety. Furthermore, any future development under the LRDP would be subject to analysis and site-specific soil studies, which would minimize seismic risk associated with new buildings and other structures. Therefore, the Project's contribution associated with soil stability hazards (Impact GEO-2) would be **less than significant (not cumulatively considerable)**.

Paleontological Resources or Unique Geologic Features

The potential for impacts from individual developments is site-specific and depends on the location and extent of ground disturbance associated with each individual development proposal. Areas

throughout the region would continue to develop, as described in the City's General Plan, County of Riverside General Plan, and the County of San Bernardino General Plan, and involve grading and excavation activities which would potentially encounter paleontological resources. All future development projects would continue to be subject to existing State and local requirements and projects may be subject to project-specific mitigation requirements under CEQA.

Development under the 2021 LRDP has the potential to encounter paleontological resources during any ground-disturbing activities associated with construction (e.g., grading, excavation, or other ground disturbing construction activity) in areas with high paleontological sensitivity and undisturbed soils. Construction activities may result in the destruction, damage, or loss of undiscovered scientifically important paleontological resources. Therefore, development associated with the implementation of the proposed 2021 LRDP, including construction-related and earth-disturbing activities, could potentially damage or destroy fossils in these geologic units. Therefore, the Project's contribution to cumulative impacts (Impact GEO-3) is considered cumulatively considerable without mitigation.

Compliance with Mitigation Measures **MM GEO-1 and MM GEO-2** would be required for proposed development under the LDRP; therefore, the proposed 2021 LRDP's contribution to cumulative impacts related to the destruction, damage, or loss of undiscovered scientifically important paleontological resources would be **less than significant with mitigation (not cumulatively considerable)**.

4.7.5 References

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4.8 Greenhouse Gas Emissions

This section discusses greenhouse gas (GHG) emissions anticipated to result from campus development and growth under the proposed 2021 LRDP and discusses potential conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions. The analysis in this section is based upon GHG emissions methodology and modeling outputs that are included in Appendix G, GHG Emissions Supporting Information, of this EIR as well as guidance and direction provided by UCR staff.

4.8.1 Environmental Setting

Greenhouse Effect, Global Warming, and Climate Change

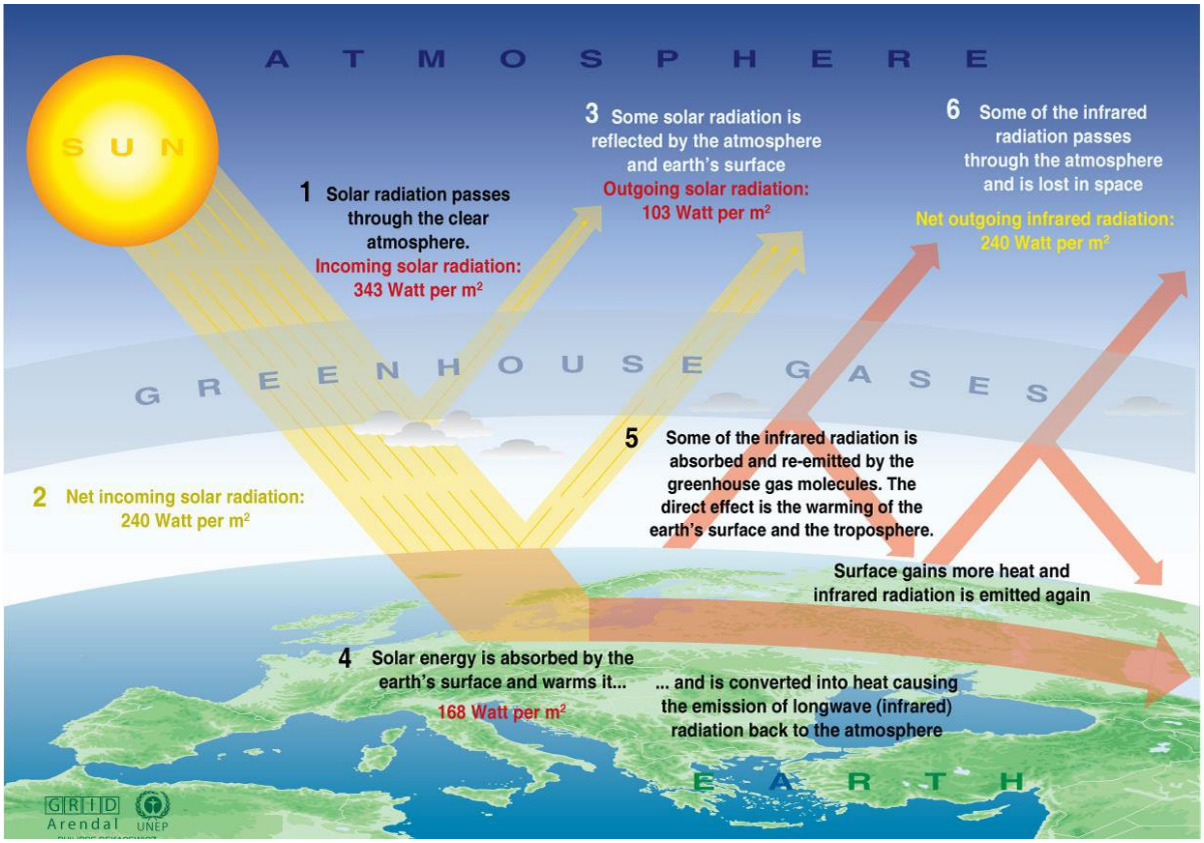
Most of the energy that affects the Earth's climate comes from the sun. Some solar radiation is absorbed by the Earth's surface, and a smaller portion of this radiation is reflected by the atmosphere back toward space. As the Earth absorbs high frequency solar radiation, its surface gains heat and then re-radiates lower frequency infrared radiation back into the atmosphere.[1]

Most solar radiation passes through gases in the atmosphere classified as GHGs; however, infrared radiation is selectively absorbed by GHGs. GHGs in the atmosphere play a critical role in maintaining the balance between the Earth's absorbed and radiated energy, the Earth's radiation budget,[2] by trapping some of the infrared radiation emitted from the Earth's surface that otherwise would have escaped to space (see Figure 4.8-1). Radiative forcing is the difference between the incoming energy and outgoing energy.[3] Specifically, GHGs affect the radiative forcing of the atmosphere,[4] which in turn affects the Earth's average surface temperature. This phenomenon, *the greenhouse effect*, keeps the Earth's atmosphere near the surface warmer than it would be otherwise and allows successful habitation by humans and other forms of life.

Combustion of fossil fuels and deforestation release carbon into the atmosphere that historically has been stored underground in sediments or in surface vegetation, thereby exchanging carbon from the geosphere and biosphere to the atmosphere in the carbon cycle. With the accelerated increase in fossil fuel combustion and deforestation since the Industrial Revolution of the 19th century, concentrations of GHGs in the atmosphere have increased exponentially. Such emissions of GHGs in excess of natural ambient concentrations contribute to the enhancement of the natural greenhouse effect. This enhanced greenhouse effect has contributed to *global warming*, an increased rate of warming of the Earth's average surface temperature.[5] Specifically, increases in GHGs lead to increased absorption of infrared radiation by the Earth's atmosphere and warm the lower atmosphere further, thereby increasing temperatures and evaporation rates near the surface.

[1] Frequencies at which bodies emit radiation are proportional to temperature. The Earth has a much lower temperature than the sun and emits radiation at a lower frequency (longer wavelength) than the high frequency (short-wavelength) solar radiation emitted by the sun.
[2] This includes all gains of incoming energy and all losses of outgoing energy; the planet is always striving to be in equilibrium.
[3] Positive forcing tends to warm the surface while negative forcing tends to cool it.
[4] This is the change in net irradiance at the tropopause after allowing stratospheric temperatures to readjust to radiative equilibrium, but with surface and tropospheric temperatures and state held fixed at the unperturbed values.
[5] This condition results when the Earth has to work harder to maintain its radiation budget, because when more GHGs are present in the atmosphere, the Earth must force emissions of additional infrared radiation out into the atmosphere.

Figure 4.8-1 The Greenhouse Gas Effect



Source: United Nations Environmental Program/GRID-Arendal 2005

Variations in natural phenomena such as volcanoes and solar activity produced most of the global temperature increase that occurred during preindustrial times. More recently, however, increasing atmospheric GHG concentrations resulting from human activity have been responsible for most of the observed global temperature increase.[6]

Warming affects global atmospheric circulation and temperatures; oceanic circulation and temperatures; wind and weather patterns; average sea level; ocean acidification; chemical reaction rates; precipitation rates, timing, and form; snowmelt timing and runoff flow; water supply; wildfire risks; and other phenomena, in ways collectively referred to as *climate change*. Climate change is the alteration in the average weather of the Earth that is measured by modifications in wind patterns, storms, precipitation, and temperature. These changes are assessed using historical records of temperature changes occurring in the past, such as during previous ice ages. Many of the concerns regarding climate change use this data to extrapolate a level of statistical significance specifically focusing on temperature records from the last 150 years (the Industrial Age) that differ from previous climate changes in rate and magnitude.

[6] These basic conclusions have been endorsed by more than 45 scientific societies and academies of science, including all of the national academies of science of the major industrialized countries. Since 2007, no scientific body of national or international standing has maintained a dissenting opinion.

Temperature Predictions

The United Nations Intergovernmental Panel on Climate Change (IPCC) was established by the World Meteorological Organization and United Nations Environment Programme to assess scientific, technical, and socioeconomic information relevant to the understanding of climate change, its potential impacts, and options for adaptation and mitigation. The IPCC constructed several emission trajectories of GHGs needed to stabilize global temperatures and climate change impacts. In its Fourth Assessment Report, the IPCC predicted that the global mean temperature change from 1990 to 2100, given six scenarios, could range from 1.1 degrees Celsius (°C) to 6.4°C. Regardless of analytical methodology, global average temperatures and sea levels are expected to rise under all scenarios. The report also concluded that "[w]arming of the climate system is unequivocal," and that "[m]ost of the observed increase in global average temperatures since the mid-20th century is very likely due to the observed increase in anthropogenic GHG concentrations." Warming of the climate system is now considered to be unequivocal, with the global surface temperature increasing about 1.33 degrees Fahrenheit (°F) over the last 100 years. The IPCC predicts increases in global average temperature of between 2°F and 11°F over the next 100 years (IPCC 2007a).

Greenhouse Gases and Global Emission Sources

Gases that trap heat in the atmosphere are referred to as GHGs. Prominent GHGs that naturally occur in the Earth's atmosphere are water vapor, carbon dioxide (CO_2), methane (CH_4), oxides of nitrogen (NO_X), and ozone. Anthropogenic (human-caused) GHG emissions include releases of these GHGs plus release of human-made gases with high global warming potential (GWP) (ozone-depleting substances such as chlorofluorocarbons [CFCs])[7] and aerosols, hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). The GHGs listed by the IPCC (CO_2, CH_4, nitrous oxide (N_2O), HFCs, PFCs, and SF_6) are discussed below, in order of abundance in the atmosphere. Water vapor, despite being the most abundant GHG, is not discussed below, because natural concentrations and fluctuations far outweigh anthropogenic influences, making it impossible to predict. Ozone is not included, because it does not directly affect radiative forcing. Ozone-depleting substances (CFCs, halons, carbon tetrachloride, methyl chloroform, and hydrochlorofluorocarbons) are not included, because they have been replaced by HFCs and PFCs.

The global warming potential is the potential of a gas or aerosol to trap heat in the atmosphere and is essentially a measurement of the radiative forcing of a GHG compared with the reference gas, CO_2. Individual GHG compounds have varying potential for contributing to global warming. For example, CH_4 is 25 times as potent as CO_2, while SF_6 is 22,200 times more potent than CO_2 on a molecule-per-molecule basis. To simplify reporting and analysis, methods have been set forth to describe emissions of GHGs in terms of a single gas. The most commonly accepted method for comparing GHG emissions is the GWP methodology defined in the IPCC reference documents (IPCC 2014a). The IPCC defines the GWP of various GHG emissions on a normalized scale that recasts all GHG emissions in terms of carbon dioxide equivalents (CO_2e), which compares the gas in question to that of the same mass of CO_2 (by definition, CO_2 has a GWP of 1). The global warming potential of a GHG is a measure of how much a given mass of a GHG is estimated to contribute to global warming. Thus, to describe how much global warming a given type and amount of GHG may cause, the CO_2e is used. A CO_2e is the mass emissions of an individual GHG multiplied by its global warming potential. As such, a high GWP represents high absorption of infrared radiation and a long atmospheric lifetime compared to CO_2. One must also select a time horizon to convert GHG emissions to equivalent CO_2

[7] CFCs destroy stratospheric ozone. The Montreal Protocol on Substances that Deplete the Ozone Layer prohibited CFCs production in 1987.

emissions to account for chemical reactivity and lifetime differences among various GHG species. The standard time horizon for climate change analysis is 100 years. Generally, GHG emissions are quantified in terms of metric tons (MT) CO_2e emitted per year.

The atmospheric residence time of a gas is equal to the total atmospheric abundance of the gas divided by its rate of removal (Seinfeld 2006). The atmospheric residence time of a gas is, in effect, a half-life measurement of the length of time a gas is expected to persist in the atmosphere when accounting for removal mechanisms such as chemical transformation and deposition. Table 4.8-1 lists the GWP of each GHG and its lifetime. Units commonly used to describe the concentration of GHGs in the atmosphere are parts per million (ppm), parts per billion (ppb), and parts per trillion (ppt), referring to the number of molecules of the GHG in a sampling of 1 million, 1 billion, or 1 trillion molecules of air. Collectively, HFCs, PFCs, and SF_6 are referred to as high-GWP gases. CO_2 is by far the largest component of worldwide CO_2e emissions, followed by CH_4, N_2O, and high-GWP gases, in order of decreasing contribution to CO_2e.

The primary human processes that release GHGs include the burning of fossil fuels for transportation, heating, and electricity generation; agricultural practices that release CH_4, such as livestock grazing and crop residue decomposition; and industrial processes that release smaller amounts of high-GWP gases. Deforestation and land cover conversion have also been identified as contributing to global warming by reducing the Earth's capacity to remove CO_2 from the air and altering the Earth's albedo or surface reflectance, thus allowing more solar radiation to be absorbed. Specifically, CO_2 emissions associated with fossil fuel combustion are the primary contributors to human-induced climate change. CO_2, CH_4, and N_2O emissions associated with human activities are the next largest contributors to climate change. GHGs of California concern are defined by California Assembly Bill (AB) 32 (see the Regulatory Environment subsection below for a description) and include CO_2, CH_4, NO_X, HFCs, PFCs, and SF_6. A seventh GHG, nitrogen trifluoride (NF_3), was also added under the California Health and Safety Code Section 38505(g)(7) as a GHG of concern. These GHGs are described in terms of their physical description and properties, global warming potential, atmospheric residence lifetime, sources, and atmospheric concentration in 2005 in Table 4.8-1.

Table 4.8-1 Description of Greenhouse Gases of California Concern

Greenhouse Gas	Physical Description and Properties	Global Warming Potential (100 years)	Atmospheric Residence Lifetime (years)	Sources
Carbon dioxide (CO_2)	Odorless, colorless, natural gas.	1	50–200	Burning coal, oil, natural gas, and wood; decomposition of dead organic matter; respiration of bacteria, plants, animals, and fungus; oceanic evaporation; volcanic outgassing; cement production; land use changes.
Methane (CH_4)	Flammable gas and is the main component of natural gas.	25	12	Geological deposits (natural gas fields) extraction; landfills; fermentation of manure; and decay of organic matter.
Nitrous oxide (N_2O)	N_2O (laughing gas) is a colorless GHG.	298	114	Microbial processes in soil and water; fuel combustion; industrial processes.

Greenhouse Gas	Physical Description and Properties	Global Warming Potential (100 years)	Atmospheric Residence Lifetime (years)	Sources
Chloro-fluoro-carbons (CFCs)	Nontoxic, nonflammable, insoluble, and chemically unreactive in the troposphere (level of air at the Earth's surface); formed synthetically by replacing all hydrogen atoms in CH_4 or ethane with chlorine and/or fluorine atoms.	3,800–8,100	45–640	Refrigerants aerosol propellants; cleaning solvents.
Hydro-fluoro-carbons (HFCs)	Synthetic human-made chemicals used as a substitute for CFCs and contain carbon, chlorine, and at least one hydrogen atom.	140-11,700	1–50,000	Automobile air conditioners; refrigerants.
Per-fluoro-carbons (PFCs)	Stable molecular structures and only break down by ultraviolet rays about 60 kilometers above Earth's surface.	6,500-9,200	10,000–50,000	Primary aluminum production; semiconductor manufacturing.
Sulfur hexafluoride (SF_6)	Human-made, inorganic, odorless, colorless, and nontoxic, nonflammable gas.	22,800	3,200	Electrical power transmission equipment insulation; magnesium industry, semiconductor manufacturing; a tracer gas.
Nitrogen trifluoride (NF_3)	Inorganic, is used as a replacement for PFCs, and is a powerful oxidizing agent.	17,200	740	Electronics manufacture for semiconductors and liquid crystal displays.

Sources:
IPCC 2007a
IPCC 2007b

Introduction to Global Climate Change

Global climate change is defined as the change in average meteorological conditions on Earth with respect to temperature, precipitation, and storms. Global temperatures are regulated by naturally occurring atmospheric gases such as water vapor, CO_2, N_2O, CH_4, HFCs, PFCs and SF_6. These gases are important because of their residence time (duration they stay) in the atmosphere, which ranges from 10 years to more than 100 years. These gases allow solar radiation into the Earth's atmosphere, but prevent radioactive heat from escaping thereby warming the Earth's atmosphere. Global climate change can occur naturally as it has in the past with the previous ice ages. According to the

California Air Resources Board (CARB), the climate change since the industrial revolution differs from previous climate changes in both rate and magnitude.

Gases that trap heat in the atmosphere are often referred to as GHGs. GHGs are released into the atmosphere by both natural and anthropogenic (human) activity. Without the natural greenhouse effect, the Earth's average temperature would be approximately 59°F cooler than it is currently. The cumulative accumulation of these gases in the Earth's atmosphere is considered to be the cause for the observed increase in the Earth's temperature (NASA 2010).

Although California's rate of GHG emissions has been reduced in comparison to historical levels, the State is still a substantial contributor to the U.S. emissions production total. In 2004, California is estimated to have produced 492 million metric tons (MMT) of CO_2e GHG emissions. Despite a population increase of 16 percent between 1990 and 2004, California has significantly reduced its GHG emissions rate because of the implementation of a range of energy efficiency programs as well as adoption of strict emission controls. In 2018, GHG emissions from statewide activities were 425 $MMTCO_2e$, 6 $MMTCO_2e$ below the 2020 GHG goal of 431 $MMTCO_2e$ (CARB 2020).

Global Climate Change Issue

Climate change is a global problem, because GHGs are global pollutants, unlike criteria air pollutants and hazardous air pollutants (i.e., toxic air contaminants) that are pollutants of regional and local concern. Pollutants with localized air quality effects have relatively short atmospheric lifetimes, approximately 1 day; by contrast, GHGs have long atmospheric lifetimes, several years to several thousand years. GHGs persist in the atmosphere for enough time to be dispersed around the globe.

Although the exact lifetime of particular GHG molecules depends on multiple variables and cannot be pinpointed, more CO_2 is currently emitted into the atmosphere than is sequestered. CO_2 sinks, or reservoirs, include vegetation and the ocean, which absorb CO_2 through photosynthesis and dissolution, respectively. These are two of the most common processes of CO_2 sequestration. Of the total annual human-caused CO_2 emissions, approximately 54 percent is sequestered through ocean uptake, Northern Hemisphere forest regrowth, and other terrestrial sinks within a year, whereas the remaining 46 percent of human-caused CO_2 emissions is stored in the atmosphere (Seinfeld 2006).

Similarly, effects of GHGs are borne globally, as opposed to the localized air quality effects of criteria air pollutants and hazardous air pollutants. The quantity of GHGs that it takes to ultimately result in climate change is not precisely known and cannot be quantified, and no single plan or project would be expected to measurably contribute to a noticeable incremental change in the global average temperature, or to global or local climates or microclimate. However, emissions of GHGs have the potential to adversely affect the environment, because such emissions contribute, on a cumulative basis, to global climate change.

Existing GHG Emissions

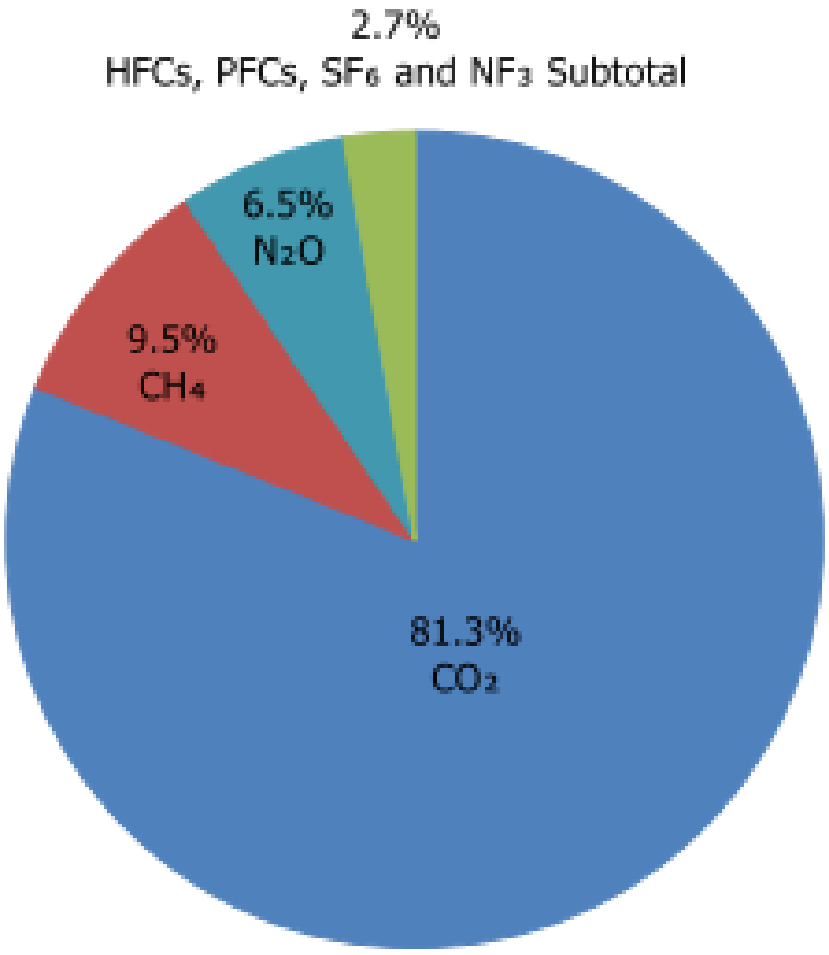
Global GHG Emissions

Worldwide anthropogenic emissions of GHG were approximately 46,000 MMT, or gigatonne of CO_2e in 2010. CO_2 emissions from fossil fuel combustion and industrial processes contributed about 65 percent of total emissions in 2010. Of anthropogenic GHGs, CO_2 was the most abundant accounting for 76 percent of total 2010 emissions. CH_4 emissions accounted for 16 percent of the 2010 total, while N_2O and fluorinated gases account for six and two percent, respectively (IPCC 2014b).

United States GHG Inventory

Total U.S. GHG emissions were 6,676.6 $MMTCO_2e$ in 2018. Total U.S. emissions increased by 3.7 percent from 1990 to 2018. Overall, net emission increase by 3.1 percent from 2017 to 2018 and decreased by 10.2 percent from 2005 to 2018. The decrease from 2005 to 2018 reflects long-term trends, including energy market trends, technological changes including energy efficiency, and energy fuel choices. Between 2017 and 2018, the increase in emissions was driven by an increase in CO_2 emissions from fossil fuel combustion, which was a result of increased energy use from greater heating and cooling needs due to a colder winter and hotter summer in 2018 compared to 2017. In 2018, the largest source of CO_2 and of overall emissions, was fossil fuel combustion, representing approximately 81.3 percent of U.S. GHG emissions (see Figure 4.8-2). CH_4 accounted for nearly 10 percent, N_2O accounted for approximately 6.5 percent, and the remaining 2.7 percent of U.S. GHG emissions were HFCs, PFCs, SF_6, and NF_3 (US EPA 2020).

Figure 4.8-2 2018 U.S. GHG Emissions by Gas

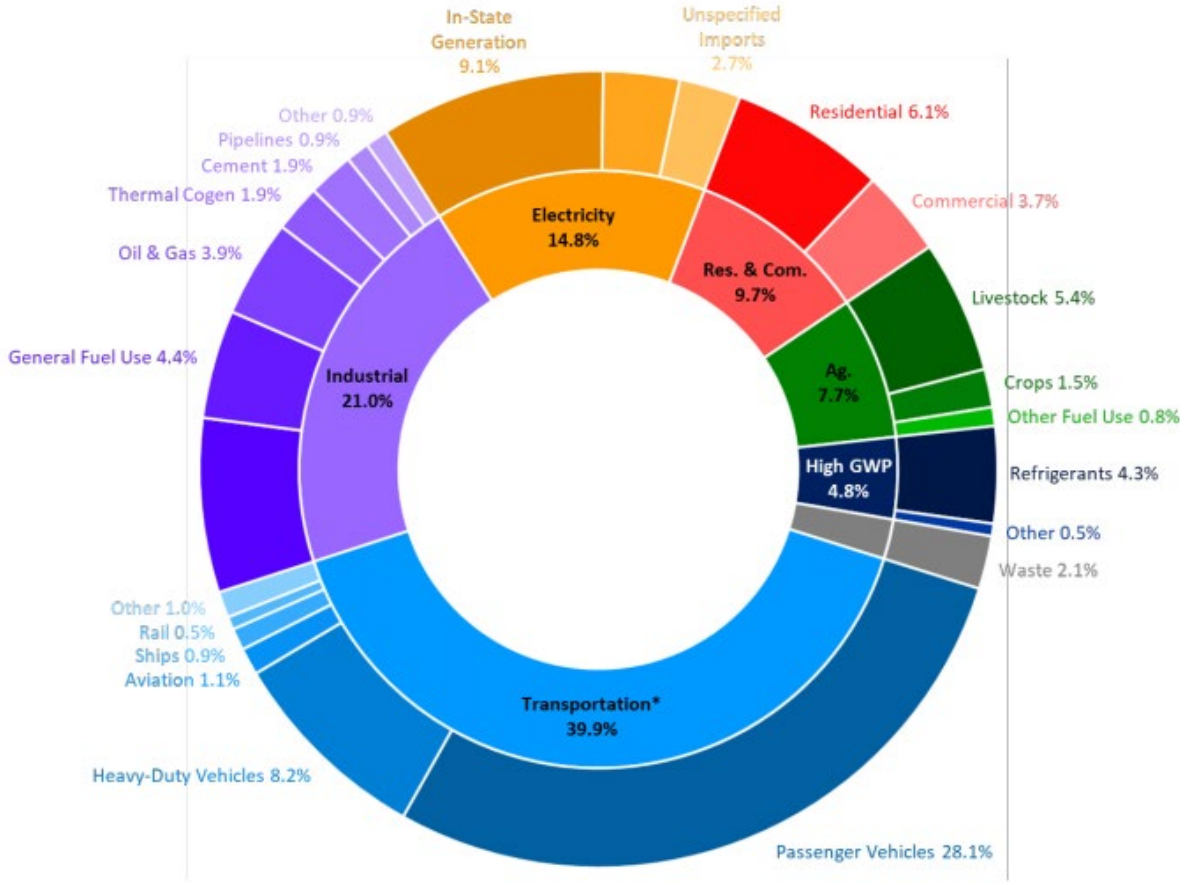


Source: US EPA 2020. Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2018.

California GHG Inventory

According to the California Air Resources Board (CARB), total California GHG emissions were 425 $MMTCO_2e$ in 2018 (CARB 2020). The major source of GHGs in California is associated with transportation, contributing nearly 40 percent of Statewide GHG emissions in 2018. The industrial sector is the second largest source, contributing 21 percent of Statewide GHG emissions, and the electricity sector accounted for approximately 15 percent (see Figure 4.8-3).

Figure 4.8-3 2018 California GHG Emissions by Scoping Plan Sectors and Sub-Sectors



Note: This figure breaks out 2018 California emissions by sector into an additional level of sub-sector categories. The inner ring shows the broad CARB Climate Change Scoping Plan sectors. The outer ring breaks out the sectors into sub-sectors or emission categories. The transportation sector represents tailpipe emissions from on-road vehicles and direct emissions from other off-road mobile sources; it does not include emissions from petroleum refineries and oil extraction and production, which are included in the industrial sector.

Source: CARB 2020

UCR Main Campus GHG Inventory

UCR prepared an inventory for main campus 2018 GHG emissions.[8] The inventory includes emissions from all main campus facilities and sources. UCR categorizes GHG emissions into three "scopes" based on the nature and source of the emissions and consistent with CARB Climate Change Scoping Plan approach. The following scope emissions are included in the UCR 2018 inventory:

- Scope 1 Emissions: Direct emissions, including stationary combustion such as boilers (e.g. UCR Central Plant), HFC refrigerant use, as well as non-stationary combustion of fuels in University-owned vehicles.
- Scope 2 Emissions: Indirect stationary sources, including emissions from purchased electricity and purchased steam for leased facilities.

[8] The boundaries for the UCR 2018 GHG inventory are limited to the geographic and operational boundary of the proposed 2021 LRDP. Similar to the 2005 LRDP, the proposed 2021 LRDP encompasses the approximate 1,108 contiguous acres constituting the UCR main campus, which is bisected by the I-215/SR 60 freeway into two distinct areas commonly referred to as East Campus and West Campus.

- Scope 3 Emissions: Other indirect emissions from business air travel and from commuting by students, faculty, and staff. Scope 3 is defined as emissions that are a consequence of the activities of the institution, but occur from sources not owned or controlled by the institution.

Overall UCR GHG emissions were 97,232 $MTCO_2e$ in 2018. The largest component were Scope 2 emissions, which account for 45,834 $MTCO_2e$ (47 percent) of emissions. Scope 3 emissions were the second largest, accounting for 31,263 $MTCO_2e$ (32 percent) of emissions. Scope 1 emissions were the smallest component, accounting for 20,136 $MTCO_2e$ (21 percent) of emissions. Emissions are summarized in Table 4.8-2 and Figure 4.8-4. See calculation details in Appendix G.

Table 4.8-2 UCR 2018 GHG Emissions Inventory

Scope	$MTCO_2e$[1]	Percent of Total Emissions[2]	Percent within Scope[2]
Scope 1	**20,136**	**20**	**100**
Stationary Fuel Combustion (Natural Gas)	18,410	19	91.4
Stationary Fuel Combustion (Diesel)	82	0.1	0.4
Mobile Fuel Combustion (Fleet)	339	0.3	1.7
Process and Fugitive Emissions (Refrigerants)	1,305	1	6.5
Scope 2	**45,834**	**47**	**100**
Electricity Consumption	45,834	47	100.0
Scope 3	**31,263**	**32**	**100**
Business Travel (Faculty/Staff Air Travel)	1,562	2	5.0
On-site Transportation (all non-transit vehicle travel, including employee commute)	26,342	27	84.3
On-site Transportation (vendors)	2,372	2	7.6
Transit Vehicle Transportation (Staff/Student Transit Travel)	743	1	2.4
Waste Generation	244	0.3	0.8
Total Emissions	**97,232**	**–**	**–**

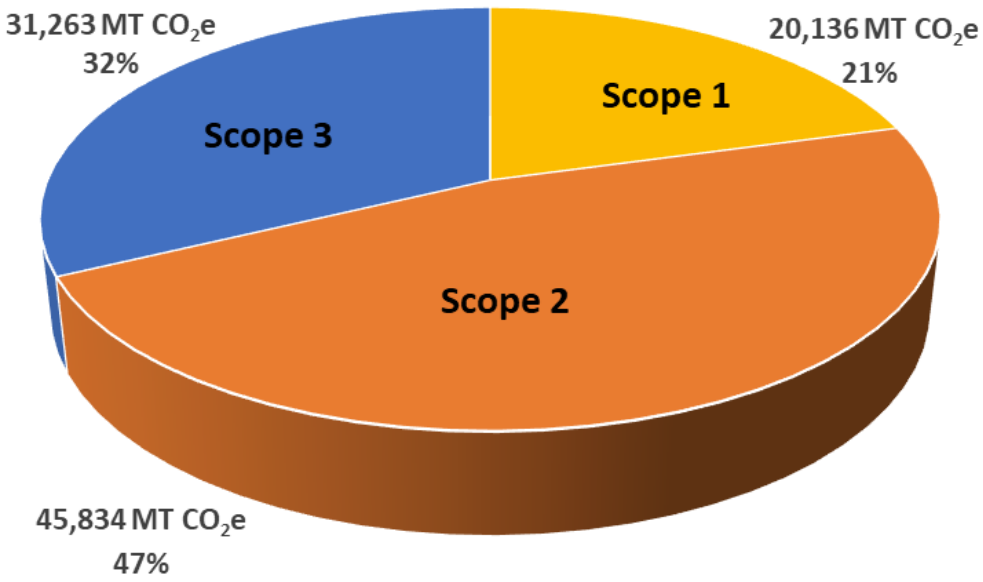
[1] Values are rounded to the nearest whole integer and may not add up to noted total.

[2] Totals are rounded to the nearest whole integer and may not add up to the noted total.

See Appendix G for detailed emission calculations. Activity data and total emissions presented herein is rounded.

Source: UCR Final GHG Inventory, Forecast, and Targets Methodology and Calculations Report (see in Appendix G).

Figure 4.8-4 2018 UCR Emissions by Scope



Source: Appendix G

ELECTRICITY GENERATION - RIVERSIDE PUBLIC UTILITY

RPU electricity generation consists of renewable and nonrenewable sources. The renewable sources include geothermal, hydroelectric, solar, wind, and other renewables. RPU internal electricity generation includes coal, large hydroelectric, natural gas, nuclear, and other generic power. Table 4.6-2 in the Section 4.6, *Energy* provides additional details on the RPU electricity generation composition.

According to the 2018 Power Content Label, which discloses power sources from retail electricity suppliers, RPU receives its energy from renewables, hydroelectric, natural gas, nuclear, and unspecific sources. Both RPU's General Power Mix and 100 Percent Renewable Energy Mix have a higher share of renewable energy compared to Statewide. RPU has also reported that it was likely to achieve 44 percent renewable power by 2020. RPU does not offer customers, including UCR, the option to purchase 100 percent renewable-sourced electricity. In addition, there is no separate community choice aggregation available to UCR.

ELECTRICITY GENERATION – UCR

In addition to obtaining electricity from RPU, UCR campus solar power is generated from SunPower photovoltaic (PV) systems. UCR purchases such solar-powered electricity through a power purchase agreement for on-site generation that on average annually produces approximately 11.6 megawatt-hours (MWh) of electricity, or almost 10 percent of the campus's total annual energy needs. Specifically, in 2018, electricity was generated by the following solar facilities on the UCR campus:

- 5,734 annual MWh system via solar panel canopies at UCR Parking Lot 30;
- 1,099 MWh system via solar panel canopies at UCR Parking Lot 32; and

- 5,040 MWh Solar Farm Tracking System scattered throughout the campus, including
  - a solar farm adjacent to agricultural research land and
  - a smaller system above the parking lot of the College of Engineering's Center for Environmental Research and Technology (CE-CERT).

CE-CERT's solar PV array feeds into a 500 kWh battery. The campus also produces solar hot water on the rooftops of the Glen Mor student housing facility.

UCR Electricity Generation, Distribution, and Energy Storage

Electricity used on the UCR campus to provide power for space cooling, heating and ventilation, lighting, research activities, office equipment, and refrigeration is distributed via an extensive network of power distribution infrastructure.

The UCR Sustainable Integrated Grid Initiative (SIGI) was designed as a smart, flexible, micro-grid capable of responding to the critical needs of the electrical grid. There is 0.5 MW of PV power capacity distributed between the three buildings at CE-CERT. The administration building has an energy scheduling system installed that controls large loads and 0.1 MW of the PV capacity. The Multidisciplinary Research Building has a 500 kWh stationary electrical energy storage system that will store or discharge energy in response to a remote command or to a scheduling algorithm and 100 kW of the PV capacity. The remaining 260 kW PV capacity is allocated to the Atmospheric Processes Laboratory. Additionally, 500 kW of battery energy storage is installed in a trailer for mobile deployment (UCR 2021).

Heat waves challenge local utilities to satisfy record-breaking peak energy demands. During a previous heat wave in 2014, RPU requested that their largest customers reduce electricity use in the afternoon. UCR responded to this request by utilizing its SIGI battery system, PV generation, and smart demand management controllers. The combined effect not only curtailed 265 kW of power consumption, but also provided 225 kW back to the grid, resulting in a 590 kW energy swing for the critical period during the afternoon hours. In addition to the demonstration of these functionalities, UCR CE-CERT's SIGI test-bed has the ability to supply reactive power and voltage support, efficiency evaluation of system components, and islanding operations. The other capacity of UCR SIGI is fast electric vehicle charging, along with vehicle to grid energy transfer capability.

UCR Heating/Central Plant

Under existing conditions, UCR privately distributes medium pressure gas throughout East and West Campus. Distribution lines exist under Iowa Avenue and Martin Luther King Boulevard, and under a portion of West Campus. East Campus is served by a distribution line under Blaine Street (SCG 2016). UCR purchases natural gas, 95 percent of which is combusted in four steam boilers at the UCR Central Plant to generate steam for distribution. The Central Plant distributes steam to most buildings in the Academic Center primarily for heating. Some natural gas is also used in the residential dining hall kitchens; on-campus restaurant kitchens; and science, research and teaching laboratories (UCR 2005). One high-pressure natural gas distribution line runs north-south under West Campus between Martin Luther King Boulevard and Le Conte Drive (SCG 2016).

Climate Change Trends and Effects

Globally, climate change has the potential to affect numerous environmental resources through potential impacts related to future air temperatures and precipitation patterns. Scientific modeling

predicts that continued GHG emissions at or above current rates would induce more extreme climate changes during the 21st century than was observed during the 20th century. Long-term trends found that each of the past four decades was warmer than all the previous decades in the instrumental record. The observed global mean surface temperature for the decade from 2006 to 2015 was 0.87°C higher than the global mean surface temperature over the period from 1850 to 1900. Several independently analyzed data records of global and regional Land-Surface Air Temperature obtained from station observations agree that Land-Surface Air Temperature and sea surface temperatures have increased. Due to past and current activities, anthropogenic GHG emissions are increasing global mean surface temperature at a rate of 0.2°C per decade. In addition, there are identifiable signs that global warming is currently taking place, including substantial ice loss in the Arctic over the past two decades (IPCC 2014b; IPCC 2018).

California

According to *California's Fourth Climate Change Assessment*, Statewide temperatures from 1986 to 2016 were approximately 1°F to 2°F higher than those recorded from 1901 to 1960. Potential impacts of climate change in California may include loss in water supply from snowpack, sea level rise, more extreme heat days per year, more large forest fires, and more drought years. While there is growing scientific consensus about the possible effects of climate change at a global and Statewide level, current scientific modeling tools are unable to predict what local impacts may occur with a similar degree of accuracy (California 2018a).

In California, climate change may result in consequences such as the following:

- **A reduction in the quality and supply of water from the Sierra snowpack.** If heat-trapping emissions continue unabated, more precipitation will fall as rain instead of snow, and the snow that does fall will melt earlier, reducing the Sierra Nevada spring snowpack by as much as 70 to 90 percent. This can lead to challenges in securing adequate water supplies. It can also lead to a potential reduction in hydropower.
- **Increased risk of large wildfires.** If rain increases as temperatures rise, wildfires in the forests, grasslands and chaparral ecosystems of Southern California are estimated to increase by approximately 30 percent toward the end of the 21st century because more winter rain will stimulate the growth of more plant "fuel" available to burn in the fall. In contrast, a hotter, drier climate could promote up to 90 percent more northern California fires by the end of the century by drying out and increasing the flammability of forest vegetation.
- **Reductions in the quality and quantity of certain agricultural products.** The crops and products likely to be adversely affected include wine grapes, fruit, nuts, and milk.
- **Exacerbation of air quality problems.** If temperatures rise to the medium warming range, there could be 75 to 85 percent more days with weather conducive to ozone formation in Los Angeles and the San Joaquin Valley, relative to today's conditions. This is more than twice the increase expected if rising temperatures remain in the lower warming range. This increase in air quality problems could result in an increase in asthma and other health-related problems.
- **A rise in sea levels resulting in the displacement of coastal businesses and residences.** During the past century, sea levels along California's coast have risen about seven inches. If emissions continue unabated and temperatures rise into the higher anticipated warming range, sea level is expected to rise an additional 22 to 35 inches by the end of the century. Elevations of this magnitude would inundate coastal areas with salt water, accelerate coastal erosion, threaten vital levees and inland water systems, and disrupt wetlands and natural habitats.

- **An increase temperature and extreme weather events.** Climate change is expected to lead to increases in the frequency, intensity, and duration of extreme heat events and heat waves in California. More heat waves can exacerbate chronic disease or heat-related illness.
- **A decrease in the health and productivity of California's forests.** Climate change can cause an increase in wildfires, an enhanced nuisance insect population, and establishment of non-native species.
- **Damage to marine ecosystems and natural environment.** Climate change can cause damage to marine ecosystems, including acidification of the oceans due to increased CO_2 levels (including coral bleaching).

Los Angeles Region

In addition to Statewide projections, *California's Fourth Climate Change Assessment* includes regional reports that summarize climate impacts and adaptation solutions for nine regions of the state as well as regionally-specific climate change case studies, including for the greater Los Angeles region that includes western Riverside County where the UCR main campus is located. Below is a summary of some of the potential effects that could be experienced in California and the Los Angeles region because of climate change (California 2018b).

In the Los Angeles region, climate change may impact the following aspects:

- **Air Quality.** In the Los Angeles region, changes in meteorological conditions under climate change will affect future air quality. Regional stagnation conditions may occur more often in the future, which would increase pollutant concentrations. Hotter future temperatures will act to increase surface ozone concentrations both due to chemistry producing more ozone and higher rates of biogenic emissions, while increases of water vapor also influence chemistry by increasing ozone production in already polluted areas.
- **Water Supply.** Like the rest of the State, the Los Angeles region is expected to face a challenging combination of decreased water supply and increased water demand. Greater interannual variability of rainfall and sharp decreases in snowpack will create surface water limitations for the region. Although the effect of climate change on average precipitation in the region is still unclear, more frequent occurrences of extreme events similar to the 2011-2016 drought could significantly decrease groundwater recharge, which is essential for the sustainability of agriculture in the region since the vast majority of water used in agriculture in the region is groundwater from local wells. Furthermore, higher temperatures mean that dry years will more quickly develop into severe drought conditions.
- **Hydrology and Sea Level Rise.** In the Los Angeles region, despite small changes in average precipitation, dry and wet extremes are both expected to increase. By the late 21st century, the wettest day of the year is expected to increase across most of the region. Increased frequency and severity of atmospheric river events are also projected to occur for this region.
- **Agriculture.** In the Los Angeles region, more frequent droughts could significantly decrease groundwater recharge and therefore impact agricultural operations that use groundwater from local wells. This and other climate effects can contribute to higher food prices and shortages. In addition, pest and disease issues with crops are anticipated to increase.
- **Ecosystems and Wildfire.** Many of the impacts identified above would impact ecosystems and wildlife in the Los Angeles region. Increases in wildfire would further remove sensitive habitat; increased severity in droughts would potentially starve plants and animals of water; and sea level rise will affect sensitive coastal ecosystems (California 2018b).

4.8.2 Regulatory Setting

Additional regulatory information related to GHG emissions are included throughout the other resource chapters including Section 4.17, *Utilities and Service Systems*, which includes discussion of water use efficiency standards, solid waste standards, and wastewater standards, Section 4.3, *Air Quality*, which includes discussion of air quality related regulations, and Section 4.6, *Energy*, which includes discussion of additional energy efficiency requirements.

International

Paris Climate Change Agreement

Parties to the United Nations Framework Convention on Climate Change (UNFCCC) reached an agreement on December 12, 2015 in Paris, charting a new course in the global climate effort. The treaty commits member countries to put forward their best efforts and to strengthen them in the years ahead, including requirements that all parties report regularly on their emissions and implementation efforts, and undergo international review. The agreement and a companion decision by parties, known as the 21st session of the UNFCCC Conference of the Parties, or "COP 21" were the key outcomes that reaffirmed the goal of limiting global temperature increase below 2°C while urging efforts to limit the increase to 1.5°C and established binding commitments by all parties to make nationally determined contribution and to pursue domestic measures aimed at achieving them.

Federal

Clean Air Act (Regulation of GHGs)

The United States Environmental Protection Agency (US EPA) issued an Endangerment Finding under Section 202(a) of the Clean Air Act, opening the door to federal regulation of GHGs. The Endangerment Finding notes that GHGs threaten public health and welfare and are subject to regulation under the Clean Air Act. To date, the US EPA has not promulgated regulations on GHG emissions, but it has already begun to develop them.

Federal Fuel Efficiency Standards (CAFE)

Under the Clean Air Act, corporate average fuel economy (CAFE) standards have been set for passenger cars and light trucks. The State of California has traditionally had a waiver to set its own more stringent fuel efficiency standards. However, on August 2, 2018, the NHTSA and US EPA, operating under the direction of the Trump Administration, proposed the Safer Affordable Fuel-Efficient Vehicles Rule (SAFE Rule). This rule addresses emissions and fuel economy standards for motor vehicles and is separated in two parts as described below.

- Part One, "One National Program" (84 FR 51310) revokes a waiver granted by US EPA to the State of California under Section 209 of the CAA to enforce more stringent emission standards for motor vehicles than those required by US EPA for the explicit purpose of GHG reduction, and indirectly, criteria air pollutants and ozone precursor emission reduction. This revocation became effective on November 26, 2019, potentially restricting the ability of CARB to enforce more stringent GHG emission standards for new vehicles and set zero emission vehicle mandates in California.

- Part Two addresses CAFE standards for passenger cars and light trucks for model years 2021 to 2026. This rulemaking proposes new CAFE standards for model years 2022 through 2026 and would amend existing CAFE standards for model year 2021. The proposal would retain the model year 2020 standards (specifically, the footprint target curves for passenger cars and light trucks) through model year 2026. The proposal addressing CAFE standards was jointly developed by NHTSA and US EPA, with US EPA simultaneously proposing tailpipe CO_2 standards for the same vehicles covered by the same model years.

EPA and NTHSA published final rules to amend and establish national CO2 and fuel economy standards on April 30, 2020 (Part Two of the SAFE Vehicles Rule) (85 FR 24174). California and 22 other states are currently challenging this new rule in the court system, and it is reasonably foreseeable that the State will be successful in its legal challenges, for the reasons outlined in the State's lawsuit[9] and on the CARB website (CARB 2021). Furthermore, on January 20, 2021, President Biden signed an executive order directing the Government to revise fuel economy standards with the goal of further reducing emissions (US White House 2021). In February 2021, the Biden administration Department of Justice also asked courts to put the litigation on hold while the administration "reconsidered the policy decisions of a prior administration." Most Recently, on April 22, 2021, the Biden Administration formally proposed to roll back portions of the SAFE Rule, thereby restoring California's right to enforce more stringent fuel efficiency standards (USDOT 2021).

It is, however, legally infeasible for individual agencies, in this case the UC system, to adopt more stringent fuel efficiency standards for commuter vehicles. The CAA (42 United States Code [USC] Section 7543[a]) states that "no State or any political subdivision therefore shall adopt or attempt to enforce any standard relating to the control of emissions from new motor vehicles or new motor vehicle engines subject to this part." Therefore, UCR students and faculty abide by federal and State transportation fuel efficiency standards related to commuter vehicles.

Construction Equipment Fuel Efficiency Standard

US EPA sets emission standards for construction equipment. The first federal standards (Tier 1) were adopted in 1994 for all off-road engines over 50 horsepower (hp) and were phased in by 2000. A new standard was adopted in 1998 that introduced Tier 1 for all equipment below 50 hp and established the Tier 2 and Tier 3 standards. The Tier 2 and Tier 3 standards were phased in by 2008 for all equipment. The current iteration of emissions standards for construction equipment are the Tier 4 efficiency requirements are contained in 40 Code of Federal Regulations Parts 1039, 1065, and 1068 (originally adopted in 69 Federal Register 38958 [June 29, 2004], and most recently updated in 2014 [79 Federal Register 46356]). Emissions requirements for new off-road Tier 4 vehicles were to be completely phased in by the end of 2015.

U.S. Consolidated Appropriations Act (Mandatory GHG Reporting)

The Consolidated Appropriations Act, passed in December 2007, required the establishment of mandatory GHG reporting requirements. In September 22, 2009, the US EPA issued the Final Mandatory Reporting of Greenhouse Gases Rule, which became effective January 1, 2010. The rule requires reporting of GHG emissions from large sources and suppliers in the U.S, and is intended to collect accurate and timely emissions data to inform future policy decisions. Under the rule, suppliers of fossil fuels or industrial GHGs, manufacturers of vehicles and engines, and facilities that

[9] *State of California et al. v. Chao et al.* (Case 1:19-cv-02826) available at: https://oag.ca.gov/system/files/attachments/press_releases/California%20v.%20Chao%20complaint%20%2800000002%29.pdf

emit 25,000 metric tons or more per year of GHG emissions are required to submit annual reports to the US EPA. The first annual reports for the largest emitting facilities, covering calendar year 2010, were submitted to US EPA in 2011.

State

Assembly Bill 1493 (Pavley Regulations and Fuel Efficiency Standards)

AB 1493 (2002), California's Advanced Clean Cars program (referred to as Pavley), requires CARB to develop and adopt regulations to achieve "the maximum feasible and cost-effective reduction of GHG emissions from motor vehicles." On June 30, 2009, US EPA granted the waiver of the Clean Air Act preemption to California for its GHG emission standards for motor vehicles beginning with the 2009 model year. Pavley I regulates model years from 2009 to 2016, and Pavley II, which is now referred to as "Low Emission Vehicle (LEV) III GHG", regulates model years from 2017 to 2025. The Advanced Clean Cars program coordinates the goals of the LEV, Zero Emissions Vehicles (ZEV), and Clean Fuels Outlet programs, and would provide major reductions in GHG emissions. By 2025, when the rules will be fully implemented, new automobiles will emit 34 percent fewer GHGs and 75 percent fewer smog-forming emissions from their model year 2016 levels.

Executive Order B-48-18: Zero-Emission Vehicles

On January 26, 2018, Governor Brown signed Executive Order B-48-18 requiring all State entities to work with the private sector to have at least 5 million zero-emission vehicles (ZEVs) on the road by 2030, as well as install 200 hydrogen fueling stations and 250,000 electric vehicle (EV) charging stations by 2025. It specifies that 10,000 of the EV charging stations should be direct current fast chargers. This order also requires all State entities to continue to partner with local and regional governments to streamline the installation of ZEV infrastructure. The Governor's Office of Business and Economic Development is required to publish a Plug-in Charging Station Design Guidebook and update the 2015 Hydrogen Station Permitting Guidebook to aid in these efforts. All State entities are required to participate in updating the 2016 Zero-Emissions Vehicle Action Plan, along with the 2018 ZEV Action Plan Priorities Update, which includes and extends the 2016 ZEV Action Plan (Governor's Interagency Working Group on Zero-Emission Vehicles 2016, 2018), to help expand private investment in ZEV infrastructure with a focus on serving low-income and disadvantaged communities. The quantitative GHG analysis below is conservative as GHG benefits of this order have not been modeled.

Executive Order N-79-20

Governor Gavin Newsom signed Executive Order N-79-20 in September 2020, which sets a Statewide goal that 100 percent of all new passenger car and truck sales in the State will be zero-emissions by 2035. It also sets a goal that 100 percent of statewide new sales of medium- and heavy-duty vehicles will be zero emissions by 2045, where feasible, and for all new sales of drayage trucks to be zero emissions by 2035. Additionally, the Executive Order targets 100 percent of new off-road vehicle sales in the State to be zero emission by 2035. CARB is responsible for implementing the new vehicle sales regulation. The quantitative GHG analysis below is conservative as GHG benefits of this order have not been modeled.

Assembly Bill 32 (Global Warming Solutions Act and Scoping Plan)

California's major initiative for reducing GHG emissions is outlined in Assembly Bill (AB) 32, the "California Global Warming Solutions Act of 2006," which was signed into law in 2006. AB 32 codifies the statewide goal of reducing GHG emissions to 1990 levels by 2020 and requires CARB to prepare a Scoping Plan that outlines the main State strategies for reducing GHGs to meet the 2020 deadline. In addition, AB 32 requires CARB to adopt regulations to require reporting and verification of statewide GHG emissions. Based on this guidance, CARB approved a 1990 Statewide GHG level and 2020 limit of 427 million $MTCO_2e$. The Scoping Plan was approved by CARB on December 11, 2008 and included measures to address GHG emission reduction strategies related to energy efficiency, water use, and recycling and solid waste, among other measures. Many of the GHG reduction measures included in the Scoping Plan (e.g., Low Carbon Fuel Standard, Advanced Clean Car standards, and Cap-and-Trade) have been adopted since approval of the Scoping Plan.

In May 2014, CARB approved the first update to the AB 32 Scoping Plan. The 2013 Scoping Plan Update defined CARB's climate change priorities for the next five years and set the groundwork to reach post-2020 Statewide goals. The 2013 Scoping Plan Update highlighted California's progress toward meeting the 2020 GHG emission reduction goals defined in the original Scoping Plan. It also evaluated how to align the State's longer-term GHG reduction strategies with other State policy priorities, including those for water, waste, natural resources, clean energy, transportation, and land use. The State of California achieved its 2020 GHG emission reduction targets in 2016, and emissions have subsequently fallen further in 2018 to 425 $MMTCO_2e$ (CARB 2020).

Senate Bill 32 (Global Warming Solutions Act and Scoping Plan Extension)

Senate Bill (SB) 32 signed into law on September 8, 2016, tightens the requirements of AB 32 by requiring the State to further reduce GHGs to 40 percent below 1990 levels by 2030 (the other provisions of AB 32 remain unchanged). On December 14, 2017, CARB adopted the 2017 Scoping Plan, which provides a framework for achieving the 2030 target. The 2017 Scoping Plan relies on the continuation and expansion of existing policies and regulations, such as the Cap-and-Trade Program, as well as implementation of recently adopted policies, such as SB 350 and SB 1383. The 2017 Scoping Plan also puts an increased emphasis on innovation, adoption of existing technology, and strategic investment to support its strategies. As with the 2013 Scoping Plan Update, it recommends that local governments adopt policies consistent with statewide per capita goals of 6 $MTCO_2e$ by 2030 and 2 $MTCO_2e$ by 2050. As stated in the 2017 Scoping Plan, these goals may be appropriate for plan-level analyses (city, county, subregional, or regional level).

CARB Cap-and-Trade Regulation

In 2011, CARB adopted the cap-and-trade regulation and created the cap-and-trade program, which covers sources of GHG emissions that emit more than 25,000 $MTCO_2e$ per year in the State such as refineries, power plants, industrial facilities, and transportation fuels. The cap-and-trade program includes an enforceable State-wide GHG emissions cap that declines approximately three percent annually. CARB distributes allowances, which are tradable permits, equal to the emissions allowed under the cap. Sources that reduce emissions more than their limits can auction carbon allowances to other covered entities through the cap-and-trade market. Sources subject to the cap are required to surrender allowances and offsets equal to their emissions at the end of each compliance period. The cap-and-trade program took effect in early 2012 with the enforceable compliance obligation beginning January 1, 2013. The cap-and-trade program was initially slated to sunset in 2020 but the passage of SB 398 in 2017 extended the program through 2030.

The UCR campus is subject to cap-and-trade and participates in the program. UCR is designated as an abbreviated reporter under the cap-and-trade program due to the fact that the GHG emissions are below the 25,000 MTCO2e per year threshold.

Senate Bill 100 (100 Percent Clean Energy Act)

Adopted on September 10, 2018, SB 100 supports the reduction of GHG emissions from the electricity sector by accelerating the State's Renewables Portfolio Standard Program, which was last updated by SB 350 in 2015. SB 100 requires electricity providers to increase procurement from eligible renewable energy resources to 33 percent of total retail sales by 2020, 60 percent by 2030, and 100 percent by 2045. As described in greater detail in the Section 4.6, *Energy*, UCR's power provider produced approximately 34 percent of its power from renewable resources in 2018, and that number was anticipated to increase to 44 percent by 2020.

Senate Bill 375 (Sustainable Communities and Climate Protection Act)

SB 375, signed in August 2008, enhances the State's ability to reach AB 32 goals by directing CARB to develop regional GHG emission reduction targets to be achieved from passenger vehicles by 2020 and 2035. In addition, SB 375 directs each of the State's 18 major Metropolitan Planning Organizations (MPOs) to prepare a "sustainable communities strategy" (SCS) that contains a growth strategy to meet these emission targets for inclusion in the Regional Transportation Plan (RTP). On March 22, 2018, CARB adopted updated regional targets for reducing GHG emissions from 2005 levels by 2020 and 2035. Southern California Association of Governments (SCAG) was assigned targets of an 8 percent reduction in GHGs from transportation sources by 2020 and a 19 percent reduction in GHGs from transportation sources by 2035. In the SCAG region, SB 375 also provides the option for the coordinated development of subregional plans by the subregional councils of governments and the county transportation commissions to meet SB 375 requirements.

Executive Order B-55-18

On September 10, 2018, Governor Brown issued Executive Order B-55-18, which established a new Statewide goal of achieving carbon neutrality by 2045 and maintaining net negative GHG emissions thereafter. This goal is in addition to the existing Statewide GHG reduction targets established by SB 32, SB 100, SB 375, and SB 1383. University of California, as a State entity, is committed to its fair share of reduction measures in support of achieving carbon neutrality by 2045. See University of California regulations below.

Senate Bill 97 and CEQA Guidelines Update

SB 97, signed in August 2007, acknowledges that climate change is an environmental issue that requires analysis in CEQA documents. In March 2010, the California Natural Resources Agency adopted amendments to the CEQA Guidelines for the feasible mitigation of GHG emissions or the effects of GHG emissions. The adopted guidelines give lead agencies the discretion to set quantitative or qualitative thresholds for the assessment and mitigation of GHG and climate change impacts.

CARB Innovative Clean Transit Regulations

In December 2018, the CARB adopted the Innovative Clean Transit regulations, requiring all transit agencies to develop a plan to achieve zero emission bus fleets on or before 2040. Starting between

2023 and 2029, transit agencies must begin purchasing only ZEB replacements and must have completed the fleet replacement program prior to 2040.

California Code of Regulations Title 24 (California Building Code)

Updated every three years through a rigorous stakeholder process, Title 24 of the California Code of Regulations requires California homes and businesses to meet strong energy efficiency measures, thereby lowering their energy use. Title 24 contains numerous subparts, including Part 1 (Administrative Code), Part 2 (Building Code), Part 3 (Electrical Code), Part 4 (Mechanical Code), Part 5 (Plumbing Code), Part 6 (Energy Code), Part 8 (Historical Building Code), Part 9 (Fire Code), Part 10 (Existing Building Code), Part 11 (Green Building Standards Code), Part 12 (Referenced Standards Code). The California Building Code is applicable to all development in California. (Health and Safety Code §§ 17950 and 18938(b).)

The regulations receive input from members of industry, as well as the public, with the goal of "[r]educing of wasteful, uneconomic, inefficient, or unnecessary consumption of energy." (Pub. Res. Code § 25402.) These regulations are scrutinized and analyzed for technological and economic feasibility (Pub. Res. Code § 25402(d)) and cost effectiveness (Pub. Res. Code § 25402(b)(2) and (b)(3)).

PART 6 – BUILDING ENERGY EFFICIENCY STANDARDS

CCR Title 24 Part 6 is the Building Energy Efficiency Standards. This code, originally enacted in 1978, establishes energy-efficiency standards for residential and non-residential buildings in order to reduce California's energy demand. The Building Energy Efficiency Standards is updated periodically to incorporate and consider new energy-efficiency technologies and methodologies as they become available. New construction and major renovations must demonstrate their compliance with the current Building Energy Efficiency Standards through submission and approval of a Title 24 Compliance Report to the local building permit review authority and the California Energy Commission. Under the 2019 standards, nonresidential buildings will be 30 percent more energy efficient compared to the 2016 standards, and residential buildings will be 7 percent more energy efficient. When accounting for the electricity generated by the solar photovoltaic system, residential buildings would use 53 percent less energy compared to buildings built to the 2016 standards.

The 2019 Building Energy Efficiency Standards, adopted on May 9, 2018, became effective on January 1, 2020. The 2019 Standards move toward cutting energy use in new residential units by more than 50 percent and will require installation of solar photovoltaic systems for single-family homes and multi-family buildings of three stories and less. The 2019 Standards focus on four key areas: 1) smart residential photovoltaic systems; 2) updated thermal envelope standards (preventing heat transfer from the interior to exterior and vice versa); 3) residential and nonresidential ventilation requirements; 4) and nonresidential lighting requirements. Under the 2019 Standards, non-residential buildings will be 30 percent more energy-efficient compared to the 2016 Standards, and single-family homes will be seven percent more energy efficient.

PART 11 – CALIFORNIA GREEN BUILDING STANDARDS

The California Green Building Standards Code, referred to as CALGreen, was added to CCR Title 24 as Part 11 first in 2009 as a voluntary code, which then became mandatory effective January 1, 2011 (as part of the 2010 CBC). The 2019 CALGreen institutes mandatory minimum environmental performance standards for all ground-up new construction of non-residential and residential structures. It also includes voluntary tiers (I and II) with stricter environmental performance

standards for these same categories of residential and non-residential buildings. Local jurisdictions must enforce the minimum mandatory Green Building Standards and may adopt additional amendments for stricter requirements.

Mandatory standards require:

- 20 percent reduction in indoor water use relative to specified baseline levels;
- 50 percent construction/demolition waste diverted from landfills;
- Inspections of energy systems to ensure optimal working efficiency;
- Low-pollutant emitting exterior and interior finish materials such as paints, carpets, vinyl flooring, and particleboards; and
- Installation of EV charging stations at least three percent of the parking spaces for all new multi-family developments with 17 or more units.

Similar to the compliance reporting procedure for demonstrating Building Energy Efficiency Standards compliance in new buildings and major renovations, compliance with the CalGreen water-reduction requirements must be demonstrated through completion of water use reporting forms for new low-rise residential and non-residential buildings. Buildings must demonstrate a 20 percent reduction in indoor water use by either showing a 20 percent reduction in the overall baseline water use as identified in CalGreen or a reduced per-plumbing-fixture water use rate.

Senate Bill 1383 (Short-lived Climate Pollutants)

Adopted in September 2016, SB 1383 requires the CARB to approve and begin implementing a comprehensive strategy to reduce emissions of short-lived climate pollutants. The bill requires the strategy to achieve the following reduction targets by 2030:

- Methane – 40 percent below 2013 levels
- Hydrofluorocarbons – 40 percent below 2013 levels
- Anthropogenic black carbon – 50 percent below 2013 levels

Assembly Bill 341/Assembly Bill 1826 (Mandatory Recycling/Composting)

The California Integrated Waste Management Act of 1989, as modified by AB 341, requires each jurisdiction's source reduction and recycling element to include an implementation schedule that shows diversion away from landfills of 75 percent of all solid waste by 2020 and annually thereafter. AB 1826 requires recycling of organic waste (i.e., composting). All businesses and public entities that generate four or more cubic yards of solid waste per week and multi-family residential dwellings that have five or more units are required to recycle and compost.

California Model Water Efficient Landscape Ordinance

The revised Model Water Efficient Landscape Ordinance became effective on December 15, 2015. New development that includes landscaped areas of 500 square feet or more are subject to the following revised Ordinance requirements:

- More efficient irrigation systems
- Incentives for graywater usage
- Improvements in on-site stormwater capture
- Limiting the portion of landscapes that can be planted with high water use plants

- Reporting requirements for local agencies.

University of California

UC Policy on Sustainable Practices

UC's official sustainability commitment began in 2003 with a Regental action that led to the adoption of a Presidential Policy on Green Building Design and Clean Energy Standards in 2004. Since adopting that policy, UC expanded its sustainability policies to address climate protection, transportation, building operations, waste, procurement, food, water, and health care facilities. The policy was subsequently renamed the *UC Policy on Sustainable Practices*, which is updated periodically. In the 2007 revision of the *UC Policy on Sustainable Practices*, the University of California Office of the President (UCOP) committed UC to implementing actions to achieve a reduction in GHG emissions from UC operations and activities to 2000 levels by 2014 and 1990 levels by 2020. UC's official commitment to sustainability across the above-listed sectors is integrated into the *UC Policy on Sustainable Practices* updated in July 2020 (UC 2020). The *UC Policy on Sustainable Practices* states that each campus and the UCOP will develop strategies for meeting the following UC goals:

- Policy C.1: Climate neutrality from Scope 1 and Scope 2 sources by 2025
- Policy C.2: Climate neutrality from specific Scope 3 sources (as defined by Second Nature's Carbon Commitment) by 2050 or sooner

In addition, the following UCR existing GHG emissions reduction policies pertain to operations that are within the operational control of UCR and set specific, quantitative standards. The following policies are noted from the *UC Policy on Sustainable Practices*:

- Policy A.1: All new building projects, other than acute care facilities, shall be designed, constructed, and commissioned to outperform the CBC energy-efficiency standards by at least 20 percent or meet the whole-building energy performance targets listed in Table 1 of Section V.A.3 of the *UC Policy on Sustainable Practices*. The University will strive to design, construct, and commission buildings that outperform CBC energy efficiency standards by 30 percent or more, or meet the stretch whole-building energy performance targets listed in Table 1 of Section V.A.3 of the *UC Policy on Sustainable Practices*, whenever possible within the constraints of program needs and standard budget parameters.
- Policy A.3: No new building or major renovation that is approved after June 30, 2019 shall use on-site fossil fuel combustion (e.g., natural gas) for space and water heating (except those projects connected to an existing campus central thermal infrastructure). Projects unable to meet this requirement shall document the rationale for this decision as described in Section V.A.4 of the *UC Policy on Sustainable Practices*.
- Policy A.4: All new buildings will achieve a U.S. Green Building Council (USGBC) LEED "Silver" certification at a minimum. All new buildings will strive to achieve certification at a USGBC LEED "Gold" rating or higher, whenever possible within the constraints of program needs and standard budget parameters.
- Policy A.5: The University of California will design, construct, and commission new laboratory buildings to achieve a minimum of LEED "Silver" certification as well as meeting at least the prerequisites of the Laboratories for the 21st Century (Labs21) Environmental Performance Criteria (EPC). Laboratory spaces in new buildings also shall meet at least the prerequisites of

Labs21 EPC. Design, construction, and commissioning processes shall strive to optimize the energy efficiency of systems not addressed by the CBC energy efficiency standards.

- Policy A.7: Major Renovations of buildings are defined as projects 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) shall at a minimum comply with III.A.4 or III.A.5, above. Such projects shall outperform CBC Title 24, Part 6, currently in effect, by 20 percent. This does not apply to acute care facilities.
- Policy A.8: Renovation projects with a project cost of $5 million or greater that do not constitute a Major Renovation as defined in Policy A.7 shall, at a minimum, achieve a LEED-ID+C Certified rating and register with the utilities' Savings by Design program, if eligible. This does not apply to acute care facilities.
- Policy B.1: Each location will implement energy efficiency actions in buildings and infrastructure systems to reduce the location's energy use intensity by an average of least 2 percent annually.
- Policy B.2: Campuses and health care locations will install additional on-site renewable electricity supplies and energy storage systems whenever cost-effective and/or supportive of the location's Climate Action Plan or other goals.
- Policy B.3: By 2025, each campus and health location will obtain 100 percent clean electricity. By 2018, the University's Wholesale Power Program will provide 100 percent clean electricity to participating locations.[10]
- Policy B.4: By 2025, at least 40 percent of the natural gas combusted on-site at each campus and health location will be biogas.
- Policy D.1: Each location will reduce GHG emissions from its fleet and report annually on its progress. Locations shall implement strategies to reduce fleet emissions and improve the fuel efficiency of all university-owned or operated fleet vehicles and equipment where practical options exist through acquisition and fleet operation protocols.
  - By 2025, zero-emission vehicles or hybrid vehicles shall account for at least 50 percent of all new light-duty vehicle acquisitions. Lawrence Berkeley National Laboratory will follow federal fleet requirements in the case where federal and UC fleet requirements conflict.
- Policy D.2: The University recognizes that single-occupant vehicle (SOV) commuting is a primary contributor to commute GHG emissions and localized transportation impacts.
  - By 2025, each location shall strive to reduce its percentage of employees and students commuting by SOV by 10 percent relative to its 2015 SOV commute rates;
  - By 2050, each location shall strive to have no more 40 percent of its employees and no more than 30 percent of all employees and students commuting to the location by SOV.
- Policy D.3: Consistent with the State of California goal of increasing alternative fuel – specifically electric – vehicle usage, the University shall promote purchases and support investment in alternative fuel infrastructure at each location.
  - By 2025, each location shall strive to have at least 4.5 percent of commuter vehicles be ZEV.
  - By 2050, each location shall strive to have at least 30 percent of commuter vehicles be ZEV.
- Policy D.4: Each location will develop a business-case analysis for any proposed parking structures serving University affiliates or visitors to campus to document how a capital investment in parking aligns with each campus' Climate Action Plans and/or sustainable transportation policies.

[10] UCR is not currently a participating location under the Wholesale Power Program.

- Policy F.1: The University will achieve zero waste[11] through prioritizing waste reduction in the following order: reduce, reuse, and then recycle and compost (or other forms of organic recycling) as described in Section V.F.6 of the *UC Policy on Sustainable Practices*. Minimum compliance for zero waste, at all locations other than health locations, is as follows:
  - Reduce per capita total municipal solid waste generation by:
    - 25 percent per capita from FY2015/16 levels by 2025.
    - 50 percent per capita from FY2015/16 levels by 2030.
  - Divert 90 percent of municipal solid waste from the landfill.
- Policy F.2: The University supports the integration of waste, climate, and other sustainability goals, including the reduction of embodied carbon in the supply chain through the promotion of a circular economy and the management of organic waste to promote atmospheric carbon reduction. In support of this goal, waste reporting will include tracking estimated Scope 3 GHG emissions (UC 2020).

UCR Transportation Demand Management

UCR's Transportation Demand Management (TDM) programs include multi-pronged efforts such as marketing, incentives, expanded vanpool offerings, on- and near-campus housing amenities, parking pricing, and more. UCR encourages students to use designated bike paths to commute to and travel within the campus. Registered bicyclists or walkers are eligible to receive a complimentary bicycle parking allotment and are eligible to utilize the day-use locker and shower facilities at the SRC without charge. UCR has also encouraged ride-sharing services, and the average vehicle ridership has increased from approximately 1.36 to 1.57 occupants per vehicle over the last 15 years. However, it is legally infeasible to mandate ridesharing. (See Health and Safety Code § 40717.9; *Merced Alliance for Responsible Growth v. City of* Merced 2012 WL 5984917.) The quantitative GHG analysis below is conservative as GHG benefits of future improvements to TDM use have not been modeled.

Regional and Local (Non-Binding)

As noted in Section 4, "University of California Autonomy," UCR, a constitutionally created State entity, is not subject to municipal regulations of surrounding local governments for uses on property owned or controlled by UCR that are in furtherance of the university's educational purposes. However, UCR may consider, for coordination purposes, aspects of local plans and policies of the communities surrounding the campus when it is appropriate and feasible, but not bound by those plans and policies in its planning efforts. No regional or local plans related to GHG emissions apply to the proposed 2021 LRDP.

4.8.3 Environmental Impacts and Mitigation Measures

Significance Criteria

UCR utilizes the following 2020 CEQA Guidelines Appendix G significance criteria questions related to GHG Emissions.

[11] The University zero waste goal is made up of incremental waste reduction and waste diversion targets. The University recognizes the attainment of reduction goals stated in this Policy and a 90 percent diversion of municipal solid waste as minimum compliance standard to be defined as a zero waste for locations other than health locations.

Would the proposed 2021 LRDP:

a) Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment?
b) Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs?

Issues Not Evaluated Further

All issues applicable to GHG emissions listed under the CEQA significance criteria above are addressed in this section.

Analysis Methodology

GHG emissions for the proposed 2021 LRDP construction and operation were calculated with regard to the GHGs CO_2, N_2O, and CH_4, which are combined using each GHGs' GWP and reported as CO_2e. GHG emissions were modeled for energy, mobile, process/fugitive, and waste sources. The input data and construction and operation GHG emission estimates for proposed 2021 LRDP are discussed below and in Appendix G.

UCR has decided to utilize the following thresholds to determine whether the proposed 2021 LRDP would result in significant impacts related to GHG emissions under significance criterion "a":

- Generation of GHG emissions that would exceed 2018 baseline GHG emissions level.
- Generation of GHG emissions that would exceed *UC Policy on Sustainable Practices* requirement to meet Scope 1 and Scope 2 emissions carbon neutrality beginning January 1, 2026.
- Generation of GHG emissions that would exceed the GHG emission reduction efforts of the State in accordance with SB 32. Total emissions would be no greater than 40 percent below 1990 levels per year (e.g. 49,300 $MTCO_2e$ total emissions) by December 31, 2030.

The baseline threshold is consistent with CEQA Guidelines Section 15064.4(b)(1) and compares GHG emissions from the proposed 2021 LRDP to baseline GHG emissions and considers any increase in GHG emissions above baseline conditions to be significant.

The second and third thresholds were developed using science-based goals of the global reductions in emissions that would be needed in order to avoid dangerous climate change effects; these goals represent what can be described as California's—and by inference, UCR's—proportional reduction in emissions to avoid dangerous climate change. Per the CARB 2017 Scoping Plan, local governments can demonstrate consistency with Statewide targets by applying derived percentage reductions, necessary to reach determined future climate goals, to their community-wide GHG emissions target. For purposes of demonstrating consistency with State targets, UCR can be considered a local government, as it has functions similar to a self-contained small city, with housing, jobs, and cultural facilities offered in a built community. Furthermore, UCR has jurisdiction over campus land uses and provides core public services. Although the 2017 Scoping Plan also gave local jurisdictions the option of using per-capita or per-service-population targets, UCR has decided to use the relative percent reduction of total emissions in line with State and UC targets as its threshold. As such, these thresholds are consistent with 2017 Scoping Plan recommendation for assessing plan-level contribution impacts to global climate change. Compliance with the *UC Policy on Sustainable Practices* would result in campus-wide emissions reductions greater than the State targets under SB 32.

To determine whether the proposed 2021 LRDP would result in significant impacts related to GHG emissions under significance criterion "b," the following methodology would apply.

- Inconsistency with any of the following applicable plans for reduction of GHG emissions:
  - 2020 *UC Policy on Sustainable Practices*
  - SB 32 and CARB 2017 Scoping Plan

Construction Emissions

Construction-related GHG emissions were calculated using the California Emissions Estimator Model (CalEEMod) Version 2016.3.2 modeling tool. Modeling was based on 2021 LRDP buildout information (e.g., land use types, traffic modeling, amount of new building space) and default values in CalEEMod that are based on location, land use type, and typical construction activities. CalEEMod accounts for a variety of State, federal, and local programs and policies that affect construction-related emissions, such as local air district rules on architectural coatings and federal emission standards for off-road equipment, but these regulations primarily affect emissions of criteria pollutants. Additional information on CalEEMod, including the user guide, defaults, and appendices are available online at: http://www.caleemod.com/.

Due to the programmatic nature of this analysis, the timing of construction activities for all projects anticipated during implementation of the proposed 2021 LRDP cannot be predicted. UCR has developed a list of buildings and the associated building square footage that are anticipated to be demolished in 5 to 10 years (total of 557,826 gsf) [12] and 10 to 15 years (total of 327,453 gsf).[13] Emissions associated with these planned demolition actions were calculated via CalEEMod. Similarly, emissions associated with construction of new buildings were calculated using building square footage provided by UCR, and CalEEMod defaults based on the land use type. CalEEMod provides a number of default land use types such as University/College 4-Year, Library, and General Office Buildings that are representative of the UCR buildings to be constructed under the 2021 LRDP. Demolition and construction emissions were amortized across 2021 to 2035 and added to the forecasted emissions.

For a detailed description of construction emissions model input and output parameters, and assumptions, see the following supporting documents in Appendix G:

- Final GHG Inventory-Forecast Data Evaluation Memo
- Final GHG Inventory, Forecast, and Targets Report

[12] UCR estimates that in 5–10 years the following buildings will be demolished: Boyden Labs; Fawcett Laboratory; Stored Product Insecticide Building; Lathhouse #1; South Campus Drive Facilities and South District/Toe of the Hill south of South Campus Drive (Genomics shed, Bio Control Building, Plant Drying Building, Herbarium, Botany Screenhouse, Storage Shed #6, Headhouse Storage Building, Growth Chamber Building, Glasshouse #51, Lathhouses #4 and #8, Facilities Services Annex A, and College Building North and South); Northwest of East Campus Drive and north of Eucalyptus Drive, Northwest of East Campus Drive and south of Eucalyptus Drive, East of East Campus Drive and northeast of Eucalyptus Drive, East of East Campus Drive and southeast of Eucalyptus Drive, and East of East Campus Drive and southeast of Eucalyptus Drive (Fawcett Laboratory, University Office Building, Campbell Hall, Facilities Services Annex B, Greenhouses #7-14, Greenhouses #18-21, Computing & Communications Center, and associated accessory structures), Health Services Building (Veitch - Student Health Services), Bannockburn Village, Plaza Apartments, Corporation Yard, and Softball and soccer fields

[13] UCR estimates that in 10-15 years the following buildings will be demolished: Advanced Neuroimaging Building (formerly FMRI), Costo Hall, University Office Building, Police Facility, University Office Building, Oban Apartments, and Falkirk Apartments

Operational Emissions

ENERGY SOURCES

Energy-related operational emissions of GHGs (related to natural gas, diesel, and electricity consumption) for the existing main campus, interim projects, and new development under the proposed 2021 LRDP were calculated. In addition, operational energy-related GHG emissions account for ongoing operation of existing solar facilities on the main campus (see Section 4.6, *Energy*). Construction and operational GHG emissions associated with the interim[14] projects have been previously quantified in separate standalone UCR project-level CEQA documents using CalEEMod Version 2016.3.2, and the respective results have been provided by UCR for inclusion in the forecast. Construction and operational emissions were estimated using CalEEMod with the exception of the renovation projects (i.e., Batchelor Hall and Pierce Hall). Only operational emissions of GHG from energy use determined by CalEEMod was included for interim projects. All other operational emissions from new building construction under the proposed 2021 LRDP were forecasted from the 2018 inventory using specific growth factors discussed in detail in Appendix G. Indicator growth rates, such as energy per building square footage, gallons of fuel per campus population, VMT per campus population, or waste tons per campus population, were developed from 2018 activity levels and applied to the various emissions sectors to project future year emissions. Appendix G contains a complete list of the indicator growth factors used to develop the forecast for the proposed 2021 LRDP. The growth factors were then multiplied by the population or service person growth rates and anticipated building square footage growth in the proposed 2021 LRDP to develop the anticipated emissions forecast which is representative of future operational emissions.

Energy use from existing buildings (i.e., natural gas and electricity consumption) is based on the 2018 inventory and actual energy data provided by UCR from the respective electric utility and natural gas supplier, Riverside Public Utilities (RPU) and Shell Energy.[15] The proposed 2021 LRDP energy use was forecasted based on applying growth metrics, as described Appendix G, to the 2018 inventory energy use. The energy use intensity (EUI) factors from the UCR Program Concept Energy Analysis and building gross square footage provided by UCR were utilized to estimate annual natural gas and electricity use by building type for both existing buildings and future building.

Energy use for existing buildings was based on the EUI associated with the current level of energy performance at the time of the UCR Program Concept Energy Analysis, while energy use for future buildings was based on the EUI for the escalating California Title-24 code. Existing building EUIs in annual energy use (kBtu) by area (square feet) per year (kBtu/sf-yr) were determined for academic/admin, lab/complex, residential, and social building types to be 107, 253, 83 and 180 kBtu/sf-yr, respectively. New buildings built to code were determined in the UCR Program Concept Energy Analysis to have EUIs of 65, 149, 57 and 107 kBtu/sf-yr for academic/admin, lab/complex, residential, and social building types, respectively. UCR distinguished buildings by building or land use type allowing for the application of the appropriate EUI. EUIs for existing and future buildings were applied to the proposed 2021 LRDP buildings' gross square feet based on building type defined as either academic/admin, lab/complex, residential, or social.

[14] There are several interim projects that have occurred or are in progress on the UCR main campus after the 2018 calendar year and, therefore, were not accounted for within the 2018 GHG inventory. However, these interim projects are included in the 2021 LRDP emissions for the purpose of CEQA impact analysis.
[15] Natural gas is transported to the UCR main campus by Southern California Gas and is procured through Shell Energy.

Additional energy use improvements resulting from other State legislation were incorporated under the legislative adjusted scenario. In addition, increases in the renewable mix of electricity generation sources due to the California Renewable Portfolio Standard and SB 350 are assumed to affect the emission factors in future years. The RPU emission factors in 2018 were adjusted for future years based on the current percentage (i.e., 34 percent) of renewable electricity sources in 2018 and the projected linear increase to 60 percent renewable sources by 2030 per SB 100 and 100 percent renewable by 2045.[16]

PROCESS AND FUGITIVE EMISSIONS

Process and fugitive emission sources include fugitive emissions associated with the process, transmission, and storage of other substances (e.g., refrigerants) that do not pass through a stack, vent, or exhaust point. For UCR operations, this includes use of refrigerants. Refrigerant data provided by UCR includes the refrigerants that have been added to the main campus system, then subtracts any refrigerant that is removed with recovery equipment and stored during repair and maintenance. The total refrigerant value is reported as the total amount added during the year, minus all refrigerant that is recovered and returned to the equipment after repair and maintenance. Emissions from refrigerants are calculated based on annual usage of refrigerant and the refrigerants GWP obtained from the US EPA *Emission Factors for Greenhouse Gas Inventories (*US EPA 2018). Refrigerants are high GWP compounds that are themselves the GHG and are not generated as a product of combustion. As such, there is no emission factor associated with refrigerants. A total of 390 pounds of refrigerants were emitted in 2018, composed of refrigerants R-22, R-134A, R-404A, R-407C and R-410A. As identified by UCR, R-407C was added and recovered outside of the proposed 2021 LRDP boundary and therefore, was excluded from the 2018 inventory. The 100-year GWP of each was used to calculate $MTCO_2e$ emissions. The UCR 2018 refrigerant use was divided by the 2018 building square footage to develop an indicator growth rate. It was assumed that future building growth would require the use of refrigerants to the same extent. Therefore, the refrigerant indicator growth rate was multiplied by the proposed 2021 LRDP anticipated building square footage to estimate emissions generated from refrigerant use at proposed 2021 LRDP buildout.

WASTE SOURCES

GHG emissions from waste generation for the proposed 2021 LRDP were forecasted through 2035 based on full build out. The 2018 inventory waste generation per person was multiplied by the proposed 2021 LRDP anticipated population to estimate waste generation. This analysis is, therefore, considered conservative as it does not account for increasing solid waste diversion rates, which are estimated to increase from 70 percent to 90 percent due to UCOP policies, as described in greater detail in Section 4.17, *Utilities and Service Systems*.

MOBILE SOURCES

Mobile source emissions from UCR include emissions from UCR vehicle fleet emissions as well as VMT emissions associated with student, faculty, commercial vendor, and visitor populations.

With respect to non-UCR fleet, non-transit mobile sources, EMission FACtors (EMFAC) 2017 was used to estimate GHG emissions from vehicle miles traveled (VMT) generated by implementation of the proposed 2021 LRDP (refer to Section 4.15, *Transportation*). The modeled emission factors reflect the average vehicle mix and usage rates forecast for Riverside County in 2035, which is the proposed 2021 LRDP horizon year. Daily VMT were adjusted to annual VMT using a conversion

[16] 2018 Power content label for RPU indicated an emission factor of 0.428 $MTCO_2e/MWh$.

factor of 315 days, which accounts for UCR's academic schedule, holidays, and enrollment levels during summer and regular academic quarters. VMT modeling was based on specific proposed 2021 LRDP information (e.g., land use types, traffic modeling, building space) and outputs of the current version of the Riverside Transportation Analysis Model (RivTAM), a regional version consistent with the SCAG transportation model.

Emissions from UCR staff and student travel on transit systems were calculated based on the UCR population that rides bus transit lines that stop, originate, or terminate on the UCR campus. UCR provided ridership data for the Riverside Transit Agency (RTA) bus routes that are subsidized through the UPASS bus subsidy program. UPASS ridership data indicates the number of rides taken under a UPASS and affiliated with UCR. To attribute total emissions from RTA to UCR riders, the annual number of miles ridden by UPASS riders was estimated based on the average RTA passenger vehicle revenue miles (VRM).[17] Total emissions for the Rapid Link Gold Line, Route 1, Route 16, Route 51, Route 52, Route 204, Route 208 and Route 212 are calculated based on total VRMs traveled in 2018 (RTA 2019). Emissions factors for motor busses are obtained from EMFAC (CARB 2018). Based on 2018 ridership data, UCR students and staff rode an estimated 407,912 miles on RTA routes, which accounts for approximately 21 percent of all RTA VRMs in 2018.

Emission from fuel use by the UCR vehicle fleet were calculated by multiplying gallons of fuel consumed by fuel specific emissions factors obtained from CARB's EMFAC2017 model and emission factors from the US EPA *Emission Factors for Greenhouse Gas Inventories* (US EPA 2018; CARB 2018). Unleaded gasoline, compressed natural gas (CNG), and diesel are the fuels used by the vehicle fleet. In 2018, 135,192 gallons of unleaded gasoline, 4,321 gallon-equivalents of CNG, and 7,306 gallons of diesel were consumed for a total of 146,819 gallons of fuel used. Emission factors for CO_2, CH_4, and N_2O of emissions from each fuel type were sourced from The Climate Registry (The Climate Registry 2020). The emission factor for mobile combustion of gasoline fuel in the UCR vehicle fleet is 0.0088 $MTCO_2e$/gallon, 0.0067 $MTCO_2e$/gallon equivalents for CNG fueled vehicles, and 0.0102 $MTCO_2e$/gallon for diesel fueled vehicles.

For a detailed description of the aforementioned emissions model input and output parameters and assumptions, estimation of UCR 1990 emissions levels (82,167 $MTCO_2e$), quantification of 2018 baseline GHG emissions inventory, and forecasted 2025, 2030, 2035, 2040, and 2045 GHG emissions, as well as interpolation and translation of Statewide goals for determination of UCR-specific GHG emissions targets for these same years, see the following technical reports in Appendix G:

- Final GHG Inventory-Forecast Data Evaluation Memo
- Final GHG Inventory, Forecast, and Targets Report

2021 LRDP Objectives and Policies

The proposed 2021 LRDP contains objectives and policies relevant to GHG:

Mobility (M)

- Objective M1: Reduce future vehicular traffic, parking demand, and GHG emissions, by increasing student housing on campus up to 40 percent of the projected enrollment in 2035.

[17] A vehicle revenue mile is one vehicle traveling one mile with revenue passengers on board.

- Policy: Continue to grow and support on-campus residency by focusing on more affordable student housing options, as well as the capacity for returning students (upperclassmen) and graduate students.
- Promote public transit as a convenient and preferred mode of commuting to campus and connecting campus residents to the community and regional destinations.
- Policy: Develop the University Avenue and Canyon Crest Drive Gateway streetscapes to support increased use and functional efficiency of the RTA system, improved clarity of drop-off and pick-up locations for ride-sharing services, reduced conflict, and improved safety for cyclists, pedestrians, and emerging micro-mobility[18] solutions in these increasingly busy mixed-mode circulation areas.
- Policy: Improve access to public transit on campus by providing connectivity to access points via pathways or shuttles, as well as comfortable waiting facilities, proximate to commuter related services, where appropriate.
- Policy: Advocate and support the development of a Metrolink train platform along Watkins Drive adjacent to campus to provide direct access and significantly reduce commute times. Consider dedicated vanpools or shuttles to nearby stations in the interim.

- Objective M2: Invest in infrastructure to increase bicycle use and support other active transportation modes to integrate desired routes with the campus' and City's circulation framework.
  - Policy: Support and facilitate City-led initiatives to extend bikeways to campus from every direction, including routes proposed along Canyon Crest Drive, Martin Luther King Boulevard, and the Gage Canal.
  - Policy: Develop wayfinding systems to interconnect preferred bicycle routes and invest in safe and secure pathways along all bicycle routes.
  - Policy: Provide adequate support amenities to facilitate and encourage the use of bicycles and other alternative transportation modes.
  - Policy: Develop a comprehensive improvement plan for Campus Drive to improve function, safety and utility for each mode of travel, as incremental growth occurs.
- Objective M3: Emphasize safe and pleasing passage for pedestrians and bicycle riders through the careful, continued development and integration of the campus' multi-modal circulation framework and its extensions into the immediate community.
  - Policy: Identify and address gaps within the existing non-motorized circulation network, both on-campus and within the adjacent community.
  - Policy: Implement University policies to improve pedestrian safety and encourage social interaction in zones of high pedestrian activity.

Campus Utility Infrastructure (INF) – Energy (E)

- Objective INF E1: Prioritize redundancy and overall reliability in the campus' power distribution network.
  - Policy: Ensure infrastructure services and demands are regularly monitored and expanded as needed to meet applicable planned campus development.

[18] Micro-mobility is a category of modes of transport that are provided by very light vehicles such as electric scooters, electric skateboards, shared bicycles and electric pedal assisted bicycles. The primary condition for inclusion in the category is a gross vehicle weight of less than 500 kg.

- Objective INF E2: Emphasize high-performance new construction and building retrofits in support of the UC Policy on Sustainable Practices and minimize the need to purchase carbon offsets.
  - Policy: For mechanical systems in existing facilities, a 30 percent reduction in electrical energy use is projected, inclusive of a 30 percent reduction in electrical energy usage in existing facilities' mechanical systems.
  - Policy: Take the fullest possible advantage of RPU's clean energy plans and the City's "greening of the grid" initiatives.
  - Policy: Achieve a 5 percent improvement in energy performance for new building mechanical systems through retro-commissioning.
- Objective INF E3: Support alternative measures (e.g. alternative fuels, energy sources, practices, carbon offsets, etc.) and mixed energy source portfolios in support of green sustainability practices.
  - Policy: Continuously explore the potential to use alternative fuels over time as they become feasibly available.
  - Policy: Evaluate procurement options for alternative energy while considering long-term financial viability for the University.
  - Policy: Incorporate solar panels on the roofs of new construction to the maximum feasible extent.
  - Policy: Incorporate solar panels as integral elements of new construction design and applicable green building certifications to the maximum feasible extent.

Campus Utility Infrastructure (INF) – Natural Gas (NG)

- Objective INF NG1: Reduce reliance on natural gas in conformance with UC policies.
  - Policy: Future projects shall not employ or expand demand for natural gas as an energy source.
  - Policy: Continue to work with RPU and UCOP to reduce current natural gas demand through efficiency improvements to the existing system, conversion of steam boilers to electricity as they are replaced over time, and, rigorous pursuit of obtaining sources for biogas, or renewable energy credit purchases to fully offset GHG emissions in conformance with UC policies.
  - Policy: Take the fullest possible advantage of RPU's clean energy plans, and the City's "greening of the grid" initiatives.

Campus Utility Infrastructure (INF) – Potable Water, Wastewater and Irrigation (WWI)

- Objective INF WWI1: Commit to a multi-prong approach to conserving potable water use.
  - Policy: Reduce potable water use in an existing building in the Academic Center by 20 percent.
  - Policy: Reduce potable water use in student residential buildings by 30 percent.
  - Policy: Reduce potable water use in new facilities by exceeding applicable codes by a minimum of 20 percent.
  - Policy: Retrofit existing urinals, toilets, showerheads, and faucets for existing buildings with higher water efficiency rated equipment.

- Objective INF WWI2: Explore options to shift away from potable water use where feasible.
  - Policy: Design new building irrigation and efficient toilet flushing systems for use with future non-potable water sources.
  - Policy: Achieve a further 20 percent reduction of potable water use for irrigation by extending Gage Canal water to also irrigate the UCR Botanic Gardens, and reducing turf on campus and replacing with lower use landscaping.

Campus Sustainability (CS)

- Objective CS1: Continue to build on this commitment to environmental stewardship to account for the impacts of development and expansion of campus infrastructure. Major planning and policy issues of the University will be subject to include the following:
  - Policy: Carbon Neutrality Initiative: Carbon Neutral by 2025 – Climate neutrality from Scope 1 & Scope 2 sources by 2025.
  - Policy: Climate neutrality from specific Scope 3 sources by 2050 or sooner - At a minimum, meet the UC intermediate goal in pursuit of climate neutrality (See Assembly Bill [AB 32], and California Global Warming Solutions Act of 2006: emission limit [SB 32].
  - Policy: Energy Efficiency: UC Annual 2 percent Energy Use Intensity (EUI) Reduction Policy (Energy Efficiency) – Each location will implement energy efficiency actions in buildings and infrastructure systems to reduce the location's energy use intensity by an average of at least 2 percent annually.
  - Policy: On-Campus Renewable Electricity – Campuses and health locations will install additional on-site renewable electricity supplies and energy storage systems whenever cost-effective and/or supportive of the location's Climate Action Plan or other goals.
  - Policy: Off-Campus Clean Electricity: 100 percent Renewable Electricity by 2025 – By 2025, each campus and health location will obtain 100 percent clean electricity.
  - Policy: On-Campus Combustion – By 2025, at least 40 percent of the natural gas combusted on-site at each campus and health location will be biogas.

Impact Analysis

Impact GHG-1 GENERATE GREENHOUSE GAS EMISSIONS THAT MAY HAVE A SIGNIFICANT IMPACT ON THE ENVIRONMENT.

THE PROPOSED 2021 LRDP WOULD GENERATE GHG EMISSIONS, EITHER DIRECTLY OR INDIRECTLY, THAT WOULD HAVE A SIGNIFICANT IMPACT ON THE ENVIRONMENT. IMPACTS WOULD BE LESS THAN SIGNIFICANT WITH THE IMPLEMENTATION OF MITIGATION MEASURES.

Construction Emissions

UCR's proposed 2021 LRDP and interim projects construction (and related demolition) are projected to generate a total of 22,654 $MTCO_2e$ between 2022 through 2035. When amortized over the 14-year proposed 2021 LRDP development period, construction emissions would be approximately 1,618 $MTCO_2e$ per year. See Appendix G for details related to construction emissions calculations.

Operational and Total Emissions

Table 4.8-3 shows the 1990 reference emissions, 2018 baseline emissions, and interim projects plus anticipated future GHG emissions generated by UCR in the years 2025, 2030, and 2035. The proposed 2021 LRDP is projected to result in 155,029 $MTCO_2e$ per year by 2035, which represents a net increase in campus-wide GHG emissions above 2018 baseline emissions caused by additional construction activity; on-road VMT; building energy consumption; waste emissions; and additional stationary source emissions. The calculations presented in Table 4.8-3 already account for emissions reductions from existing buildings and operations that are presumed to occur as a result of legislative requirements as the State electricity grid becomes more carbon neutral under SB 100 and as average vehicle emission rates decrease over time.[19,20]

The proposed 2021 LRDP GHG emissions under the future emissions forecast, which has been adjusted to account for applicable legislative reductions,[21] are projected to be:

- 139,920 $MTCO_2e$ per year by 2025
- 159,124 $MTCO_2e$ per year by 2030
- 155,029 $MTCO_2e$ per year by 2035

[19] Pursuant to SB 100 is assumed that RPU will procure 60% of electricity from a renewable source by 2030 and 100% by 2045. Renewably sources electricity is carbon neutral.
[20] The CARB EMFAC2017 transportation modeling program incorporates legislative requirements and regulations including Advanced Clean Cars program (Low Emissions Vehicles III, Zero Emissions Vehicles program, etc.), and Phase 2 federal GHG Standards.
[21] Legislative reductions include the mandatory requirements of SB 100, AB 1493, CBC Title 24 Parts 6 and 12, and CARB Innovative Clean Transit Regulations.

Table 4.8-3 Proposed 2021 LRDP GHG Emissions by Scope and Year

Scope	Reference Emissions – 1990[1] ($MTCO_2e$)	Baseline Emissions – 2018 ($MTCO_2e$)	2021 LRDP Emissions – 2025[2] ($MTCO_2e$)	2021 LRDP Emissions – 2030[2] ($MTCO_2e$)	2021 LRDP Emissions – 2035[2] ($MTCO_2e$)
Scope 1					
Natural Gas	–	18,410	32,526	43,056	53,702
Other Fuels	–	82	138	178	218
Building and Facility Refrigerants	–	339	569	734	899
UCR Fleet (Unleaded)	–	1,200	1,440	1,611	1,782
UCR Fleet (Diesel)	–	75	90	100	111
UCR Fleet (CNG)	–	30	36	40	44
Total Scope 1 Emissions	**17,535**	**20,136**	**34,798**	**45,719**	**56,756**
Scope 2					
Electricity	-	45,834	63,650	68,666	57,703
Total Scope 2 Emissions	**39,704**	**45,834**	**63,650**	**68,666**	**57,703**
Scope 3					
UCR Business Travel	–	1,562	1,943	2,215	2,487
On-Road Transportation (Passenger)	–	26,342	29,684	30,324	29,423
On-Road Transportation (Commercial/Heavy Duty)	–	2,372	3,121	3,624	3,135
Public Transit	–	743	608	453	251
Waste	–	244	293	328	362
2021 LRDP Demolition	–	0	44	44	44
2021 LRDP Construction	–	0	1,055	1,055	1,055
Interim Project Construction	–	–	1,820	0	0
Interim Project Operation	–	0	2,905	6,697	3,814
Total Scope 3 Emissions	**24,928**	**31,263**	**41,471**	**44,738**	**40,570**
Total Emissions[3]	**82,167**	**97,232**	**139,920**	**159,124**	**155,029**

Notes:

[1] 1990 emissions by scope were provided by UCR. Further breakdown by 1990 scope sub-sectors is not available.

[2] Interim project emissions are also included.

[3] Total numbers are rounded values therefore values may not add up exactly. Annual emissions may fluctuate year-over-year, dependent on true growth implemented under the proposed 2021 LRDP.

Source: Appendix G

Table 4.8-4 compares the proposed 2021 LRDP annual GHG emissions to the UCR thresholds.

Table 4.8-4 Comparison of Proposed 2021 LRDP Projected GHG Emissions Without Mitigation Against UCR Thresholds

	Emissions per Threshold (MT CO_2e)		
	2021-2025	**2026-2030**	**2030-2035**
Projected Annual Scopes 1, 2, and 3 Emissions Pre-Mitigation	**139,920**	**159,124**	**155,029**
Total 2018 Baseline Emissions[1]	97,232	97,232	97,232
Meeting Threshold?	**No**	**No**	**No**
UC Policy on Sustainable Practices[2] (Carbon Neutral Scope 1 and Scope 2, only Scope 3 Emissions Permitted)	n/a	41,471	41,471[4]
Meeting Threshold?	**n/a**	**No**	**No**
SB 32 Emissions Compliance[3] (40% below 1990 levels [82,167 $MTCO_2e$])	n/a	n/a	49,300[4]
Meeting Threshold?	**n/a**	**n/a**	**No**

Notes:

[1] UCR would utilize the 2018 Baseline Emissions Threshold between 2021 LRDP adoption through December 31, 2025

[2] UCR would achieve carbon neutrality for Scope 1 and Scope 2 emissions per the *UC Policy on Sustainable Practices* beginning on January 1, 2026 ; only Scope 3 emissions would be permitted.

[3] UCR would demonstrate compliance with SB 32 no later than December 31, 2030

[4] Compliance with the *UC Policy on Sustainable Practices* would result in campus-wide emissions reductions greater than the State targets under SB 32.

UCR emissions under the proposed 2021 LRDP are projected to exceed 2018 baseline emissions, *UC Policy on Sustainable Practices*, and SB 32 reduction targets. As such, UCR emissions under the proposed 2021 LRDP would represent a significant and cumulatively considerable contribution to climate change. This impact would be significant. Mitigation Measure **MM GHG-1** (on-campus GHG emissions reduction measures) and **MM GHG-2** (carbon offset purchases) would be required to reduce impacts to less than significant levels. Thus, impacts are considered to be **less than significant with mitigation incorporated**.

Mitigation Measures

MM GHG-1 Implement On-Campus GHG Emissions Reduction Measures

UCR shall implement the following GHG emissions reduction measures by scope emissions category:

SCOPE 1 (STATIONARY FUEL COMBUSTION, REFRIGERANT USE, FLEET FOSSIL FUEL COMBUSTION)

Energy (EN)

- Measure EN1: In order to meet 100 percent electrification of all new campus buildings and structures, UCR shall prioritize construction of all-electric building design for new campus buildings and structures and discourage the construction and connection of new fossil fuel combustion infrastructure on campus. In addition, UCR shall focus on energy optimization through the Central Plant control systems by automating manual processes and initiating an engineering study focused on transitioning away from natural gas use at the Central Plant.
- Measure EN2: In order to address on-campus natural gas combustion, starting in 2025 and continuing through 2035, UCR shall purchase biogas for at least 40 percent of the total on-campus natural gas usage.

Global Warming Potential (GWP)

- Measure GWP1: In order to reduce emissions from refrigerants used on campus, UCR shall phase out of high global warming potential chemical refrigerants on campus to achieve 100 percent relative carbon neutrality by 2045. This may include the replacement of chemical refrigerants with lower global warming potential in the interim of full phase out while an alternative technology is determined. Furthermore, UCR shall prohibit the use of equipment in new buildings or construction projects that do not utilize low global warming potential or Significant New Alternatives Policy Program accepted refrigerants.

Fuel (FL)

- Measure FL1: In order to decarbonize the campus vehicle fleet, UCR shall reduce emissions from the campus vehicle fleet by 25 percent by 2025, by 50 percent by 2030, and by 75 percent by 2035 through replacement of fleet vehicles with electric vehicles or low-emission alternative vehicles.

SCOPE 2 (ELECTRICITY CONSUMPTION AND GENERATION)

Energy (EN)

- Measure EN3: UCR shall work to obtain 100 percent clean-sourced electricity through either Riverside Public Utilities (RPU) and/or through the installation of on-site clean-sourced electricity sources for all new buildings by 2025. In addition, UCR shall establish annual budgets that include funding to purchase 100 percent clean-sourced energy. Furthermore, all newly constructed building projects, other than wet lab research laboratories, shall be designed, constructed, and commissioned to outperform the California Building Code (Title 24 portion of the California Code of Regulations) energy efficiency standards by at least 20 percent. Finally, UCR shall incorporate solar PV as feasibly possible for newly constructed and majorly-renovated buildings with the maximum system size, highest solar panel efficiency, and greatest system performance.[22]
- Measure EN4: In order to obtain electricity from 100 percent renewable source(s) for all existing buildings by 2045, UCR shall renegotiate its contractual agreement with RPU to establish a schedule and specific goals for obtaining 100 percent renewable electricity for the campus. In addition, UCR shall conduct an evaluation of existing buildings for structural suitability in terms of accommodating a solar photovoltaic system capacity with highest energy generation yield and for installing energy storage technology on campus and then installing such systems on identified buildings and facilities.
- Measure EN5 (Parts A, B, C): In order to prioritize energy efficiency and green building initiatives for building/facility upgrades and new construction as well as reduced energy use, UCR shall identify aging equipment throughout the campus such as equipment associated with the Central Plant, electrical distribution system, and building HVAC systems and develop a strategy and schedule to upgrade such equipment with high-energy efficiency systems and optimize HVAC systems through heat zoning, high-efficiency filters, and shut-down times expansion. The strategy shall include an evaluation and cost analysis related to upgrading/retrofitting equipment versus retirement of equipment if no longer needed with future initiatives (i.e., Central Plant boiler retirement). The schedule and upgrade strategy must meet a 2 percent energy efficiency improvement annually through 2035. In addition, UCR shall require new buildings to incorporate occupancy sensors and controls such that lighting of shared spaces is on

[22] The EIR GHG modeling efforts assume that clean energy is in line with California-defined renewable sources.

occupancy sensors, building temperature set points are widened and aligned with occupancy schedules, and ventilation systems are converted from constant volume to variable so ventilation rates are occupancy-based. Furthermore, UCR shall develop a plan to identify existing buildings and projects that could undergo upgrades to the control systems and establish a schedule for upgrade incorporation. Finally, UCR shall develop a tracking program to monitor and share campus energy efficiency activities and progress towards increased energy efficiency.

SCOPE 3 (WASTE GENERATION, BUSINESS AIR TRAVEL, ON-SITE TRANSPORTATION, WATER CONSUMPTION, CARBON SEQUESTRATION, AND CONSTRUCTION)

Waste Generation (WG)

- Measure WG1: UCR shall implement and enforce SB 1383 organics and recycling requirements to specifically reduce landfilled organics waste to 75 percent by 2025.
- Measure WG2: UCR shall reduce campus waste sent to landfills 90 percent by 2025 and 100 percent by 2035. In addition, UCR shall reduce waste generation at campus events 25 percent by 2025 and 50 percent by 2035, with goals of being zero waste and plastic free events. Furthermore, UCR shall establish purchasing and procurement policies and guidelines prioritizing vendors that limit packaging waste and purchase reusable and compostable goods.

Transportation (TR)

- Measure TR1: In order to reduce GHG Emissions related to business air travel, UCR shall provide incentives to faculty for emission-reducing behaviors and utilizing travel options that are less carbon intensive, promote the use of virtual meetings, and encourage alternative forms of travel other than air travel.
- Measure TR2: UCR shall update the Transportation Demand Management (TDM) program for the campus to decrease single occupancy vehicle VMT 5 percent by 2025 and 20 percent by 2035. In addition, UCR shall evaluate trends of current programs to expand on existing programs and establish new initiatives that utilize proven successful strategies.
- Measure TR3: UCR shall develop and implement a Campus Active Transportation Plan to shift 2 percent of baseline (2018) passenger vehicle VMT to active transportation by 2025 and 8 percent by 2035. In addition, UCR shall update the Campus Bicycle and Pedestrian Network Map every five years, including routes from off campus to on campus.
- Measure TR4: UCR shall reduce GHG emissions associated with campus commuting 10 percent by 2025 and 25 percent by 2035.

Water Consumption(WC)

- Measure WC1: UCR shall reduce per-capita water consumption 20 percent by 2025 and 35 percent by 2035 compared to academic year 2018/2019 per capita consumption.

Carbon Sequestration (CS)

- Measure CS1: UCR shall increase carbon sequestration through increasing tree planting and green space 5 percent by 2025 and 15 percent by 2035.

Construction (CR)

- Measure CR1: UCR shall reduce construction-related GHG emissions on campus 10 percent by 2025 and 25 percent by 2035 through emission reduction controls and/or electric equipment requirements in line with contract obligations related to minimizing off-road construction

equipment emissions. Specifically, UCR shall require off-road diesel-powered construction equipment greater than 50 horsepower to meet the Tier 4 emission standards as well as construction equipment to be outfitted with BACT devices certified by CARB and emissions control devices that are no less than what could be achieved by a Level 3 diesel emissions control strategy for a similar-sized engine. In addition, UCR shall develop zero waste procurement guidelines and processes for campus construction projects and integrate into purchasing RFP language as part of campus procurement.

The UCR Office of Sustainability, Facilities Services, Environmental Health & Safety (EH&S), Transportation and Parking Services (TAPS), and/or Planning, Design & Construction (PD&C) shall annually monitor, track, and verify implementation of these GHG emissions reduction measures.

MM GHG-2 Purchase Carbon Offsets to Achieve GHG Emissions Reduction Balance

In order to achieve the necessary GHG emissions reduction balance after implementation of Mitigation Measure MM GHG-1 and in order to meet the *UC Policy on Sustainable Practices* and State targets, UCR shall annually track and purchase carbon offsets for the balance of GHG emissions after on-site reductions per Mitigation Measure MM GHG-1 that still meet or exceed the UCR emissions targets by year.

UCR shall sequester funds for carbon offset purchases into a restricted account such that any/all uses shall directly reduce carbon emissions and address UCR goals. Prior to the purchase of carbon offsets, UCR shall research and purchase carbon offsets that are real, permanent, quantifiable, verifiable, enforceable, supported by substantial evidence, and additional to any GHG emission reduction otherwise required by law or regulation and any other GHG emission reduction that otherwise would occur under Mitigation Measure **MM GHG-1**.

If any changes occur with regard to implementation of on-campus GHG reduction measures as part of Mitigation Measure **MM GHG-1**, UCR shall adjust the purchase of carbon offsets accordingly and keep respective accounting records. UCR Office of Sustainability, Facilities Services, EH&S, and PD&C shall annually monitor, track, and verify purchase of the required carbon offsets.

As part of this mitigation measure, UCR shall make the following separate, though overlapping, GHG emission reduction commitment including maintaining compliance with carbon offset accreditation requirements under the CARB Cap-and-Trade Program. Any carbon credits obtained for the purpose of compliance with the CARB Cap-and-Trade Program shall be purchased from an accredited carbon credit market. Based on the current program as of 2021, such offset credits (or California Carbon Offsets) shall be registered with, and retired by an Offset Project Registry, as defined in 17 California Code of Regulations Section 95802(a), that is approved by CARB, such as, but not limited to, Climate Action Reserve (CAR), American Carbon Registry, and Verra (formerly Verified Carbon Standard), that is recognized by The Climate Registry, a non-profit organization governed by U.S. states and Canadian provinces and territories.

Significance After Mitigation

Table 4.8-5 shows the GHG emissions reduction measures quantification summaries by scope and year associated with implementation of the various GHG reduction measures identified under Mitigation Measure **MM GHG-1**. Where GHG reduction measures were considered supportive and, thus, not quantifiable, specific quantification cannot be determined.

Table 4.8-5 Scopes 1, 2, and 3 GHG Emissions On-campus Reduction Measures Quantification Summary

	Project Reduction Value per Measure by Year		
Emissions Reduction Measures	**2025**	**2030**	**2035**
Scope 1 Emissions Reduction Measures			
Measure EN1: Require 100 percent electrification of all new Campus buildings and structures.		Supportive	
Measure EN2: Addressing On-campus natural gas combustion.	12,341	15,651	19,072
Measure EN3: Obtain electricity from 100 percent clean energy source(s) for all new buildings.	487	974	1,460
Measure EN5 Part A: Prioritize energy efficiency and green building initiatives for building/facility upgrades and new construction.	1,083	2,747	4,252
Measure EN5 Part B: Prioritize initiatives that promote behaviors that reduce energy use and establish operational strategies to implement that will increase energy efficiency.	103	206	310
Measure GWP1: Reduce emissions from refrigerants used on Campus by 100 percent by 2045.	176	349	587
Measure FL1: Decarbonize Campus vehicle fleet 100 percent by 2045.	271	663	1,218
Total Scope 1 Emissions Reduction	**14,461**	**20,590**	**26,899**
Scope 2 Emissions Reduction Measures			
Measure EN3: Obtain electricity from 100 percent clean energy source(s) for all new buildings.	5,569	8,837	8,837
Measure EN4: Obtain electricity from 100 percent renewable source(s) for all existing buildings by 2045.		Supportive	
Measure EN5 Part A: Prioritize energy efficiency and green building initiatives for building/facility upgrades and new construction.	2,905	5,849	6,035
Measure EN5 Part B: Prioritize initiatives that promote behaviors that reduce energy use and establish operational strategies to implement that will increase energy efficiency.	59	94	94
Measure EN5 Part C: Develop a tracking program to monitor and share Campus energy efficiency activities and progress towards increased energy efficiency.		Supportive	
Total Scope 2 Emissions Reduction	**8,533**	**14,780**	**14,966**

Emissions Reduction Measures	Project Reduction Value per Measure by Year		
	2025	2030	2035
Scope 3 Emissions Reduction Measures			
Measure WG1: Implement and enforce SB 1383 organics and recycling requirements to reduce landfilled organics waste emissions 50 percent by 2022 and 75 percent by 2025.	191	222	252
Measure WG2: Reduce Campus waste sent to landfills 90 percent by 2025 and 100 percent by 2035.	15	9	110
Measure TR1: Reduce GHG Emissions Related to Business Air Travel.		Supportive	
Measure TR2: Implement programs for shared transit that decrease passenger vehicle VMT 5 percent by 2025 and 20 percent by 2035.	1,484	1,516	5,885
Measure TR3: Develop and implement a Campus Active Transportation Plan to shift 2 percent of baseline (2018) passenger vehicle VMT to active transportation by 2025 and 8 percent by 2035.	104	106	412
Measure TR4: Reduce GHG emissions associated with Campus commuting 10 percent by 2025 and 25 percent by 2035. This supports UC Sustainability Practices Policy D.2.	1,380	1,410	1,060
Measure WC1: Reduce per-capita water consumption 20 percent by 2025 and 35 percent by 2035 compared to academic year 2018/2019 per capita consumption. This supports and expands upon UC Policy on Sustainable Practices I1.		Not Quantified[1]	
Measure CS1: Increase carbon sequestration through increasing tree planting and green space 5 percent by 2025 and 15 percent by 2035.	11	11	32
Measure CR1: Reduce construction-related GHG emissions on Campus 10 percent by 2025 and 25 percent by 2035 through emission reduction controls and/or electric equipment requirements.	292	110	275
Total Scope 3 Emissions Reduction	**3,477**	**3,384**	**8,026**
Projected Total Scopes 1, 2, and 3 Emissions Reductions	**26,471**	**38,754**	**49,891**

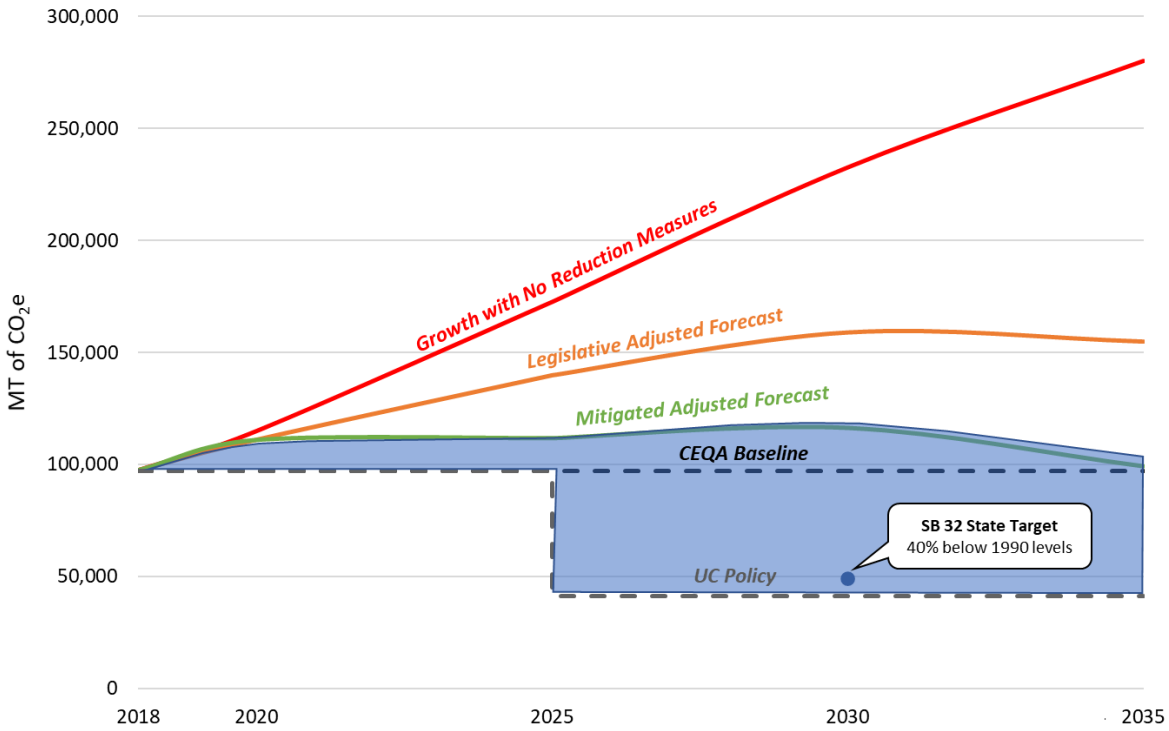
Notes: Total numbers are rounded values.

[1] Emissions related to water and wastewater were not included in the UCR 1990 and 2018 GHG inventories, and, as a result, data for this sector was not quantified for future conditions.

Source: Calculated and compiled by Rincon Consultants, Inc. See Appendix G.

Figure 4.8-5 visually demonstrates the calculated reduction value of Mitigation Measure MM GHG-1 as represented by the green line label "Mitigated Adjusted Forecast." The blue shaded area represents the anticipated value of the purchase of carbon offsets with the implementation of Mitigation Measure MM GHG-2. The dash lines represent the CEQA baseline threshold (black dash) and the UC Policy threshold (grey dash), while the dark blue dot represents the SB 32 2030 state target.

Figure 4.8-5 UCR Forecasted Growth Comparison to Thresholds



Similar to actual, annual emissions fluctuations year-over-year (dependent on true growth implemented under the proposed 2021 LRDP), emissions reduction measures may be implemented in increments (i.e., one or more over time) and to differing degrees (i.e., more of one measure, less of one measure). By annually tracking GHG emissions levels, UCR would be able to calculate and purchase carbon offsets for the balance of GHG emissions after on-site reductions per Mitigation Measure MM GHG-1 that still exceed the UCR emissions thresholds by year, to meet the UCR GHG emissions targets of:

- 2018 baseline GHG emissions levels of 97,232 $MTCO_2e$ between 2021 LRDP adoption through December 31, 2025;
- *UC Policy on Sustainable Practices* emissions restrictions beginning on January 1, 2026 (i.e., carbon neutral Scope 1 and Scope 2 emissions); only Scope 3 emissions would be permitted; and
- Compliance with SB 32 no later than December 31, 2030 (40 percent below 1990 levels [82,167 $MTCO_2e$]).

With implementation of Mitigation Measures **MM GHG-1 and MM GHG-2** requiring on-campus GHG reduction measures and the purchase of carbon offsets, the proposed 2021 LRDP would result in mitigated emissions that meet the UCR Thresholds. Therefore, with implementation of the identified mitigation measures, impacts related to generation of GHG emissions under the proposed 2021 LRDP would be **less than significant with mitigation incorporated**.

Impact GHG-2 CONFLICT WITH AN APPLICABLE PLAN, POLICY OR REGULATION ADOPTED FOR THE PURPOSE OF REDUCING THE EMISSIONS OF GREENHOUSE GASES.

THE PROPOSED 2021 LRDP GHG EMISSIONS DURING CONSTRUCTION AND OPERATION ARE PROJECTED TO EXCEED THE STATE TARGETS AND UC-DERIVED GHG EMISSION THRESHOLDS. THEREFORE, THE PROPOSED 2021 LRDP WOULD CONFLICT WITH THE GOALS OF AN APPLICABLE PLAN, POLICY OR REGULATION ADOPTED FOR THE PURPOSE OF REDUCING THE EMISSIONS OF GREENHOUSE GASES. HOWEVER, THIS IMPACT WOULD BE LESS THAN SIGNIFICANT WITH THE IMPLEMENTATION OF MITIGATION MEASURES.

Campus development under the proposed 2021 LRDP would result in additional GHG emissions due to construction, an increase in mobile sources, more building space requiring more heating and cooling, and an increased campus population with respective operational activities entailing both increased commute-related mobile emissions and building energy-related stationary emissions. However, with implementation of the proposed 2021 LRDP:

- Existing campus facilities slated for retrofit would be redeveloped to be more energy efficient, resulting in less energy use and generating less emissions for those same facilities than under existing conditions (per **MM GHG-1**);
- New and retrofitted on-campus facilities would be developed to meet or exceed energy efficiency standards with a commitment to meet 2019 CBC Title 24 Part 6 (Building Energy Efficiency Standards) and Part 11 (California Green Building Standard) as well as achieve at least LEED Silver building certification, thereby resulting in fewer GHG emissions related to electricity and natural gas use compared to existing on-campus facilities (per **MM GHG-1**);
- Land use and planned infrastructure would be developed to discourage personal non-renewable fuel vehicle use, such as through construction of bicycle and transit infrastructure and encouragement of use of EVs, thereby reducing transportation-related emissions (per **MM GHG-1**) ; and
- Remaining GHG emissions that need to be reduced after the physical implementation of the proposed 2021 LRDP to meet UCR's GHG reduction targets would be abated by purchases of renewable energy credits and verified by carbon offset credits by UCR (**MM GHG-2**).

The proposed 2021 LRDP was evaluated for consistency with applicable State and UC plans that were developed with the intent of reducing GHG emissions. Applicable State and UC plans are discussed separately below.

Consistency with State Plans

The CARB 2017 Scoping Plan outlines a pathway to achieving the GHG emissions reduction targets set under SB 32 that are considered interim targets toward meeting the longer-term 2045 carbon neutrality goal established by EO B-55-18. Implementation of the proposed 2021 LRDP would impede "substantial progress" toward meeting the SB 32 and EO B-55-18 targets if the proposed 2021 LRDP GHG emissions exceeded the respective State targets derived as 2025, 2030, and 2035 GHG emission thresholds. As discussed under Impact GHG-1, the proposed 2021 LRDP's GHG emissions would exceed these State targets. As a result, implementation of the proposed 2021 LRDP would conflict with the reduction targets of the 2017 Scoping Plan and SB 32, and, therefore, EO B-55-18, and would contribute to climate change. This impact is **significant**. Mitigation Measures **MM GHG-1 and MM GHG-2** requiring on-campus GHG reduction measures and the purchase of carbon offsets would be required.

With implementation of Mitigation Measures **MM GHG-1 and MM GHG-2**, UCR Scopes 1, 2, and 3 emissions would be reduced to meet State targets by 2025, 2030, and 2035 respectively and demonstrate UCR's path toward achieving the emissions goals outlined by these State plans. As such, the proposed 2021 LRDP would not preclude or create obstacles to future attainment of the related State GHG reduction goals. Therefore, the proposed 2021 LRDP impacts related to consistency with applicable State plans for GHG reduction would be **less than significant with mitigation incorporated**.

Consistency with UC Sustainability Policy

The UC Sustainability Policy commits UC campuses, including UCR, to achieve carbon neutrality in terms of Scopes 1 and 2 emissions by 2025 and carbon neutrality in terms of all scopes by 2050 or sooner. The plan-specific GHG emissions thresholds utilized for the proposed 2021 LRDP in this analysis are interpolated targets for 2025, 2030, and 2035 to comply with a net-zero Scopes 1 and 2 emissions date of 2025.

As shown in Table 4.8-3, the proposed 2021 LRDP Scopes 1 and 2 emissions in 2025 are projected to total 98,448 $MTCO_2e$ per year. Therefore, when evaluated under the *UC Policy on Sustainable Practices* target, the 2021 LRDP would not be consistent with the *UC Policy on Sustainable Practices* of Scopes 1 and 2 climate neutrality (i.e., net zero emissions) by 2025 and would represent a an obstacle to future attainment of the related UCR GHG reduction goal related to Scopes 1 and 2 emissions. This impact is significant. Mitigation Measures **MM GHG-1 and MM GHG-2** requiring on-campus GHG reduction measures and the purchase of carbon offsets would be required.

With implementation of Mitigation Measures **MM GHG-1 and MM GHG-2**, UCR Scopes 1 and 2 emissions would demonstrate carbon neutrality by 2025 as well as UCR's path toward achieving the emissions goals outlined by the *UC Policy on Sustainable Practices*. As such, the proposed 2021 LRDP would not preclude or create obstacles to future attainment of the related UC GHG reduction goals. Therefore, the proposed 2021 LRDP impacts related to consistency with applicable UC plans for GHG reduction would be **less than significant with mitigation incorporated**.

Mitigation Measures

See Mitigation Measures **MM GHG-1 (Implement On-Campus GHG Emissions Reduction Measures) and MM GHG-2 (Purchase Carbon Offsets to Achieve GHG Emissions Reduction Balance)** under Impact GHG-1.

Significance After Mitigation

See *Significance After Mitigation* discussion under Impact GHG-1. With implementation of **MM GHG-1 and MM GHG-2** requiring on-campus GHG reduction measures and the purchase of carbon offsets, the proposed 2021 LRDP would result in GHG emissions that meet the 2025, 2030, and 2035 GHG emission State and UC-derived targets. The proposed 2021 LRDP would not impede "substantial progress" toward meeting the CARB 2017 Scoping Plan, SB 32, EO B-55-18, or *UC Policy on Sustainable Practices* targets. Therefore, with implementation of the identified mitigation measures, impacts related to the proposed 2021 LRDP consistency with applicable GHG reduction plans would be **less than significant with mitigation incorporated**.

4.8.4 Cumulative Impacts

GHG emissions and global climate change represent cumulative impacts. GHG emissions cumulatively contribute to the significant adverse environmental impacts of global climate change. No single project could generate enough GHG emissions to noticeably change the global average temperature; instead, the GHG emissions from past, present, and future projects and activities have contributed, currently are contributing, and would contribute to global climate change and its associated environmental impacts.

Project GHG emissions are inherently cumulative and do not require the estimation of cumulative projects in the region of a project (i.e., cumulative projects listed in Table 4-1). Rather, the determination of GHG cumulative impacts is based on the proposed plan's compliance with State targets established by SB 32 and EO B-55-18 to reduce GHG emissions to 40 percent below 1990 levels by 2030 and to net zero by 2045. In order to ensure that this goal would be achieved, Air Districts and Lead Agencies develop GHG thresholds to ensure compliance with the State target. Projects with GHG emissions in conformance with these thresholds, therefore, would not be considered significant for purposes of CEQA. In addition, although the emissions from such cumulative projects would add an incremental amount to the overall GHG emissions that cause global climate change impacts, emissions from projects consistent with these thresholds would not be a "cumulatively considerable" contribution under CEQA. Such projects would not be "cumulatively considerable," because they would be helping to solve the cumulative problem as a part of the SB 32 Scoping Plan process. As determined under Impact GHG-1, the proposed plan would exceed the applicable State target derived thresholds. Furthermore, as discussed under Impact GHG-2, the proposed 2021 LRDP would conflict with applicable plans adopted to reduce the emissions of GHGs, specifically the *UC Policy on Sustainable Practices*, CARB 2017 Scoping Plan, SB 32, and EO B-55-18. Therefore, there would be a potentially **significant cumulative impact** related to GHG emissions.

However, implementation of Mitigation Measures **MM GHG-1 and MM GHG-2** would reduce impacts related to the proposed 2021 LRDP's generation of GHG emissions to a less-than-significant level (represented by more than 40 percent below 1990 levels by 2030). And implementation of Mitigation Measures **MM GHG-1 and MM GHG-2** would reduce impacts related to the proposed 2021 LRDP's consistency with applicable GHG reduction plans to a less-than-significant level (represented by consistency with the *UC Policy on Sustainable Practices*, CARB 2017 Scoping Plan, SB 32, and EO B-55-18). As such, there would be a **less than significant with mitigation incorporated cumulative impact** related to GHG emissions generation and consistency with applicable GHG reduction plans.

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4.9 Hazards and Hazardous Materials

This section evaluates potential health, safety, and environmental impacts related to the use, storage, and transport of hazards and hazardous materials that may affect the UCR campus and off-site land uses with implementation of the proposed 2021 LRDP.

4.9.1 Environmental Setting

The term "hazardous material" is defined in different ways for different regulatory programs. This EIR uses the definition given in the California Health and Safety Code Sections 25501(n), which defines hazardous material as:

> Any material that, because of its quantity, concentration, or physical or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment if released into the workplace or the environment, or a material specified in an ordinance adopted pursuant to the governing body of a unified program agency.

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

Most hazardous materials are thought to be hazardous chemicals, but certain radioactive materials and biohazardous materials, as defined here, are also hazardous. A hazardous waste, for the purpose of this analysis, is any hazardous material that is abandoned, discarded, burned or incinerated, mislabeled (or inadequately labeled), packaged in deteriorating or damaged containers, and recycled. In addition, hazardous wastes occasionally may be generated by actions that change the composition of previously non-hazardous materials. The criteria that characterize a material as hazardous also characterize a waste as hazardous: toxicity, ignitability, corrosivity, or reactivity.

Potential water quality effects related to surface water runoff from construction sites and/or groundwater dewatering during construction and operation are discussed in Section 4.10, *Hydrology and Water Quality*. Potential impacts related to toxic air contaminants that could be emitted during campus operations are discussed in Section 4.3, *Air Quality*. Potential impacts related to hazards associated with wildfires are discussed in Section 4.18, *Wildfire*.

Hazardous Materials at UCR

The campus is a permitted large-quantity generator of hazardous waste, which includes chemical waste, universal waste, and radioactive and biohazardous (infectious) waste. The policies and procedures for the safe management of hazardous materials and wastes at UCR are approved and administered at the Vice Chancellor level. The UCR Vice Chancellor Administration organization includes Environmental Health & Safety (EH&S), which is the principal administrator for hazardous materials/waste management on the UCR campus.

EH&S is charged with issuing policies (approved by the Vice Chancellor Administration), evaluating departmental activities, and disseminating general information regarding the handling, storage, and disposal of hazardous materials and wastes, in part through discussions with the department heads, training of employees, and teaching assistants and also through distribution of various safety manuals, newsletters, and other publications. Most of the hazardous materials used on the campus

are associated with research and instruction. The primary users of hazardous materials include the following departments:

- Environmental Research
- The Arts and Photography
- Biochemistry
- Biology
- Biomedical Sciences and Research
- Botany
- Chemistry
- Entomology
- Geology
- Health Services
- Institute of Geophysics and Planetary Physics
- Nematology
- Facilities and Physical Plant
- Physics
- Plant Pathology
- Soil and Environmental Sciences

The hazardous materials that are used by these departments include flammables and combustibles, acids and bases, biohazards, pesticides and herbicides, explosive and blasting agents, compressed gases, cryogenic fluids, radioactive material, oxidizers, and poisonous gases and could include the following:

- Solvents used for cleaning, extraction, or other laboratory activities
- Reagents (chemical starting materials)
- Reaction products (products of chemical reactions), which may have unknown compositions
- Radioisotopes (radioactive elements used to stimulate or trace chemical reactions)
- Paints and paint thinners (both oil-based and latex) for fine arts
- Set design and construction materials used in theater arts classes and productions
- Test samples (e.g., specimens such as blood, tissue, soil, or water), prior to use in a testing procedure
- Infectious agents, including bacteria, viruses, and other materials encountered in biological studies and human health care or research

In addition to research and instruction facilities, maintenance and physical plant units on campus, including grounds, custodian services, fleet services, pest management, and craft shops, also use a wide variety of commercial products formulated with hazardous materials during the course of daily campus operations. These include fuels, oils and lubricants, cleaners, solvents, paints, pesticides, adhesives, sealers, refrigerants, and others. Ongoing facilities management activities also include the operation and maintenance of boilers and other central plant equipment, underground storage tanks, asbestos abatement projects, and the replacement of electrical equipment (e.g., transformers and capacitors) containing polychlorinated biphenyls (PCBs). PCBs are currently used in transformers and capacitors located in several campus buildings and facilities. Also, virtually all buildings on the UCR campus contain commercial products (e.g., cleaners, copier toners, etc.) that could be considered hazardous materials under regulatory definitions.

Certain locations on campus may also have been contaminated by various hazardous substances because of the former uses of the site, such as leaks from unidentified underground storage tanks, or unidentified buried debris that could contain hazardous substances or hazardous byproducts. If not managed safely, contaminated soil, groundwater, or building materials have the potential to pose hazards to construction workers and existing and future campus occupants and nearby land

uses. All identified contamination on the campus has either been remediated or has been identified for remediation. These sites are discussed below under *Building Site Contamination.*

Hazardous material profiles for campus users have been identified in the UCR Hazardous Materials Business Emergency Plan (UCR 2020a) prepared pursuant to the State Hazardous Materials Release Response Plans and Inventory Law of 1985 (Business Plan Law), which contains information about the location of, and emergency procedures for, campus buildings in which hazardous materials are handled. The business plan satisfies federal and State Community Right-to-Know laws. The Business Plan Law requires periodic reporting of inventory changes at UCR to the local administering agency, which is the City of Riverside (City) Fire Department (RFD).

The California Environmental Reporting System (CERS) hazardous material business activities forms were submitted to the Riverside County Department of Environmental Health (RCDEH) on November 11, 2020 and accepted by the RCDEH on November 11, 2020. These forms indicate the following:

- Hazardous chemical materials are found on the UCR campus in quantities greater than 55 gallons for liquids, 500 pounds for solids, or 200 cubic feet for compressed gases
- UCR is a hazardous waste generator
- UCR campus utilizes above-ground storage (AST) tanks to store greater than 1,320-gallons of petroleum hydrocarbons on-site
- The owner of the property, emergency contacts, and the environmental contact for the UCR campus

The forms also provide UCR campus plans regarding spills, fires and earthquakes, involving hazardous materials and hazardous wastes, as listed below:

- Internal response
- Emergency communications, phone numbers, and notifications information
- Emergency containment and cleanup procedures
- Facility evacuation
- Arrangements for emergency services – alarm signals, emergency assembly areas, and evacuation routes
- Emergency equipment – safety and first aid, firefighting, spill control and cleanup, and communications and alarm systems
- Earthquake vulnerability – vulnerable areas and vulnerable systems and/or equipment
- Employee training – type, frequency, and recordkeeping

Additionally, Hazardous Materials Business Emergency Plan facility maps are included as an attachment (Appendix H).

Compressed gases, fuels, and lab chemicals (e.g., solvents, acids, and bases) are examples of the kinds of chemicals that are subject to Business Plan Law reporting requirements. The 2020 UCR Hazardous Materials Business Plan (Business Plan), which was last updated in 2020, provides the most accurate and current data available regarding hazardous materials use on the campus. The RFD administers the Business Plan requirements for UCR and other private and public entities in the City that are subject to the Business Plan.

EH&S provides requirements to campus users of hazardous materials concerning proper disposal of the resulting hazardous wastes at UCR; included in these requirements are prohibitions against the discharge of any hazardous wastes into storm drains or the sanitary sewer system.

Chemical Hazardous Waste

There are many different types of chemical waste managed by EH&S including solvents, cleaners, paint/sludge, asbestos, mercury, photochemicals, formalin (formaldehyde solution), oil/lubricants, pesticides, adhesives/sealers, acids, explosives/reactives, and organic and inorganic laboratory chemicals. UCR does not treat, store (for longer than 90 days), or dispose of hazardous waste on-site. All waste is shipped off-site to licensed disposal facilities using a contracted licensed hazardous waste transporter.

The campus tracks waste as required by federal and State Law. UCR is required to use UC-approved and audited contractors, transporters, and disposal sites. The campus currently contracts with Clean Harbors Environmental Services, which is the transporter and treatment storage disposal facility responsible for most of UCR's hazardous waste disposal. Some waste profiles are incinerated for energy recovery. Stericycle Inc. transports and disposes of biohazardous waste.

In addition, UCR must file reports with the State detailing waste disposal and recycling activities in addition to paying annual hazardous waste taxes based on volumes of waste disposed. Before EH&S collects materials, the materials must be packaged and labeled properly, which includes placing them in appropriate sealed containers, segregating incompatible materials, and identifying all components with approximate concentrations. Wastes are stored in the EH&S Hazardous Materials Management Facility in the 90-day storage area prior to shipment to treatment, storage, and disposal facilities (UCR 2018a). Chemical wastes are segregated by type and consolidated, bulked, or compacted before removal from the campus by a licensed hauler to permitted off-campus facilities for incineration, treatment, recycling, or other means of disposal. Emergency response and spill cleanup equipment and supplies are maintained in the Hazardous Materials Management Facility (UCR 2018a).

Radioactive Waste

Exposure to ionizing radiation can result in adverse human health effects that range from short-term mild symptoms (such as sunburn) to serious illness or death, depending on the type of radiation and the amount of exposure. The extent to which exposure would result in any adverse effects depends on the radioisotope, the amount, and the length of time of exposure.

The UCR campus generates radioactive wastes from research and teaching activities. As is the case with hazardous chemical waste, the amount of radioactive waste generated by the campus varies depending upon changes in research projects, techniques, and methodologies. Radioactive substances contain atoms that spontaneously emit radiation from the transformation of unstable atomic nuclei, which result in chemically different substances that may or may not be radioactive. These radioactive atoms are called "radio-nuclides" or "radioisotopes." Because radioactive materials emit ionizing radiation, their presence can be detected easily. Researchers and health care professionals take advantage of this easy detectability by using radioactive materials to study various biochemical functions in animals and humans. Sealed sources are radioactive materials encased in containers designed to prevent release of radioactive materials to the environment. Limited types and quantities of radioisotopes are also used in research laboratories. All radioisotopes used on campus are listed in the campus Broadscope Radioactive Materials License issued by the State and must be authorized by EH&S (see *Regulatory Setting* below) (UCR 2020b).

UCR currently contracts with Thomas Gray & Associates, a radioactive-hazardous waste management group, as the transporter for the campus' radioactive waste. No radioactive waste is incinerated on campus. Like chemical wastes, low-level radioactive waste from campus teaching, research, and health sciences-related activities is collected and managed by EH&S staff. UCR collects dry and liquid low-level radioactive waste directly from its sources (research or clinical users). In accordance with strict regulatory guidelines and procedures, the EH&S staff transports the waste to the Hazardous Materials Management Facility designed to safely store and contain materials. As a mitigation measure from the EH&S Expansion EIR document[1], which has been and will continue to be implemented, EH&S staff shall provide all drivers removing hazardous materials or hazardous waste from the EH&S Expansion facility with printed directions clearly indicating the mandated haul route, exiting the EH&S Expansion facility left onto Watkins Drive, and proceeding northwest to Blaine Street, then west on Blaine Street to the I-215/SR 60 freeway entrance ramps.

Biohazardous Waste

Various biologically hazardous (biohazardous) substances are used for research on the UCR campus like recombinant DNA molecules, infectious agents, parasites, and other biological agents. The California Medical Waste Management Act (codified in California Health & Safety Code sections 117600-118360) defines medical waste as:

- Any biohazardous, pathology, pharmaceutical, or trace chemotherapy waste
- All sharps and any biohazardous waste from research involving the treatment, diagnosis, or immunization of humans or animals
- Waste generated in autopsy or necropsy
- Waste generated in research using human or animal pathogens
- Laboratory waste such as human or animal specimen cultures that are infected with pathogens that are also infectious to humans
- Laboratory wastes from the production of bacteria, viruses, spores, and discarded live and attenuated vaccines used in human health care or research

The UCR *Biosafety Manual* defines the responsibilities, procedures, and guidelines for the safe handling, use, and disposal of biohazardous materials in research and teaching activities performed at UCR. The *Biosafety Manual* compliments the UCR *Exposure Control Plan*, which contains additional policies and procedures for UCR personnel exposed to blood or other potentially infectious material. UCR laboratories with biohazards must be sufficiently decontaminated to eliminate the possibility of transmission of infectious materials to researchers, the public, and the environment. Disinfectant levels (high, medium, and low) are regulated by the Food and Drug Administration or United States Environmental Protection Agency (US EPA) and selected for use based on the type and amount of biohazardous materials present.

Heat sterilization is achieved by using an autoclave by applying wet heat (i.e. high-pressure steam) at temperatures above the normal boiling point of water and pressures above normal atmospheric pressure. Autoclaves are used to sterilize laboratory equipment or materials such as glassware, media, reagents, or waste. Vapors and gases are used in a closed system and under controlled conditions of temperature and humidity. Agents in this category include the aerosol, vapor, or gas phase of chlorine dioxide, glutaraldehyde, paraformaldehyde, ethylene oxide, peracetic acid, and

[1] Mitigation Measure MM 4.4-2 in the EH&S Expansion EIR; available at https://pdc.ucr.edu/sites/g/files/rcwecm2356/files/2019-04/ehs_expansion_and_related_projects_final_eir.pdf

hydrogen peroxide. Vapors and gases are primarily used to decontaminate biosafety cabinets, animal rooms, and their associated systems, bulky or stationary equipment not suited to liquid disinfectants, instruments or optics that might be damaged by other decontamination methods, and rooms, buildings, and associated air-handling systems.

Activities that create the potential for biohazardous aerosols are conducted in biosafety cabinets, which filter all released air to remove biohazardous materials. Biosafety cabinets and equipment with special filters to remove biological agents are disinfected at the end of the workday or whenever they are grossly contaminated. These cabinets must also be certified when installed, annually and whenever they are moved or undergo major servicing (e.g., HEPA filter replacement, motor repairs, etc.). Biosafety cabinets are designed to provide personnel, environmental and product protection when appropriate practices and procedures are followed. There are three classes of biosafety cabinets. At UCR, almost all biosafety cabinets approved for use of biohazards and human material are Class II (UCR 2021a).

UCR complies with regulations that specify that infectious wastes be stored in refrigerated (below freezing) facilities for no more than 90 days and that such wastes be properly packaged, labeled, and disposed. If biohazardous wastes are stored above freezing, then they may be stored for 7 days or less. For liquid biological waste with no chemical hazards, liquid waste (cultures, stocks, and other regulated liquid waste) can be decontaminated by a 10 percent final concentration household bleach solution for 30 minutes minimum contact-time prior to disposal down the sink with copious amounts of running water. Research plant and soil waste are disposed of in clear autoclavable bags and devitalized (most commonly by autoclave) before disposal in regular trash. At UCR, disposal of animal carcasses is handled through the Office of Campus Veterinarian. Animal carcasses should be double bagged in red biohazardous bags, transported in leak-proof containers, and held in the freezer located in the vivarium until the next scheduled pick up from an approved vendor under contract with UCR (UCR 2021b). Biohazard waste that is not autoclaved or deactivated in the lab are collected on a weekly basis and stored in a chiller by EH&S staff. The waste is stored at below freezing temperatures and collected by Stericycle Inc.

Laboratory Animal Use

Because UCR is a center for research and teaching in the biomedical sciences, the campus uses animals for both teaching and research activities. The use and care of animals in research is required to comply with protocols established by the National Institutes of Health and the Animal Welfare Act. Laboratory research involving research animals and animal care activities produce biohazardous wastes.

UCR has established an Institutional Animal Care and Use Committee (IACUC) to function as the review body responsible for approval and oversight of activities involving the use of vertebrate animals at UCR in accordance with federal requirements, including the Animal Welfare Act and the U.S. Public Health Service Policy. The IACUC members are appointed by the Vice Chancellor for Research and Economic Development and contain the experience and expertise to oversee the institution's animal program, facilities, and procedures in coordination with the UCR Office of the Campus Veterinarian. Additionally, the IACUC is committed to promoting open and cooperative relationships with investigators and educating the UCR community concerning the ethical and regulatory standards for the humane care of animals (UCR 2021c).

Building and Site Contamination

Because of materials commonly used in the construction and operation of buildings on the UCR campus, existing buildings or potential building sites may contain various hazardous substances as a result of former uses of the sites, leaks from unidentified underground storage tanks (UST), or unidentified buried debris that could contain hazardous substances or hazardous byproducts. Contaminated soils, building materials, or groundwater have the potential to pose hazards to construction workers, existing and future campus occupants, and nearby development if not managed and remediated safely.

As required by Public Resources Code Section 21092.6, lists compiled pursuant to Section 65962.5 of the Government Code (Cortese List), as well as additional databases maintained by federal and State agencies, were reviewed to determine whether the campus is included on any list pertaining to hazardous materials or hazardous wastes. These lists also identify known or suspected locations with soil or groundwater contamination. One of the most common sources in site contamination stems from petroleum hydrocarbons leaking from storage tanks that may have been in various areas of the UCR Campus.

Areas where petroleum hydrocarbon storage has formerly occurred include:

- One 6,000-gallon diesel, one 1,500-gallon gasoline, and one 300-gallon former Underground Storage Tanks (USTs) at the UCR Agricultural Operations (Ag Ops) facility at 1060 Martin Luther King Boulevard; USTs removed in 1999 – closed (2005) RCDEH Local Oversight Program (LOP) Case # 99-15484 (Root 2005).
- Four 6,000-gallon gasoline and one 550-gallon waste oil former USTs at the former Atlantic Richfield Oil Company service station at 1160 University Avenue; USTs removed in 1977 – closed (2018) Regional Water Quality Control Board Case (Smythe 2018).
- Five 20,000-gallon former diesel USTs at UCR Parking Lot #6 – closed (1998) RCDEH LOP Case # 91-353 (Tuntland 1998).
- Two 7,000-gallon gasoline, one 3,000-gallon gasoline, and one 550 waste oil former USTs at the former Chevron service station at 1011 University Avenue; USTs removed in 1991 – closed (1992) RCDEH LOP Case # 91-776 (Eckhardt and Gallagher 1991; Boltinghouse 1992).
- Four former 10,000-gallon #6 heating oil USTs at 3401 Watkins Drive (Steam Plant) – abandoned in place in October 1998 – closed in place (1998) RCDEH LOP Case # 95-454 (Hansen 1998).
- One 10,000-gallon gasoline, one 6,000-gallon gasoline, and one 500-waste oil former USTs at the UCR Fleet Service facility at 3401 Watkins Drive; USTs removed in 1997 – closed (2000) RCDEH LOP Case # 98-0244 (Tuntland 2000).

Areas where petroleum hydrocarbon or hazardous material and hazardous waste storage currently occurs include:

- UCR Fleet Services – RCDEH Permitted UST - 3401 Watkins Drive (Facility ID FA0014750) (GeoTracker 2021)
- UCR Steam Plant – RCDEH closed Leaking UST - 3401 Watkins Drive - four abandoned in-place USTs and residual fuel contamination remaining in place beneath the steam pipes (Site Number 95454) (Lee and Beckmann 1997, GeoTracker 2021)
- Agricultural research support operations areas on the West Campus (e.g., fuel storage and dispensing, maintenance oils, and hazardous waste) (UCR 2018a)
- Corporation Yard located north of West Linden Street on the East Campus (UCR 2005)

- An UST, previously located at the Grounds Maintenance Facility along East Campus Drive, was removed and the soil tested to confirm no contamination remained. Subsequently, an aboveground tank was installed, including proper containment facilities (UCR 2005)

An approximately 3.25-acre site on the UCR campus at 1060 Martin Luther King Boulevard is listed as a California Department of Toxic Substances Control (DTSC) Certified Operations and Maintenance Land Use Restrictions site as of December 15, 2010 (DTSC 2020a). The site was historically used for the disposal of pesticide and herbicide waste from previous research operations in laboratories, greenhouses, and field plots during the 1950s and 1960s. Investigation activities were conducted between 1988 and 1998. Cleanup activities were conducted between June 2000 and February 2002, and groundwater monitoring activities were conducted from 1991 until 2016 to assess groundwater quality before and after cleanup. As part of the cleanup activities, about 38,400 cubic yards of material were excavated from the site. Of the soil removed, about 21,200 cubic yards were treated on-site using a cleanup technology that uses heat to remove chemicals from soil called low temperature thermal desorption. The remaining soil either met the approved site cleanup levels without treatment or was disposed of at a licensed disposal facility, and all clean soil was used as backfill. An additional 2,074 cubic yards of clean soil was imported to the site and used for backfilling. Following cleanup, DTSC approved a soil management plan in August 2005 and entered into an Operations and Maintenance Agreement with UCR. The site was cleaned up so that remaining soil, including the backfilled soil, is safe for current and future use and is not adversely affecting groundwater quality. Groundwater monitoring data shows that groundwater quality at the site meets California drinking water criteria. After over 18 years of groundwater monitoring, DTSC concluded that the monitoring can be terminated. A Covenant to Restrict Use of Property was recorded with Riverside County in May 2006. Cleanup levels were established based on a human health risk assessment which focused primarily on potential exposures to University and construction workers. These cleanup levels were achieved and are protective of these types of workers. The Covenant to Restrict Use of Property prohibits the site from being used for residential, hospital for humans, indoor classroom for persons under 18 years of age, or as a daycare center for children. The covenant will remain in place unless additional evaluations are conducted to make sure the site is suitable for such uses (DTSC 2020b). In July 2020, DTSC issued a No Further Action Determination for Groundwater Monitoring and Operations and Maintenance Agreement after groundwater monitoring indicated groundwater appears to have not been impacted by site activities. The site is currently managed by the Covenant to Restrict Use of Property, a Soil Management, Implementation and Enforcement Plan dated July 2020 and Revised Erosion Control Plan dated September 2015.

Also located at 1060 Martin Luther King Boulevard is a site listed as a closed Riverside County LOP case for three leaking USTs. The diesel, gasoline, and waste oil USTs were removed in 1999, along with 187 tons of total petroleum hydrocarbon as gasoline impacted soil. A portable soil vapor extraction system was installed and operated for 52 days, during which an estimated 1,630 pounds (276 gal) of total petroleum hydrocarbon as gasoline vapor were removed (DTSC 2020a).

Fuel and Oil Storage

Based on a review of the 2018 Spill Prevention, Control, and Countermeasure (SPCC) Plan, fuels, maintenance and hydraulic oils, transmission fluids, and used vegetable cooking oils and animal fat are stored on campus. According to the facilities map included in the SPCC, the majority of fuel and oil storage sites are concentrated in the Academic Center and Corporation Yard in East Campus, and

the Ag Ops Headquarters in the eastern area of West Campus just south of Martin Luther King Boulevard.

FUEL STORAGE

According to the SPCC Plan, there are 39 emergency generator engine fuel bulk storage containers (100-4,900 gallons) on campus. The total amount of diesel fuel stored in these emergency generator engine fuel bulk storage containers is 29,774 gallons, 50 percent of the total fuel storage for the entire campus (UCR 2018a).

Grounds Maintenance, Refuse & Recycling operations (Grounds) is included in the Facilities Services organization. Grounds has its own building and shop areas located at the southern end of the campus, including fuel storage and dispensing equipment consisting of two 1,000-gallon aboveground bulk storage containers, one containing unleaded gasoline and one containing diesel.

Fuel storage at Ag Ops includes vehicle fuel storage and dispensing equipment near Ag Ops Headquarters consisting of one 1,500-gallon single compartment double wall aboveground bulk storage container containing gasoline, one 1,500-gallon single compartment double wall aboveground bulk storage container containing diesel fuel, and one 1,500-gallon dual compartment double wall aboveground bulk storage container containing 500 gallons of gasoline and 1,000 gallons of diesel fuel.

Other large fuel storage includes:

- A SPCC-exempt 6,000-gallon UST operated by Fleet Services located east of the Fleet Services office and contains unleaded gasoline for refueling fleet vehicles by three dispensers at the nearby fueling island
- A 4,000-gallon diesel tank at the School of Medicine Education Trailers
- A 3,600-gallon diesel tank at EH&S Expansion
- A 1,200-gallon diesel tank at Insectary and Quarantine
- A 1,400-gallon diesel tank at School of Medicine Research
- A 1,150-gallon diesel tank at the Steam Plant

MECHANICAL OIL AND TRANSMISSION FLUID STORAGE

According to the SPCC Plan, Facilities Services operations is responsible for campus oil storage in oil-filled operational equipment. Oil-filled operational equipment consists of 153-gallons capacity lubricating oil in the largest emergency generator engine on campus, 98-gallons capacity lubricating oil in the second largest emergency generator engine, and a total of 18,071 gallons hydraulic oil contained in 95 elevators ranging from 89 to 476 gallons in capacity (UCR 2018a).

Portable oil storage in the Ag Ops maintenance shop includes a total of nine 55-gallon drums of maintenance oils including engine oil, hydraulic oil, universal tractor fluid, and automatic transmission fluid. Portable oil storage also includes one 55-gallon drum of waste oil and one 55-gallon drum of drained used oil filters. All 55-gallon drums are stored on secondary containment drum pallets.

Fleet Services operates a light maintenance and repair shop for campus fleet vehicles at the Corporation Yard Building C. One 240-gallon double wall aboveground bulk storage container containing motor oil and one 120-gallon double wall aboveground bulk storage container with automatic transmission fluid are located at the southern end of the maintenance shop. Both

aboveground bulk storage containers reside in impervious concrete containment berms with bypass valves sealed closed. These bulk storage containers are piped to the maintenance bays. The lube bays contain small containers of grease, lube oils, antifreeze, and a small solvent tank. The perimeter of the maintenance shop has impervious concrete berms around the entrance doors. These berms would contain any potential spill or leak in the maintenance shop. There is a 360-gallon double wall aboveground bulk storage container containing waste oil located at the west side of the maintenance shop and another 360-gallon double wall aboveground bulk storage container with waste oil located at the north end of the shop. Both waste oil aboveground bulk storage containers are piped from the maintenance bays (UCR 2018a).

COOKING OIL/FATS STORAGE

Dining Services operates several residential dining and retail restaurant facilities throughout campus. Three of these facilities have 325-gallon double wall aboveground bulk storage containers containing used vegetable cooking oil and/or animal fat; these aboveground bulk storage containers are located one each at Highlander Union Building, Aberdeen-Inverness Residential Restaurant, and Lothian Residential Restaurant. The Dining Services facility located at the Market at Glen Mor has a smaller, 200-gallon double wall aboveground bulk storage container also containing used vegetable cooking oil and/or animal fat. These used cooking oil/fat aboveground bulk storage containers are equipped with automatic pumping systems to eliminate open container transfer and prevent spills. Spill kits are maintained at each used cooking oil/fat aboveground bulk storage container location. There are three 200-gallon portable single wall steel bins containing used vegetable cooking oil and/or animal fat located at three Dining Services restaurants: one at The Barn, one at the Alumni & Visitors Center, and one at the Highlander Union Building. A smaller, 82-gallon portable plastic single wall bin containing used cooking oil/fat is located at the Market at Glen Mor (UCR 2018a). These portable containers have been removed and replaced with 32-gallon plastic bins not covered by SPCC Plan requirements.

OTHER

Smaller containers of oil and petroleum-based products are stored throughout the campus. These products may be stored from time to time in the following general locations:

- Laboratories
- Corporation Yard Facilities Services Shops at Corporation Yard
- Grounds Landscape Maintenance, Refuse & Recycling facility
- Fleet Services Maintenance Shop
- Lothian Residence Hall Maintenance Shop and Residential Restaurant
- Aberdeen-Inverness Residence Hall Maintenance Shop and Residential Restaurant
- Bannockburn Residence Hall Maintenance Shop

Infrastructure

ASBESTOS

Asbestos, a naturally occurring fibrous material, was used for years in many building materials for its fireproofing and insulating properties. Loose insulation, ceiling panels, and brittle plaster are potential sources of friable (easily crumbled) asbestos. Buildings that were built prior to 1981 may contain asbestos materials in public access areas. These materials may include, but are not limited

to, vinyl asbestos floor tiles and/or linoleum sheet flooring, as well as the mastic used to secure them, sprayed on acoustical or "popcorn ceiling," gypsum wallboard, and joint compounds. In addition, some laboratory and machine shop areas have benches and/or fume hoods constructed of transite and other similar asbestos containing materials (ACM). Asbestos in these materials is bonded with vinyl, epoxy, cement or other materials and under normal conditions, does not pose any danger to the building occupant. In areas where the asbestos is not airborne when bonded or encapsulated, such as floor tiles or painted and properly maintained insulation materials, there is little or no risk to human health. However, if the material is drilled, sanded or otherwise disturbed, it could result in the release of asbestos fibers into the air that could pose a health risk, such as respiratory diseases, cancers, or other pulmonary complications (UCR 2021d).

Abatement projects are typically performed quickly and monitored by qualified individuals from Physical Plant, Housing, Dining, and Residential Services, EH&S, outside consultants/laboratories, and/or contractors.

Bannockburn Village has asbestos content in ceiling and wall materials. The health hazard is low unless this material is disturbed. Under UCR policy, non-certified UCR employees, students, or contractors shall not remove, disturb, or attempt to renovate (e.g., drill into or saw) or repair materials known or suspected to contain asbestos (UCR 2021e).

LEAD

Lead is a naturally occurring metallic element. Among its numerous uses and sources, lead can be found in paint, water pipes, solder in plumbing systems, and soils around buildings and structures painted with lead-based paint (LBP). In 1978, the federal government required the reduction of lead in house paint to less than 0.06 percent (600 parts per million). However, some paints manufactured after 1978 for industrial uses or marine uses legally contain more than 0.06 percent lead. Because many structures on the UCR campus were constructed prior to 1978, wall surfaces and other building materials may contain LBPs, which can pose a risk of exposure due to chipped or peeling paint, or from renovation or demolition of buildings or building materials that contain lead. Exposure to lead can cause adverse health effects, including disturbance of the gastrointestinal system, anemia, kidney disease, and neuromuscular and neurological dysfunction (in severe cases).

POLYCHLORINATED BIPHENYLS (PCBS)

PCBs are organic chemicals, usually in the form of oil, that were formerly used in electrical equipment, including transformers and capacitors, primarily as electrical insulators. Although the campus has an ongoing program to replace electrical equipment that contain PCBs, some PCB-containing electrical equipment (e.g., transformers and capacitors) are still present on the UCR campus. In addition, some fluorescent light ballasts that contain PCBs may be present in existing buildings that would be demolished or renovated. Nearly all ballasts manufactured prior to 1979 contain PCBs. PCB ballasts manufactured after July 1, 1978, which do not contain PCBs, are required to be clearly marked "No PCBs." PCBs, which are highly persistent in the environment, can cause various human health effects, including liver injury, irritation of the skin and mucous membranes, and adverse reproductive effects. PCBs are also suspected human carcinogens. In California, PCB-containing materials must be disposed as hazardous waste.

MERCURY

Elemental mercury is an insoluble, liquid, inorganic metal. It is commonly used in laboratory and medical equipment such as thermometers and manometers (used for measuring pressure). Other

uses include electrical equipment and some water pumps. Mercury liquid evaporates very slowly if exposed to air. At certain levels of exposure, mercury vapors are toxic and can cause kidney and liver damage. Due to accidental spills and historic disposal practices before the adoption of more stringent environmental regulations pertaining to hazardous waste disposal, it is possible that elemental mercury may be present in research laboratory sink traps, in cupboard floor spaces, or in sewer pipes that could be exposed in the event of building renovation or demolition.

Groundwater Conditions

As noted in Section 4.10, *Hydrology and Water Quality*, measured depth to groundwater on campus is anticipated to range from 73 to 175 feet below grade, with flow in a generally westerly direction. Most of the campus overlies the Riverside-Arlington sub-basin of the larger Upper Santa Ana River Groundwater Basin, which underlies the entire Riverside area. However, the southeastern portion of East Campus is not located in a groundwater sub-basin. Although UCR has no knowledge of groundwater contamination on campus, the extent to which groundwater quality may have been affected by historic activities is unknown. In addition, the campus is not identified as a significant groundwater recharge area.

Aircraft Accident Hazards

UCR is in Area E of the March Air Reserve Base/Inland Port Airport Land Use Compatibility Plan (ALUCP) influence area, which is designated an area of concern for "hazards to flight." Area E defines the outer limits of the airport influence area, where the risk level is defined as "low." Hazards to flight include physical (e.g., tall objects), visual, and electronic forms of interference with the safety of aircraft operations. Land use development that may cause the attraction of birds to increase is also prohibited. Man-made features must be designed to avoid heightened attraction of birds. Additionally, certain farm crops and farming practices that tend to attract birds are strongly discouraged. These include certain crops, farming activities, confined livestock operations, and various farming practices involving livestock.

In Area E, there is no limit on residential or other use population density or requirement for open space. However, although there is no explicit upper limit on usage intensity, land uses of the types listed—uses that attract very high concentrations of people in confined areas—are discouraged in locations below or near the principal arrival and departure flight tracks. The UCR campus is not located near the principal arrival and departure flight tracks (Riverside County Airport Land Use Commission 2014).

4.9.2 Regulatory Setting

The management of hazardous materials and hazardous wastes is regulated at federal, State, and UCR Programs, including programs administered by the US EPA and agencies within the California Environmental Protection Agency (Cal/EPA), such as the DTSC, and federal and State occupational safety agencies.

Federal

United States Environmental Protection Agency

The US EPA is the main federal agency responsible for enforcing laws and regulations relating to hazardous materials and wastes, including evaluation and remediation of contamination and hazardous wastes. The US EPA works collaboratively with other agencies to enforce hazardous

materials handling and storage regulations and site cleanup requirements. The Occupational Safety and Health Administration (OSHA) and the United States Department of Transportation (USDOT) are authorized to regulate safe transport of hazardous materials. EPA Region 9 has jurisdiction over the southwestern United States (Arizona, California, Nevada, and Hawaii).

Resource Conservation and Recovery Act (RCRA)

Under RCRA, US EPA regulates the generation, treatment, and disposal of hazardous waste, and the investigation and remediation of hazardous waste sites. RCRA includes procedures and requirements for reporting releases of hazardous materials and for cleanup of such releases. RCRA also includes procedures and requirements for handling hazardous wastes or soil or groundwater contaminated with hazardous wastes. Individual states may apply to US EPA to authorize them to implement their own hazardous waste programs in lieu of RCRA, if the state program is at least as stringent as federal RCRA requirements. California has been authorized by US EPA to implement its own hazardous waste program, with certain exceptions. The California program is handled by the DTSC and further discussed below.

Hazardous and Solid Waste Amendments Act (HSWA) of 1984

The HSWA amended the Solid Waste Disposal Act of 1965, as amended by the RCRA. The HSWA placed greater responsibility on the US EPA to implement and enforce hazardous waste rules set in place by the RCRA. The HSWA affirmed and extended the "cradle to grave" system of regulating hazardous wastes and specifically prohibited the use of certain techniques for the disposal of some hazardous wastes. The HSWA includes more than 70 provisions, including the establishment of permitting deadlines for hazardous waste facilities, the regulation of small-quantity generators of hazardous waste, and the formation of RCRA Corrective Action requirements, which assist hazardous waste facilities in investigating and cleaning up any release of hazardous waste.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)

CERCLA, also known as Superfund, establishes a cleanup liability regime and process for certain properties contaminated by hazardous substances that pose a threat to human health and the environment. CERCLA created a tax on chemical and petroleum industries, which generated a trust fund for cleaning abandoned or uncontrolled hazardous waste sites with no identified responsible party. It also authorized short-term and long-term removal and response actions to address hazardous substance releases and/or permanently reduce releases or threats of releases.

Superfund Amendments and Reauthorization Act (SARA)

In 1986, SARA amended CERCLA, reflecting the US EPA's experience in administering the Superfund program over 6 years. SARA provided new enforcement authorities and tools, increased the amount of funds available for hazardous waste site cleanups and increased the awareness of human health problems affiliated with hazardous waste sites. Another change generated by SARA was the revision of the US EPA's Hazard Ranking System, to accurately assess the risk posed to human health and the environment by uncontrolled hazardous waste sites.

Emergency Planning and Community Right-to-Know Act (SARA Title III)

The Emergency Planning and Community Right-to-Know Act was created under SARA Title III to help communities protect public health and safety from chemical hazards. The national legislation

requires each state to appoint a State Emergency Response Commission, which then divides each state into Emergency Planning Districts and nominates a Local Emergency Planning Committee for each district. The Emergency Planning and Community Right-to-Know Act provides compliance and reporting standards as well as waste, chemical, and cleanup enforcement, allowing each district to plan and prepare thoroughly, should a hazardous waste accident or release arise.

Hazardous Materials Transportation Act

The Hazardous Materials Transportation Act was developed in 1975 to create a uniform ruling on the transportation of hazardous materials in the U.S. The law was intended to coordinate existing regulations, which previously varied widely across state lines and led to mismanagement and illegal dumping of hazardous waste. The Hazardous Materials Transportation Act is administered by the USDOT via its issuance of inspections, training, and transportation requirements and information. The federal government delegates enforcement authority to the states.

Occupational Safety and Health Act

OSHA (29 CFR 1910) is intended to ensure that employers provide their workers with a work environment free from recognized hazards to safety and health, such as exposure to toxic chemicals, excessive noise levels, mechanical dangers, or unsanitary conditions. Operation of this program is delegated to the State and operated by the Division of Occupational Safety and Health, known as Cal/OSHA. Standards are created by the National Institute for Occupational Safety as the research institution for the federal Occupational Safety and Health Act (Fed/OSHA). These standards are adopted at the State and local level and are enforced on campus by Cal/OSHA and other agencies.

Public Health Security and Bioterrorism Preparedness and Response Act

Title 42, Part 73 of the CFR, published in December 2002, implements the provisions of the Public Health Security and Bioterrorism Preparedness and Response Act of 2002, which sets forth the requirements for possession, use, and transfer of select agents and toxins. The biological agents and toxins listed in this part have the potential to pose a severe threat to public health and safety, to animal health, or to animal products. Overlap select agents and toxins are subject to regulation by both the Centers for Disease Control (CDC) and Animal and Plant Health Inspection Service.

Spill Prevention, Control, and Countermeasure

The SPCC Rule (40 CFR 112) was enacted to provide engineering, operational, maintenance, and management strategy that minimize the potential for a spill or release of oil products, such as fuel and petroleum/lubricating oil, from certain storage and operational equipment and activities and to prevent an oil spill from entering a waterway. The SPCC requirements in Title 40, Part 112 of the CFR apply to owners or operators of non-transportation-related onshore and offshore facilities engaged in drilling, producing, gathering, storing, processing, refining, transferring, distributing, or consuming oil or oil products that store more than 1,320 gallons total in all aboveground containers of 55 gallons or greater storage capacity. Facilities subject to the rule must prepare and implement an SPCC Plan. UCR has an SPCC Plan for oil storage operations on campus.

Atomic Energy Act

The Atomic Energy Act (10 CFR) established the Atomic Energy Commission to promote the "utilization of atomic energy for peaceful purposes to the maximum extent consistent with the

common defense and security and with the health and safety of the public." Since the abolition of the Atomic Energy Commission, much of the Atomic Energy Act has been carried out by the Nuclear Regulatory Commission and the U.S. Department of Energy. When the US EPA was formed, however, the Atomic Energy Commission's authority to issue generally applicable environmental radiation standards was transferred to the US EPA. Other federal and State organizations must follow these standards when developing requirements for their areas of radiation protection.

Health Research Extension Act

The Health Research Extension Act of 1985 is implemented and supported by the U.S. Public Health Service Policy on the Humane Care and Use of Laboratory Animals and provides for the establishment of guidelines for the proper care and treatment of animals used in biomedical and behavioral research by the Director of the National Institutes of Health (NIH). The guidelines require animal care committees at each entity that conducts biomedical and behavioral research with funding from the NIH to ensure compliance with the guidelines.

Federal Plant Pest Act

The federal agencies primarily responsible for regulating transgenic materials in the U.S. are the U.S. Department of Agriculture (USDA), the US EPA, and the Food and Drug Administration. Transgenic materials include microorganisms, plants, and animals that have been genetically engineered or modified and generally do not meet the standard criteria for hazardous materials. Much research is performed using tissue cultures or benign bacteria grown under laboratory-controlled conditions. Except for transgenic bacteria that could be infectious (considered biohazardous waste), transgenic materials generally do not pose a threat to public health or the environment. Under the authority of the Federal Plant Pest Act (7 CFR 330), USDA Animal and Plant Health Inspection Service regulates importation, interstate movement, and environmental release of transgenic plants and organisms. The service licenses, through permits, the field testing of food crops before commercial release.

Federal Insecticide, Fungicide, and Rodenticide Act

The Federal Insecticide, Fungicide, and Rodenticide Act (40 CFR 152-186), provided the US EPA with authority of pesticide labeling and establishing standards for certification of restricted pesticide application. The US EPA also has the authority to delegate pesticide enforcement authority to states by entering into cooperative agreements with State pesticide programs. Since 1975, California has had primary authority over pesticide enforcement in the State. The US EPA uses its authority under the Federal Insecticide, Fungicide, and Rodenticide Act to regulate the distribution, sale, use, and testing of plants and microbes producing pesticidal substances.

Food, Drug, and Cosmetic Act

The Food and Drug Administration, under authority provided by the Food, Drug, and Cosmetic Act (21 CFR), regulates food and feed derived from new plant varieties and sets tolerance limits for substances used as pesticides on and in food and feed and for residues of herbicides used on certain crops.

Agricultural Bioterrorism Protection Act

This law (7 CFR 331; 9 CFR 121) requires that entities that possess, use, or transfer agents or toxins deemed a severe threat to animal or plant health or products must notify and register with the

Secretary of the USDA. USDA's Animal and Plant Health Inspection Service has been designated by the Secretary as the agency for implementing the provisions of the law for USDA.

Centers for Disease Control and National Institute of Health Guidelines

The CDC and NIH have issued federal guidelines that address biological safety. Because research at UC campuses often involves federal funding, compliance with these guidelines becomes mandatory for most research. The CDC and the NIH have developed containment and handling guidelines for use in microbiological and biomedical laboratories.

The CDC Biosafety in Microbiological and Biomedical Laboratories manual has become the overarching guidance document for the practice of biosafety in the U.S.— the mechanism for addressing the safe handling and containment of infectious microorganisms and hazardous biological materials (CDC 2020). The manual focuses on two main principles: containment and risk assessment. The fundamentals of containment include the microbiological practices, safety equipment, and facility safeguards that protect laboratory workers, the environment, and the public from exposure to infectious microorganisms that are handled and stored in the laboratory. Risk assessment is the process that enables the appropriate selection of microbiological practices, safety equipment, and facility safeguards that can help prevent Laboratory-associated infections.

In the U.S., an Institutional Biosafety Committee (IBC) is required for institutions that receive federal funding from the NIH and/or are subject to a local ordinance that applies to work with recombinant or synthetic nucleic acid molecules. The institution must adhere to the requirements of the NIH Guidelines for Research Involving Recombinant or Synthetic Nucleic Acid Molecules (NIH 2019).

Section 402 of the Clean Water Act – National Pollutant Discharge Elimination System

Section 402 of the Clean Water Act (CWA) regulates point-source discharges to surface waters (other than dredge or fill material) through the National Pollutant Discharge Elimination System (NPDES), administered by the US EPA. The primary regulatory control relevant to the protection of water quality is the NPDES permit administered by the State Water Resources Control Board (SWRCB). The SWRCB establishes requirements prescribing the quality of point sources of discharge and water quality objectives. These objectives are established based on the designated beneficial uses (e.g., water supply, recreation, and habitat) for a particular surface water body. The NPDES permits are issued to point source dischargers of pollutants to surface waters pursuant to Water Code Chapter 5.5, which implements the federal CWA. Examples include, but are not limited to, public wastewater treatment facilities, industries, power plants, and groundwater cleanup programs discharging to surface waters (SWRCB, Title 23, Chapter 9, Section 2200). The Regional Water Quality Control Boards (RWQCBs) establish and regulate discharge limits under the NPDES permits.

State

At the State level, agencies such as Cal/OSHA, the Office of Emergency Services (OES), and the California Department of Public Health (CDPH) have rules governing the use of hazardous materials that parallel federal regulations and are sometimes more stringent. DTSC is the primary State agency governing the storage, transportation, and disposal of hazardous wastes. DTSC is authorized by the US EPA to enforce and implement federal hazardous materials laws and regulations.

Department of Toxic Substances Control

DTSC regulates the generation, transportation, treatment, storage, and disposal of hazardous waste, and the investigation and remediation of hazardous waste sites. DTSC implements the Hazardous Waste Control Law (HWCL), which provides regulations for existing hazardous waste facilities, such as "any structure, other appurtenances, and improvements on the land, used for treatment, transfer, storage, resource recovery, disposal, or recycling of hazardous wastes." The HWCL requires permits for, and inspections of, facilities involved in generation and/or treatment, storage, and disposal of hazardous wastes. DTSC has oversight of Annual Work Plan sites (commonly known as State Superfund sites), sites designated as having the greatest potential to affect human health and the environment. Lead responsibility for remediation depends on the proposed use of a parcel, the character of waste contaminants, and the need for site monitoring.

California Emergency Plan

California has developed an Emergency Plan to coordinate emergency services provided by federal, State, local government, and private agencies. The Emergency Plan is administered by the OES and includes response to hazardous materials incidents. The OES coordinates the response of other agencies, including the Cal/EPA, the California Highway Patrol (CHP), the California Department of Fish and Wildlife, the RWQCB, and Air Pollution Control Districts. UCR's Emergency Operations Plan is consistent with the policies and procedures set forth in California's Emergency Plan.

California Environmental Protection Agency

Cal/EPA has broad jurisdiction over hazardous materials management in California. Within Cal/EPA, the DTSC has primary regulatory responsibility for hazardous waste management and cleanup. Enforcement of regulations has been delegated to local jurisdictions that enter into agreements with DTSC for the generation, transport, and disposal of hazardous materials under the authority of the HWCL.

Cal/EPA and the DTSC regulate the generation, transportation, treatment, storage, and disposal of hazardous waste under the RCRA and the California HWCL. Both laws impose "cradle to grave" regulatory systems for handling hazardous waste in a manner that protects human health and the environment.

Hazardous Waste and Substance Site List – Site Cleanup

Government Code Section 65962.5 requires the DTSC to develop, update, and submit to Cal/EPA the Cortese List. The Cortese List is updated at least annually by Cal/EPA to provide the public with the hazardous sites' location and status. The DTSC is responsible for a portion of the reporting of the Cortese List, which is made available via the EnviroStor database. The Cortese List is a planning document used by State and local agencies and developers to comply with CEQA requirements in providing information about the location of hazardous materials release sites.

Environmental Health Standards for the Management of Hazardous Waste Law

Title 22, Division 4.5, Chapter 11, Sections 66261.20-24 of the CCR contain technical descriptions of characteristics that would classify wasted material, including soil, as hazardous waste. Specifically, waste is considered hazardous if it is toxic (causes human health effects), ignitable (has the ability to burn), corrosive (causes severe burns or damage to materials), or reactive (causes explosions or generates toxic gases) pursuant to the criteria established in Article 3. Article 4 lists specific

hazardous wastes, and Article 5 identifies specific waste categories, including RCRA hazardous wastes, non-RCRA hazardous wastes, extremely hazardous wastes, and special wastes. When excavated, soils with concentrations of contaminants higher than certain acceptable levels must be handled and disposed of as hazardous waste. When demolished, structural features containing LBP also can be considered hazardous waste, depending on concentrations, and must be handled and disposed of as hazardous waste.

General Industry Safety Orders – Control of Hazardous Substances Law

The Occupational Safety and Health Act of 1970 (Title 8 CCR) is implemented by Cal/OSHA, which is responsible for ensuring worker safety in the handling and use of chemicals in the workplace. Cal/OSHA has primary responsibility to develop and enforce workplace safety regulations concerning the use of hazardous materials in the workplace, including requirements for employee safety training, availability of safety equipment, accident and illness prevention programs, hazardous substance exposure warnings, and emergency action and fire prevention plan preparation.

For example, under Title 8 CCR 5194 (Hazard Communication Standard), construction workers must be informed about hazardous substances that may be encountered. Compliance with Injury Illness Prevention Program (IIPP) requirements (Title 8 CCR 3203) would ensure that workers are properly trained to recognize workplace hazards and to take appropriate steps to reduce potential risks due to such hazards. This would be relevant if previously unidentified contamination or buried hazards are encountered. If additional investigation or remediation is determined to be necessary, compliance with Cal/OSHA standards for hazardous waste operations (Title 8 CCR 5192) would be required for those individuals involved in the investigation or cleanup work. A Site Health and Safety Plan must be prepared prior to commencing any work at a contaminated site or involving disturbance of building materials containing hazardous substances, to protect workers from exposure to potential hazards. Cal/OSHA also enforces hazard communication program regulations, including procedures for identifying and labeling hazardous substances and requires Material Safety Data Sheets to be available for employee information and training programs.

State Water Resources Control Board

The SWRCB is responsible for implementing regulations pertaining to management of soil and groundwater investigation and cleanup. SWRCB regulations are contained in Title 27 of the CCR. Additional State regulations applicable to hazardous materials are contained in Title 22 of the CCR. Title 26 of the CCR is a compilation of those sections or titles of the CCR that are applicable to hazardous materials.

The SWRCB and the nine RWQCBs, collectively known as the California Water Boards, are dedicated to a single vision: abundant clean water for human uses and environmental protection to sustain California's future. Under the federal CWA and the State's pioneering Porter-Cologne Water Quality Control Act, the State and Regional Water Boards have regulatory responsibility for protecting the water quality in California.

Municipal Regional Stormwater NPDES Permit

On January 29, 2010, the RWQCB adopted Order R8-2010-0033, as amended by Order R8-2013-0024 (NPDES Permit and Waste Discharge Requirements for the Riverside County Flood Control and Water Conservation District [RCFCWCD], the County of Riverside, and the incorporated cities of Riverside County in the Santa Ana Region) otherwise known as the municipal separate storm sewer

system (MS4) permit. The City is a co-permittee under the Riverside County MS4 permit. One component of the MS4 permit requires the development of site-specific WQMPs for new development and significant redevelopment projects. WQMPs include site design, source control, and treatment elements to reduce stormwater pollution from urban runoff (SARWQCB 2010).

Statewide General Storm Water NPDES Permit

On February 5, 2013, the SWRCB adopted WQ Order 2013-0001-DWQ NPDES NO. CAS000004 General Permit for Waste Discharge Requirements for Storm Water Discharges from Small MS4s designating the UCR campus a Non-traditional Small MS4 permittee. Small MS4s include systems similar to separate storm sewer systems in municipalities, such as systems at military bases, large hospital or prison complexes, and highways and other thoroughfares but do not include separate storm sewers in very discrete areas, such as individual buildings (40 C.F.R. §122.26(b)(16(iii).) The Small MS4 General Permit WQ Order 2013-0001-DWQ refers to MS4s that operate throughout a community as "Traditional MS4s" and MS4s that are similar to traditional MS4s but operate at a separate campus or facility as "Non-traditional MS4s." This order regulates storm water runoff from small municipalities and other facilities, including federal and State operated facilities that can include universities, prisons, hospitals, and military bases. Small MS4 General Permit elements include post construction storm water management to effectively reduce runoff and pollutants associated with runoff from new development and redevelopment projects. Post-construction management includes site design measures, low impact development design standards, source control, and baseline hydromodification management measures.

California Toxics Rule and State Implementation Policy

The California Toxics Rule, presented in 2000 in response to requirements of the US EPA's National Toxics Rule, establishes numeric water quality criteria for approximately 130 priority pollutant trace metals and organic compounds. The California Toxics Rule criteria are regulatory criteria adopted for inland surface waters, enclosed bays, and estuaries in California that are on the CWA Section 303(c) list for contaminants. The California Toxics Rule includes criteria for the protection of aquatic life and human health. Human health criteria (water- and organism-based) apply to all waters with a Municipal and Domestic Water Supply beneficial use designation as indicated in the basin plans. The Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California, also known as the State Implementation Policy, was adopted by the State Water Board in 2000. It establishes provisions for translating the California Toxics Rule criteria, National Toxics Rule criteria, and basin plan water quality objectives for toxic pollutants into:

- NPDES permit effluent limits
- Effluent compliance determinations
- Monitoring for 2,3,7,8-tcdd (dioxin) and its toxic equivalents
- Chronic (long-term) toxicity control provisions
- Site-specific water quality objectives
- Granting of effluent compliance exceptions

The goal of the State Implementation Plan is to establish a standardized approach for permitting discharges of toxic effluent to inland surface waters, enclosed bays, and estuaries throughout the State.

Article IX of the California Constitution

The Regents is a Constitutional Corporation, organized under Article IX, Section 9 of the California Constitution, with full authority over governance and management of University operations. Under this authority, UCR has legal authority to prevent illicit discharges into its system, including control of inflow and infiltration sources such as stormwater, chemical dumping, or debris.

California Accidental Release Prevention Program

The California Accidental Release Prevention Program (CCR Title 19, Division 2, Chapter 4.5) covers certain businesses that store or handle more than a certain volume of specific regulated substances at their facilities. The list of regulated substances is found in Article 8, Section 2770.5 of the California Accidental Release Prevention Program regulations. The businesses that use a regulated substance above the noted threshold quantity must implement an accidental release prevention program, and some may be required to complete a Risk Management Plan (RMP). An RMP is a detailed engineering analysis of the potential accident factors present at a business and the mitigation measures that can be implemented to reduce this accident potential. The purpose of an RMP is to decrease the risk of an off-site release of a regulated substance that might harm the surrounding environment and community. An RMP includes the following components: safety information, hazard review, operating procedures, training, maintenance, compliance audits, and incident investigation. The RMP must consider the proximity to sensitive populations located in schools, residential areas, general acute care hospitals, long-term health care facilities, and child day-care facilities and must also consider external events such as seismic activity.

California Hazardous Materials Release Response Plans and Inventory Law

The California Hazardous Materials Release Response Plans and Inventory Law of 1985 (Business Plan Act) requires preparation of Hazardous Materials Business Plans (HMBPs) and disclosure of hazardous materials inventories, an emergency response plan, and provisions for employee training in safety and emergency response procedures (see Health and Safety Code, Division 20, Chapter 6.95, Article 1 and Title 19 Division 2, Chapter 4, Article 4 of the CCR).

United States Department of Transportation

Caltrans manages more than 50,000 miles of California's highway and freeway lanes, provides inter-city rail services, permits more than 400 public-use airports and special-use hospital heliports and works with local agencies. Caltrans is also the first responder for hazardous material spills and releases that occur on those highway and freeway lanes and inter-city rail services.

California adopted the USDOT regulations for the movement of hazardous materials by motor vehicle; State regulations are contained in Title 13, Division 2, Chapter 6 of the CCR. In addition, the State of California regulates the transportation of hazardous waste originating in the State and passing through the State (26 CCR). Both regulatory programs apply in California. The State agency with primary responsibility for enforcing State hazardous materials transportation regulations and responding to hazardous materials transportation emergencies is the CHP.

State Office of Emergency Services

California has developed an Emergency Plan to coordinate emergency services provided by federal, State, local government, and private entities. Response to hazardous materials incidents is one component of this plan. The OES administers the plan, which coordinates the responses of other

agencies, including Cal/EPA, the CHP, the California Department of Fish and Wildlife, the RWQCB, and the Radiologic Health Branch of the CDPH.

California Occupational Safety and Health Administration

The Cal/OSHA and the Fed/OSHA are the agencies responsible for assuring worker safety in the handling and use of chemicals in the workplace. Cal/OSHA assumes primary responsibility for developing and enforcing standards for safe workplaces and work practices.

Medical Waste Management Act

In 1990, the California legislature adopted the Medical Waste Management Act (Health and Safety Code Sections 117600-118360), which provides for the regulation of medical waste generators, transporters, and treatment facilities. The California Department of Health Care Services has adopted statewide regulations covering medical waste treatment permits and shares regulatory authority with local programs that choose to enforce the requirements.

California Radiation Law

California is an "agreement state" with respect to federal radiation law. The agreement is that the State will administer the Nuclear Regulatory Commission federal regulations found in Title 10 of the CFR. CDPH is the agency responsible for administering the agreement. Under the agreement, the rules for California must be adequate to protect public health and safety and compatible with those of the Nuclear Regulatory Commission. The California rules are codified under Title 17 of the CCR and Division 20 of the Health and Safety Code. Under the California Radiation Control Law, the Radiologic Health Branch of the CDPH administers these rules. The State's rules govern the receipt, storage, use, transportation, and disposal of sources of ionizing radiation and provide for the protection of users of these materials and the general public from radiation hazards. The CDPH controls the use of radioactive materials in California by issuing Radioactive Material Licenses to California users of radioactive materials and radiation-producing machines.

Underground Storage Tank Act

The UST monitoring and response program is required under Chapter 6.7 of the California Health and Safety Code and Title 23 of the CCR. The program was developed to ensure that the facilities meet regulatory requirements for monitoring, maintenance, and emergency response in operating USTs. The County of Riverside DEH is the local administering agency for this program. UCR operates one UST subject to this program.

Aboveground Petroleum Storage Act

The Aboveground Petroleum Storage Act (Health and Safety Code, Chapter 6.67, Sections 25270-25270.13) requires registration and spill prevention programs for ASTs that store petroleum. In some cases, ASTs for petroleum may be subject to groundwater monitoring programs that are implemented by the RWQCBs and the SWRCB. UCR operates several ASTs containing diesel, oil, or gasoline, which are subject to this regulation and SPCC Plan requirements.

Lead Regulations

Because of its toxic properties, lead is regulated as a hazardous material. Lead is also regulated as a toxic air contaminant. State-certified contractors must perform inspection, testing, and removal (abatement) of lead-containing building materials in compliance with applicable health and safety

and hazardous materials regulations. The Residential Lead-Based Paint Hazard Reduction Act of 1992 (Title X) requires disclosures of the presence of lead paint in residential structures.

Regulations for LBP are also contained in the Lead-Based Paint Elimination Final Rule, 24 CFR 33, governed by the U.S. Housing and Urban Development, which requires sellers and lessors to disclose known LBP and LBP hazards to perspective purchasers and lessees. Additionally, all LBP abatement activities must be in compliance with Cal/OSHA, Fed/OSHA, and with the State of California Department of Health Services requirements. Only LBP-trained and certified abatement personnel are allowed to perform abatement activities. All LBP removed from structures must be hauled and disposed of by a transportation company licensed to transport this type of material at a landfill or receiving facility licensed to accept the waste.

Regulations to manage and control exposure to LBP are also described in CFR Title 29, Section 1926.62 and CCR Title 8 Section 1532.1. These regulations cover the demolition, removal, cleanup, transportation, storage, and disposal of lead-containing material. The regulations outline the permissible exposure limit, protective measures, monitoring, and compliance to ensure the safety of construction workers exposed to lead-based materials. Cal/OSHA's Lead in Construction Standard requires project proponents to develop and implement a lead compliance plan when LBP would be disturbed during construction. The plan must describe activities that could emit lead, methods for complying with the standard, safe work practices, and a plan to protect workers from exposure to lead during construction activities. Cal/OSHA requires 24-hour notification if more than 100 sf of LBP would be disturbed.

UCR also maintains a Lead Compliance Plan which establishes a plan to minimize occupational exposure to lead and management of construction activities involving lead. The main components of the program include:

- Lead identification from bulk samples or analysis
- Exposure monitoring
- Determination of surface contamination levels

The Lead Compliance Plan also provides control measures for implementing when construction work involves lead contamination or potential lead contamination. For example, the Lead Compliance Plan requires personal protection equipment be worn where there is potential for construction workers to be exposed to lead containing materials.

Asbestos Regulations

The following asbestos related regulations apply to asbestos activities at UCR:

- UCR Asbestos Management Plan (see discussion under UCR Regulations in subsequent subsection)
- Cal/OSHA (8 CCR section 1529)
- Cal/OSHA (8 CCR section 8358)
- Cal/OSHA (8 CCR section 5208)
- OSHA Asbestos Construction Standard (29 CFR 1926.1101)
- OSHA Asbestos General Industry Standard (29 CFR 1910.1001)
- EPA National Emission Standards of Hazardous Air Pollutants Asbestos Standard (UCR 2019a)

- SCAQMD Rule 1403 (Asbestos Emissions from Demolition/Renovation Activities) (SCAQMD 1989)

Pursuant to Sections 25915 through 25916 of the California Health and Safety Code, EH&S maintains a campus-wide inventory of locations of asbestos-containing building materials and provides annual campus-wide notification of locations containing asbestos. Appropriate signs are posted when ACMs are disturbed during construction or renovation at campus locations, pursuant to State and South Coast Air Quality Management District (SCAQMD) regulations. These regulations require testing of any facility being demolished or renovated for the presence of all friable and Class I and II non-friable ACM. They also establish notification procedures, removal procedures, handling operations, and warning label requirements. Approved procedures for ACM removal to protect surrounding uses include HEPA filtration, the glovebag method, wetting, and some methods of dry removal.

California Fire Code

The 2019 California Fire Code (24 CCR 9) contains regulations consistent with nationally recognized accepted practices for safeguarding, to a reasonable degree, life and property from the hazards of the following: fire and explosion, hazardous conditions in the use or occupancy of buildings or premises, and, dangerous conditions arising from the storage, handling, and use of hazardous materials and devices. It also contains provisions to assist emergency response personnel. The California Fire Code and the California Building Code use a hazard classification system to determine what protective measures are required to protect fire and life safety. These measures may include construction standards, separations from property lines, and specialized equipment.

The provisions of this code apply to the construction, alteration, movement enlargement, replacement, repair, equipment, use and occupancy, location, maintenance, removal, and demolition of every building or structure or any appurtenances connected or attached to such building structures throughout the State.

More specifically, California Fire Code Title 24, part 9, Chapter 7 addresses Fire-Resistances-Rated Construction, California Building Code (Part 2), Chapter 7A addresses Materials and Construction Methods for Exterior Wildfire Exposure, Fire Code Chapter 8 addresses fire related Interior Finishes, and Fire Code Chapter 9 addresses Fire Protection Systems, and Fire Code Chapter 10 addresses fire related Means of Egress, including Fire Apparatus Access Road width requirements. Fire Code Section 4906 also contains existing regulations for vegetation and fuel management to maintain clearances around structures.

Fire Code Chapter 33, *Fire Safety During Construction and Demolition*, also includes requirements for a construction pre-fire plan, training, fire protection devices, regulations for refueling, fire clearances, precautions against fire, including prohibitions on smoking, on-site firewatch, and regulations for welding and electrical wiring.

University of California, Riverside

Main Campus Emergency Action Plan (EAP)

As required by CCR Title 8, UCR prepared and implemented an EAP in July 2012. The latest revision to the plan occurred in 2016. The document is intended to guide the emergency response actions of all campus personnel during an emergency event, as well as provide standard actions in the case of a safety-threatening emergency. The plan includes procedures relevant to address hazards such as: evacuation procedures and emergency escape routes, procedures for employees who remain to

operate critical plan operations before they evacuate, procedures to account for all employees after an emergency evacuation is completed, rescue and medical duties for those employees able to perform them, the preferred means of reporting fires and other emergencies, the names, job titles, and departments of persons who can be contacted for further information or explanation of duties under the plan; alerting, notification, and contacts related to emergencies; and emergency procedures.

Operational fundamentals to manage response activities for several types of emergencies, including blood and body fluid exposure, hazardous material exposure/spills, and radioactive contamination/spills are available online at the UCR Office of Emergency Management website.[2]

EH&S Program

The campus EH&S program has the primary responsibility of providing technical assistance, consulting, and regulatory compliance support in a variety of areas. The goal of EH&S is to protect the health and safety of University faculty, staff, students, and visitors through safe handling, collection, and disposal of hazardous chemical, biological, radioactive, and universal waste. EH&S oversees the following programs and services:

Biosafety – Prevents against infectious agents and biohazardous materials. Regulation of bloodborne pathogens, Biological Use Authorization, Exposure Control Plans, Biosafety Cabinets, High Containment Labs and more.

Chemical Safety – Protects against chemicals that pose risk to people or property. Oversight of chemical hygiene plans, chemical inventory, placards, hazardous materials, Material Safety Data Sheets and more.

Controlled Substances – Regulates federal Drug Enforcement Agency scheduled or listed controlled substances and California precursor chemicals. Oversight of orders, Controlled Substance Use Authorization, storage requirements, use logs, and disposal.

Environmental Programs – Management of compliance with environmental regulations, including outdoor air quality, surface water quality, including UCR Clean Water Phase II MS4 stormwater program, and remediation.

Industrial Hygiene – Protects worker health and safety and implementation of the IIPP. Oversight of asbestos, fume hoods, hearing conservation, indoor air quality, mold remediation, personal protective equipment (i.e., respirators), and more.

Laboratory and Research - Provides safety guidelines for hazards found in the laboratory and research setting. Oversight of Laboratory Manual, Standard Operating Procedures, Laboratory Evaluations, field safety, Laboratory Safety Officers program, personal protective equipment and more.

Public Health – Prevents human health and diseases caused by environmental factors. Oversight of Food Permits, swimming pool inspections, communicable diseases, vector control, and drinking water quality.

Radiation and Laser – Regulates ionizing and non-ionizing radiation such that exposure is as low as reasonably achievable. Facilitates safe use, design, and implementation of lasers. Oversight of campus Laser Safety Manual, Radiation Use Authorization (RUA), and the *Radiation Safety*

[2] https://emergency.ucr.edu/emergency-procedures

Manual. It is the policy of UCR to implement a Radiation Safety program that maintains the level of exposure to students, faculty, staff and the public "as low as reasonably achievable." The purpose of the radiation safety program is to protect health and minimize the risk to life, property, and the environment in the use of ionizing radiation.

Safety – Protects worker health and safety and implementation of the IIPP. Oversight of ergonomics, compressed gas, drones, fall control, hearing conservation, heat stress prevention, personal protective equipment, safety engineering, shop safety, and more.

Training – Delivers classes, records, and resources for learning about health and safety responsibilities. Oversight of schedule of classes, transcripts, online training courses, needs assessment, publications, and videos.

Waste Management – Servicing of hazardous chemical, radioactive, and biohazardous waste. Oversight of hazardous and biohazardous waste using the online Waste Accumulation Storage Tracking electronically (WASTe) program, which is a web-based system that facilitates regulatory compliant labeling, tracking, collection and shipping of hazardous chemical, radioactive, and biohazardous wastes. WASTe supports creation of tags for five types of waste: chemical, mixed, radiological, biological, and universal, which notifies EH&S staff when waste is ready for pickup (UCR 2021d). The ChemCycle Program recycles unused and used (good condition) chemicals that would otherwise be disposed of as hazardous waste.

Detailed information regarding these programs are provided in the campus's EH&S website[3], which provides each program's elements, contact personnel, applicable manuals and policy, and web links to other pertinent government agencies and information sources.

Lab Safety Design Manual

UCR also follows a *Lab Safety Design Manual* for the construction of new lab space.[4] This includes standards related to safety lab space, electrical safety and power systems, lab ventilation and fume hoods, emergency equipment, pressure vessel and compressed gas planning, hazardous materials storage and use areas, biosafety, and radiation.

Spill Prevention, Control, & Countermeasures Plan

Pursuant to the regulatory requirements of Title 40 of the CFR Part 112, a 2018 SPCC Plan was prepared for UCR. The objectives of the plan are to define the spill prevention, control, and countermeasures implemented by UCR. The SPCC Plan also provides a series of three facility maps and associated tables that include hazardous material storage information for bulk storage tanks, portable storage tanks, and exempt USTs. The SPCC Plan addresses inspection and record keeping, facility drainage, bulk storage tanks, personnel training and spill prevention procedures, bulk liquid transfer operations, and security.

The plan requires an annual review and update by a SPCC "Designated Person" to ensure that all the requirements in the plan are achieved. The designated person is the Director of the EH&S Office. The EH&S building contains an emergency hazardous material response truck equipped with appropriate personal protective equipment, self-contained breathing apparatus, hazardous material

[3] https://ehs.ucr.edu/about/who-do-i-call
[4] *UC Lab Safety Design Manual*: https://lsdm.ucop.edu/

storage receptacles, absorbent booms, pads, and vermiculite (an absorbent powder) that could be deployed during spillage incidents (UCR 2018a).

Chemical Hygiene Plan

The Chemical Hygiene Plan establishes a formal written program for protecting laboratory personnel against adverse health and safety hazards associated with exposure to potentially hazardous chemicals and must be made available to all employees working with hazardous chemicals. The Chemical Hygiene Plan describes the proper use and handling practices and procedures to be followed by faculty, staff, students, visiting scholars, and all other personnel working with potentially hazardous chemicals in laboratory settings. It was created to conform to CCR regulations concerning occupational exposure to hazardous materials, carcinogens, and ventilation requirements for laboratories. The plan is based on best practices identified in, among other sources, "Prudent Practices for Handling Hazardous Chemicals in Laboratories," published by the National Research Council, and the American Chemical Society's "Safety in Academic Chemistry Laboratories"[5] (UCR 2019b).

Asbestos Management Plan

UCR EH&S has the primary authority for ACM at all UCR facilities. An Asbestos Management Plan is to be implemented for the purpose of minimizing and/or eliminating the possibility of exposure to airborne asbestos fibers for UCR building tenants, the public using UCR buildings, and employees and maintenance workers. The UCR Asbestos Management Plan will remain in effect until all ACM have been completely removed from all UCR facilities. The UCR Asbestos Management Plan includes the following items:

- A written plan
- An asbestos survey request system
- An abatement notification system to control activities that might disturb ACM
- A periodic, routine in-house monitoring or inspection system
- A provision for training campus employees who encounter the materials and, if necessary
- A medical screening program for campus custodial and maintenance employees who work around the materials
- A thorough documentation and recordkeeping system (UCR 2020c)

Regional and Local

South Coast Air Quality Management District

The SCAQMD establishes Rules that regulate or control various air pollutant emissions and emissions sources, including hazardous emissions sources, within the South Coast Air Basin. The SCAQMD coordinates its actions with local, State, and federal government agencies, the business community, and private citizens to achieve and maintain healthy air quality. This includes, but is not limited to, regulations related to asbestos (Rule 1403), described above under Asbestos regulations.

[5] www.acs.org

Riverside County Department of Environmental Health

Under the California Unified Hazardous Waste and Hazardous Material Management Regulatory Program, (Chapter 6.11, Division 20, Section 25404 of the Health and Safety Code), hazards/hazardous materials management is addressed locally through the Certified Unified Program Agency (CUPA). The CUPA for Riverside County is the RCDEH, Hazardous Materials Branch.

The RCDEH is responsible for overseeing the six hazardous materials programs in the county. The RCDEH is responsible for inspecting facilities that handle hazardous materials, generate hazardous waste, treat hazardous waste, own/operate USTs, own/operate aboveground petroleum storage tanks, or handle other materials subject to the California Accidental Release Program. In addition, RCDEH maintains an emergency response team that responds to hazardous materials and other environmental health emergencies 24 hours a day, 7 days a week. The RCDEH also oversees the two Participating Agencies (Corona Fire and Riverside Fire) that implement hazardous materials programs in the county (County of Riverside 2021).

Certified Unified Program Agency

The primary local agency, known as the CUPA, with responsibility for implementing federal and State laws and regulations pertaining to hazardous materials management is Riverside County Environmental Health Department, Hazardous Materials Unit.

The Unified Program is the consolidation of six State environmental regulatory programs into one program under the authority of a CUPA. A CUPA is a local agency that has been certified by Cal/EPA to implement the six State environmental programs within the local agency's jurisdiction. A Participating Agency (PA) is a local agency that has been designated by the local CUPA to administer one or more Unified Programs in their jurisdiction on behalf of the CUPA. The RFD maintains a special program that regulates hazardous materials through disclosure and risk management plans as well as AST referral in cooperation with the County of Riverside. Thus, the RFD is a PA with the RCDEH, Hazardous Materials Unit as the CUPA.

Regional and Local (Non-Binding)

As a State entity, the UC system, of which UCR is a part, is not subject to regional or local plans and policies that regulate development. Although UCR is not subject to local plans, those plans and policies are of interest or concern, because it is UC policy to seek consistency with regional and local plans and policies, where feasible. Information pertinent to hazards and hazardous materials from the City and/or County general plans is included here for informational purposes.

The City and County of Riverside are required to comply with federal and State laws and regulations pertaining to hazardous materials management, including, but not limited to, Articles 79 and 80 of the Uniform Fire Code and applicable hazardous materials management requirements set forth in the Uniform Building Code (with California Amendments). Various departments and divisions in the City and County are responsible for monitoring and enforcement of such activities as the Business Plan, hazardous waste management, UST operation and removal, and fire prevention and emergency response.

The California Health and Safety Code grants discretionary authority to the local agency—typically the local Certified Uniform Program Agency—with oversight responsibilities to determine the need for preparation of an RMP pursuant to Health and Safety Code Section 25534(a). For facilities not previously subject to RMP requirements, but for which an RMP must be prepared, the RMP must be

submitted in accordance with a schedule established by the administering agency after consultation with the stationary source.

Riverside County Airport Land Use Commission

The Riverside County Airport Land Use Compatibility Plan (ALUCP) establishes various policies and compatibility maps for individual ALUCP airports, including the March Air Reserve Base/Inland Port Airport. Riverside County Airport Land Use Commission (Riverside County ALUC) review is required when a project is located within the boundaries of an Airport Influence Area and the project proposes a legislative action like a General Plan Amendment, Specific Plan Amendment, Zone Change, or Zoning Ordinance.

City of Riverside General Plan

The City's General Plan contains objectives, policies, and tools that aim to reduce potential hazards and protect individuals from injuries caused by hazards and hazardous materials. Through implementation of the General Plan policies, the City will continue to ensure that hazardous materials are handled properly in business and industry, work with responsible federal, State, and County agencies to identify and regulate the disposal of toxic materials, reduce the risks associated with air and ground transportation hazards, and minimize groundwater contamination.

4.9.3 Environmental Impacts and Mitigation Measures

Significance Criteria

UCR utilizes the following 2020 CEQA Guidelines Appendix G significance criteria questions related to Hazards and Hazardous Materials.

Would the proposed 2021 LRDP:

a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the likely release of hazardous materials into the environment?
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within 0.25 mile of an existing or proposed school?
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Section 65962.5 and, as a result, create a significant hazard to the public or the environment?
e) Result in a safety hazard or excessive noise for people residing or working in the project area (or a project located within an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport?
f) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?
g) Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires?

Issues Not Evaluated Further

Construction Hazards from Routine Transport, Use, or Disposal of Materials (Criterion a)

The Initial Study for the 2021 LRDP (Appendix A) concluded that with continued implementation of UCR EH&S and compliance with the federal and State regulations described above, impacts during construction of 2021 LRDP projects would be less than significant. No further evaluation is required.

Emergency Response Plan (Criterion f)

Impacts to emergency response plans are discussed under Impact T-4 and Impact WF-1 in Section 4.15, *Transportation* and Section 4.18, *Wildfire*, respectively. This topic is not evaluated further in this section.

Wildland Fire (Criterion g)

Impacts related to wildland fires are discussed under Impact WF-2 and Impact WF-4 in Section 4.18, *Wildfire*. This topic is not evaluated further in this section.

Analysis Methodology

The impact analysis examines the hazards and hazardous materials impacts that would result from the development under the proposed 2021 LRDP. Conditions that could pose a risk to the populations on and off campus were identified through review of documents pertaining to hazards and hazardous materials, including: the SPCC, UCR webpages, the UCR Emergency Operations Plan, previous UCR EIRs, background reports prepared for nearby plans and projects, and published literature. The information obtained from these sources was reviewed and summarized to establish the existing conditions (described above) and identify potential impacts from hazards and hazardous material associated with development of the proposed 2021 LRDP. In determining level of significance, the analysis assumes that the proposed 2021 LRDP would comply with relevant laws, regulations, and guidelines.

2021 LRDP Objectives and Policies

There are no objectives or policies in the proposed 2021 LRDP related to hazards and hazardous materials.

Impact Analysis

Impact HAZ-1 Create a Significant Hazard Through the Routine Transport, Use, or Disposal of Hazardous Materials.

The proposed 2021 LRDP could result in an increased use, transport, or disposal of hazardous materials during facility operations, which would be subject to federal, State, and UCR policies designed to minimize risk of endangerment to the campus population, the public, and the environment. Therefore, the routine use, transport, or disposal of hazardous materials would not create a significant hazard to the public or the environment and impacts would be less than significant.

Operation

Hazardous Chemical Use

The proposed 2021 LRDP would add approximately 300,000 gsf of new laboratory facilities, as well as additional dining, housing, and other facilities that may use, store, and transport hazardous materials. UCR is currently a licensed generator of hazardous waste, which includes chemical, radioactive, and biohazardous (infectious) waste. Implementation of the proposed 2021 LRDP would lead to an increase in the number of laboratories, medical/research facilities, academic activities, and the expansion of other facilities such as building and vehicle maintenance that involve the use of hazardous materials, which would increase the amount of hazardous chemicals used and stored at UCR as well as the number of people working with such materials, and the number of people in proximity to such materials. Various chemicals that may be used may pose different levels of hazards in their use. Some substances, such as acetone, are flammable, while others, like cyanide and mercuric chloride, are toxic. Some nonradioactive chemicals have the potential for causing cancer or acute and chronic illnesses. The properties and health effects of chemical substances are unique to the individual materials, although they often can be grouped by chemical types. No classifications exist to rate the level of hazard posed by all substances under all circumstances. While some substances may present little hazard, others may be capable, in certain situations, of causing severe health effects. However, the types of hazardous chemicals generated at UCR are not expected to change because of implementation of the proposed 2021 LRDP.

Potential hazardous materials may be used and/or stored on-site at facilities developed under the proposed 2021 LRDP. Laboratories and other facilities constructed because of implementation of the proposed 2021 LRDP would continue to comply with all hazardous materials standards for UCR described in the preceding sections. To minimize exposure to chemicals in the air, researchers and other workers would continue to take standard procedural precautions, such as working under fume hoods when using chemicals likely to present exposure hazards. Fume hoods and other engineering controls would be required to meet Cal/OSHA requirements and fume hood ventilation rates are checked annually by EH&S. Proper use of the fume hoods and other engineering controls would keep indoor laboratory air toxics concentrations below the suggested guidelines of the American Conference of Governmental Industrial Hygienist Threshold Limit Values and the legal limits of the OSHA Permissible Exposure Levels.

Maintenance and upkeep of facilities, including cleaning of workspaces and on-campus residences, parking areas, restroom facilities, and maintenance of landscaping would require the applicable use of various solvents, cleaners, paints, oils/fuels, lubricants, and/or pesticides/herbicides. Facilities Services has small maintenance shops at each of the residence halls that store small containers of

maintenance lubricants, solvents and other maintenance-related liquid materials. Since the proposed 2021 LRDP would increase the number of student housing facilities, the amount of such materials would increase.

The increase in development under the proposed 2021 LRDP could result in additional dining facilities, emergency generators, and campus fleet vehicles, which may result in the need for an increase in the use and storage of diesel and non-diesel fuel, mechanical and cooking oils, automatic transmission fluid, and other materials associated with vehicle maintenance, which are managed by Fleet Services in the Corporation Yard. Oils, fluids, and fuel would be used, stored, and maintained similar to current conditions and pursuant to applicable regulations and policies, and stored in containers designed to prevent leaks and spills. The perimeter of the maintenance shop has impervious concrete berms around the entrance doors. Fleet Services operates an SPCC-exempt 6,000-gallon UST located east of the Fleet Services office. This UST contains unleaded gasoline for refueling fleet vehicles by three dispensers at the nearby fueling island. The dispensers have containment boxes below them and two spill kits are maintained at the fueling island (UCR 2018a).

As required by existing UCR policies and programs, the hazardous materials would be stored in locations according to compatibility and in storage enclosures or in areas or rooms specially designed, protected, and contained for such storage, in accordance with applicable regulations. Flammable liquids would continue to be stored in flammable liquid safety storage cabinets with leakproof door sills.

Campus departments are primarily responsible for ensuring that safe work practices are followed; EH&S supports departments with this responsibility. EH&S also reviews proposed laboratory designs for nonstructural seismic safety concerns and compliance with Cal/OSHA requirements to provide appropriate protection for the workers. Similarly, new laboratories are constructed in compliance with the *UC Lab Safety Design Manual* which includes design standards for safety lab space, electrical safety and power systems, lab ventilation and fume hoods, emergency equipment, pressure vessel and compressed gas planning, hazardous materials storage and use areas, biosafety, and radiation. Chemical handling training programs that are being used to educate existing staff would be extended to new staff working within newly developed or modified facilities. EH&S is required to evaluate developments where activities include the handling of hazardous materials and to disseminate general information about the handling, storing, and disposing of hazardous materials. This includes training all individuals who may handle hazardous materials through the circulation of various safety guidance documents and other publications. Hazardous materials are managed throughout campus ranging from the Art Department to the Biomedical Sciences Department and can include flammable, corrosive, and reactive materials used in a variety of ways. The UCR HMBP, the SPCC Plan, the EAP, and Office of Emergency Management procedures are regularly updated to be in line with current regulatory requirements. The campus would continue to implement the programs under the proposed 2021 LRDP as mandated by State and federal laws and regulations. Therefore, the impact of the proposed 2021 LRDP related to use, and disposal of hazardous chemicals would be **less than significant**.

RADIOACTIVE AND LASER MATERIALS USE

The Radiation Safety Program is responsible for ensuring that all users of ionizing radiation and radiation producing machines follow existing regulatory requirements. All radioactive materials at UCR are licensed by the State of California under a Broad Scope License. This license grants authority to the UCR Radiation Safety Committee to authorize the use of radioactive materials at

any of its facilities. Radiation producing machines are registered by the California Radiologic Health Branch and must also be authorized by the UCR Radiation Safety Committee (UCR 2021e).

The Broad Scope Radioactive Materials License requires sealed sources to be tested for leakage and contamination as required by Title 17, CCR Section 30275(c). In accordance with the license, prior to obtaining radioactive materials, each principal investigator must apply for a RUA from the Radiation Safety Committee. The RUA specifies the particular radioisotopes to be used and maximum limits on the quantities possessed (UCR 2020b). The UCR radiation safety program, which is required by the Radiation Control Law and documented in the *Radiation Safety Manual*, is designed to provide adequate protective measures against exposure for visitors, students, faculty, staff, and the community at large. The radiation safety program requires UCR to perform documented surveys to detect surface contamination in areas where radioactive materials are used, including storage and waste facilities, and contains detailed information regarding radioactive waste storage guidelines and disposal methods. Additionally, new laboratories are constructed in compliance with the *UC Lab Safety Design Manual* which includes standards for safe lab space, including express design requirements for radiation safety.

All lasers and laser systems (whether purchased, borrowed, fabricated, or brought in for use by others) must be operated in accordance with the requirements established by the latest American National Standards Institute Z136.1 document, *Standards for the Safe Use of Lasers and the Laser Safety Manual*. Custom-built and modified lasers are verified by EH&S Radiation Safety (UCR 2018b).

EH&S's current maintenance processes for radioactive equipment would apply to newly constructed facilities that would operate radioactive equipment, and the *Radiation Safety Manual* and *Laser Safety Manual* would be implemented and updated, as necessary, to reflect changes to the types, quantities, and locations of radioactive materials. Therefore, the impact of the proposed 2021 LRDP related to use and disposal of radioactive and laser materials would be **less than significant**.

BIOHAZARDOUS MATERIALS USE

Federal law requires the establishment of an IBC at institutions that receive federal funding for research involving recombinant or synthetic nucleic acid molecules, potentially infectious organisms (human, plant, arthropod, toxins), and human-derived materials. At UCR, the IBC is appointed by the Vice Chancellor for Research and Economic Development under the auspices of the Office of Research Integrity (ORI). Administrative support for the IBC is provided by the Office of Vice Chancellor for Research and Economic Development. The IBC consists of at least five individuals: two community members who are not affiliated with UCR, an appropriate recombinant or synthetic DNA expert, a plant and animal expert, and the Biosafety Officer. The IBC membership represents collective expertise and research experience in recombinant DNA, infectious agents, biological toxins, and animal research which are applied to the evaluation of appropriate safety measures needed for experiments that may pose potential risks to health or the environment.

The IBC is responsible for:

- Ensuring that research conducted at UCR complies with the NIH Guidelines for Research Involving Recombinant or Synthetic Nucleic Acid Molecules (hereinafter as "NIH Guidelines")
- Drafting and establishing campus biosafety policies and procedures for proper handling of biohazardous materials
- Reviewing individual research proposals for biosafety concerns

All UCR Principal Investigators and laboratory workers must adhere to the biological safety policies and procedures of the *UCR Biosafety Manual* in the conduct of their research and in the management of their laboratories. For new facilities that would be developed under the proposed 2021 LRDP, EH&S would continue to monitor compliance with university policies, CDC, NIH, OSHA, and State criteria regarding the use of potentially infectious materials. New laboratories are constructed in compliance with the *UC Lab Safety Design Manual* which includes standards for safe lab space, including express design requirements for biosafety. All labs which contain biohazardous materials would also adhere to standard microbiological practices outlined in the *CDC Biosafety in Microbiological and Biomedical Laboratories Manual*, including the use of biosafety cabinets for personnel, environmental, and product protection (UCR 2021f). EH&S would continue to review and approve the use and transfer of biohazardous materials by Principal Investigators and setting safety criteria for the use of these agents, provide training; advise on appropriate safe work practices and procedures, containment controls, personal protective equipment, investigate accidents, and develop emergency plans for handling accidental spills and personnel contamination (UCR 2017). Therefore, the impact of the proposed 2021 LRDP related to use and disposal of biohazardous materials would be **less than significant**.

HAZARDOUS WASTE DISPOSAL

Implementation of the proposed 2021 LRDP may increase the number of laboratories, medical research facilities, and academic activities, which may result in an increase in the overall use and subsequent disposal of hazardous, biohazardous, and radioactive waste. Oversight of hazardous and biohazardous waste would continue to be overseen by EH&S using the online WASTe program, ChemCycle Program, and radioactive waste pickups using UC Radiation. Storage and disposal of radioactive waste is strictly regulated at UCR, and all radioactive waste must be labeled per EH&S mandated storage guidelines and transferred to EH&S for disposal. Therefore, the impact of the proposed 2021 LRDP related to use, and disposal of hazardous waste would be **less than significant**.

TRANSPORT OF HAZARDOUS MATERIALS AND WASTE

As discussed above, implementation of the proposed 2021 LRDP would increase hazardous materials use and hazardous waste generation on campus. Consequently, the transport of hazardous materials to and from campus, and between campus departments, would also increase. UCR policy requires that packaging of chemicals to be transported on public roads conforms with all legal requirements, including those of the USDOT, CHP, CDPH, and RCDEH and to the guidelines of the International Civil Aeronautics Organization and the International Air Transport Association. All hazardous waste is picked up from generators by EH&S or a licensed hazardous waste contractor, and generators must package and label all hazardous wastes in compliance with policies and regulations. As a mitigation measure from the EH&S Expansion EIR document which has been and will continue to be implemented, EH&S staff shall provide all drivers removing hazardous materials or hazardous waste from the EH&S Expansion facility with printed directions clearly indicating the mandated haul route, exiting the EH&S Expansion facility left onto Watkins Drive and proceeding northwest to Blaine Street, then west on Blaine Street to the I-215/SR 60 freeway entrance ramps.

Federal, State, and international law strictly regulate shipping, transport, and import of biological materials. During intra-campus transfers of biohazardous agents, the materials are placed in securely closed and labeled primary containers. The exterior of the primary container must be decontaminated prior to transportation. Federal (USDOT, 49 CFR §171-175) and international agencies have in place regulations for shipping of dangerous goods by surface or air.

Under the proposed 2021 LRDP, UCR would continue to require compliance with these safety regulations, guidelines, and policies. Furthermore, the types of hazardous materials that would be transported are not expected to change as a result of the implementation of the proposed 2021 LRDP. Therefore, the impact of the proposed 2021 LRDP related to transport of hazardous materials to and from campus would be **less than significant**.

OVERALL OPERATION IMPACTS

The use, storage, transport, and disposal of hazardous materials in facilities developed under the proposed 2021 LRDP would be guided by existing and future UCR, County, State, and federal regulations designed to maximize the safety of UCR personnel, students, the public, and the environment. Therefore, operational impacts related to the routine transport, use, or disposal of hazardous materials would be **less than significant**.

Mitigation Measures

No mitigation is required.

Significance After Mitigation

Impacts would be less than significant without mitigation.

Impact HAZ-2 CREATE A SIGNIFICANT HAZARD TO THE PUBLIC OR THE ENVIRONMENT THROUGH ACCIDENTAL RELEASE OF HAZARDOUS MATERIALS INTO THE ENVIRONMENT.

OPERATION OF FACILITIES AND MATERIALS WOULD BE SUBJECT TO FEDERAL, STATE, COUNTY, AND UCR POLICIES DESIGNED TO MINIMIZE UPSET AND ACCIDENT CONDITIONS AND WOULD RESULT IN LESS THAN SIGNIFICANT IMPACTS RELATED TO SIGNIFICANT HAZARDS TO THE PUBLIC OR THE ENVIRONMENT. FACILITY CONSTRUCTION AND RENOVATION UNDER THE PROPOSED 2021 LRDP COULD DISTURB OR EMIT HAZARDOUS MATERIAL FROM IMPACTED SOIL, SOIL VAPOR, OR GROUNDWATER, WHICH COULD EMIT HAZARDOUS EMISSIONS OR HANDLE HAZARDOUS OR ACUTELY HAZARDOUS MATERIALS, SUBSTANCES, OR WASTE DURING REASONABLY FORESEEABLE UPSET AND ACCIDENT CONDITIONS. IMPACTS WOULD BE LESS THAN SIGNIFICANT WITH THE IMPLEMENTATION OF MITIGATION AND MANDATORY COMPLIANCE WITH EXISTING REGULATIONS PERTAINING TO THE IDENTIFICATION, HANDLING, AND DISPOSING OF HAZARDOUS MATERIALS.

Construction

FACILITY DEMOLITION AND RENOVATION

Due to their age, numerous campus buildings are assumed to contain some form of ACM or LBP. An unknown number of fluorescent light ballasts containing PCBs are also present in some campus buildings. Building materials may also be contaminated because of radioactive or chemical hazardous materials use in the building, resulting in spills or aerosol releases that may deposit contaminants on the floors or walls. It is also possible that elemental mercury may be present in research laboratory sink traps, in cupboard floor spaces, or in sewer pipes.

If contamination is present during renovation and/or demolition of existing campus buildings under the proposed 2021 LRDP, exposure would be minimized through required worker training and appropriate engineering and administrative controls and protective equipment in accordance with existing campus health and safety practices such as the Asbestos Management Plan, as well as with federal and State regulations. LBP and other lead-containing materials associated with proposed projects would be handled pursuant to Cal/OSHA regulations regarding LBPs and lead-containing

materials. CCR Title 8, Section 1532.1, requires testing, monitoring, containment, and disposal of LBPs and lead-containing materials in a manner that exposure levels do not exceed Cal/OSHA standards. If potentially hazardous materials are encountered during construction or redevelopment, EH&S would conduct a comprehensive assessment of the situation in coordination with the appropriate regulatory authority, such as the RCDEH. Compliance with existing plans and regulations, such as the Asbestos Management Plan and CCR Title 8, Section 1532.1, would ensure impacts related to asbestos containing materials and lead would be **less than significant**.

Under Title 8 CCR 5194 (Hazard Communication Standard), construction workers must be informed about hazardous substances that may be encountered. Compliance with IIPP requirements (Title 8 CCR 3203) would ensure that workers are properly trained to recognize workplace hazards and to take appropriate steps to reduce potential risks due to such hazards, such as contaminated soils. This would be relevant if previously unidentified contamination or buried hazards are encountered. If additional investigation or remediation is determined to be necessary, compliance with Cal/OSHA standards for hazardous waste operations (Title 8 CCR 5192) would be required for those individuals involved in the investigation or cleanup work. A Site Health and Safety Plan must be prepared prior to commencing any work at a contaminated site or involving disturbance of building materials containing hazardous substances, to protect workers from exposure to potential hazards. Cal/OSHA also enforces hazard communication program regulations, including procedures for identifying and labeling hazardous substances that require Material Safety Data Sheets to be available for employee information and training programs. Mandatory compliance with regulatory requirements, such as Title 8 CCR 5192 and 5194 would reduce the potential for workers to be exposed to hazardous materials. Impacts would be **less than significant**.

The UCR campus includes abandoned in-place USTs and the potential for other unidentified hazardous material features to be present. Although there are no remaining open release cases on campus, residual hazardous materials may be present in soil, soil vapor, and/or groundwater at the following locations: former USTs, current ASTs, closed in-place UST, former agricultural land use areas, and near the Land Use Covenant, although the potential is considered low. Unanticipated hazardous materials may also be encountered during demolition or redevelopment of previously developed sites. Disturbance of soil containing existing hazardous materials, soil vapor, or contaminated groundwater during construction could create a significant hazard to the public or the environment. Impacts would be **significant**.

Given this potential, Mitigation Measures **MM HAZ-1 through MM HAZ-4** would be required to reduce impacts to less-than-significant levels.

CONSTRUCTION-SITE STORMWATER DISCHARGE

As described in Section 4.10, *Hydrology and Water Quality*, the UCR campus is a non-traditional permittee under the Phase II municipal separate storm sewer systems (MS4) Small statewide general storm water permit, which requires UCR to prevent construction site discharges of pollutants through the installation, implementation, and maintenance of BMPs and ensure compliance with Construction General Permit (State Water Resources Control Board Order 2009-0009-DWQ, as amended). As part of the compliance with the Construction General Permit, a Stormwater Pollution Prevention Plan (SWPPP) would be prepared for specific construction projects. Among other things, the SWPPP requires that hazardous materials be properly stored, contained, and disposed of to prevent polluted stormwater discharged from construction sites, which would prevent substantial spills of hazardous materials during reasonably foreseeable upset and accident conditions and prevent or reduce the release hazardous materials into the environment.

The UCR HMBP and the EAP address emergency and spill response procedures that include, but are not limited to, specific emergency response instructions, locations of personnel and equipment resources, specialty hazard instructions, and appropriate training. Therefore, impacts related to potential hazards to the public or the environment through reasonably foreseeable upset and accident conditions due to construction-site stormwater discharge would be **less than significant**.

Operation

As discussed in Impact HAZ-1, the use, storage, transport, and disposal of hazardous materials in facilities developed under the proposed 2021 LRDP would be guided by existing and future federal, State, and UCR regulations designed to maximize the safety of UCR personnel, students, the public, and the environment. Adherence to these regulations would ensure hazards impacts associated with reasonably foreseeable upset and accident conditions involving hazardous materials would be **less than significant**.

Mitigation Measures

MM HAZ-1 Property Assessment – Phase I and II ESAs

During the pre-planning stage of campus projects on previously developed sites or on agricultural lands (current or historic), and in coordination with EH&S, UCR shall obtain documentation from EH&S or prepare a Phase I Environmental Site Assessment (ESA) assessing the land use history of the proposed project site and identify potential hazardous materials concerns, including, but not limited to, fuel tanks, chemical storage, elevator pistons and associated hydraulic oil reservoirs and piping, heating-oil USTs, or agricultural uses. If the Phase I ESAs, or similar documentation, identify recognized environmental conditions or potential concern areas, a Phase II ESA would be conducted in coordination with EH&S to determine whether the soil, groundwater, and/or soil vapor has been impacted at concentrations exceeding regulatory screening levels for residential or commercial/industrial type land uses (as applicable). If the Phase II ESA concludes that the site is or may be impacted and could affect the planned development, assessment, remediation, or corrective action (e.g., removal of contaminated soil, in-situ treatment, capping, engineering controls) would be conducted prior to or during construction under the oversight of federal, State, and/or local agencies (e.g., US EPA, DTSC, RWQCB, RFD, RCDEH) and in full compliance with current and applicable federal and State laws and regulations. Additionally, Voluntary Cleanup Agreements may be used for parcels where remediation or long-term monitoring is necessary.

MM HAZ-2 Regulatory Agency UST Involvement

Because the UCR campus includes abandoned in-place USTs and the potential for other unidentified hazardous material features to be present, UCR shall notify the RCDEH and RFD if the following situations occur:

- Soil disturbance, grading, or excavation are planned for areas where current USTs are present or former USTs were present, including:
  - One 6,000-gallon UST operated by Fleet Services located east of the Fleet Services office
  - One 6,000-gallon diesel, one 1,500-gallon gasoline, and one 300-gallon former USTs at the Ag Ops facility at 1060 Martin Luther King Boulevard
  - Four 6,000-gallon gasoline and one 550-gallon waste oil former USTs at the former Atlantic Richfield Oil Company service station at 1160 University Avenue

  - Five 20,000-gallon former diesel USTs at UCR Parking Lot #6
  - Two 7,000-gallon gasoline, one 3,000-gallon gasoline, and one 550 waste oil former USTs at the former Chevron service station at 1011 University Avenue
  - Four former 10,000-gallon #6 heating-oil USTs at 3401 Watkins Drive – Abandoned in place in October 1998
  - One 10,000-gallon gasoline, one 6,000-gallon gasoline, and one 500-waste oil former USTs at the UCR Fleet Service facility at 3401 Watkins Drive
  - UCR Fleet Services – RCDEH Permitted UST - 3401 Watkins Drive
  - UCR Steam Plant – RCDEH Closed Leaking UST - 3401 Watkins Drive
  - Agricultural research support operations areas on the West Campus (e.g., fuel storage and dispensing, maintenance oils, and hazardous waste)
  - Corporation Yard located north of West Linden Street on the East Campus
  - UST, previously located at the Grounds Maintenance Facility along East Campus Drive
  - 3.25-acre site on the UCR campus at 1060 Martin Luther King Boulevard, listed as a DTSC Certified Operations and Maintenance Land Use Restrictions site as of December 15, 2010 (DTSC 2020a)
  - 1060 Martin Luther King Boulevard, a site listed as a closed Riverside County LOP case for three leaking USTs
- Identification of additional underground storage tanks and associated piping, or other underground features such as railroad spurs or ties, elevator pistons, stained or odorous soils, unknown piping, cisterns, wells, waste/burn pits, etc., if encountered

Additionally, all UST removals and associated assessment work shall be completed under the direction of RCDEH and RFD.

Upon identification of stained soil, odorous soil, USTs, or other underground features onsite, RCDEH or RFD could require actions such as: development of removal action workplans, obtaining permits for removal of USTs or other underground features, soil excavation and offsite disposal, assessment of soil and/or groundwater beneath the excavation, and/or completion of UST removal reports or case closure documents.

MM HAZ-3 Regulatory Agency Subsurface Involvement – DTSC

Because UCR includes one DTSC Certified Land Use Restrictions case on-site (Envirostor, Site ID 33890001, 2020), DTSC shall be notified of redevelopment or soil disturbance work that is planned in the Land Use Covenant area involving excavation of 4 feet or more below ground surface. Additionally, UCR shall notify the DTSC if the following situations occur:

- LRDP is modified to include soil disturbance in the Land Use Covenant area.
- Stained or odorous soils, chemical substances, or debris from an unidentified source are identified during excavation of 4 feet or more below ground surface and/or within 100 feet of the Land Use Restriction area.

Upon notification of the information above, DTSC could require actions such as: development of subsurface investigation workplans, completion of soil, soil vapor, and/or groundwater subsurface investigations, installation of soil vapor or groundwater monitoring wells, soil excavation and off-site

disposal, completion of human health risk assessments, and/or completion of remediation reports or case closure documents.

MM HAZ-4 Construction Site Management Plan

If impacted soils are identified pursuant to activities conducted through Mitigation Measures MM HAZ-1, MM HAZ-2, or MM HAZ-3; or encountered during construction (soil disturbance), UCR shall prepare a Construction Site Management Plan (SMP) for the proposed redevelopment project area to address potential issues that may be encountered during redevelopment activities involving subsurface work. The Construction SMP objectives shall include:

- Communicating information to proposed project construction workers about environmental conditions
- Presenting measures to mitigate potential risks to the environment, construction workers, and other nearby receptors from potential exposure to hazardous substances that may be associated with unknown conditions or unexpected underground structures
- Presenting protocols for management of known contaminated soil or groundwater encountered during construction activities

The Construction SMP shall identify the proposed project contacts, responsibilities, and notification requirements and outline the procedures for health and safety, soil management, contingency measures for discovery of unexpected underground structures, erosion, dust, and odor management, groundwater management, waste management, stormwater management, and written records and reporting. The Construction SMP shall be reviewed and approved by UCR prior to issuance of grading permits.

Significance After Mitigation

Impacts related to potential hazards to the public or the environment through reasonably foreseeable upset and accident conditions during facility construction and renovation would be less than significant with mitigation incorporated.

Impact HAZ-3 Result in Handling of Hazardous or Acutely Hazardous Materials Within 0.25 Mile of an Existing or Proposed School.

Operation of facilities and materials would be subject to federal, State, and UCR policies designed to minimize hazardous emissions and spills and would result in less than significant impacts related to significant hazards to the public or the environment. Facility construction and renovation under the proposed 2021 LRDP could disturb or emit hazardous material from impacted soil, soil vapor, or groundwater, which could emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within 0.25 mile of an existing or proposed school. Impacts would be less than significant with the implementation of mitigation measures and mandatory compliance with existing regulations pertaining to hazardous wastes and materials.

Multiple schools are located within 0.25 mile of the boundaries of the UCR campus, and one child development center is located on campus (UCR Child Development Center). As discussed in greater detail in Section 4.13, *Public Services*, several schools are in proximity to UCR, including Riverside STEAM Academy (approximately 0.25 mile from UCR's southeast boundary), Highland Elementary (approximately 0.14 mile from UCR's northernmost parcels, which contain the Stonehaven Apartment Community), Longfellow Elementary (approximately 0.76 mile from UCR's western

boundary), University Heights Middle School (approximately 0.25 mile from UCR's northernmost parcels which contain the Stonehaven Apartment Community), and John W. North High School (approximately 0.39 mile north of West Campus). Additionally, the Canyon Crest Gateway land use designation allows non-affiliated educational facilities.

Construction

Construction and redevelopment of facilities associated with implementation of the 2021 LRDP would comply with existing federal, State, and UC requirements for the transport, use, or disposal of hazardous materials. Removal of LBPs, ACMs, PCBs, and other hazardous materials would be performed in compliance with existing regulations. As discussed in Impact HAZ-2, mandatory compliance with existing federal and State regulations would apply during construction activities. However, there is the potential for disturbance of unknown hazardous materials from impacted soil, soil vapor, or groundwater during construction which could create a hazard to the public or the environment. Therefore, construction and redevelopment of facilities associated with implementation of the proposed 2021 LRDP could emit hazardous emissions or handle hazardous materials, substances, or waste within 0.25 mile of an existing or proposed school. Impacts would be **significant.** Mitigation Measures **MM HAZ-1 through MM HAZ-4** would be required to reduce impacts to less than significant levels.

Operation

While hazardous materials and waste could continue to be handled within 0.25 mile of an existing or proposed school as a result of implementation of the proposed 2021 LRDP, and overall quantities may increase, these materials would still not exist in quantities significant enough to pose a risk to occupants of the school or the campus community. As explained in the discussion under Impact HAZ-1 above, hazardous materials in laboratories are typically handled in small quantities. The potential consequences of accidental releases would be limited to a single building and in most cases are limited to the individual laboratory where the spill would occur, and people outside the buildings would not be exposed.

The UCR Child Development Center comprises two adjacent facilities on the northeastern corner of East Campus. It is surrounded by a surface parking lot, Blaine Street and Watkins Drive to the east, Facilities Services to the southeast, and the future North District Development (Phase I currently under construction) to the southwest. Under the proposed 2021 LRDP, the UCR Child Development Center would be in the future Student Neighborhood land use area, which would accommodate student residences and residential support services and not research laboratories or other facilities that may handle hazardous materials. Additionally, the UCR Child Development Center would be located outside of areas likely to redevelop under the proposed 2021 LRDP. It is unlikely there would be substantial impacts to Student Neighborhood areas associated with the emission of hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste related to the operation of facilities developed under the proposed 2021 LRDP.

Additionally, the Canyon Crest Gateway land use designation allows non-affiliated educational facilities. The land area designated as Canyon Crest Gateway would not be located adjacent to laboratory uses or other land uses where substantial quantities or emissions of hazardous materials would occur from development under the proposed 2021 LRDP.

While the amount and type of hazardous materials may vary over time with changes in research and additions to hazardous materials lists, the general range and type of hazardous materials used on campus is not expected to substantially change upon implementation of the proposed 2021 LRDP.

UCR will continue to use materials, some of which are considered hazardous, during daily operations. While hazardous materials and waste could be handled within 0.25 mile of an existing or proposed school as a result of implementation of the proposed 2021 LRDP, these materials would not exist in quantities significant enough to pose a risk to occupants of the school or the campus community. Furthermore, compliance with federal, State, and local regulations and UCR policies and programs would reduce the risk of substantial spill and harm to the public, campus personnel, and the environment during the transport, use, storage, and disposal of hazardous materials and wastes. Adherence to these regulations would ensure significant hazards associated with operational use of hazardous materials would be **less than significant**.

Mitigation Measures

Mitigation Measures MM HAZ-1 *Property Assessment – Phase I and II ESAs*, MM HAZ-2 *Regulatory Agency UST Involvement*, MM HAZ-3 *Regulatory Agency Subsurface Involvement – DTSC*, and MM HAZ-4 *Construction Site Management Plan* would ensure potential unknown hazardous materials were determined and addressed properly prior to construction near area schools.

Significance After Mitigation

Implementation of the above mitigation measures would reduce impacts related to hazardous emissions or the handling of hazardous materials within 0.25 mile of a school to less-than-significant levels.

Impact HAZ-4 LOCATED ON A SITE WHICH IS INCLUDED ON A LIST OF HAZARDOUS MATERIALS SITES COMPILED PURSUANT TO SECTION 65962.5.

THE UCR CAMPUS INCLUDES SEVERAL CLOSED UST RELEASE SITES (LISTED) AND IS LOCATED ADJACENT TO A SITE WITH A RESTRICTED LAND USE COVENANT. AS A RESULT, SOIL, SOIL VAPOR, AND/OR GROUNDWATER DISTURBANCE DURING CONSTRUCTION COULD CREATE A SIGNIFICANT HAZARD TO THE PUBLIC OR THE ENVIRONMENT. GIVEN THE OPPORTUNITY FOR CONTAMINATED SOILS TO OCCUR ON THE PROJECT SITE, PROJECT CONSTRUCTION WOULD POTENTIALLY CREATE A SIGNIFICANT HAZARD TO THE PUBLIC OR THE ENVIRONMENT. IMPACTS WOULD BE LESS THAN SIGNIFICANT WITH THE IMPLEMENTATION OF MITIGATION MEASURES.

Construction

As remediation has already been completed in the former pesticide disposal pits located in the agricultural teaching and research fields on the West Campus, that land is under a restricted land use covenant, and no construction is planned in that area under the proposed 2021 LRDP; no risk of exposure to hazardous materials in that area would be present. Furthermore, as discussed in Impact HAZ-2, mandatory compliance with existing federal and State regulations would apply during construction activities. However, the UCR campus includes several closed UST release sites, and construction of facilities could occur in areas located adjacent to the former pesticide disposal pits. Disturbance of hazardous material impacted soil, soil vapor, or groundwater during construction could create a **significant hazard** to the public or the environment. Mitigation Measures **MM HAZ-1 through MM HAZ-4** would be required to reduce impacts to less-than-significant levels.

Operation

All non-UST hazardous waste storage locations on campus are managed in accordance with all applicable federal and State laws, such as RCRA and California HWCL, as well as all existing campus

programs and policies as discussed in Impact HAZ-1. Operational impacts would be **less than significant**.

Mitigation Measures

Mitigation Measures MM HAZ-1 *Property Assessment – Phase I and II ESAs*, MM HAZ-2 *Regulatory Agency UST Involvement*, MM HAZ-3 *Regulatory Agency Subsurface Involvement – DTSC*, and MM HAZ-4 *Construction Site Management Plan* would ensure potential soil, soil vapor, and/or groundwater disturbance is determined and addressed properly prior to construction.

Significance After Mitigation

Implementation of the above mitigation measures would reduce impacts related to hazardous materials sites to less-than-significant levels.

Impact HAZ-5 IMPACTS RELATED TO CONSTRUCTION AND OPERATION AT HAZARDOUS MATERIAL RELEASE LISTED SITES WOULD BE LESS THAN SIGNIFICANT WITH MITIGATION INCORPORATED. LOCATED WITHIN AN AIRPORT LAND USE PLAN OR 2 MILES OF AN AIRPORT RESULTING IN A SAFETY HAZARD OR EXCESSIVE NOISE FOR PEOPLE RESIDING OR WORKING ON THE UCR CAMPUS.

THE UCR CAMPUS IS IN THE MARCH AIR RESERVE BASE/INLAND PORT ALUCP INFLUENCE AREA, ALTHOUGH IN AN AREA WITH LOW LEVELS OF NOISE AND SAFETY RISK. THEREFORE, THE PROPOSED 2021 LRDP WOULD NOT RESULT IN AIRPORT-RELATED SAFETY HAZARDS AND EXCESSIVE NOISE IMPACTS TO PEOPLE RESIDING OR WORKING ON THE UCR CAMPUS, AND IMPACTS WOULD BE LESS THAN SIGNIFICANT.

Construction and Operation

The UCR campus is in Area E of the March Air Reserve Base/Inland Port ALUCP influence area. As analyzed in Section 4.11, *Noise,* noise levels in Area E of the March Air Reserve Base/Inland Port ALUCP are low and beyond the 55-CNEL corridor; safety risk level is also considered low. In Area E, there is no limit on residential or other use population density or requirement for open space. However, although there is no explicit upper limit on usage intensity, land uses of the types listed—uses that attract very high concentrations of people in confined areas—are discouraged in locations below or near the principal arrival and departure flight tracks. The UCR campus is not located near the principal arrival and departure flight tracks (Riverside County Airport Land Use Commission 2014). Therefore, the proposed 2021 LRDP would not result in airport-related safety hazards and excessive noise impacts to construction workers, faculty/staff, students, and visitors, and impacts would be **less than significant**.

Mitigation Measures

No mitigation is required.

Significance After Mitigation

Impacts would be less than significant without mitigation.

4.9.4 Cumulative Impacts

Although some hazardous materials releases can cover a large area and interact with other releases (e.g., atmospheric contamination, contamination of groundwater aquifers), incidents of hazardous materials contamination due to leaking UST sites or release at individual businesses are more

typically confined to a limited area. These relatively limited areas of contamination typically do not interact in a cumulative manner with other sites of hazardous materials contamination. However, if construction would create a new site of contamination, or contribute substantially to a hazardous condition, it could be considered to contribute to a cumulative impact. This cumulative analysis assesses development on and proximate to the UCR campus and includes buildout of the cities of Riverside and Moreno Valley General Plans as discussed in Table 4-2 and projects in unincorporated Riverside County, the closest of which is approximately 1.9 miles northeast of the East Campus boundary as described in Table 4-1.

It is anticipated that future growth in the cumulative project area, would result in an incremental increase in the amount of hazardous materials used, treated, transported, and disposed area-wide. Cumulative projects and associated activities listed in Tables 4-2 and 4-1 would be required to comply with safety procedures mandated by applicable federal, State, and local laws and regulations related the transport, use, and disposal hazardous materials. Nonradioactive hazardous waste materials would be disposed of into permitted hazardous waste facilities, and radioactive waste would be decayed on-site or disposed of in facilities specifically approved for radioactive waste pursuant to federal and State regulations.

As described under Impact HAZ-1, operation of development under the proposed 2021 LRDP would involve the transport, use, and disposal of hazardous materials. However, the use, storage, transport, and disposal of hazardous materials in facilities developed under the proposed 2021 LRDP would be guided by existing and future federal, State, and UCR regulations designed to maximize the safety of UCR personnel, students, the public, and the environment. Consequently, the contribution of the proposed 2021 LRDP to cumulative impacts **would not be cumulatively considerable**.

It is anticipated that future growth in the cumulative project area would result in an incremental increase in reasonably foreseeable upset and accident conditions involving the likely release of hazardous materials, particularly during redevelopment of older buildings that may contain ACMs and/or LBPs, or encounter unknown USTs and at construction sites where there may be occurrences of stormwater discharge.

Cumulative projects and associated activities in the cumulative area would be required to comply with safety procedures mandated by applicable federal, State, and local laws and regulations related to the release of hazardous materials. LBPs and other lead-containing materials associated with proposed projects would be handled in compliance with Cal/OSHA regulations regarding LBPs and lead-containing materials. CCR Title 8, Section 1532.1, requires testing, monitoring, containment, and disposal of LBPs and lead-containing materials in a manner that exposure levels do not exceed Cal/OSHA standards. Additionally, all new development and redevelopment would be subject to the water quality requirements of the SARWQCB, the Small MS4 General Permit, and other applicable federal, State, and local regulations. Adherence to such regulations would reduce the potential for impacts of the proposed 2021 LRDP to combine with similar impacts of other projects to result in cumulative impacts.

As discussed in Impact HAZ-2, proposed 2021 LRDP, impacts related to potential unknown hazards to the public or the environment through reasonably foreseeable upset and accident conditions during facility construction and renovation would be significant without mitigation. Impacts would be reduced would be less than significant Mitigation Measures **MM HAZ-1 through HAZ-4** incorporated. Consequently, the contribution of the proposed 2021 LRDP to cumulative impacts **would not be cumulatively considerable with mitigation**.

Future development in the cumulative area may involve hazardous emissions or the handling of acutely hazardous materials, substances, or wastes within 0.25 mile of an existing or proposed school. Under the proposed 2021 LRDP, UCR would continue to comply with applicable hazardous materials and disclosure requirements for the handling, use, storage, and disposal of hazardous materials. Future development off campus would also be required to comply with applicable laws and regulations pertaining to hazardous wastes, and risks associated with hazardous emissions or materials to existing or proposed schools located within 0.25 mile of future development would be eliminated or reduced through proper handling, disposal practices, and/or cleanup procedures. Furthermore, the materials would not be anticipated to occur in quantities significant enough to pose a risk to occupants of nearby schools or the campus community. As discussed in Impact HAZ-3, impacts related to hazardous emissions or the handling of hazardous materials within 0.25 mile of a school would be significant without mitigation, and therefore cumulatively considerable. Impacts would be reduced to less than significant with Mitigation Measures **MM HAZ-1 through MM HAZ-4** incorporated. Therefore, the proposed 2021 LRDP contribution to cumulative impacts associated with hazardous emissions or handling of hazardous materials within 0.25 mile of an existing or proposed school **would not be cumulatively considerable with mitigation**.

Future development on the UCR campus and in the cumulative area could potentially expose residents and construction workers to contaminated soil or groundwater, including on or near sites included on a list of hazardous materials sites compiled pursuant to government code Section 65962.5. As discussed in Impact HAZ-4, the UCR campus includes several closed UST release sites (listed) and construction of facilities could occur in areas located adjacent to the former pesticide disposal pits. Disturbance of hazardous material impacted soil, soil vapor, or groundwater during construction could create a significant hazard to the public or the environment and impacts are considered cumulatively considerable without mitigation. However, impacts related to construction and operation at hazardous material release listed sites would be less than significant with mitigation **MM HAZ-1 through MM HAZ-4** incorporated. Therefore, the proposed 2021 LRDP's contribution to cumulative impacts associated with exposure to contaminated soil or groundwater, including development on or near hazardous materials sites, **would not be cumulatively considerable**.

As discussed in Impact HAZ-5, the proposed 2021 LRDP would not result in airport-related safety hazards and excessive noise impacts to construction workers for projects developed under the proposed 2021 LRDP. Therefore, the proposed 2021 LRDP's contribution to cumulative impacts associated with airport-related safety hazards and excessive noise impacts **would not be cumulatively considerable**.

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_____. 2021e. Housing Services Frequently Asked Questions. https://housing.ucr.edu/frequently-asked-questions.

_____. 2021f: UCR Biosafety Manual: XI. Laboratory Equipment. https://ehs.ucr.edu/laboratory/biosafety-manual#11_laboratory_equipment.

4.10 Hydrology and Water Quality

This section describes the existing hydrology and water conditions on the UCR campus and throughout the region and analyzes the potential for the proposed 2021 LRDP to affect water quality, including resulting in substantial siltation or erosion, cause flooding due to the alteration of drainage patterns, or to deplete groundwater supplies or interfere with groundwater recharge. Potential effects related to overall water supply or the potential need for construction of new or expanded stormwater infrastructure are discussed in Section 4.17, *Utilities and Service Systems*.

4.10.1 Environmental Setting

Surface Water

Hydrologic Units and Watersheds

A hydrologic unit is a drainage area in a multi-level drainage system with boundaries that are defined by hydrographic and topographic criteria specifying an area of land upstream from a specific point on a river, stream, or other surface waters. A hydrologic unit can accept surface water directly from upstream drainage areas and indirectly from associated surface areas such as remnant, non-contributing, and diversions to form a drainage area with single or multiple outlet points. A watershed is an area of land where all of the water that originates or falls in it or drains off of it collects into the same surface body of water (i.e., river, lake, ocean). Hydrologic units are only synonymous with watersheds when the boundaries include all the source area contributing surface water to a single defined outlet point (USDA 2020).

The UCR campus is located in the Santa Ana River Hydrologic Unit in the South Coast Hydrologic Region, in the management area of the Santa Ana Regional Water Quality Control Board (RWQCB) and subject to the management direction of the Basin Plan for the Santa Ana Region (Santa Ana RWQCB 2019). The Santa Ana River flows over 100 miles from the San Bernardino Mountains to the Pacific Ocean. The Santa Ana River is the receiving water for over 2,700 square miles covering portions of San Bernardino, Riverside, and Orange Counties. The Santa Ana RWQCB governs basin planning and water quality in the Santa Ana River Hydrologic Unit. The UCR Campus is in the Middle Santa Ana River Watershed, which lies within the Santa Ana River Hydrologic Unit.

MIDDLE SANTA ANA RIVER WATERSHED

Reach 3 of the Santa Ana River is the receiving water for the majority of the City of Riverside (City), including the UCR campus (City of Riverside 2007). The Santa Ana River and its watershed are shown in Figure 4.10-1. Surface waters start in the upper zone of the Santa Ana River Watershed, primarily the San Bernardino, Santa Ana, and San Jacinto Mountains. Flows consist mainly of snowmelt from the surrounding mountains and stormwater from watershed. Tributaries to the Middle Santa Ana River (Reaches 3 and 4) include: Temescal Creek (Reaches 1-6), Tequesquite Arroyo (Sycamore Creek), Day Creek, and San Sevaine Creek. Cities in the Middle Santa Ana River Watershed include Corona, Eastvale, Jurupa Valley, Moreno Valley, Norco, and Riverside (Riverside County Flood Control and Conservation District [RCFCWCD] 2017).

Records show that average annual rainfall is approximately 8.4 inches, with monthly averages ranging from 0 to 1.9 inches. Most rainfall typically occurs from November through April (Jurupa Community Services District [JCSD] 2016).

Figure 4.10-1 Santa Ana River Watershed Boundary and Santa Ana River Reaches

Imagery provided by Google and its licensors © 2018.

UCR is further part of two sub-watersheds in the Middle Santa Ana River Watershed. The northern portion of East Campus drains to the Tequesquite Arroyo Watershed, while the southern portion of East Campus and most of West Campus drains to the East Etiwanda Creek-Santa Ana River Watershed. The Tequesquite Arroyo Watershed (Hydrologic Unit Code 180702030802) is 19,030 acres. The East Etiwanda Creek-Santa Ana River watershed (Hydrologic Unit Code 180702030804) is 138,519 acres. Both watersheds drain to Middle Santa Ana River.

TEQUESQUITE ARROYO SUB-WATERSHED

The 30-square-mile Tequesquite Arroyo Sub-watershed stretches from the Santa Ana River to the west to the western edge of Moreno Valley in the east. The northern edge of this sub-watershed overlays most of the Academic Center and the southwestern portions of East Campus as well as the southern portion of West Campus (UC Davis 2021a).

EAST ETIWANDA CREEK-SANTA ANA RIVER SUB-WATERSHED

The 216.6-square-mile triangular-shaped East Etiwanda Creek-Santa Ana River Sub-watershed covers the middle portion of the Santa Ana River, the northern area of the City, and southern San Bernardino County. The southern edge of this sub-watershed overlays the northern and eastern portions of the UCR campus, including the UCR Botanic Gardens, areas east and north of the Academic Center in East Campus, and the northern portion of West Campus south of University Avenue (UC Davis 2021b).

Drainages and Drainage Patterns

Several arroyos, or dry creeks that experience flows in direct response to precipitation events in the City are tributaries to the Santa Ana River; portions are in their natural state, disturbed by human activities, and piped under urbanized areas before they reach the Santa Ana River. The major arroyos include Springbrook Wash, Tequesquite Arroyo, Alessandro Arroyo, Prenda Arroyo, Woodcrest Arroyo, and Mockingbird Canyon (City of Riverside 2007).

The general flow of runoff on the UCR campus is in a northwesterly direction (2021 LRDP). As such, the majority of runoff entering the UCR campus does so from the east. The existing storm drain network serving the UCR campus is comprised of UCR, City, and county drainage facilities. On-site and off-site stormwater is collected and discharged through overland flow, underground storm drains, and natural arroyos that ultimately discharge to open channel arroyos and large-diameter county drainage infrastructure.

Two major lines provide stormwater drainage on the UCR campus. The main line, known as the University Arroyo system, conveys the majority of stormwater runoff that flows toward and through campus from the east. Surface water runoff is collected by an inlet structure located near Valencia Hill Drive and Big Springs Road and is conveyed by the University Arroyo system in an east-west alignment through campus between Valencia Hill Drive and Canyon Crest Drive. The University Arroyo system discharges runoff to the Gage Detention Basin north of University Avenue at Canyon Crest Drive. Discharge is conveyed through aboveground swales, a 72-inch pipe, and finally a seven-foot-diameter box culvert (UCR 2016a). Surfaces in the University Arroyo system consist of both impermeable materials, such as concrete and asphalt that are used to construct the inlet and culvert facilities, as well as permeable materials, such as soils and vegetation that form the natural channel base. The composition of impermeable versus permeable materials present in the University Arroyo system has been shaped by previous and ongoing development.

Lateral lines drain the north, south, and east areas of East Campus. A second major storm drain on campus is in West Campus, east of Chicago Avenue and south of Martin Luther King Boulevard, known as the Box Springs Arroyo system. It handles runoff that accumulates from the foothills near the freeway and from the Agricultural Operations area south of Martin Luther King Boulevard. The Agricultural Operations area consists of mainly unpaved permeable areas, with no subsurface storm drains or catch basins (UCR 2015). No agricultural research irrigation runoff enters into the Box Springs Arroyo conveyance. The agricultural research lands include efficient irrigation system including drainage lines that capture any runoff for recirculation via a salvage and earthen reservoir system. Surface water resources and drainages on and near the UCR campus are shown in Figure 4.10-2 and described below.

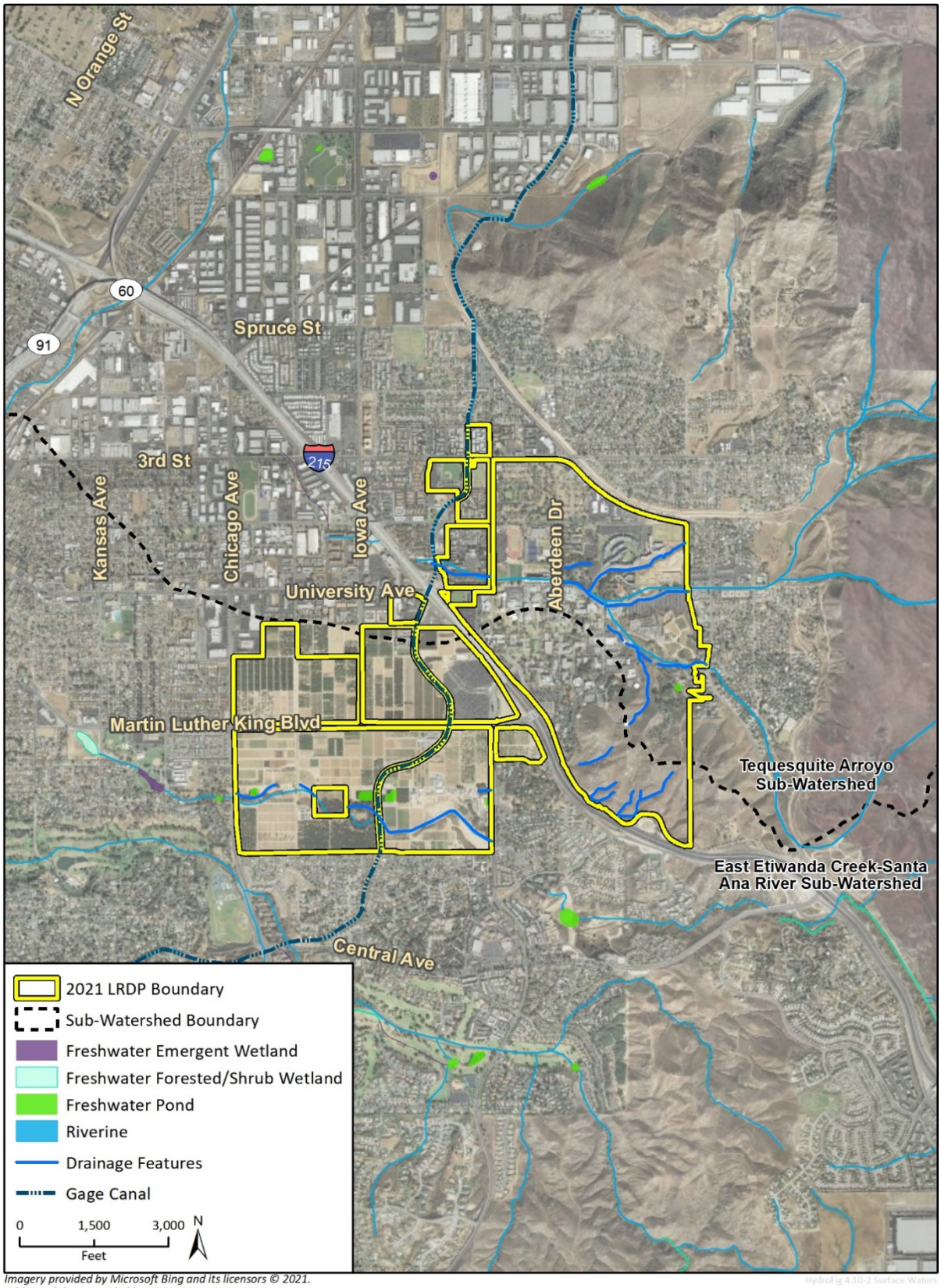
UNIVERSITY ARROYO SYSTEM

The majority of East Campus is located in the 2,294-acre University Arroyo system, generally defined by the Box Springs Mountains and the campus hills on the east and south, the I-215/SR 60 freeway on the west, and a line that follows West Linden Street, Valencia Hill Drive (north of the railroad), and the local foothills in the vicinity of Mount Vernon Drive on the north. Steep canyon tributaries from the mountains discharge surface runoff onto broad alluvial fans toward a confluence at Islander Park east of Watkins Drive. Surface runoff then flows westward towards UCR along Big Springs Road (UCR 2005).

The University Arroyo traverses along Big Springs Road, North Campus Drive, and University Avenue. Portions of this drainage have been channelized and are diverted underground via culverts. The University Arroyo has three on-campus tributaries: an unnamed arroyo, which enters the campus west of Valencia Hill Drive and traverses between the Pentland Hills and Lothian Residence Halls, the UCR Botanic Gardens Arroyo, which has two minor tributary channels and traverses the UCR Botanic Gardens and then traverses northwest towards East Campus Drive, and a small unnamed arroyo, which parallels East Campus Drive into the UCR Botanic Gardens tributary just east of Parking Lot 10 (UCR 2011). The western end of University Arroyo, north of University Avenue and west of Canyon Crest Drive is referred to as Gage Basin.

The unnamed northern tributary to the University Arroyo daylights from underground piping from Valencia Hill Drive northeast of the campus and traverses between Pentland Hills Residence Hall and Lothian Residence Hall to the glade at the northeast corner of Aberdeen Drive and North Campus Drive. Near Valencia Hill Drive, the arroyo has been stabilized as part of the Glen Mor 2 Arroyo Improvements Project. Gabion Walls have been added to stabilize and restore the meandering stream without restricting its flow. It is now a restored natural plant community and wildlife habitat (UCR 2020a). Figure 4.10-3 shows an aerial photo of the restored area.

Figure 4.10-2 Water Resources and Drainages On and Proximate to UCR Campus



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Additional data provided by USGS, 2020.; NWI, 2020.

HydroFig 4.10-2 Surface Waters

Figure 4.10-3 University Arroyo Tributary Looking Southwest

Photo credit: Stephanie Tang

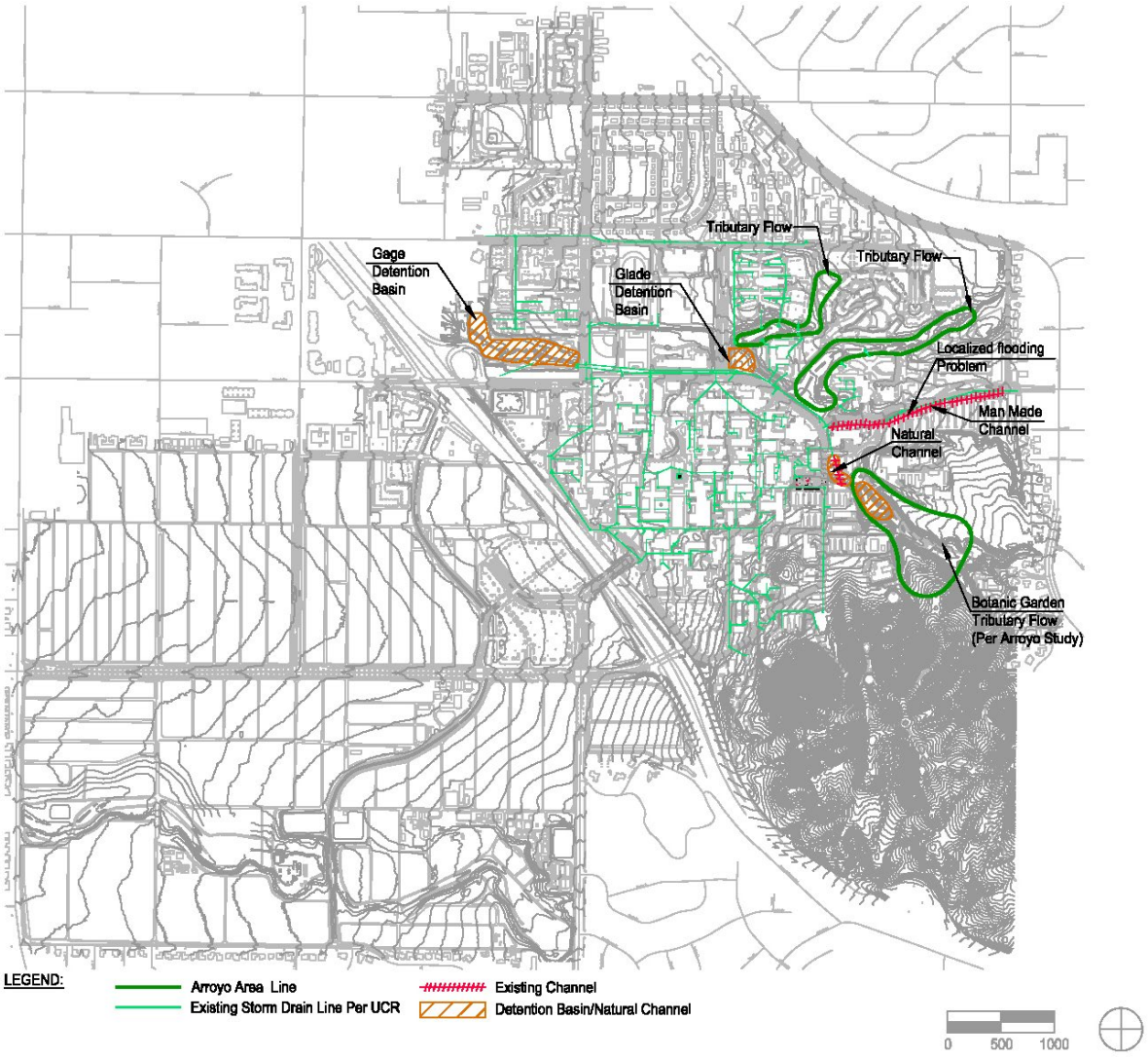
Between 2006 and 2010, UCR implemented the University Arroyo Flood Control and Enhancement System, which included a series of above and belowground improvements to the existing University Arroyo system, in order to provide the necessary capacity to convey stormwater flows associated with the 100-year storm event and not exceed the capacity of the municipal storm drain system. These improvements occurred in the University Arroyo as the arroyo flows from the eastern boundary of the campus at Valencia Hill Drive and Big Springs Road and the western edge of Parking Lots 10 and 13, as well as the athletic fields. Improvements included:

- Aboveground channel enlargements and enhancements in the form of bioswales placed along the southern edge of Big Springs Road and western edge of Parking Lot 10
- Enlargement of the junction area (north of North Campus Drive between Big Springs Road and Veitch Drive) detention capacity
- Creation of a detention basin downstream of the UCR Botanic Gardens parking lot
- Installation of a seven-foot-wide by seven-foot-tall underground culvert extending from the intersection of Big Springs Road and East Campus Drive to the Gage Basin at University Avenue and Canyon Crest Drive (UCOP 2006)

These improvements, collectively implemented as the University Arroyo Flood Control and Enhancement System, adapted the previous University Arroyo system to have sufficient flow conveyance capacity to accommodate the increased flows associated with buildout on the UCR campus. As improved, the current drainage system accepts surface runoff flows at the campus

boundary, moderates peak flows, and conveys both off-site flows and campus discharges to the downstream terminus at the Gage Basin. From the Gage Basin, discharges pass through the municipal storm drain system and ultimately the Santa Ana River (UCR 2011). Figure 4.10-4 shows the locations of the University Arroyo drainage channels, Gage Detention Basin, and Glade Detention Basin, the man-made channel along Big Springs Road, and existing storm drain lines.

Figure 4.10-4 East Campus Existing Drainage Conditions



Source: Psomas 2016

BOX SPRINGS ARROYO SYSTEM

Flows in the Box Springs Arroyo are controlled by the Box Springs Dam south of El Cerrito Drive, which is an earth-filled flood control dam located east of campus that controls runoff from approximately 2,500 acres of upstream area. Flow in the Box Springs Arroyo is conveyed under Canyon Crest Drive in a culvert for discharge into the natural channel, which is comprised of a flat, broad, ephemeral wash, meaning that it typically only contains flows in response to a storm event, or a release from the Box Springs Dam. As the arroyo continues westward, it has been subjected to

substantial modification, and is currently characterized as a shallow grassy swale. Continuing farther west, the arroyo is characterized as an incised channel bordered by eucalyptus trees, which conveys flows into a 54-inch pipe for conveyance under Chicago Avenue (UCR 2005). The transitioning of flows from a shallow grassy swale to an incised channel and ultimately to a 54-inch pipe results in higher flows being retained in the incised channel upstream. The Box Springs Arroyo is crossed by the channelized Gage Canal at the southern central portion of West Campus.

GAGE CANAL

The 20.13-miles-long Gage Canal carries water from the Santa Ana River and local aquifers that are fed by the San Bernardino Mountains. The canal has historically been the source of agricultural water for local citrus ranches and the groves of California Citrus State Historic Park (California Department of Parks and Recreation [CDPR] 2020). The canal provides irrigation water service to Riverside Public Utility (RPU) customers (including UCR). About 80 percent of canal water is sourced from wells, pipelines, and treatment plants that meet drinking water standards (RPU n.d.)[1]. The canal delivers 36,000-39,000 acre-feet of water to the Arlington Heights area of the city. Fifty-five percent of the water is delivered to citrus areas with the remaining 45 percent delivered to the City reservoir (Riverside-Corona Resource Conservation District [RCRCD] 2020). The UCR East and West Campuses are irrigated with water from the canal, which generally traverses north-south west of campus (UCR 2020a). The Gage Canal runs underground in certain areas of campus, including the UCR Baseball Complex, where it is aligned belowground south of Martin Luther King Boulevard then turns west and continues southward towards the center of West Campus. The canal continues underground near Le Conte Drive. Figure 4.10-5 shows the aboveground portion of the channelized canal in West Campus.

Figure 4.10-5 Gage Canal Looking East in West Campus

Photo credit: UCR

[1] The RPU service area can be found at https://cityofriverside.maps.arcgis.com/apps/webappviewer/index.html?id=ba09fd6a633d4f4390e66928b1000fab.

STORM DRAIN FACILITIES

The City municipal storm drain system receives runoff from the UCR campus and ultimately discharges to the Santa Ana River. The UCR campus is located in the Riverside County Flood Control and Water Conservation District (RCFCWCD) Master Drainage Plan areas for the Box Springs and University areas. The West Campus drains into the Box Springs Storm Drain system, with an east-west storm drain line along Martin Luther King Boulevard and a north-south storm drain line in the center of the western portion of West Campus. Existing RCFCWCD storm drain facilities in and proximate to the UCR campus are shown on Figure 4.10-6.

Flood Hazard Zones

Campus arroyos and major storm drainages are located in areas subject to flooding in response to the 100-year storm event; this is the magnitude storm that has potential to occur once every 100 years, or has a 1 percent chance of occurring during any given year. The Federal Emergency Management Agency (FEMA) identifies the majority of the UCR campus as Zone X, which refers to an Area of Minimal Flood Hazard. There is also a FEMA-designated Zone AE, which refers to areas subject to inundation by the 100-year storm event, surrounding University Wash and bisecting the UCR campus. This flood zone designation is shown on FEMA's Flood Insurance Rate Maps 06065C0727G and 06065C0726G, including Letter of Map Revision 10-09-0680P (FEMA 2008). FEMA flood zones on and near the UCR campus are shown in Figure 4.10-7.

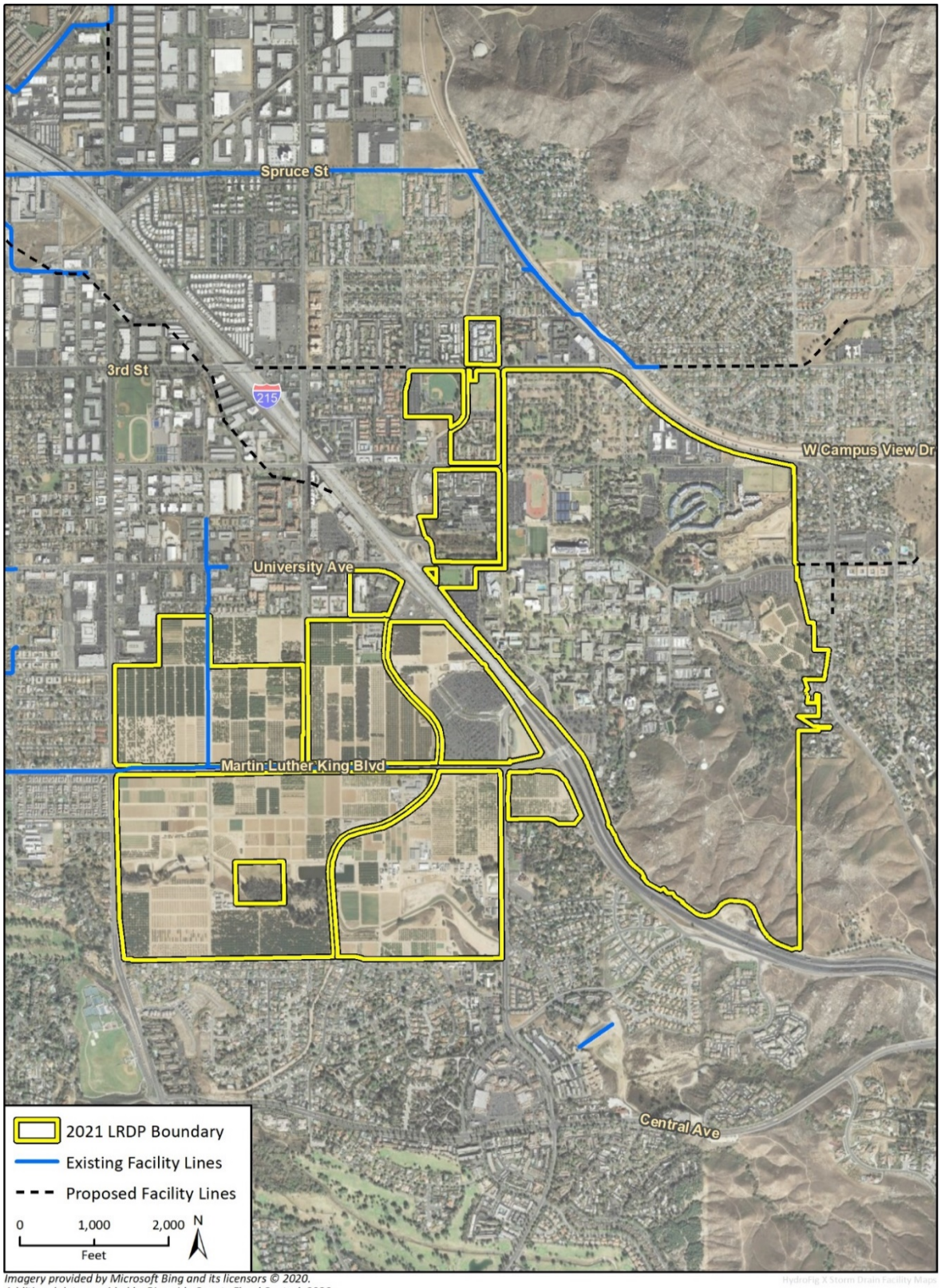
Groundwater

Groundwater Basins

UPPER SANTA ANA VALLEY GROUNDWATER BASIN

The City is mostly underlain by the 92-square mile Upper Santa Ana Valley Groundwater Basin. The Upper Santa Ana Valley Groundwater Basin includes nine subbasins defined by the California Department of Water Resources (DWR): Bunker Hill, Cajon, Rialto-Colton, Chino, Cucamonga, Yucaipa, San Timoteo, Riverside-Arlington, and Temescal; however, as discussed below under "Riverside-Arlington Groundwater Subbasin," some of the aforementioned subbasins are managed under different naming conventions. Aquifers of the Upper Santa Ana Valley Groundwater Basin are generally unconfined and comprise several subbasins filled with alluvial deposits eroded from the surrounding mountains. The thickness of these deposits ranges from less than 200 feet to more than 1,000 feet. Faults play an important role in the groundwater flow system here. The San Andreas Fault, which lies along the base of the San Bernardino Mountains, and other faults, which lie along the base of the San Gabriel Mountains and Chino Hills, bound the valley flow system on three sides. Other faults, such as the San Jacinto Fault, divide the Upper Santa Ana Valley Groundwater Basin into its subbasins. These interior faults locally restrict groundwater flow and control the location of groundwater discharge (USGS 2009). In general, groundwater in the basin flows the same direction as surface waters from the mountains in the east/north to the Pacific Ocean in the west (Santa Ana Watershed Project Authority [SAWPA] 2014).

Figure 4.10-6 RCFCWCD Stormwater Drainage Facilities On and Proximate to UCR Campus



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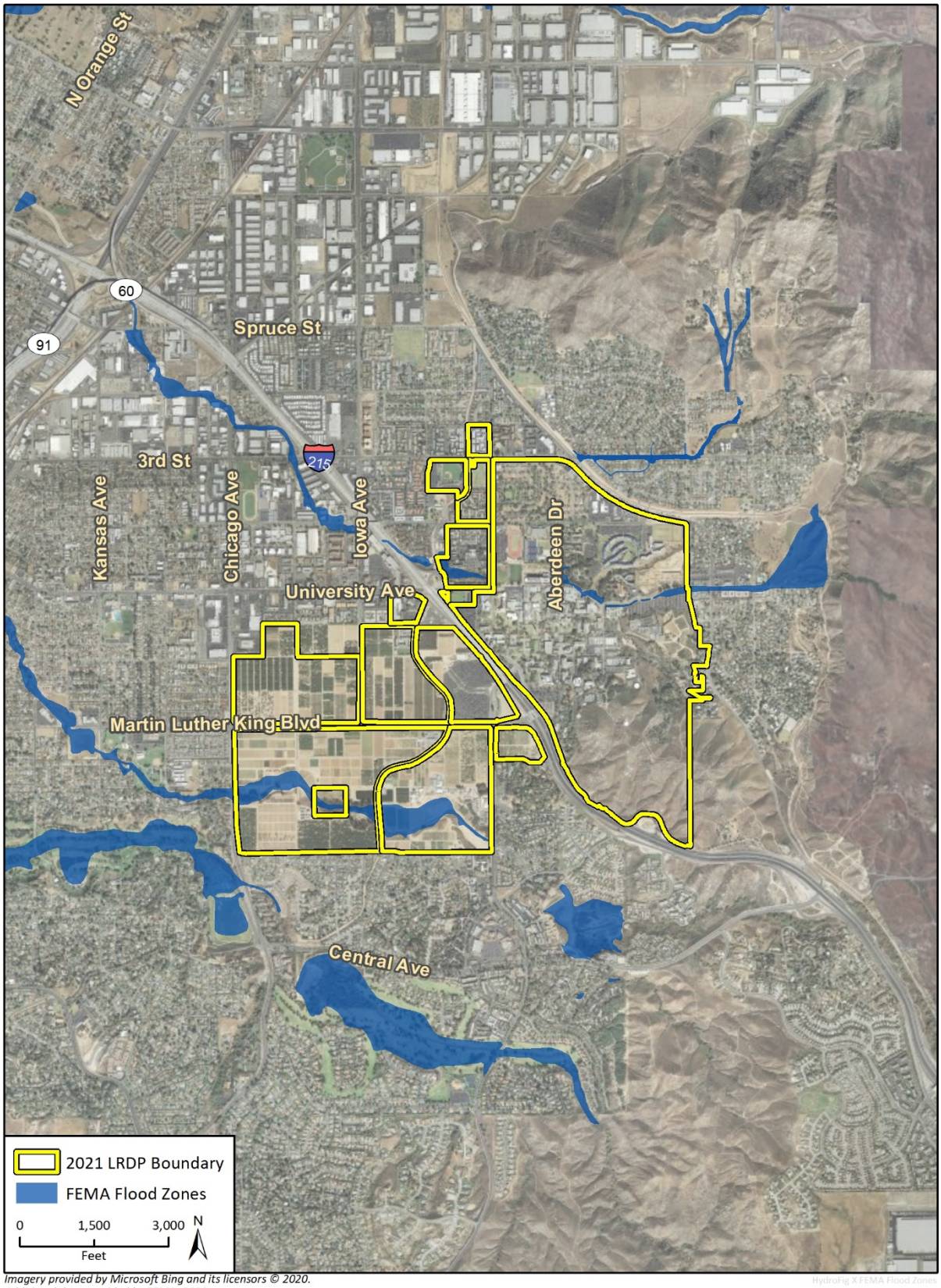
Additional data provided by Riverside County Flood Control, 2020.

Figure 4.10-7 Flood Hazard Zones On and Proximate to UCR Campus



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Additional data provided by FEMA, 2020.

RIVERSIDE-ARLINGTON GROUNDWATER SUBBASIN

The Riverside-Arlington Groundwater Subbasin (Groundwater Basin Number 8-2.03), as shown in Figure 4.10-8, underlays northwest Riverside County and southwest San Bernardino County. Groundwater in this Subbasin is stored primarily in clay, silt, and gravel alluvium deposited by the Santa Ana River and its tributaries (RPU 2016).

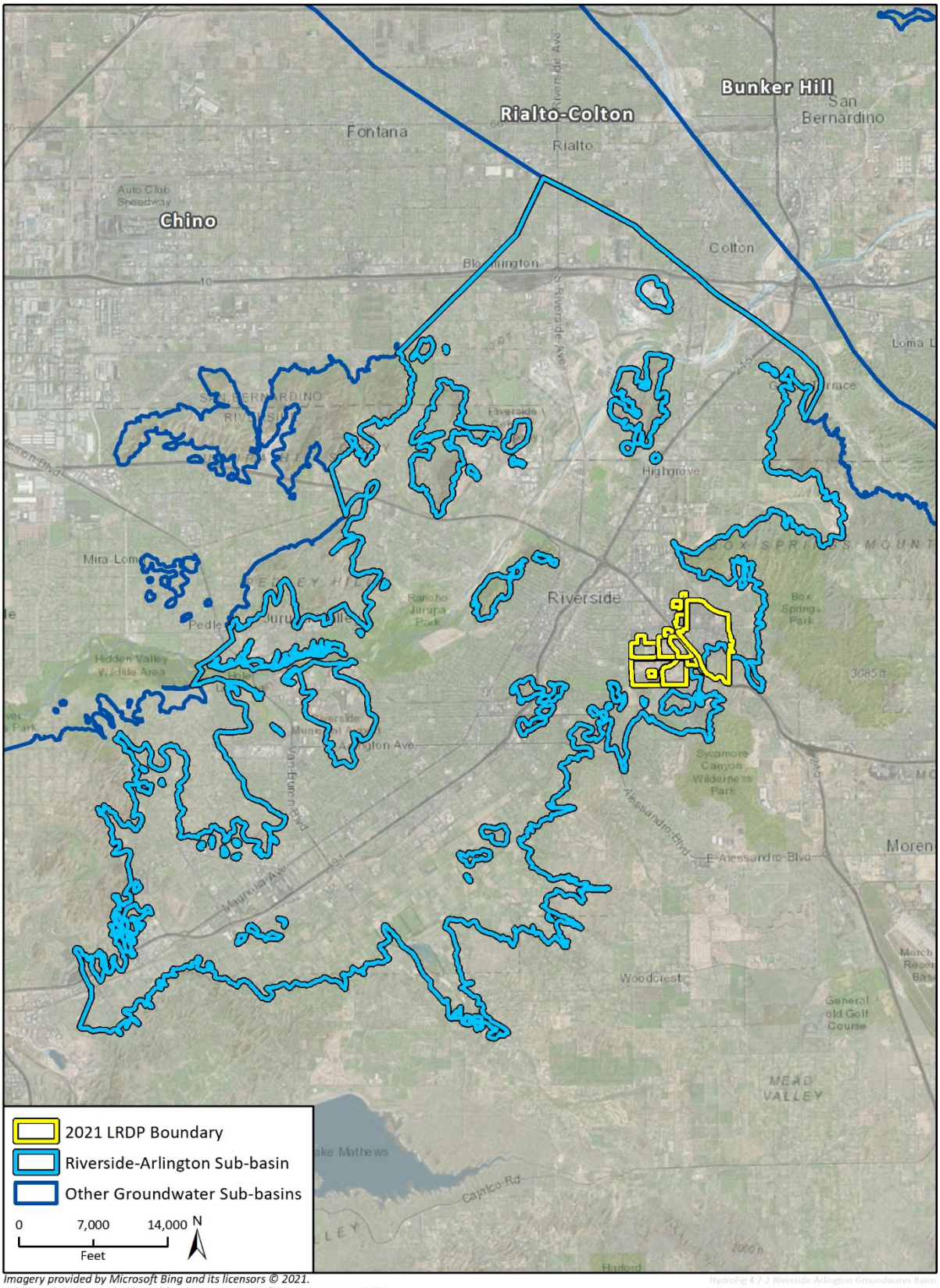
The Riverside-Arlington Groundwater Subbasin is bounded on the northwest by impermeable plutonic rocks of the Pedley Hills and Jurupa Hills, on the northeast boundary by the Rialto-Colton fault, on the southeast by impermeable rocks of the Box Springs Mountains, on the south by Arlington Mountain, and on the west by the La Sierra Hills and the adjoining Temescal Subbasin, which is separated from the Riverside-Arlington Groundwater Subbasin by a narrow bedrock constriction. The Santa Ana River flows over the northern portion of the Riverside-Arlington Groundwater Subbasin. A groundwater divide in the alluvium separates the Riverside portion from the Arlington portion of the Subbasin (DWR 2016). The Riverside-Arlington Groundwater Subbasin is replenished by infiltration from Santa Ana River flow, underflow past the Rialto-Colton fault, intermittent underflow from the Chino subbasin, return irrigation flow, wastewater discharge, and deep percolation of precipitation (Upper Santa Ana Water Resources Association [USAWRA 2015]).

While identified as a single subbasin by DWR, a litigious history has resulted in unique management-based delineations in the area, including as related to the Riverside-Arlington Groundwater Subbasin. The 1969 Western-San Bernardino Judgment ("Adjudication Judgment") (*Western Municipal Water District [WMWD] of Riverside County et al. v. East San Bernardino County Water District et al.*, Case No. 78426) settled extraction rights throughout the Upper Santa Ana River watershed to meet flow obligations to lower reaches of the river. A copy of the Adjudication Judgment is included as Appendix I to the 2015 Riverside Public Utilities Urban Water Management Plan. The Adjudication Judgment resulted in adjudication of a portion of the subbasin (the Riverside portion), with the remainder of the subbasin (the Arlington portion) remaining non-adjudicated. The basin area of the Riverside-Arlington Groundwater Subbasin is 56,563 acres. The adjudicated portion is 37,217 acres, or 65.8 percent, while the non-adjudicated portion is 19,346 acres, or 34.2 percent. The DWR has computed the groundwater volume for the non-adjudicated portion of this subbasin as 7,778 acre-feet (DWR 2019). Two watermasters, one appointed by the San Bernardino Valley Municipal Water District and one appointed by WMWD, oversee groundwater extractions in the adjudicated portions of the basin and ensure compliance with the judgment (RPU 2016).

The Western-San Bernardino Judgment addresses groundwater management in the Rialto-Colton Subbasin, Riverside-Arlington Subbasin, and the San Bernardino Basin Area (SBBA), which contains the Bunker Hill and Lytle Creek Subbasins (RPU 2016). The Adjudication Judgment provides a determination of the safe yield for the SBBA, establishes specific amounts of water that can be extracted from the SBBA by parties in Riverside County, and identifies the following requirements towards the purpose of maintaining sustainable groundwater conditions (USAWRA 2015):

- Valley District must provide replenishment for extractions from the SBBA by nonplaintiffs (entities in the Valley District service area) in aggregate exceeding 72.05 percent of the safe yield, which is 167,228 acre-feet per year (AFY)
- WMWD must replenish the Rialto-Colton and Riverside-Arlington basins if extractions for use in Riverside County in aggregate exceed certain specific amounts
- Valley District must replenish the Rialto-Colton and Riverside-Arlington Subbasins if water levels are lower than certain specific water level elevations in specified wells

Figure 4.10-8 Riverside-Arlington Groundwater Subbasin Boundary



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Additional data provided by California Department of Water Resources, 2020.

HydroFig 4.7-2 Riverside-Arlington Groundwater Basin

As listed above, the Adjudication Judgment identifies parties responsible for replenishing groundwater extractions that result in overdraft or exceeding the identified safe yield of the affected basin or subbasin. For the Riverside-Arlington Subbasin, the requirement for replenishment is determined by groundwater levels in specified wells which are indicative of safe yield in the area.

UCR Campus Groundwater Conditions

The UCR campus is located in the Upper Santa Ana Valley Groundwater Basin and is mostly underlain by the adjudicated portion of the Riverside-Arlington Groundwater Subbasin. The southeastern portion of the UCR campus is not located in a designated groundwater subbasin. The campus is not designated as a groundwater recharge area, nor does the campus serve as a primary source of groundwater recharge in the subbasin. The soils underlying the East Campus are designated as Class D, the least-permeable soil type, and the soils underlying the West Campus are Class C, which has intermediate permeability (UCR 2005). Groundwater may also be contained in isolated perched water tables that are separated from the regional aquifer by unsaturated rock. Table 4.10-1 presents recorded depths to groundwater at wells near the UCR campus. As described in the California DWR's Bulletin 118 for the Upper Santa Ana Valley Groundwater Basin, groundwater flow direction is defined by local fault presence and generally flows in a northwest direction near Arlington, then flows southwest to Arlington Gap, through which it flows into the Temescal Subbasin (DWR 2004). Based on historical well data in the vicinity, it is estimated that groundwater depths near campus vary from approximately 73 feet below the ground surface to 175 feet below ground surface.

Table 4.10-1 Depth to Groundwater

Site	Local Well ID	Distance from UCR Campus	Depth to Groundwater (bgs)[1]	Date of Measurement[2]
Well Site Code: 339840N1173750W001	Fox Metro (inactive)	1.7 miles northwest of West Campus	73.5	March 8, 2016
Well Site Code: 339690N1173590W001	Clearwater (inactive)	0.6 mile east of West Campus	142.4	April 20, 2020
Well Site Code: 340180N1173300W001	Highgrove 3 (inactive)	2.3 miles north of East Campus	175.2	April 27, 2020

[1] bgs = below ground surface (in feet)

[2] The most recent available groundwater level measurement available was used. Where measurement was recorded as "questionable data," the most recently available non-questionable data point was used.

Source: DWR 2020

Groundwater Management

Groundwater management activities are undertaken in cooperation with local agencies including RPU, WMWD, Valley District, SAWPA, and the San Bernardino Valley Water Conservation District. The Western-San Bernardino Watermaster manages and reports on the conditions of the local groundwater basins and administers the Adjudication Judgement for the adjudicated area. Annually, Valley District publishes an engineering report to determine the replenishment requirements for the Bunker Hill Subbasin in the ensuing water year. The Integrated Regional Water Management Plan (IRWMP) for the Upper Santa Ana River Watershed focuses on long-term management of water resources in the Bunker Hill and Rialto-Colton Subbasins and the reduction of reliance on imported water (USAWRA 2015). The Valley District, which is the lead agency for the IRWMP, has established target ranges for groundwater level management within Bunker Hill Subbasin and is obligated under

the Western-San Bernardino Judgment to maintain water levels in the Rialto-Colton and Riverside North Subbasins (RPU 2016).

As discussed above under "Riverside-Arlington Groundwater Subbasin", groundwater management for approximately 65 percent of this subbasin occurs through administration of an Adjudication Judgement by the Western-San Bernardino Watermaster. The portion of the Riverside-Arlington Groundwater Subbasin that is not adjudicated is identified by the DWR as a Low-Priority groundwater basin. Basins that are designated as High Priority are subject to the Sustainable Groundwater Management Act (SGMA) of 2014, and a Groundwater Sustainability Plan is required to be developed and implemented by a DWR-approved Groundwater Sustainability Agency, toward the purpose of achieving and maintaining sustainable groundwater conditions. DWR's prioritization of the Riverside-Arlington Groundwater Subbasin has changed over recent years, as described below:

- 2014: Basin prioritization – High. Water quality degradation issues known in several public supply wells.
- 2016: Riverside-Arlington Groundwater Subbasin boundaries modified along with the boundaries of Yucaipa Subbasin 8-002.07, Bunker Hill Subbasin 8-002.06, and Rialto-Colton Subbasin 8-002.04 to align with adjudicated areas.
- 2018: Draft Basin Prioritization – High. Hydrographs generally show increasing water levels starting around 1960 and stabilizing or declining somewhat after the 1980s.
- 2018: Final Basin Prioritization – Very Low.
- 2019: DWR released the *Sustainable Groundwater Management Act 2018 Basin Prioritization* report, which outlined the process involved with reassessing the priority of the groundwater basins in California following the 2016 basin boundary modifications; through this process, the Arlington Basin was designated as very low-priority, and therefore not requiring a GSP (WMWD 2021).

The Groundwater Sustainability Plan for the Riverside-Arlington Groundwater Subbasin is scheduled for completion in early 2022 (CNRA 2015).

RIVERSIDE PUBLIC UTILITIES

RPU has facilities that extract groundwater from five groundwater subbasins: Bunker Hill, Rialto-Colton, Riverside North, Riverside South, and Arlington Subbasins, described below. As discussed above, portions of the Santa Ana Valley Groundwater Basin are adjudicated, including the aforementioned subbasins; although the 1969 Adjudication Judgement refers to the subbasins below as "management areas", for the purposes of this analysis, the term "subbasin" is used for consistency with DWR Bulletin 118 and RPU Water Division's current (2015) Urban Water Management Plan (UWMP) for Riverside (RPU 2016).

- **Bunker Hill Subbasin:** The Bunker Hill Subbasin is a valley-fill aquifer comprised of six confining and water-bearing hydrogeologic units. The Bunker Hill Subbasin lies between the San Andreas and San Jacinto Faults. The primary source of recharge for the Bunker Hill Subbasin is runoff from precipitation in the San Bernardino Mountains to the north and San Gabriel Mountains to the northwest. The Santa Ana River, Mill Creek, Lytle Creek, and smaller tributaries contribute most of the total recharge to the groundwater system. The subbasin is also replenished by deep percolation of water from precipitation and resulting runoff, percolation from delivered water,

and water spread in streambeds and spreading grounds (USARWA 2015). RPU's extraction rights from the Bunker Hill Subbasin are 55,263 AFY (RPU 2016).

- **Rialto-Colton Subbasin:** The Rialto-Colton Subbasin is bounded by the San Jacinto fault to the northeast, Rialto-Colton fault to the southwest, the San Gabriel Mountains to the northwest, and Badlands to the southeast. This subbasin is about 10 miles long and varies in width from about 3.5 miles in the northwestern part to about 1.5 miles in the southeastern part. The principal recharge areas are Lytle Creek, Reche Canyon, and the Santa Ana River. Artificial recharge is also used to maintain basin levels. The Rialto-Colton Basin consists of four hydrostratigraphic units with the water-bearing units expressing unconfined to partly confined properties. RPU's extraction rights from the Rialto-Colton Subbasin are 2,728 AFY (RPU 2016).
- **Riverside (North and South) Subbasins:** The Riverside Subbasin is bounded by the Rialto-Colton fault to the north, Arlington Subbasin to the south, Box Spring Mountains to the east, and Chino Basin to the west. The Riverside Subbasin is an alluvial fill, unconfined basin. The Western-San Bernardino Judgment divides the Riverside Subbasin into two areas, based on jurisdictional boundaries: the portion of the Riverside Subbasin in San Bernardino County (Riverside North Subbasin) and the portion of the Riverside Subbasin in Riverside County (Riverside South Subbasin). RPU's extraction rights from Riverside North Subbasin are 10,902 AFY, and RPU's extraction rights from Riverside South are 16,880 AFY (RPU 2016).
- **Arlington Subbasin:** The Arlington Subbasin consists of alluvial deposits and is located between the Riverside South Subbasin and the Temescal Subbasin. The Arlington Subbasin is not currently used by RPU due to the high levels of total dissolved solids and nitrates. RPU may use the Arlington Subbasin as a source of water supply in the future if the costs for alternative new supplies make treatment of water from this source cost-effective. The Arlington Subbasin is not adjudicated (RPU 2016).

In addition to the subbasin areas summarized above, the IRWMP also discusses regional groundwater supplies in terms of the SBBA, which is comprised of the Bunker Hill and Lytle Creek Subbasins, and contributes a major source of water supply for agencies in San Bernardino and Riverside Counties (USAWRA 2015). The IRWMP reports that the SBBA, including the Bunker Hill and Lytle Creek Subbasins, is affected by overdraft conditions, but there are sufficient supplies to meet replenishment obligations (USAWRA 2015). In addition, the RPU Water Division's 2015 UWMP for Riverside reports that a 2011 Groundwater Management Plan (GWMP) was developed by RPU in collaboration with WMWD, the Valley District, SAWPA, and other local water purveyors, and identified that Riverside North Subbasin is currently overdrafted, and both Riverside North and Riverside South Subbasins are projected to be overdrafted (RPU 2016). The Arlington Subbasin is also affected by overdraft conditions and will be managed by WMWD pursuant to the Arlington Basin GWMP.

The Valley District is obligated per the Western-San Bernardino Judgment to maintain water levels in the Bunker Hill and Rialto-Colton Subbasins and in the Riverside North Subbasin. In addition, WMWD is required to replenish excess extractions above the base period extractions in Rialto-Colton, Riverside North, and Riverside South Subbasins as specified in the Western-San Bernardino Judgment. Furthermore, RPU contributes to efforts to monitor and manage the surrounding groundwater basins and participates in independent groundwater level and quality monitoring in Bunker Hill, Riverside, and Arlington Subbasins. All groundwater production in Riverside is metered and extractions are reported to the Western-San Bernardino Watermaster (RPU 2016).

RPU operates a total of 201 wells, of which 50 are potable wells, 14 are non-potable wells, 85 are monitoring wells, 50 are not active (i.e., standby, out of service, abandoned, destroyed or unknown), and two are not categorized. RPU met all the water supply demand in its service area in 2019 by utilizing groundwater sources, among other water sources (RPU 2019). In 2020, RPU supplies included approximately 88,773 AFY of groundwater resources, 6,430 AFY of recycled water, and 21,700 AFY of purchased or imported water. Therefore, groundwater constitutes nearly 80 percent of the RPU current potable and non-potable water supply. Approximately 60 percent of groundwater supplies originate from the Bunker Hill Subbasin, which is adjudicated. RPU water rights are based on the long-term safe yield from the Bunker Hill Subbasin, which includes wet, dry, and normal periods. RPU wells are generally located in the section of the basin with the greatest thickness of water bearing layers. Thus, RPU water supply from the Bunker Hill Subbasin is considered reliable during single and multi-year dry periods (RPU 2016). Additional information on water supply, including reliability and quality, is available in the RPU Urban Water Management Plan, which is incorporated by reference.

WESTERN MUNICIPAL WATER DISTRICT

Several local water purveyors in western Riverside County, including the cities of Norco and Corona, Box Springs Mutual Water Company, Western Retail, Eagle Valley Mutual Water Company, Elsinore Valley Municipal Water District, Temescal Valley Water District, and Rancho California Water District, purchase water from WMWD. Additionally, WMWD retail service includes unincorporated areas around Lake Mathews, Murrieta, and unincorporated Riverside County south of Temecula (WMWD 2016). Groundwater comprised 21 percent of WMWD's total supply in 2015. Groundwater from four subbasins constitute primary source of groundwater supply for WMWD: the Riverside-Arlington Groundwater Subbasin, the Temecula-Murrieta Subbasin, the San Bernardino Subbasin, and the Chino Subbasin. None of these basins or subbasins are considered critically overdrafted, and adjudicated basins are closely monitored and annually assessed for adequate groundwater pumping and recharge (WMWD 2016).

Water Quality

There are two major classes of water pollutants: point source and non-point source. Point-source pollutants can be traced to their original source and are discharged directly from pipes or spills. Raw sewage discharging directly into a stream is an example of a point-source water pollutant. Non-point-source pollutants cannot be traced to a specific original source. Non-point-source pollution is caused by precipitation runoff collecting natural and human-made pollutants before depositing them into various watersheds, including lakes, rivers, wetlands, coastal waters, and groundwater (United States Environmental Protection Agency [US EPA] 2018).

The primary sources of surface and groundwater pollution enter the water system via stormwater runoff from paved areas. As water travels over the surface of land or through the ground, it dissolves naturally occurring minerals, and in some cases radioactive materials, and can pick up substances resulting from the presence of animals or human activity. Bunker Hill and Riverside Groundwater Subbasins are considered most vulnerable to historical contamination from industrial and agricultural operations. Contaminants that may be present in source water include:

- Microbial contaminants, such as viruses and bacteria that may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife

- Inorganic contaminants, such as salts and metals that can be naturally occurring or result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining, or farming
- Pesticides and Herbicides, which may come from a variety of sources, such as agriculture, urban stormwater runoff, and residential uses
- Organic chemical contaminants, including synthetic and volatile organic chemicals, which are by-products of industrial processes and petroleum production and can also come from gas stations, urban stormwater runoff, agricultural application, and septic systems
- Radioactive contaminants, which can be naturally occurring or be the result of oil and gas production and mining activities

Surface Water Quality

The Santa Ana RWQCB develops water quality standards for the Santa Ana River to fulfill designated beneficial uses of the river. Water bodies that fail to meet these standards are listed as impaired, and a total maximum daily load (TMDL) limit may be required to allocate the maximum pollutant load the water body may receive and still meet its water quality standards. Reaches 3, 4, and 6 of the Santa Ana River are listed on the 2014/2016 California Clean Water Act (CWA) section 303(d) List as impaired with an Integrated Report category of 5, indicating water quality standards are not met and requiring a TMDL. A TMDL is required but has not yet been completed for at least one of the pollutants listed for the segment (State Water Resources Control Board [SWRCB] 2018). Designated beneficial uses and impairments for all reaches of the Santa Ana River and downstream reaches are summarized in Table 4.10-2.

Table 4.10-2 Santa Ana River Surface Water Pollutants and Contamination Categories

Water Body	Designated Beneficial Uses	Impairments	Integrated Report Category
Santa Ana River – Reach 6	Municipal, Agriculture, Groundwater Recharge, Recreational 1, Recreational 2, Power, Wildlife Habitat, Spawning	Cadmium, Copper, Lead (TMDL Required)	Category 5[1]
Santa Ana River – Reach 5	Warm Freshwater Habitat	Alachlor, Atrazine, Azinphos-methyl (Guthion), Carbaryl, Carbofuran, Chloride, Chlorpyrifos, DDE (Dichlorodiphenyldichloroethylene), Diazinon, Dieldrin, Disulfoton, Malathion, Methyl Parathion, Molinate, Simazine, Sulfates, Thiobencarb/Bolero, Toxicity	Category 2[2]
Santa Ana River – Reach 4	Groundwater Recharge, Water Contact Recreation, Non-Contact Water Recreation, Warm Freshwater Habitat, Wildlife Habitat, Rare, Threatened or Endangered Species, Spawning, Reproduction and Development	Indicator Bacteria (TMDL Required)	Category 5

Water Body	Designated Beneficial Uses	Impairments	Integrated Report Category
Santa Ana River – Reach 3	Agricultural Supply, Groundwater Recharge, Water Contact Recreation, Non-Contact Water Recreation, Warm Freshwater Habitat, Wildlife Habitat, Rare, Threatened or Endangered Species, Spawning, Reproduction and Development	Copper (TMDL Required) Lead (TMDL Required) Indicator Bacteria (TMDL Approved)	Category 5
Santa Ana River – Reach 2	Agricultural Supply, Groundwater Recharge, Water Contact Recreation, Non-Contact Water Recreation, Warm Freshwater Habitat, Wildlife Habitat, Rare, Threatened or Endangered Species	Not Impaired	Category 1[3]
Santa Ana River – Reach 1	Water Contact Recreation, Non-Contact Water Recreation, Warm Freshwater Habitat (intermittent), Wildlife Habitat (intermittent)	Not Impaired	Category 1

TMDL = Total Maximum Daily Load

[1] Category 5 Criteria: A water segment where standards are not met and a TMDL is required, but not yet completed, for at least one of the pollutants being listed for this segment.

[2] Category 2 Criteria: A water segment with water quality information that is insufficient to determine an appropriate decision recommendation, for reasons such as: monitoring data have poor quality assurance, not enough samples in a dataset, no existing numerical objective or evaluation guideline, the information alone cannot support an assessment, etc.

[3] Category 1 Criteria : A water that fully supports at least one of its California beneficial uses, has other uses that are not assessed or lack sufficient information to be assessed, and for which no assessed uses are not supported.

Note: Pursuant to the Clean Water Act section 303(d), each State is required to submit to the US EPA a list identifying water bodies not meeting water quality standards. The water bodies listed in this table are on California's 2014/2016 303(d) list for the pollutants indicated.

Source: SWRCB 2017

As shown in Table 4.10-2, Reach 6 of the Santa Ana River is impaired for cadmium, copper, and lead and Reach 3 of the Santa Ana River is impaired for indicator bacteria, copper, and lead, and Reach 4 is impaired for indicator bacteria. The decomposition of excess organic waste may cause increased growth of undesirable organisms, such as bacteria, in the water. Pathogenic microorganisms (including bacteria, viruses, and protozoans) are associated with fecal waste and can cause a variety of diseases either through the consumption of contaminated shellfish or ingestion of tainted water (US EPA 2006). Metals of concern, including copper and lead, can be toxic to aquatic and human life. Humans can be impacted from contaminated groundwater resources and bioaccumulation of metals in fish and shellfish. Primary sources of metal pollution in stormwater are typically commercially-available metals and metal products. Along with brake pads and tires from cars, the exposure of building materials such as architectural copper to rain, can pollute stormwater runoff. Other potential metals sources include soil erosion, household chemicals, and pesticides (Wright Water Engineers, Inc. 2011).

Groundwater Water Quality

Groundwater extracted by RPU is blended and chlorinated prior to distribution, reducing vulnerability to contamination at individual wells (RPU 2016). In 2019, RPU collected approximately 27,600 water samples to test for a variety of potential contaminants. Samples were collected at water sources, along transmission pipelines, throughout the distribution system, including

reservoirs and booster stations, and treatment plants (RPU 2019). Table 4.10-3 shows the contamination levels found during the water sample. None of the average contamination levels in RPU groundwater supply sources were greater than the State maximum contaminant level.

Table 4.10-3 RPU System Groundwater Contamination Levels (Regulated Chemicals)

Contaminant Category	Contaminant	State Maximum Contaminant Level	State Public Health Goal	RPU Average	RPU Range	Sources in Drinking Water
Microbiological	Coliform	>5%	0 (MCLG)	0.18%	0 - 1%	Naturally present in environment
Clarity	Turbidity	Treatment Technique[1]	No standard	0.1 Nephelometric Turbidity Units (Highest)	100% Meeting turbidity limits	Soil runoff
Regulated Organic	Total Trihalomethanes	80 ppb	No standard	6.8 ppb	1.2-10 ppb	By-product of drinking water disinfection
Regulated Inorganic	Arsenic	10 ppb	4 ppt	0.3 µg/L	0-2.6 µg/L	Erosion of natural deposits
Regulated Inorganic	Fluoride	2 ppm	1 ppm	0.46 mg/L	0.40-0.54 mg/L	Naturally present in environment
Regulated Inorganic	Nitrate (as nitrogen)	10 ppm	10 ppm	5.5 mg/L	4.7-7 mg/L	Naturally present in environment
Regulated Inorganic	Perchlorate	6 ppb	1 ppb	Not detected at the detection limit for reporting.	Not detected at the detection limit for reporting.	Inorganic chemical used in variety of industrial operatives
Radiological	Gross Alpha	15 pCi/L	0 pCi/L	0.34 pCi/L	ND-4.6 pCi/L	Erosion of natural deposits
Radiological	Uranium	20 pCi/L	0.43 pCi/L	6.9 pCi/L	4.7-11 pCi/L	Erosion of natural deposits
Lead/Copper	Copper	1300 ppb	300 ppb	440 ppb	ND-840 ppb	Internal corrosion of home plumbing

[1]A required process intended to reduce the level of a contaminant in drinking water.

MCLG=Maximum Contaminant Level Goal (The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs are set by the US EPA).

RPU = Riverside Public Utilities, Ppb = parts per billion, Ppm = parts per million, µg/L = micrograms per liter, mg/L = milligrams per liter, pCi/L = Picocuries per liter

Source: RPU 2019

4.10.2 Regulatory Setting

Federal

Clean Water Act

Congress enacted the Clean Water Act (CWA), formally the Federal Water Pollution Control Act of 1972, with the intent of restoring and maintaining the chemical, physical, and biological integrity of the Waters of the United States (U.S.). The act established the basic structure for regulating discharges of pollutants into the waters of the U.S. and requires states to set standards to protect, maintain, and restore water quality through the regulation of point source and non-point source discharges to surface water. Those discharges are regulated by the National Pollutant Discharge Elimination System (NPDES) permit process (CWA Section 402). At the State and regional levels in California, the SWRCB and its nine RWQCBs administer NPDES permitting authority and enforce the CWA. The UCR campus is under the jurisdiction of the Santa Ana RWQCB (Region 8).

SECTION 303 (WATER QUALITY STANDARDS AND TOTAL MAXIMUM DAILY LOADS)

Section 303(d) of the CWA (CWA, 33 USC 1250, et seq., at 1313(d)) requires states to identify "impaired" water bodies as those which do not meet water quality standards. States are required to compile this information in a list and submit the list to the US EPA for review and approval. This list is known as the Section 303(d) list of impaired waters. As part of this listing process, states must prioritize waters and watersheds for future development of TMDLs. TMDLs are estimates of the total load of pollutants from point, non-point, and natural sources that a water body may receive without exceeding applicable water quality standards. Once established, the TMDL is allocated among current and future pollutant sources to the water body. The SWRCB and RWQCBs enact ongoing efforts to monitor and assess water quality, to prepare the Section 303(d) list, and to develop TMDL requirements.

SECTION 311 (SPILL PREVENTION, CONTROL, AND COUNTERMEASURES PLAN)

Section 311 of the CWA requires any person in charge of a vessel, an onshore facility, or an offshore facility, as soon as she/he has knowledge of any discharge of oil or a hazardous substance that may be harmful, to notify immediately the appropriate federal agency of the discharge. The regulation requires that all regulated facilities fully prepare and implement a Spill Prevention, Control, and Countermeasures (SPCC) Plan. A SPCC Plan is a detailed, facility-specific, written description of how a facility's operations comply with the prevention guidelines in the Oil Pollution Prevention regulation. These guidelines include measures such as secondary containment, facility drainage, dikes or barriers, sump and collection systems, retention ponds, curbing, tank corrosion protection systems (TCPS), and liquid devices. A registered professional engineer must certify each SPCC Plan, unless the owner/operator is able to, and chooses to, self-certify the plan.

The regulation applies to non-transportation-related facilities with a total aggregate above ground (i.e., not completely buried) oil storage capacity of greater than 1,320 gallons or total underground (i.e., buried) oil storage capacity greater than 42,000 gallons. This regulation applies specifically to a facility's storage capacity (regardless of whether the tank[s] are filled). In addition to the storage capacity criteria, a reasonable expectation must exist that the facility, due to its location, could discharge oil into navigable waters of the U.S. or adjoining shorelines, or certain other areas.

SECTION 401 (WATER QUALITY CERTIFICATION)

Under Section 401 of the CWA, the RWQCBs have regulatory authority over actions in Waters of the U.S. and/or the State of California through the issuance of water quality certifications, which are issued in conjunction with any federal permit (e.g., permits issued by the U.S. Army Corps of Engineers under Section 404 of the CWA, described below). Section 401 of the CWA requires that the RWQCB certify any activity that may result in discharges into a state water body. This certification indicates the proposed activity does not violate federal and/or State water quality standards, including those protecting beneficial uses and water quality. The limits of non-tidal waters extend to the Ordinary High Water Mark, defined as the line on the shore established by the fluctuation of water and indicated by physical characteristics, such as natural line impressed on the bank, changes in the character of the soil, and presence of debris. The U.S. Army Corps of Engineers (USACE) may issue either individual, site-specific permits or general, nationwide permits for discharge into Waters of the U.S.

SECTION 402 (NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM PERMIT)

Section 402 of the CWA regulates point-source (e.g., pipe, ditch, or channel) discharges to surface waters (other than dredge or fill material), requiring permission under the NPDES permitting system, administered by the US EPA. All NPDES permits are written to ensure that the surface water receiving discharges will achieve specified water quality standards. In California, the NPDES permit program is administered by the SWRCB through the RWQCBs and requires municipalities to obtain permits that outline programs and activities to control wastewater and stormwater pollution. The SWRCB establishes requirements prescribing the quality of point sources of discharge and water quality objectives, which are based on the designated beneficial uses (e.g., water supply, recreation, and habitat) for a particular surface water body. The NPDES permits are issued to point source dischargers of pollutants to surface waters pursuant to Water Code Chapter 5.5, which implements the federal CWA. Examples include, but are not limited to, public wastewater treatment facilities, industries, power plants, and groundwater cleanup programs discharging to surface waters (SWRCB, Title 23, Chapter 9, Section 2200). The RWQCB establishes and regulates discharge limits under the NPDES permits.

SECTION 404 (DISCHARGE OF DREDGE AND FILL OF WATERS OF THE UNITED STATES PERMIT)

Section 404 of the CWA allows the discharge of fill material into Waters of the U.S., including wetlands, lakes, streams, and rivers, as permitted under approval by the USACE and US EPA. To discharge dredged or fill material into Waters of the U.S., including wetlands, Section 404 requires projects to receive authorization from the Secretary of the Army, acting through the USACE.

The USACE identifies wetlands using a multi-parameter approach, which requires positive wetland indicators in three distinct environmental categories: hydrology, soils, and vegetation. According to the *Corps of Engineers Wetlands Delineation Manual* (1987), except in certain situations, all three parameters must be satisfied for an area to be considered a jurisdictional wetland. The *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region* (USACE 2008) is also used when conducting jurisdictional wetland determinations in areas identified in the boundaries of the arid west, such as the Coachella Valley.

When an application for a Section 404 permit is made, the Applicant must show it has:

- Taken steps to avoid impacts to wetlands or Waters of the U.S. where practicable
- Minimized unavoidable impacts on Waters of the U.S. and wetlands
- Provided mitigation for unavoidable impacts

Floodplain Management Executive Order 11988

Floodplain Management Executive Order 11988 (May 24, 1977) directs all federal agencies to evaluate potential effects of any actions it may take in the floodplain, to avoid long- and short-term adverse impacts of occupancy and modification of floodplains and to avoid supporting development in a floodplain either directly or indirectly wherever there is a practicable alternative. Title 23 of the Code of Federal Regulations 650, Subpart A, "Location and Hydraulic Design of Encroachment on Floodplains" specifies applicable floodplain regulations, including to avoid encroachment into the 100-year floodplain whenever there is a practicable alternative and to restore and preserve the natural and beneficial values served by the floodplains.

National Flood Insurance Program

The FEMA oversees floodplain management and runs the National Flood Insurance Program (NFIP) adopted under the National Flood Insurance Act of 1968. FEMA prepares Flood Insurance Rate Maps that delineate the regulatory floodplain to assist local governments with land use and floodplain management decisions to meet the requirements of the NFIP. In general, the NFIP mandates that new development is not to proceed in the 100-year regulatory floodplain, if the development is expected to increase flood elevation by one foot or more. Very limited development is allowed in designated 100-year floodways (i.e., flood flow channels and areas with sufficient directional flow velocity of 100-year floodwaters).

National Pollutant Discharge Elimination Program

NPDES CONSTRUCTION GENERAL PERMIT

The SWRCB adopted an NPDES Construction General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities (Construction General Permit; "CGP") (Order 2009-0009,[2] as amended by Orders 2010-0014-DWQ[3] and 2012-006-DWQ[4]). Projects that disturb 1 or more acres of soil, or projects that disturb less than 1 acre but are part of a larger common plan of development that in total disturbs 1 or more acres are required to comply with the NPDES Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities, Order No. 2009-0009-DWQ and the NPDES CGP. Activities subject to the CGP include clearing, grading, and disturbances to the ground, such as grubbing or excavation. This permit also covers linear underground and overhead projects such as pipeline installations.

The CGP requires the development and implementation of a Stormwater Pollution Prevention Plan (SWPPP). The SWPPP should contain a site map which shows the construction site perimeter, existing and proposed buildings, lots, roadways, stormwater collection and discharge points, general topography both before and after construction, and drainage patterns across the project site. The purpose of the SWPPP is: (1) to help identify the sources of sediment and other pollutants that

[2] More details on SWRCB Order 2009-0009 are available online at: https://www.waterboards.ca.gov/water_issues/programs/stormwater/docs/constpermits/wqo_2009_0009_complete.pdf
[3] More details on SWRCB Order 2010-0014-DWQ are available online at: https://www.waterboards.ca.gov/board_decisions/adopted_orders/water_quality/2010/wqo2010_0014dwq.pdf
[4] More details on SWRCB Order 2012-006-DWQ are available online at: https://www.waterboards.ca.gov/board_decisions/adopted_orders/water_quality/2012/wqo2012_0006_dwq.pdf

could affect the quality of stormwater discharges, and (2) to describe and ensure the implementation of best management practices (BMPs) to reduce or eliminate sediment and other pollutants in stormwater as well as non-stormwater discharges resulting from construction activity. General Permit includes a menu of BMPs to be selected and implemented based on the phase of construction and the weather conditions to effectively control erosion, sediment, and other construction-related pollutants to meet the Best Available Technology Economically Achievable and Best Conventional Pollutant Control Technology standards. Erosion-control BMPs are designed to prevent erosion, whereas sediment controls are designed to trap sediment once it has been mobilized. Such BMPs include:

- Silt fences and/or fiber rolls installed along limits of work and/or the project construction site
- Stockpile containment and exposed soil stabilization structures (e.g., visqueen, fiber rolls, gravel bags, and/or hydroseed)
- Runoff control devices (e.g., fiber rolls, gravel bag barriers/chevrons) used during construction phases conducted during the rainy season
- Wind erosion (dust) controls
- Tracking controls at the site entrance, including regular street sweeping and tire washes for equipment
- Prevention of fluid leaks (inspections and drip pans) from construction vehicles
- Materials pollution management
- Proper waste/trash management
- Regular inspections and maintenance of BMPs

Additionally, the SWPPP must contain a visual monitoring program, a chemical monitoring program for "non-visible" pollutants, and a sediment monitoring plan if the site discharges directly to a water body listed on the US EPA 303(d) list for sediment.

The SWPPP must be prepared by a Qualified SWPPP Developer and submitted to the SWRCB via the online SMARTS system. A Qualified SWPPP Practitioner (QSP) is required during construction activities to monitor the construction site and ensure that the recommendations and requirements outlined in the SWPPP are implemented correctly. The QSP is responsible for protecting the owner's interests during construction; a contractor-provided QSP could result in a conflict of interest if the QSP determines the contractor needs to provide additional services beyond what is identified in the project SWPPPs.

The CGP uses a risk-based permitting approach and mandates certain requirements based on the project risk level (Level 1, Level 2, or Level 3). The project risk level is based on the risk of sediment discharge and the receiving water risk. The sediment discharge risk depends on project location and timing (such as wet season versus dry season activities). The receiving water risk depends on whether the project would discharge to sediment-sensitive receiving water. The determination of the project risk level would be made by UCR when the Notice of Intent is filed (and more details of the ultimate timing of the construction activity are confirmed).

NPDES MS4 PERMITS

The Santa Ana RWQCB has issued Order No. R8-2010-0033 (adopted January 29, 2010) and adopted NPDES Permit No. CAS 618033 for municipal stormwater and urban runoff discharges in the RCFCWCD, the County of Riverside, and the incorporated cities of Riverside County within the Santa

Ana Region. In compliance with the permit, the Santa Ana Region has implemented a Water Quality Management Plan (WQMP) and a Drainage Area Management Plan (DAMP) with the ultimate goal of accomplishing the requirements of the permit and reducing the amount of pollutants in stormwater and urban runoff.

NPDES Phase I Provision C.3 addresses post-construction stormwater management requirements for new development and redevelopment projects that add and/or replace 10,000 square feet or more of impervious area. NPDES Provision C.3 requires the incorporation of site design, source control, and stormwater treatment measures into development projects to minimize the discharge of pollutants in stormwater runoff and non-stormwater discharges and to prevent increases in runoff flows. Site design requirements for new developments and redevelopments include stipulations to minimize the area of new roofs and paving and treat runoff, and in some cases, control the rates and durations of site runoff. Where feasible, pervious surfaces should be used instead of paving so that runoff can infiltrate to the underlying soil. Runoff should be dispersed to landscaping where possible. Remaining runoff from impervious areas must be treated using bioretention. In some developments, the rates and durations of site runoff must also be controlled.

The NPDES Phase I Provision C.3 requirements are separate from, and in addition to, requirements for erosion and sediment control and for pollution prevention measures during construction. In addition, UCR must execute agreements to allow verification that stormwater treatment and flow-control facilities that are approved as part of new development are maintained in perpetuity. Low-impact development (LID) methods are the primary mechanism for implementing such controls. The NPDES Permit provision requires five Control Design Criteria to be implemented: range of flows to control, goodness of fit criteria, allowable low-flow rate, standard hydromodification modeling, and alternate hydromodification modeling and design.

NPDES Phase II addresses Small Municipal Separate Stormwater Sewer System (MS4)s. On April 30, 2003, as part of Phase II, the SWRCB issued a General Permit for the Discharge of Stormwater from Small MS4s (WQ Order No. 2003-0005-DWQ) to provide permit coverage for smaller municipalities (population less than 100,000), including non-traditional small MS4s covering facilities such as military bases, public campuses, prisons, and hospital complexes. UCR is not subject to the NPDES Phase I MS4 permit, rather is designated a non-traditional permittee under the Phase II Small MS4 General Permit. The Phase II Small MS4 General Permit covers Phase II Permittees statewide. On February 5, 2013 the Phase II Small MS4 General Permit was adopted and became effective on July 1, 2013 (WQ Order No. 2013-0001-DWQ).[5] UCR was approved for coverage under the Phase II MS4 permit program (NPDES No. CAS000004) and is required to comply with the requirements of the MS4 permit, including implementation of a stormwater quality management program with the goal of accomplishing the requirements of the permit and reducing the amount of pollutants in stormwater and urban runoff.

Under the NPDES Phase II NPDES MS4 General Permit, UCR is required to visually monitor open channels, detention basins and other drainage structures for debris at least once per year and identify/prioritize problem areas and inspect all operations and management BMPs quarterly. UCR has been implementing a landscape design and maintenance program that reduces the amount of pesticides, herbicides and fertilizers used on new or decorative landscapes. UCR employs a Post-Construction Stormwater Management Requirements and Checklist to ensure projects adequately implement BMPs as required under the Phase II Small MS4 General Permit.

[5] WQ Order No. 2013-0001-DWQ Available at:
https://www.waterboards.ca.gov/board_decisions/adopted_orders/water_quality/2013/wqo2013_0001dwq.pdf

Additionally, the NPDES permit provides for alternative compliance measures and encourages participation in multiple-benefit projects that may be applied at various scales, including project site, municipal, or sub-watershed level. The Phase I MS4 permit for Riverside County in the Santa Ana region has a draft Watershed Action Plan that describes how potential project proponents may participate in a watershed-based approach.

UCR requirements under the MS4 permit include:

- Public education and outreach
- Staff training to prevent and eliminate illicit discharges and pollution
- Illicit discharge detection and elimination
- Construction site stormwater runoff control and pollution prevention
- Post-construction site stormwater runoff control program for new development and redevelopment
- Facilities mapping, inventory, and assessment for pollution prevention
- SWPPPs for high-priority facilities
- Inspections, visual monitoring, and remedial action
- Storm drain system assessment, prioritization, and maintenance
- Assessment of operations and maintenance activities to reduce runoff and pollution
- Stormwater program modifications
- Reporting and documentation

National Toxics Rule and California Toxics Rule

In 1992, the US EPA promulgated the National Toxics Rule under the CWA to establish numeric criteria for priority toxic pollutants for 14 states to bring all states into compliance with the requirements of CWA Section 303(c)(2)(B). The National Toxics Rule established water quality standards for 42 pollutants not covered under California's statewide water quality regulations at that time. As a result of the court-ordered revocation of California's statewide basin plans in September 1994, the US EPA initiated efforts to promulgate additional federal water quality standards for California. In May 2000, the US EPA issued the California Toxics Rule, which includes all the priority pollutants for which the US EPA has issued numeric criteria not included in the National Toxics Rule.

State

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act (Division 7 of the California Water Code) is the primary statute covering the quality of waters in California. Under the act, the SWRCB has the ultimate authority over the State's water quality policy. The SWRCB administers water rights, water pollution control, and water quality functions throughout the State, while the nine RWQCBs conduct planning, permitting, and enforcement activities. The RWQCBs also regulate water quality under this act through the regulatory standards and objectives established in Water Quality Control Plans (also referred to as Basin Plans) prepared for each region.

Section 13260(a) of the Porter-Cologne Water Quality Control Act requires any person discharging waste or proposing to discharge waste, other than to a community sewer system, in any region that

could affect the quality of the Waters of the State (all surface and subsurface waters) to file a report of waste discharge. The discharge of dredged or fill material may constitute a discharge of waste that could affect the quality of Waters of the State.

Historically, California relied on its authority under Section 401 of the CWA to regulate discharges of dredged or fill material to Waters of the U.S. That section requires UCR to obtain "water quality certification" from the State Water Board through its RWQCBs to ensure compliance with State water quality standards before certain federal licenses or permits may be issued. The permits subject to Section 401 include permits for the discharge of dredged or fill materials (CWA § 404 permits) issued by the USACE. The RWQCB's typically waived waste discharge requirements under the Porter-Cologne Water Quality Control Act for projects or plans that also required Section 401 certification. Following the U.S. Supreme Court's decision, *Rapanos v. United States*, 547 U.S. 715 (2006), which limited the jurisdiction of wetlands under the CWA, the RWQCBs generally rely on the report of waste discharge process to regulate discharges into Waters of the State. The UCR campus is not considered a point source for regulatory purposes and is not subject to Waste Discharge Requirements.

California Toxics Rule and State Implementation Policy

The California Toxics Rule, presented in 2000 in response to requirements of US EPA's National Toxics Rule, establishes numeric water quality criteria for approximately 130 priority pollutant trace metals and organic compounds. The California Toxics Rule criteria are regulatory criteria adopted for inland surface waters, enclosed bays, and estuaries in California that are on the CWA Section 303(c) list for contaminants. The California Toxics Rule includes criteria for the protection of aquatic life and human health. Human health criteria (water- and organism-based) apply to all waters with a Municipal and Domestic Water Supply beneficial use designation as indicated in the basin plans. The Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California, also known as the State Implementation Policy, was adopted by the State Water Board in 2000. It establishes provisions for translating the California Toxics Rule criteria, National Toxics Rule criteria, and basin plan water quality objectives for toxic pollutants into:

- NPDES permit effluent limits
- Effluent compliance determinations
- Monitoring for 2,3,7,8-tcdd (dioxin) and its toxic equivalents
- Chronic (long-term) toxicity control provisions
- Site-specific water quality objectives
- Granting of effluent compliance exceptions

The goal of the State Implementation Plan is to establish a standardized approach for permitting discharges of toxic effluent to inland surface waters, enclosed bays, and estuaries throughout the state.

Sustainable Groundwater Management Act

In September 2014, Governor Brown signed legislation signed a three-bill package known as the Sustainable Groundwater Management Act (SGMA) into law, establishing a framework for local groundwater management and requiring local agencies to bring overdrafted basins into balanced levels of pumping and recharge. The SGMA gives local agencies the power to sustainably manage groundwater and requires groundwater sustainability plans to be developed for medium- and high-

priority groundwater basins, as defined by DWR. DWR released the *Sustainable Groundwater Management Act 2018 Basin Prioritization* report, which outlined the process involved with reassessing the priority of the groundwater basins in California following the 2016 basin boundary modifications. This process designated the Arlington Basin as very low-priority and does not require a groundwater sustainability plan (WMWD 2021).

Article IX of the California Constitution

The Regents of the University of California is a Constitutional Corporation, organized under Article IX, Section 9 of the California Constitution, with full authority over governance and management of University operations. Under this authority, UCR has legal authority to prevent illicit discharges into its system, including control of inflow and infiltration sources such as stormwater, chemical dumping, or debris.

South Coast Air Quality Management District Fugitive Dust Rule

Rule 403 – Fugitive Dust: This rule is intended to reduce the amount of particulate matter entrained in the ambient air as a result of anthropogenic (human-made) fugitive dust sources by requiring actions to prevent, reduce, or mitigate fugitive dust emissions. Rule 403 applies to any activity or human-made condition capable of generating fugitive dust and identifies measures to reduce fugitive dust. This includes soil treatment for exposed soil areas. Treatment shall include, but not necessarily be limited to, periodic watering, application of environmentally safe, non-toxic soil stabilization materials, and/or roll compaction as appropriate. However, during times of drought SCAQMD's limits potable water dust suppression by "increasing reliance on non-toxic chemical dust suppressants to stabilize soils." (SCAQMD 2014)

University of California

UC Policy on Sustainable Practices

The UC established the UC Policy on Sustainable Practices, with the most recent update made in July 2020, which applies to all campuses and has the following goals related to hydrology and water quality:

- UC campuses will reduce growth-adjusted potable water consumption 20 percent by 2020, and 36 percent by 2025, when compared to a 3-year average baseline of FY2005/06, FY2006/07, and FY2007/08. UCR has achieved that goal.
- Each location will develop and maintain a Water Action Plan that identifies long term strategies for achieving sustainable water systems. Campuses will include in this update quantification of total square feet of used turf and under-used turf areas on campus as well as a plan for phasing out un-used turf irrigated with potable water.
- Each location shall identify existing single-pass cooling systems and constant flow sterilizers and autoclaves in laboratories and develop a plan for replacement.
- New equipment requiring liquid cooling shall be connected to an existing recirculated building cooling water system, new local chiller vented to building exhaust or outdoors, or to the campus chilled water system through an intervening heat exchange system if available.
    - Once-through or single-pass cooling systems shall not be allowed for soft-plumbed systems using flexible tubing and quick connect fittings for short term research settings.

- If no alternative to single-pass cooling exists, water flow must be automated and controlled to avoid water waste.

University of California, Riverside

UCR CleanWater Stormwater Management Program

The UCR campus is a non-traditional permittee under the Phase II Small MS4 Statewide General Stormwater Permit, as described above. UCR Environmental Health & Safety administers the UCR CleanWater Stormwater Management Program to ensure compliance with all Phase II Small MS4 Statewide General Stormwater Permit requirements.

Spill Prevention, Control, and Countermeasures Plan

UCR has prepared a SPCC Plan in accordance with Section 311 of the CWA, which has been developed in accordance with 40 CFR Part 112 general requirements for SPCC Plans. The SPCC plan was created to address potential spills from oil storage containers and bulk storage containers at the UCR campus. The SPCC plan was last updated in 2018.

Sewer System Management Plan

The UCR Sanitary Sewer Management Plan was developed by UCR to comply with SWRCB Order No. 2006-0003-DWQ and directs appropriate management of the sanitary sewer system to prevent sanitary sewer overflows, prohibits any sanitary sewer overflow that results in a discharge of untreated or partially treated wastewater to Waters of the U.S., and prohibits any sanitary sewer overflow that results in a discharge of untreated or partially treated wastewater that creates a nuisance as defined in California Water Code Section 13050(m).

Regional and Local (Binding)

Santa Ana River Basin Water Quality Control Plan (Basin Plan)

The Santa Ana RWQCB (Region 8) provides permits for projects that may affect surface waters and groundwater locally and is responsible for the Water Quality Control Plan for the Santa Ana River Basin (Basin Plan). The Basin Plan designates beneficial uses of water in the region and establishes narrative and numerical water quality objectives. Water quality objectives, as defined by the CWA Section 13050(h), are the "limits or levels of water quality constituents or characteristics which are established for the reasonable protection of beneficial uses or the prevention of nuisance within a specific area." The State has developed TMDLs, which are a calculation of the maximum amount of a pollutant that a waterbody can have and still meet water quality objectives established by the region. The Basin Plan serves as the basis for the Santa Ana RWQCB's regulatory programs and incorporates an implementation plan to ensure water quality objectives are met. Basin Plans undergo a triennial review process, with the Santa Ana RWQCB's Basin Plan most recently updated in February 2016 (Santa Ana RWQCB 2019).

Resolution R8-2005-0001 amended the Basin Plan to incorporate Bacterial Indicator TMDLs for Middle Santa Ana River Watershed Waterbodies. At its Board meeting held on January 29, 2010, the RWQCB adopted Order RB8-2010-0033 approving a revised MS4 permit for Riverside County. This permit includes requirements for Comprehensive Bacteria Reduction Plans (CBRPs) to address excessive levels of bacteria in impaired Middle Santa Ana River waterbodies. CBRPs were approved by the Regional Board for Riverside County at the Board meeting held on February 10, 2012 as

Resolution R8-2012-0015. UCR discharges into the Santa Ana River Reach 3 which has an approved TMDL for pathogens.

Adopted December 19, 2017, WQ-Order 2017-XXXX-DWQ amended Order 2013-001-DWQ-0001 requires Phase II MS4 permittees to comply with applicable TMDL based requirements. For UCR, TMDL specific requirements include watershed-wide attainment monitoring and facility-specific bacterial indicator monitoring program and bacterial indicator reduction plans.

Municipal Regional Stormwater NPDES Permit

On January 29, 2010, the RWQCB adopted Order R8-2010-0033, as amended by Order R8-2013-0024 (NPDES Permit and Waste Discharge Requirements for the RCFCWCD, the County of Riverside, and the incorporated cities of Riverside County in the Santa Ana Region) otherwise known as the MS4 permit. The City is a co-permittee under the Riverside County MS4 permit. One component of the Phase I MS4 permit requires the development of site-specific WQMPs for new development and significant redevelopment projects. WQMPs include site design, source control, and treatment elements to reduce stormwater pollution from urban runoff (Santa Ana RWQCB 2010). UCR is not subject to the NPDES Phase I MS4 permit, rather is designated a non-traditional permittee under the Phase II Small MS4 General Permit, as noted above. The Phase II Small MS4 also requires site design, source control, and treatment elements to reduce stormwater pollution from urban runoff.

On April 7, 2015, the Santa Ana RWQCB adopted statewide trash provisions to address impacts of trash on surface waters in the region. The trash provisions outline additional requirements for all MS4 permittees, including either installation of full capture systems for all storm drains capturing runoff from priority land uses, or a combination of full capture systems, multi-benefit projects, treatment controls, and/or institutional controls to reduce trash accumulation in surface waters (SWRCB 2021). UCR is bound by the Statewide trash provisions; UCR received a Water Code Section 13383 Order in June 2017 to comply with specific initial requirements.

Regional and Local (Non-Binding)

As noted in Section 4, "University of California Autonomy," UCR, a constitutionally-created State entity, is not subject to municipal regulations of surrounding local governments for uses on property owned or controlled by UCR that are in furtherance of the university's educational purposes. However, UCR may consider, for coordination purposes, aspects of local plans and policies of the communities surrounding the campus when it is appropriate and feasible, but is not bound by those plans and policies in its planning efforts.

Riverside County Drainage Area Management Plan

The Riverside County DAMP, developed by the RCFCWCD and other co-permittees to the MS4 Permit, outlines programs and policies to manage urban runoff. The DAMP includes development review procedures for co-permittees, required construction BMPs and inspection frequency, annual reporting and evaluation framework, and TMDL implementation strategies. The DAMP is the primary document outlining compliance procedures for co-permittees to adhere to the requirements of the MS4 Permit in Riverside County. The DAMP for the Santa Ana Region was last updated in 2017 (RCFCWCD 2017).

Riverside County Watershed Action Plan

The Riverside County Watershed Action Plan is intended to enable co-permittees under the Riverside County MS4 Permit to address watershed-level water quality impacts associated with urbanization (County of Riverside 2017). The Watershed Action Plan describes the Santa Ana Watershed, applicable MS4 programs (e.g., the DAMP, WQMPs), and the development review process for new development and redevelopment projects.

RCFCWCD Low Impact Development Best Management Practices

Developed in 2011 by the RCFCWCD, the Design Handbook for Low Impact Development Best Management Practices describes LID guidelines for projects to reduce downstream erosion by more closely mimicking pre-project hydrology and minimizing pollutant runoff. The handbook details strategies for selecting appropriate LID BMPs, design capture volume requirements for BMPs, and sizing calculation methodology for BMP implementation in specific watersheds in the County.

City of Riverside General Plan

The City adopted the General Plan 2025 in November 2007 to outline a 20-year vision for Riverside. The Public Safety, Open Space and Conservation, and Public Facilities and Infrastructure Elements each contain policies relevant to hydrology and water quality. The Public Safety Element contains policies to reduce flood risks and exposure, encourage appropriate flood control infrastructure, and create and maintain evacuation routes for areas that could be affected by flooding or dam failure, with special emphasis on critical and emergency facilities. The Open Space and Conservation Element contains policies to minimize impacts to groundwater and surface water resources, coordinate public and private entities which affect the consumption and quality of water resources in Riverside, enforce RWQCB and NPDES regulations regarding urban runoff and water quality standards, and protect aquifer recharge features. The Public Facilities and Infrastructure Element contains policies to protect local groundwater resources from localized and regional contamination, reduce stormwater flows into the wastewater system and the Santa Ana River, cooperate in regional programs to implement the NPDES program, and routinely monitor and evaluate the effectiveness of the storm drain system.

City of Riverside Municipal Code

The City of Riverside Municipal Code contains several requirements and ordinances relevant to hydrology and water resources.

TITLE 14, CHAPTER 14.12 (WASTE DISCHARGE TO SEWERS AND STORM DRAINS)

Title 14, Chapter 14.12 regulates the discharge of wastes to the public sewer and pollutants into the storm drain systems. Section 14.12.315 prohibits the discharge of pollutants to the storm drainage system or any waterway, whether carrying water or not. Section 14.12.316 requires the preparation of a WQMP and installation of BMPs for new development and redevelopment projects in the City, and Section 14.12.319 outlines inspection and enforcement for post-construction requirements detailed in the project's WQMP.

TITLE 16, CHAPTER 18 (DEVELOPMENT IN FLOOD HAZARD AREAS)

Title 16, Chapter 18 contains regulations pertaining to flood hazard areas in the City and implements the NFIP. Specifically, the ordinance outlines the process for development permit review by the Floodplain Administrator or designee as well as floodplain construction materials and standards.

TITLE 17 (EROSION AND RUNOFF FROM GRADING)

Title 17 describes regulations pertaining to grading, including those intended to minimize erosion and runoff. Section 17.16.010 outlines grading permit application requirements, including noticing requirements to the SWRCB for coverage under the statewide CGP and preparation of a SWPPP.

TITLE 19 (WATER EFFICIENT LANDSCAPING AND IRRIGATION ORDINANCE)

Title 19, Chapter 19.570 contains the City's Water Efficient Landscaping and Irrigation Ordinance, which is intended to promote quality landscaping as well as efficient use of water in the City. The ordinance requires preparation and implementation of a planting plan that identifies the Maximum Applied Water Allowance and the Estimated Annual Water Use of the project's landscaping, as well as irrigation design and soil management plans.

4.10.3 Environmental Impacts and Mitigation Measures

Significance Criteria

UCR utilizes the following 2020 CEQA Guidelines Appendix G significance criteria questions related to Hydrology and Water Quality.

Would the proposed 2021 LRDP:

a) Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality?
b) Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:
    i. Result in substantial erosion or siltation on- or off-site?
    ii. Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?
    iii. Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?
    iv. Impede or redirect flood flows?
d) Risk release of pollutants due to project inundation in flood hazard, tsunami, or seiche zones?
e) Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?

Issues Not Evaluated Further

Risk of Pollutants Release Due to Inundation (Criterion d)

The Initial Study for the proposed 2021 LRDP (Appendix A) concluded that the UCR campus is not in a tsunami or seiche zone and, therefore, is not subject to inundation by either activity. FEMA identifies UCR's main campus as an Area of Minimal Flood Hazard and University Wash, which bisects the campus, is shown on FEMA's Flood Insurance Rate Maps. The proposed 2021 LRDP

would not involve the storage or processing of pollutants such that they may be spilled or released due to inundation, should a flood hazard event occur. Implementation of the proposed 2021 LRDP would occur in compliance with the UCR MS4 permit, and, as such, the potential for campus project activities to result in pollutant release would be minimized or avoided, representing a less-than-significant impact. No further evaluation is required.

Analysis Methodology

Impacts related to hydrology and water quality were determined by reviewing information regarding regional and local hydrology, climate, topography, and geology contained in the City's General Plan and General Plan EIR, Santa Ana River Basin Water Quality Control Plan, the RPU Urban Water Management Plan (2015), FEMA Flood Insurance Rate Maps, the 2016 UCR Physical Master Plan Study (2016 Master Plan Study), and environmental documentation prepared for projects located in the City and on the UCR campus. Evaluation of impacts is based on comparison of existing conditions to the proposed 2021 LRDP buildout condition, such as changes in impervious area and facilities located in flood zones. Specifically, the impact evaluation focuses on effects on surface and groundwater quality, groundwater supply, and drainage (in terms of erosion, siltation, flooding, stormwater system exceedance, and polluted runoff). Water quality conditions are compared with water quality standards by identifying potential contaminants and pollution pathways, amount of impervious area, and runoff treatment requirements. Finally, as part of the analysis, flooding on the UCR campus is assessed by reviewing potential flooding zone elevations relative to the final grade elevations of proposed 2021 LRDP facilities and features.

2021 LRDP Objectives and Policies

The proposed 2021 LRDP contains objectives and policies relevant to hydrology and water quality including the following:

Open Space (OS)

- Objective OS5: Demonstrate an increased commitment to preservation and enhancement of the natural environment through the design and placement of future campus landscapes.
  - Policy: Consider the ecological and potential stormwater management functions of proposed landscapes. Utilize climate-appropriate, native/drought-tolerant, and/or low-maintenance landscape materials outside of signature campus open spaces.

Infrastructure and Sustainability (IS)

- Potable Water and Wastewater and Irrigation (W) Objective IS W1: Commit to a multi-prong approach to conserving potable water use.
  - Policy: Reduce potable water use in existing building in the Academic Center by 20 percent.
  - Policy: Reduce potable water use in student residential buildings by 30 percent.
  - Policy: Reduce potable water use in new facilities by exceeding applicable codes by a minimum of 20 percent.
  - Policy: Retrofit existing urinals, toilets, showerheads, and faucets for existing buildings with higher water efficiency rated equipment.
- Objective IS W2: Explore options to shift away from potable water use where feasible.
  - Policy: Design new building irrigation and efficient toilet flushing systems for use with future non-potable water sources.

- Policy: Achieve a further 20 percent reduction of potable water use for irrigation by extending Gage Canal water to also irrigate the UCR Botanic Gardens and reducing turf on campus and replacing it with lower water use landscaping.

Stormwater (SW)

- Objective IS SW1: Transition the campus lands to manage stormwater in a manner that replicates natural drainage patterns and allow plants to filter pollutants out of runoff and promote infiltration over flowing into waterways, thus meeting regulatory requirements through innovative, attractive, and cost-efficient solutions.
  - Policy: Prepare and maintain a Stormwater Management Program (SWMP) to account for the additional runoff from the projected new development to meet the requirements of the State of California's mandated Phase II Small MS4 Section F.5.g. (Post-Construction SWMP), including Section F.5.g.3. (Alternative Post-Construction SWMP) consistent with the Maximum Extent Practicable (MEP) standard.
  - Policy: To the extent feasible, integrate stormwater infrastructure within the open space framework of campus such that developable campus lands are minimally lost. The SWMP will include planning and design strategies to restore, enhance, and maintain hydrological function on campus and in the regional hydrological system in response to the projected development.

Impact Analysis

Impact HWQ-1 VIOLATE ANY WASTE DISCHARGE REQUIREMENTS THAT WOULD SUBSTANTIALLY DEGRADE SURFACE OR GROUNDWATER QUALITY.

CONSTRUCTION AND OPERATION OF THE PROPOSED 2021 LRDP WOULD OCCUR IN COMPLIANCE WITH APPLICABLE WATER QUALITY STANDARDS AND WASTE DISCHARGE REQUIREMENTS. IN ACCORDANCE WITH REGULATIONS AND POLICIES, A SWPPP WOULD BE IMPLEMENTED DURING CONSTRUCTION ACTIVITIES AND A SWMP WOULD BE IMPLEMENTED DURING OPERATIONS, TO PROVIDE ON-SITE CONSTRUCTION AND POST-CONSTRUCTION PREVENTION, CAPTURE, AND TREATMENT OF STORMWATER RUNOFF, SUCH THAT POTENTIAL WATER QUALITY IMPACTS WOULD BE LESS THAN SIGNIFICANT. NO MITIGATION IS REQUIRED.

Construction

Pollutants associated with construction activities in general include soils, debris, other materials generated during demolition and clearing, fuels and other fluids associated with the equipment used for construction, paints, other hazardous materials, concrete slurries, and asphalt materials. During construction, materials such as aggregate-base rock for roadway and parking area subgrade, sand bedding and backfill for utility lines, and crushed rock for building foundations would be brought to development areas. Without regulatory compliance, construction activities also have the potential to cause spills of fuel, oils, paint, or other materials from construction equipment or activities if not properly contained. Additionally, removal of vegetation, excavation, grading, and stockpiling of soils for new facilities, building foundations, roads and driveways, and utility trenching in general have the potential to result in soil disturbance that can accelerate erosion, especially during storm events.

Also discussed in the regulatory setting above and in Section 4.9, *Hazards & Hazardous Materials*, the UCR campus is a permittee under the Phase II MS4 Small Statewide General Stormwater Permit, which requires UCR to prevent construction site discharges of pollutants through the installation,

implementation, and maintenance of BMPs and ensure compliance with CGP (State Water Resources Control Board Order 2009-0009-DWQ, as amended). All construction projects under the proposed 2021 LRDP would be required to comply with the provisions of the NPDES Statewide General Construction Activity Stormwater Permit that specifies the implementation of BMPs through a SWPPP, which typically includes both source-control and treatment-control BMPs to reduce water quality impacts including, but not limited to:

- Proper storage, use, and disposal of construction materials
- Watering exposed soils
- Installing sandbags to minimize off-site runoff
- Creating temporary desilting basins
- Containing construction vehicle maintenance in staging areas to avoid leaks or spills of fuels, motor oil, coolant, and other hazardous materials
- Installation of silt fences and erosion control blankets
- Timing grading to avoid the rainy season (November through April)
- Stabilizing cleared or graded slopes
- Protecting or stabilizing stockpiled soils
- Continual inspection and maintenance of all specified BMPs through the duration of construction

General Construction Stormwater Permit requirements also require inspection, monitoring, and reporting. Corrective action within 72 hours is also required for any issue of non-compliance identified during monitoring and inspections. Finally, projects developed under the proposed 2021 LRDP would be required to comply with applicable provisions of the most current CBC and CalGreen Code, which require the reduction of erosion and sedimentation and would further reduce construction-related water quality impacts. With the continued implementation of construction-period BMPs to address potential discharges of polluted runoff, water quality impacts would be minimized to avoid violation of water quality standards and waste discharge requirements. Therefore, construction-period water quality impacts would be **less than significant**.

Operation

Land uses associated with the implementation of the proposed 2021 LRDP would be similar in category to existing land uses and also include some new land use categories (see Section 2, *Project Description*). Operation of the new land use categories would not introduce different pollutants.

As currently envisioned, development under the proposed 2021 LRDP would occur primarily in previously disturbed areas, adjacent to previously developed areas, surface parking areas, generally along North/South/East/West Campus Drive, and generally along University Avenue, Canyon Crest Drive, Big Springs Road, Aberdeen Drive, and West Linden Street. Additionally, development under the 2021 LRDP would primarily be infill development or expansion of already developed areas. Some of the new facility development may be located on currently undeveloped and unpaved areas of campus, such as in land use areas designated as Agricultural/Campus Research, Student Neighborhood, Campus Support, and University Avenue Gateway designations, as well as the potential for an interpretive center in the UCR Botanic Gardens. The southeastern foothills have been largely untouched by development, which has preserved the natural drainages. The proposed 2021 LRDP would designate 154.8 acres of Open Space Reserve in this area and would maintain relatively intact natural habitat and pathways for stormwater.

As discussed in the 2016 Master Plan Study, the arroyos and detention basins currently provide sufficient conveyance capacity to accommodate flows associated with the 100-year storm event. This conveyance capacity would be maintained under the proposed 2021 LRDP. Future project sites would incorporate pre-treatment systems before discharging surface flows into the treatment areas and ultimately to the Gage Basin (UCR 2016a, 2016b). Future malls and internal pathways included as part of future development plans, as well as future and existing storm drains, would be used to pre-treat and transport runoff to the identified treatment areas (UCR 2016a). In addition, individual projects implemented under the 2021 LRDP would include storm drain infrastructure to provide appropriate conveyance through and around the development areas, such that the development would not overwhelm the capacity of the existing UCR storm drain system. Future 2021 LRDP projects would also adhere to State requirements under the NPDES Permit as well as the proposed UCR policies related to post-construction site stormwater runoff control program for new development and redevelopment. This would include development and implementation of a SWMP to address the additional runoff from the projected new development to meet the requirements of the Phase II Small MS4 permit, Section F.5.g. (Post-Construction SWMP), including Section F.5.g.3. (Alternative Post-Construction SWMP) consistent with the MEP standard.

Under the UCR SWMP, the proposed 2021 LRDP facilities would incorporate site design, source control, and treatment BMPs to prevent pollutants from reaching receiving waters. Site design BMPs, including LID measures, would reduce runoff or pollutants at the source. Source control BMPs would minimize or avoid post-project runoff and control sources of pollutants. Treatment BMPs utilize treatment mechanisms with performance standards to remove targeted pollutants that have entered stormwater runoff. Storm drain infrastructure for the proposed 2021 LRDP development may include area drains, roof drain connections, and/or piped conveyance of stormwater to water quality treatment basins/devices and connections to the existing storm drain system. Water quality treatment may consist of biofiltration basins, proprietary treatment devices, and/or underground storage vaults, which would slow the velocity of water and allow sediment and debris to settle out of the water column and minimize the potential for downstream flooding, erosion/siltation, or exceedances of stormwater drainage system capacity. Pre-treatment and biofiltration prior to entering the storm sewer system would reduce adverse water quality impacts to groundwater and downstream water bodies. Specific details related to these regional stormwater BMPs would be developed during required project-level design evaluations, and such BMPs would minimize downstream flooding, erosion/siltation, or exceedances of stormwater drainage system capacity such that operation and maintenance of the proposed 2021 LRDP would not violate water quality standards or otherwise substantially degrade surface water or groundwater quality.

With the continued implementation of operation-period BMPs and SWMP requirements, which include LID measures, runoff reduction measures, and site design, source control, and treatment BMPs, water quality impacts associated with changes in stormwater runoff would be minimized to avoid violation of water quality standards and waste discharge requirements. Therefore, operational impacts related to water quality would be **less than significant**.

Mitigation Measures

No mitigation measures are required.

Significance After Mitigation

Impacts would be less than significant without mitigation.

Impact HWQ-2 SUBSTANTIALLY DECREASE GROUNDWATER SUPPLIES OR INTERFERE SUBSTANTIALLY WITH GROUNDWATER RECHARGE, IMPEDING SUSTAINABLE GROUNDWATER MANAGEMENT OF THE BASIN.

POTENTIAL IMPACTS TO GROUNDWATER SUPPLIES AND RECHARGE WOULD BE LESS THAN SIGNIFICANT. NO MITIGATION IS REQUIRED.

The IRWMP for the Upper Santa Ana River Watershed focuses on long-term management of water resources and reducing reliance on imported water supplies, and is informed by the RPU Water Division's UWMP, among other sources. The current UWMP (2015) for Riverside reports that the SBBA (consisting of the Bunker Hill and Lytle Creek Subbasins) and the Rialto-Colton Subbasin are affected by overdraft conditions, but there are sufficient supplies to meet replenishment obligations. This sufficiency of groundwater supplies is provided through continued implementation of the 1969 Western-San Bernardino Judgment, as administered by two Watermasters appointed to oversee groundwater extractions (RPU 2016).

As reported in the IRWMP and required by the Adjudication Judgment, if groundwater pumping in the SBBA exceeds the safe yield of the SBBA (i.e., if water is overdrafted), then water is imported to offset the amount exceeding the safe yield (i.e. the amount of the overdraft) (USAWRA 2015). Similarly, as stipulated in the Adjudication Judgment, WMWD must replenish the Rialto-Colton Subbasin if extractions for use in Riverside County in aggregate exceed certain specific amounts, and Valley District must replenish the Rialto-Colton Subbasin if water levels are lower than certain specific water level elevations in specified wells. Therefore, although the SBBA and Rialto-Colton Subbasin are identified as being affected by overdraft, such conditions are actively managed by specified agencies with legal obligations to replenish supplies extracted under overdraft, as determined by the aforementioned thresholds of safe yield, aggregate uses, and water levels in specified wells.

In addition to the SBBA and Rialto-Colton Subbasin, the Riverside North Subbasin is identified in the 2015 UWMP as currently affected by overdraft conditions, and both Riverside North and Riverside South Subbasins are projected to be overdrafted. The Adjudication Judgment further obligates specified agencies to maintain sustainable groundwater levels in affected basins and subbasins, including as follows: Valley District is required to maintain sustainable groundwater levels in the SBBA and the Riverside North Subbasin. WMWD is required to replenish excess extractions above the base period extractions in both Riverside North and Riverside South Subbasin, as well as the Arlington Subbasin. RPU also contributes to efforts to monitor and manage the surrounding groundwater basins and participates in independent groundwater level and quality monitoring in Bunker Hill, Riverside, and Arlington Subbasins. Also, in accordance with the Adjudication Judgment, all groundwater production is metered and recorded, and groundwater extraction amounts, as well as depth to groundwater in extraction and monitoring wells, are reported to the Watermaster, who is responsible for administering the Adjudication Judgment. As mentioned above regarding the SBBA, the determination that sufficient groundwater supplies are available to meet replenishment obligations despite local basins and subbasins being affected by overdraft is provided through continued implementation of the Adjudication Judgment.

Construction and operation of the proposed 2021 LRDP would introduce temporary and long-term water demands in the area, and all water demands associated with the 2021 LRDP would be met with supplies provided by the RPU. Approximately 80 percent of supplies delivered by the RPU are sourced from local groundwater supplies that are actively managed in accordance with the Adjudication Judgement. As discussed above, the Adjudication Judgment specifies sustainable water use rates for all approved producers, including the RPU, and legally obligates specified water

management agencies to replenish supplies extracted under overdraft conditions, as determined by thresholds including safe yield, aggregate uses, and water levels in specified wells, depending upon the specific subbasin affected by such withdrawals. Due to continued implementation and compliance with the Adjudication Judgement, which was specifically developed to avoid future overdraft and to maintain sustainable groundwater conditions, the proposed 2021 LRDP would not substantially decrease groundwater supplies or impede sustainable groundwater management of the basins and subbasins in the area. Furthermore, although the proposed 2021 LRDP would introduce some new impervious surfaces, existing drainages and recharge areas would be maintained such that groundwater recharge rates and patterns would not be substantially affected.

The availability and reliability of water supplies in the project area for the proposed 2021 LRDP are addressed in detail in Section 4.17, *Utilities and Service Systems*. As discussed therein, sufficient water supplies are available to meet the demands of the proposed 2021 LRDP, including with consideration to the current characteristics of local groundwater subbasins, as discussed above, and the continued implementation of and compliance with the Adjudication Judgment.

Construction

During construction of individual projects under the proposed 2021 LRDP, temporary water supply would be required, primarily for dust suppression during grading and grubbing activities, as well as during equipment wheel washing, and concrete mixing and casting. Pursuant to the requirements of the South Coast Air Quality Management District (SCAQMD) Rule 403, which is discussed in detail in Section 4.3, *Air Quality*, all surfaces disturbed within the UCR campus during construction activities would be watered appropriately to reduce fugitive dust generation and the associated air quality impacts. However, during times of drought, SCAQMD's Drought Management and Water Conservation Plan limits potable water dust suppression by increasing reliance on non-toxic chemical dust suppressants to stabilize soils, paving unpaved roadways and using vacuum sweepers instead of water to remove dust from paved areas and increasing use of physical/mechanical barriers to contain or limit transport of fugitive dust. Furthermore, water demand for dust suppression is highly dependent on site-specific variables including soil properties, antecedent moisture conditions, and other climatic factors. In addition, the disturbance area requiring watering for dust control would vary depending on the nature of projects and the number of projects occurring simultaneously, as construction water demand would occur at various times over the approximately 15-year buildout by 2035 period. Additionally, where redevelopment of Campus facilities would replace existing structures, construction water use would be significantly less than operational demand, which would generally halt during construction activities (e.g. landscaping water demands for these areas would halt).

UCR would not directly extract groundwater supplies, as water supply would be delivered to the UCR campus by the RPU. The RPU, in turn, would extract groundwater in accordance with the Adjudication Judgement, thereby ensuring that 2021 LRDP-related water uses would not cause or exacerbate overdraft conditions affecting underlying groundwater basins and subbasins. As discussed in Section 4.17, *Utilities and Service Systems,* the RPU may purchase supplemental water supplies in times of peak demand or drought conditions from Metropolitan via the WMWD, to ensure sufficient supply availability for construction of projects under the proposed 2021 LRDP. In addition, construction activities conducted under the proposed 2021 LRDP are not anticipated to directly encounter local groundwater as groundwater depths near campus vary from approximately 73 feet below the ground surface to 175 feet below ground surface, as shown in Table 4.10-1. However, should perched groundwater be unexpectedly encountered during construction activities, standard construction dewatering methods would be implemented to prevent the perched water

from leaving the construction site. In accordance with appropriate dewatering methods for the given site and activity, the captured water may be applied to a detention basin for infiltration to the subsurface, or used elsewhere on campus, such as, but not limited to, for landscaping support.

Due to the temporary nature of construction water demands, compliance with the Adjudication Judgement, availability of supplemental water supplies, and implementation of standard construction BMPs including as applicable to dewatering practices, construction of the proposed 2021 LRDP would not substantially decrease groundwater supplies, impede sustainable groundwater management, or interfere substantially with groundwater recharge. Potential impacts would be **less than significant**.

Operation

The UCR campus is presently characterized by large areas of impervious surfaces, such as paving for streets, pathways, structures, and buildings, and there are existing stormwater drainage systems in place to convey surface flows across these impermeable areas to permeable areas such as arroyos and vegetated swales, where the water is allowed to infiltrate to the subsurface. Infiltration and percolation of precipitation occurs in permeable areas such as open space areas in East Campus and research fields located in West Campus (Figure 4.10-4). As currently envisioned, development under the proposed 2021 LRDP would occur primarily within previously disturbed areas, adjacent to previously developed areas, surface parking areas, generally along North/South/East/West Campus Drive, and generally along University Avenue, Canyon Crest Drive, Big Springs Road, Aberdeen Drive, and West Linden Street. Additionally, development under the 2021 LRDP would primarily be infill development or expansion of already developed areas. Some of the new facility development may be located on currently undeveloped and unpaved areas of campus, such as in land use areas designated as Agricultural/Campus Research, Student Neighborhood, Campus Support, and University Avenue Gateway, and an interpretative center in the UCR Botanic Gardens. Although the proposed 2021 LRDP would introduce new impervious areas through development of new buildings/facilities, such development would be implemented with site-specific appropriate drainage features to convey surface flows across and around impermeable areas to those areas where flows may infiltrate to the subsurface. This would be achieved through implementation of LID methods including Control Design Criteria for compliance with the NPDES program and the Phase II MS4 Permit.

The MS4 Permit requires all regulated projects – defined as projects creating and/or replacing 5,000 square feet or more of impervious area – to implement an SWMP that incorporates LID measures, including stormwater retention and treatment features. The requirement for an SWMP is also provided under the 2021 LRDP Objective IS-SW1, discussed above under "2021 LRDP Objectives and Policies." Such stormwater retention features must capture runoff from the 85th percentile, 24-hour storm event, 80 percent of the annual runoff, or flow from either 0.2 inch per hour rainfall intensity or twice the 85th percentile hourly rainfall intensity as determined by local rainfall records. As such, the proposed 2021 LRDP directs UCR to develop an SWMP in planning and design strategies to restore, enhance, and maintain hydrological function on campus and in the regional hydrological system, which would minimize or avoid potentially adverse impacts associated with introducing new impervious areas on groundwater recharge rates and patterns. Redevelopment sites which do not currently meet these standards would benefit from long-term post-construction stormwater controls in comparison to baseline conditions.

Through compliance with MS4 Permit requirements, implementation of LID methods, and implementation of an SWMP during operation of the proposed 2021 LRDP, potential impacts of new

impervious surfaces of groundwater recharge rates and patterns would be less than significant. In addition, the 2021 LRDP would not impede the creation or implementation of a groundwater sustainability plan and would occur in compliance with existing groundwater sustainability plans. As such, the proposed 2021 LRDP would not substantially decrease groundwater supplies or substantially interfere with groundwater recharge and potential impacts are **less than significant**.

Mitigation Measures

No mitigation measures are required.

Significance After Mitigation

Impacts would be less than significant without mitigation.

Impact HWQ-3 ALTERATION OF DRAINAGE PATTERNS IN A MANNER WHICH WOULD RESULT IN SUBSTANTIAL EROSION, INCREASED RUNOFF RESULTING IN FLOODING, CREATION OR CONTRIBUTION OF RUNOFF WATER WHICH WOULD EXCEED THE CAPACITY OF A STORMWATER DRAINAGE SYSTEM, OR IMPEDE OR REDIRECT FLOOD FLOWS.

CONSTRUCTION AND OPERATION OF THE PROPOSED 2021 LRDP WOULD NOT ALTER THE COURSE OF A STREAM OR RIVER AND WOULD NOT ALTER REGIONAL STORMWATER DRAINAGE PATTERNS. COMPLIANCE WITH APPLICABLE REGULATIONS AND POLICIES, INCLUDING IMPLEMENTATION OF A SWPPP DURING CONSTRUCTION AND A SWMP DURING OPERATION, WOULD PROVIDE SUFFICIENT ON-SITE CONSTRUCTION AND POST-CONSTRUCTION PREVENTION, CAPTURE, AND TREATMENT OF STORMWATER RUNOFF, AND WOULD MINIMIZE OR AVOID POTENTIALLY ADVERSE IMPACTS SUCH THAT THEY WOULD BE LESS THAN SIGNIFICANT. NO MITIGATION IS REQUIRED.

The proposed 2021 LRDP would not alter the course of a stream or river. However, full buildout of the proposed 2021 LRDP may result in site-specific alterations to the local drainage patterns, which are the footprint of travel of unabsorbed rainwater in a given area (generally moving from areas of higher elevation to lower elevation). Hydromodification, or changes in the natural watershed hydrologic processes and runoff characteristics (i.e., interception, infiltration, overland flow, interflow, and groundwater flow), is caused by land disturbance activities such as vegetation removal or grading, and other land use changes that result in drainage pattern modifications. Hydromodification generally increases surface runoff rates and decreases infiltration rates, or the rate at which surface runoff infiltrates to the subsurface. Additional development can increase surface runoff rates by creating more impervious surfaces that do not allow percolation of the water down into the soil. Water is instead conveyed directly into storm drain systems or streams.

Construction

As discussed under Impact HWQ-1, removal of vegetation, excavation, grading, and stockpiling of soils may accelerate erosion and siltation, if disturbed soils are not secured. The portion of campus that would see the most intense development under the proposed 2021 LRDP include the Academic Center and the northern half of East Campus around Canyon Crest Drive and West Linden Street. These areas would potentially experience the greatest extent of hydromodification. However, construction activities under the proposed 2021 LRDP would be implemented in accordance with a site-specific SWPPP as part of CGP requirements, and the SWPPP would detail BMPs to avoid or minimize erosion, siltation, and flooding associated with drainage pattern alternations. Therefore, the construction impacts related to alteration of drainage patterns resulting in erosion, siltation, or flooding would be less than significant.

Construction projects under the proposed 2021 LRDP would be implemented with site-specific drainage features that direct and convey surface runoff into the UCR campus' existing drainage system and infiltration facilities which have sufficient capacity to accommodate buildout of the proposed LRDP. Implementation of the proposed 2021 LRDP would not disrupt regional drainage patterns and would not impede or redirect regional flood flows. Localized drainage pattern alterations would be addressed through site-specific drainage and flood control features, in accordance with the NPDES General Stormwater Permit for Small MS4s requirements. The implementation of a SWPPP during construction would minimize or avoid potential water quality related impacts from drainage pattern alterations. With the continued implementation of UCR policies and regulatory requirements, which include the implementation of construction-period BMPs, construction impacts related to generating polluted runoff, resulting in drainage pattern alternations, or exceeding storm drainage system capacity would be **less than significant**.

Operation

Implementation of the proposed 2021 LRDP would increase impervious surfaces compared to existing conditions. The net increase in impervious surfaces with 2021 LRDP implementation has not been quantified, as it will depend upon the design specifications of individual projects, as well as the projects' baseline conditions at the time of project implementation. A hydrology report was conducted for the 2016 Master Plan Study, which provided guidance to future campus development in support of the Strategic Plan's academic vision and the proposed 2021 LRDP. The 2016 Master Plan Study computed peak discharges for 21 identified UCR sub-drainage areas in East Campus for existing and future conditions using guidelines and methodology developed by the RCFCWCD. A comparison of the existing and future conditions reveals that the 2-year and 25-year peak flows are anticipated to generate on-site runoff increase for the East Campus by nearly 10 percent (UCR 2016a).

Storm drain infrastructure for development under the proposed 2021 LRDP would adhere to federal, State, and UCR requirements under the NPDES Program, including a post-construction stormwater runoff control program for new development and redevelopment. In addition, the proposed 2021 LRDP directs UCR to implement a SWMP to address additional runoff from the projected new development to meet the requirements of the Stormwater General Small MS4s Permit, Section F.5.g. (Post-Construction Stormwater Management Program), including Section F.5.g.3. (Alternative Post-Construction Stormwater Management Program) consistent with the MEP standard. Redevelopment of older UCR buildings with long-term post-construction stormwater controls would also improve operational stormwater drainage and treatment. UCR Planning, Design & Construction staff would review and approve project plans to ensure compliance with federal, State, and UCR regulatory requirements and that stormwater management and utility infrastructure is appropriately considered. The primary objective of these post-construction requirements is to ensure that the projects reduce pollutant discharges to the maximum extent practicable and prevent stormwater discharges from causing or contributing to a violation of water quality standards. Therefore, operational impacts related to alteration of drainage pattern resulting in erosion, siltation, or flooding would be less than significant.

The UCR campus storm drain system connects to the RCFCWCD storm drain network, as shown in Figure 4.10-6. As shown in Figure 4.10-7, FEMA Flood Zones are located in and around these arroyos and the bioswales located south of Big Springs Road in East Campus, including the area north of University Avenue and west of Canyon Crest Drive known as Gage Basin. To comply with FEMA requirements, development under the proposed 2021 LRDP would be located outside of the 100-year flood plain, and the proposed development under the 2021 LRDP would not impede or redirect

flood flows in a 100-year flood hazard area. The proposed 2021 LRDP would also protect and enhance the natural arroyo system on campus, thereby minimizing future flood hazards and avoiding adverse impacts of LRDP development of flood patterns.

The arroyos and detention basins currently serve to convey and contain the 100-year flood storm generated by the campus and upstream properties and would be maintained under the proposed 2021 LRDP. Future development project sites would need to incorporate pre-treatment systems before discharging into the treatment areas. Future and existing streets and malls included as part of future development under the proposed 2021 LRDP would provide opportunities for centralized stormwater treatment. Future and existing storm drains would be used to pre-treat and transport runoff to treatment areas. For instance, the Great Glen Basin at the northeast intersection of East Campus Road and Big Springs Road currently receives flows from a natural arroyo which serves a portion of the campus as well as an off-site residential area to the northeast, approximately 100 acres in total. The 85th percentile treatment storm from development in the East Campus around East Campus Drive would be collected and conveyed by various drainage systems, including underground storm drains and surface conveyance through the proposed Science Walk extension pedestrian mall. Stormwater runoff which exceeds the treatment flow would overflow to future and existing storm drain conveyance systems that serve the existing sites and maintain existing drainage patterns. The volume from the upstream development sites would increase the stormwater volume held on the Great Glen Basin (UCR 2016a).

Similarly, the Glade Basin at the northeastern corner of North Campus Drive and Aberdeen Drive currently accepts flows from a 40-acre portion of the campus to its north. The 85th percentile treatment storm from development near Aberdeen Drive and north of North Campus Drive would be collected in underground storm drains and conveyed by a vegetated swale along Aberdeen Drive to the existing detention basin. Stormwater runoff which exceeds the treatment flow would overflow to future and existing storm drain conveyance systems which would serve the existing sites and maintain existing drainage patterns. Although not proposed under the 2021 LRDP, the capacity of the Great Glen Basin and Glade Basin may be increased by increasing the depth of storage area, widening the edges, or a combination of both. Subsurface storage such as a gravel storage area at the bottom of the basins would also aid in increasing capacity with minimal land disturbance. Should UCR choose to pursue such modifications to the existing basins, they would be subject to CEQA review and applicable regulatory agency permitting requirements (UCR 2016a).

According to the 2016 Master Plan Study, an existing area of narrow parking separating the I-215/SR 60 freeway and West Campus Drive south of University Avenue could be replaced with a 40- to 50-foot-wide buffer consisting of trees, a multi-use area, and an area designated for stormwater treatment (UCR 2016b). The 85th percentile treatment storm from development in the Academic Center would be collected and conveyed through various landscape spaces, pedestrian malls, and underground storm drains. The stormwater treatment buffer would be designed to treat stormwater in a similar fashion to a vegetated swale while conveying it from south to north, to a future stormwater management infrastructure located south of Parking Lot 1. The 2016 Master Plan Study also proposes a Canyon Crest Drive Linear Treatment System to modify the existing Canyon Crest Drive to include an area for stormwater treatment as part of its cross-section. The 85th percentile treatment storm from development east of Canyon Crest Drive would be collected and conveyed through landscape spaces, pedestrian malls, and underground storm drains. The stormwater treatment strip would be designed to treat stormwater, similar to a vegetated swale, while conveying it from north to south, to the existing Gage Basin (UCR 2016a).

Development under the proposed 2021 LRDP would not substantially alter existing drainage patterns through the addition of impervious surfaces or otherwise result in hydromodification such that flooding would occur, the stormwater drainage system capacity would be exceeded, or flood flows would be impeded or redirected. Therefore, operational impacts related to flooding, exceedance of storm drainage capacity, or impedance or redirection of flood flows would be **less than significant**.

Mitigation Measures

No mitigation measures are required.

Significance After Mitigation

Impacts would be less than significant without mitigation.

Impact HWQ-4 Conflict with a Water Quality Control Plan or Sustainable Groundwater Management Plan.

The proposed 2021 LRDP would implement water quality BMPs in accordance with applicable requirements, reducing potential downstream water quality impacts to ensure that the proposed 2021 LRDP would not conflict with or obstruct implementation of the Water Quality Control Plan or a sustainable groundwater management plan. This impact would be less than significant. No mitigation is required.

The Basin Plan for the Santa Ana Region is addressed in Section 4.10.2, *Regulatory Setting*, under the "Regional and Local" subheading for the Santa Ana River Basin Water Quality Control Plan (Basin Plan). The Basin Plan, as developed and implemented by the Santa Ana RWQCB in accordance with the federal CWA, designates beneficial uses for surface waters in the Santa Ana Region and associated water quality objectives to fulfill such uses. The proposed 2021 LRDP would result in increased water demand due to the development and redevelopment of UCR facilities and the accommodation of additional students and faculty/staff. Implementation of the proposed 2021 LRDP may expand impervious surfaces on the UCR campus, and BMPs would be implemented to avoid conflicting with a water quality control plan or sustainable groundwater management plan.

As discussed under Impact HWQ-1, construction and operation of the proposed 2021 LRDP would be conducted in compliance with applicable regulatory requirements related to stormwater runoff to minimize the potential for pollutants to enter receiving waters. The proposed 2021 LRDP activities would also comply with the provisions of the Statewide General Construction Activity Stormwater Permit that specifies the implementation of BMPs as well as the NPDES Stormwater General Permit for Small MS4s. This would include implementation of a project-specific SWPPP during construction activities as well as a SWMP during operation and maintenance activities. Under the SWMP, facilities would incorporate site design, source control, and treatment BMPs to prevent pollutants from reaching receiving waters. Storm drain infrastructure for the proposed 2021 LRDP would also adhere to UCR requirements, including a post-construction site stormwater runoff control program for new development and redevelopment. With incorporation of operational BMPs, the proposed 2021 LRDP would not impair existing or potential beneficial uses of nearby or downstream water bodies and would not conflict with or obstruct implementation of the Basin Plan.

As discussed under Impact HWQ-2, neither construction nor operation and maintenance of the proposed 2021 LRDP would adversely impact groundwater supplies or supply reliability, and the 2021 LRDP would not interfere with management of the local groundwater basins in accordance

with the Adjudication Judgement. In addition, the proposed 2021 LRDP would not impede the creation or implementation of a future groundwater sustainability plan for a groundwater subbasin. Given that adequate groundwater supplies are anticipated to be available in year 2035 for the projected 2035 population across Riverside County, and existing regulatory measures prevent over-drafting of the groundwater subbasin that underlies the UCR campus, water consumption would not substantially decrease groundwater supplies. Potential impacts related to water quality control and groundwater management plan consistency would be **less than significant**.

Mitigation Measures

No mitigation measures are required.

Significance After Mitigation

Impacts would be less than significant without mitigation.

4.10.4 Cumulative Impacts

The geographic scope of cumulative analysis for hydrology and water quality impacts is defined by Tequesquite Arroyo and East Etiwanda Creek, the Santa Ana River Sub-Watersheds, and Riverside-Arlington Groundwater Subbasin, as defined above in Section 4.10.1, *Environmental Setting*. As such, this cumulative analysis assesses development on and proximate to the UCR campus and includes buildout of the cities of Riverside and Moreno Valley, the closest of which is 1.9 miles northeast of the East Campus boundary as described in Table 4-1.

Surface Water Quality and Groundwater Quality

The violation of any water quality standards or waste discharge requirements could result in water quality degradation and impacts to surface water quality or groundwater quality. However, the UCR campus is a permittee under the Phase II MS4 Small Statewide General Stormwater Permit, which requires UCR to prevent construction site discharges of pollutants through the installation, implementation, and maintenance of BMPs and ensure compliance with CGP (State Water Resources Control Board Order 2009-0009-DWQ, as amended). All construction projects under the proposed 2021 LRDP would comply with the provisions of the NPDES Statewide General Construction Activity Stormwater Permit, including through the implementation of a SWPPP with BMPs to address both source control and treatment control to reduce or avoid water quality impacts. In addition, projects under the proposed 2021 LRDP would also implement a SWMP, as required by the MS4 permit and included in objectives of the 2021 LRDP. As such, projects under the 2021 LRDP would comply with water quality standards and waste discharge requirements, and potential water quality impacts would have minimal potential to combine with similar impacts of other projects in the cumulative scenario. Furthermore, cumulative projects within the region would also be obligated to comply with regulatory requirements for water quality protection. Potential cumulative impact related to surface water and groundwater quality (Impact HWQ-1) would be less than significant, and the proposed 2021 LRDP's **contribution would not be cumulatively considerable**.

Groundwater Recharge and Sustainability

Continued development throughout the cumulative analysis area in the absence of regulations could alter groundwater recharge rates and patterns such that underlying groundwater supplies could be affected. However, such effects from the proposed 2021 LRDP and cumulative

development would be minimized or avoided through implementation of LID methods and compliance with the SWMP, which would collectively minimize drainage pattern alterations that could affect groundwater recharge. As such, potential groundwater recharge impacts of the proposed 2021 LRDP would have minimal potential to combine with similar impacts of other projects in the cumulative scenario. Cumulative projects within the region would have to comply with similar regulatory requirements for both construction and operation BMPs. In many instances, where cumulative project's redevelop existing sites which do not currently meet stormwater standards, there would benefit from long-term post-construction stormwater controls in comparison to baseline conditions. Cumulative impacts would not be significant, and the proposed 2021 LRDP's **contribution would not be cumulatively considerable**.

Furthermore, although the proposed 2021 LRDP would result in an increased water use, this increase in water demands is accounted for in the current UWMP, which also accounts for other projects in the cumulative scope of analysis, and there are sufficient water supplies available to meet the regional water demands in a sustainable manner.

It is likely that a portion of the new campus population would reside in jurisdictions outside the City. Both the RPU and WMWD, which supplies water to several water retailers in western Riverside County, have indicated that the supply source groundwater basins are stable during the lifespan of the proposed 2021 LRDP, and that new recharge projects and regulation of adjudicated basins will prevent them from being overdrafted. The proposed 2021 LRDP does not propose any new wells. Additionally, the proposed 2021 LRDP includes policies to decrease potable water use, such as extending Gage Canal water to also irrigate the UCR Botanic Gardens and reducing turf on campus and replacing with lower-use landscaping. Potential cumulative impact related to groundwater recharge and sustainability (Impact HWQ-2) would be less than significant, and the proposed 2021 LRDP's **contribution would not be cumulatively considerable**.

Surface Drainage Patterns and Erosion

Construction of projects on the UCR campus and other projects considered in the cumulative analysis would involve grading and other earthmoving activities that could result in temporary and short-term localized soil erosion in the absence of proper regulations. Urban development in the Tequesquite Arroyo and East Etiwanda Creek Santa Ana River Sub-Watersheds and associated hydromodification in general have the potential to result in flooding, drainage systems capacity issues, and erosion and sedimentation problems throughout the sub-watershed areas. However, construction-related impacts from individual projects under the proposed 2021 LRDP and those considered in the cumulative analysis would be temporary and short term, and each project's construction activities would be localized. Furthermore, cumulative future development projects in these areas would be subject to the same NPDES/SWPP stormwater permit requirements as UCR, including minimizing the area of impervious surfaces, implementing LID measures, and reducing runoff from project sites through stormwater capture, so that increases in peak flows and flow durations would be minimized. In many instances, where cumulative project's redevelop existing sites which do not currently meet stormwater standards, there would benefit from long-term post-construction stormwater controls in comparison to baseline conditions. The 2021 LRDP area is largely built out and urbanized, with defined stormwater drainage systems and facilities present throughout the UCR campus to convey flood flows. These existing systems and facilities would be maintained and protected in place with the implementation of development under the proposed 2021 LRDP. In addition, although projects under the proposed 2021 LRDP would introduce new impervious surfaces, such features would continue to direct flood flows to the existing stormwater conveyance systems and facilities, and would be implemented with project-specific drainage

improvements as necessary to avoid adverse impacts to existing systems. Thus, potential cumulative impact related to drainage patterns and erosion (Impact HWQ-3) would be less than significant and the proposed 2021 LRDP's **contribution would not be cumulative considerable**.

Water Quality Control Plan and Sustainable Groundwater Management Plans

Potential water quality impacts of the proposed 2021 LRDP and other projects in the cumulative scenario are fully captured in the discussion under "Surface Water Quality and Groundwater Quality," above. As discussed therein, the proposed project and cumulative projects would be subject to the same water quality regulations and requirements, including the Phase II MS4 Small Statewide General Stormwater Permit, to which the UCR campus is a permittee. Similarly, potential groundwater impacts of the proposed 2021 LRDP and other projects within the cumulative scenario are fully captured in the discussion under "Groundwater Recharge and Sustainability," above. As discussed therein, the proposed project and cumulative projects would be subject to the same groundwater management standards and regulations, including the 1969 Western-San Bernardino Adjudication Judgment, which provides for groundwater supply sustainability despite overdraft conditions; this is accomplished through conjunctive use management efforts such as the replenishment of any groundwater extracted under overdraft conditions with imported surface water supplies to avoid adverse effects associated with overdraft. Therefore, impacts of the proposed 2021 LRDP would have minimal potential to combine with similar impacts of other projects, and potential cumulative impacts related to water quality control plans and sustainable groundwater management plans (Impact HWQ-4) would be less than significant, and the proposed 2021 LRDP's **contribution would not be cumulative considerable**.

4.10.5 References

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4.11 Noise

This section analyzes the temporary and long-term noise impacts associated with the construction and operation of campus development from implementation of the proposed 2021 LDRP.

4.11.1 Environmental Setting

Overview of Sound Measurement

Sound is a vibratory disturbance created by a moving or vibrating source, which is capable of being detected by the hearing organs. Noise is defined as sound that is loud, unpleasant, unexpected, or undesired and may therefore be classified as a more specific group of sounds. The effects of noise on people can include general annoyance, interference with speech communication, sleep disturbance, and, in the extreme, hearing impairment (Caltrans 2013).

Noise levels are commonly measured in decibels (dB) using the A-weighted sound pressure level (dBA). The A-weighting scale is an adjustment to the actual sound pressure levels so that they are consistent with the human hearing response. Decibels are measured on a logarithmic scale that quantifies sound intensity in a manner similar to the Richter scale used to measure earthquake magnitudes. A doubling of the energy of a noise source, such as doubling of traffic volume, would increase the noise level by 3 dBA; reducing the energy in half would result in a 3 dBA decrease (Crocker 2007). Because the dB scale is based on logarithms, two noise sources do not combine in a simple additive fashion, but rather logarithmically. For example, if two noise sources produce identical noise levels of 50 dBA, their combined sound level would be 53 dBA, not 100 dBA. However, where ambient noise levels are high in comparison to a new noise source, there will be a small change in noise levels. For example, when an ambient noise level of 70 dBA is combined with a noise source generating 60 dBA, the resulting noise level equals 70.4 dBA.

Human perception of noise has no simple correlation with sound energy: the perception of sound is not linear in terms of dBA or in terms of sound energy. Two sources do not "sound twice as loud" as one source. It is widely accepted that the average healthy ear can barely perceive changes of 3 dBA, increase or decrease (i.e., twice the sound energy), that a change of 5 dBA is readily perceptible (8 times the sound energy), and that an increase (or decrease) of 10 dBA sounds twice (half) as loud (10.5 times the sound energy) (Crocker 2007).

Sound changes in both level and frequency spectrum as it travels from the source to the receiver. The most obvious change is the decrease in level as the distance from the source increases. The manner in which noise reduces with distance depends on factors such as the type of sources (e.g., point or line, the path the sound will travel, site conditions, and obstructions). Noise levels from a point source typically attenuate, or drop off, at a rate of 6 dBA per doubling of distance (e.g., construction, industrial machinery, ventilation units). Noise from a line source (e.g., roadway, pipeline, railroad) typically attenuates at about 3 dBA per doubling of distance (Caltrans 2013). The propagation of noise is also affected by the intervening ground, known as ground absorption. A hard site, such as a parking lot or smooth body of water, receives no additional ground attenuation and the changes in noise levels with distance (drop-off rate) result from simply the geometric spreading of the source. An additional ground attenuation value of 1.5 dBA per doubling of distance applies to a soft site (e.g., soft dirt, grass, or scattered bushes and trees) (Caltrans 2013). Noise levels may also be reduced by intervening structures. The amount of attenuation provided by this "shielding" depends on the size of the object and the frequencies of the noise levels. Natural terrain features

such as hills and dense woods, and man-made features such as buildings and walls, can significantly alter noise levels. Generally, any large structure blocking the line of sight will provide at least a 5-dBA reduction in source noise levels at the receiver (Federal Highway Administration [FHWA] 2011). Structures can substantially reduce exposure to noise as well. The FHWA's guidelines indicate that modern building construction generally provides an exterior-to-interior noise level reduction of 20 to 35 dBA with closed windows.

The impact of noise is not a function of loudness alone. Most noise that lasts for more than a few seconds is variable in its intensity. Consequently, a variety of noise descriptors have been developed. One of the most frequently used noise metrics is the equivalent noise level (L_{eq}); it considers both duration and sound power level. L_{eq} is defined as the single steady A-weighted level equivalent to the same amount of energy as that contained in the actual fluctuating levels over time. Typically, L_{eq} is summed over a one-hour period. L_{max} is the highest root-mean-square (RMS) sound pressure level in the sampling period, and L_{min} is the lowest RMS sound pressure level in the measuring period (Crocker 2007).

Noise that occurs at night tends to be more disturbing than that occurring during the day. Community noise metrics are usually measured using Day-Night Average Level (L_{dn}), which is the 24-hour average noise level with a +10 dBA penalty for noise occurring during nighttime (10:00 p.m. to 7:00 a.m.) hours. It is also measured using Community Noise Equivalent Level (CNEL), which is the 24-hour average noise level with a +5 dBA penalty for noise occurring from 7:00 p.m. to 10:00 p.m. and a +10 dBA penalty for noise occurring from 10:00 p.m. to 7:00 a.m. (Caltrans 2013). Noise levels described by L_{dn} and CNEL usually differ by about 1 dBA. The relationship between the peak-hour L_{eq} value and the L_{dn}/CNEL depends on the distribution of traffic during the day, evening, and night. Quiet suburban areas typically have CNEL noise levels in the range of 40 to 50 dBA, while areas near arterial streets are in the 50 to 60-plus CNEL range. Normal conversational levels are in the 60 to 65-dBA L_{eq} range; ambient noise levels greater than 65 dBA L_{eq} can interrupt conversations (Federal Transit Administration [FTA] 2018).

Effects of Noise on People

The effects of noise on people can be placed into three categories:

- Subjective effects of annoyance, nuisance, and dissatisfaction
- Interference with activities such as speech, sleep, and learning/studying
- Physiological effects such as hearing loss or sudden startling

These potential effects can be caused by both short- and long-term exposure to very loud noises and long-term exposure to lower levels of sound. However, there is no perfect way to measure the subjective effects of noise or the corresponding reactions of annoyance and dissatisfaction, including interference with communication and human speech. A wide variation exists in the individual thresholds of annoyance, and different tolerances to noise tend to develop based on an individual's past experiences with noise. In general, the more a new noise exceeds the previously existing ambient noise level, the less acceptable the new noise would be judged by those hearing it.

Nighttime noise can potentially affect sleep. Noise can make it difficult to fall asleep and create momentary disturbances of natural sleep patterns by causing shifts from deep to lighter stages (Los Angeles World Airports [LAWA] 2012). In addition, noise can awaken people from sleep, although nighttime awakenings also occur independent of noise. People commonly attain full waking consciousness two or three times per night for reasons having nothing to do with noise exposure.

Health effects from noise have been studied around the world for nearly 30 years. Scientists have attempted to determine if high noise levels can adversely affect human health apart from auditory damage. In a review of 30 studies conducted worldwide between 1993 and 1998, a team of international researchers concluded that, while some findings suggest that noise can affect health, improved research concepts and methods are needed to verify or discredit such a relationship. The team of international researchers called for more study of the numerous environmental and behavioral factors than can confound, mediate, or moderate survey findings. Until science refines the research process, a direct link between a single source noise exposure and non-auditory health effects remains to be demonstrated (LAWA 2012).

The Occupational Safety and Health Administration has an established noise exposure limit of 90 dBA for 8 hours per day (or higher for shorter duration exposures) to protect an individual from hearing loss (29 Code of Federal Regulations [CFR] 1910.95). Noise levels in neighborhoods, even near a major airport or a major freeway, are not sufficiently loud to cause hearing loss (LAWA 2012).

Vibration

Groundborne vibration of concern in environmental analysis consists of the oscillatory waves that move from a source through the ground to adjacent structures. The number of cycles per second of oscillation makes up the vibration frequency, described in terms of Hz. The frequency of a vibrating object describes how rapidly it oscillates. The normal frequency range of most groundborne vibration that can be felt by the human body starts from a low frequency of less than 1 Hz and goes to a high of about 200 Hz (Crocker 2007).

While people have varying sensitivities to vibrations at different frequencies, in general, they are most sensitive to low-frequency vibration. Vibration in buildings, such as from nearby construction activities, may cause windows, items on shelves, and pictures on walls to rattle. Vibration of building components can also take the form of an audible low-frequency rumbling noise, referred to as groundborne noise. Groundborne noise is usually only a problem when the originating vibration spectrum is dominated by frequencies in the upper end of the range (60 to 200 Hz), or when foundations or utilities, such as sewer and water pipes, physically connect the structure and the vibration source (FTA 2018). Vibration energy spreads out as it travels through the ground, causing the vibration level to quickly diminish with distance from the source. High-frequency vibrations diminish much more rapidly than low frequencies, so low frequencies tend to dominate the spectrum at large distances from the source. Discontinuities in the soil strata can also cause diffractions or channeling effects that affect the propagation of vibration over long distances (Caltrans 2020a). When a building is impacted by vibration, a ground-to-foundation coupling loss will usually reduce the overall vibration level. However, under rare circumstances, the ground-to-foundation coupling may actually amplify the vibration level due to structural resonances of the floors and walls.

Vibration amplitudes are usually expressed in peak particle velocity (PPV) or RMS vibration velocity. The PPV and RMS velocity are normally described in inches per second (in./sec.). PPV is defined as the maximum instantaneous positive or negative peak of a vibration signal. PPV is often used in monitoring of blasting vibration because it is related to the stresses that are experienced by buildings (Caltrans 2020a).

The background vibration velocity level in residential and educational areas is usually or lower around 50 VdB, or 0.007 in./sec. PPV (FTA 2018). As described in greater detail below in Table 4.11-7, vibration at sufficient levels can result in damage to structures, depending upon the age and type of construction.

Ground vibration can be annoying to people. The degree to which a person is annoyed depends on the activity in which they are participating at the time of the disturbance. For example, someone sleeping or reading will be more sensitive than someone who is running on a treadmill (Caltrans 2020a).

Historic structures are considered more sensitive to vibration than regular structures, as such structures are usually of older, less competent construction, and lower vibration limits for them are often justified (Caltrans 2020a). Ground vibration also has the potential to disrupt the operation of vibration-sensitive research and advanced technology equipment (Caltrans 2020a). This equipment can include optical microscopes, cell probing devices, magnetic resonance imaging (MRI) machines, scanning electron microscopes, photolithography equipment, micro-lathes, and precision milling equipment. The degree to which this equipment is disturbed depends on the type of equipment, how it used, and its support structure. For example, equipment supported on suspended floors may be more susceptible to disturbance than equipment supported by an on-grade slab.

Existing Noise Setting

The campus is in a semi-urban, developed area. Land uses adjacent to East Campus include commercial uses, single- and multi-family residences, open space, and the I-215/SR 60 freeway. Land uses near West Campus include agriculture, commercial uses, single- and multi-family residences, and the I-215/SR 60 freeway. The primary sources of noise on-site and in the surrounding area are motor vehicles from roadways. The greatest vehicle noise would occur from vehicles on the I-215/SR 60 freeway and on the main thoroughfares (e.g., Big Springs Road, Blaine Street, North/South/East/West Campus Drive, Canyon Crest Drive, Central Avenue, West Linden Street, Martin Luther King Boulevard, University Avenue, and Watkins Drive). To establish the existing noise setting, the EIR considers previously measured noise levels, City of Riverside General Plan noise contours, other sources of noise on campus (e.g., construction noise and special event noise), and campus noise control programs, described below.

Measured Noise Levels

Due to the campus-wide shut down as a result of COVID-19, measuring the ambient noise around the campus during the year 2020 would not accurately represent the existing noise setting. Instead, noise measurements were used from previous projects on the UCR campus to evaluate existing noise levels which were taken prior to the COVID-19 shutdown. Table 4.11-1 through Table 4.11-4 show measurements taken during planning for the: (A) UCR Parking Structure 1 Project, (B) UCR Glen Mor 2 Student Apartments Project, (C) CARB Southern California Consolidation Project, and (D) the UCR North District Development Plan Project, respectively. The general noise measurement locations for each project are shown in Figure 4.11-1. These noise measurements are representative of noise levels in proximity to these locations.

Table 4.11-1 UCR Parking Structure 1 Noise Monitoring Results (Location A)

Measurement	Measurement Location	Sample Times[1]	Approximate Distance to Primary Noise Source	L_{eq} (dBA)
A1	Southeast corner of Parking Lot 13	10:25 – 10:40 a.m.	440 feet from traffic in Parking Lot 13	53.5
A2	Along Big Springs Road, north of Parking Lot 13, and south of the Glen Mor Student Residence Complex	11:31 – 11:46 a.m.	50 feet from landscaping equipment and traffic on Big Springs Road	58.8
A3	East side of Parking Lot 13	10:46 – 11:01 a.m.	45 feet from traffic on Big Springs Road	50.1
A4	Along Big Springs Road, east of Valencia Hill Drive, adjacent to off-campus residences	11:08 – 11:23 a.m.	45 feet from traffic on Big Springs Road	62.5

[1] Measurements performed on October 2,2019

Leq = equivalent noise level; dBA = A-weighted decibels

Source: UCR 2020

Table 4.11-2 UCR Glen Mor 2 Student Apartments Project Noise Monitoring Results (Location B)

Measurement	Measurement Location	Sample Times[1]	Noise Source	L_{eq} (dBA)
B1	Athletic fields	7:09 – 7:24 a.m.	Intramural football game; distant music; birds; distant aircraft; distant traffic	57.3
B2	3624 Valencia Hill Drive Riverside, CA 92507	7:28 – 7:43 a.m.	Intramural football game; distant music; birds; distant aircraft; distant traffic	52.6
B3	University Village Apartment Pool	10:45 – 11:00 a.m.	Traffic along West Big Springs road; birds	52.0
B4	University Village Apartment	11:08 – 11:23 a.m.	Traffic along West Big Springs road; birds	49.6
B5	3706 Valencia Hill Drive Riverside, CA 92507	11:39 – 11:54 a.m.	Traffic along Watkins Drive; birds	48.0
B6	3592 Valencia Hill Drive Riverside, CA 92507	12:02 – 12:17 p.m.	Traffic along Watkins Drive; birds; distant aircraft	49.0
B7	Common area of Glen Mor 1 student apartments north of project site	12:32 – 12:47 p.m.	Birds; distant aircraft	48.0

[1] Measurements performed on May 26, 2010 or May 27, 2010

Leq = equivalent noise level; dBA = A-weighted decibels

Source: UCR 2011

Table 4.11-3 CARB Southern California Consolidation Project Noise Monitoring Results (Location C)

Measurement	Measurement Location	Sample Times[1]	Description	L_{eq} (dBA)
C1	3996 Iowa Avenue Riverside, CA 92507	11:02 – 11:12 a.m.	East of Iowa Avenue, approximately 50 feet from the center line	64.7
C2	3993 Iowa Avenue Riverside, CA 92507	10:49 – 10:59 a.m.	West of Iowa Avenue, approximately 150 feet from the center line	49.7
C3	3993 Iowa Avenue Riverside, CA 92507	10:37 – 10:47 a.m.	West of Iowa Avenue, approximately 330 feet from the center line	48.1
C4	1414 Everton Place Riverside, CA 92507	10:12 – 10:22 a.m.	Southwest end of the basketball court	41.9
C5	3998 Cranford Avenue Riverside, CA 92507	9:43 – 9:53 a.m.	North of Cranford Avenue, approximately 40 feet from the center line	41.6
C6	3988 Cranford Avenue Riverside, CA 92507	9:30 – 9:40 a.m.	North of Cranford Avenue, approximately 30 feet from the center line	49.6

[1] Measurements performed on September 14, 2016

L_{eq} = equivalent noise level; dBA = A-weighted decibels

Source: CARB 2017

Table 4.11-4 UCR North District Development Plan Noise Monitoring Results (Location D)

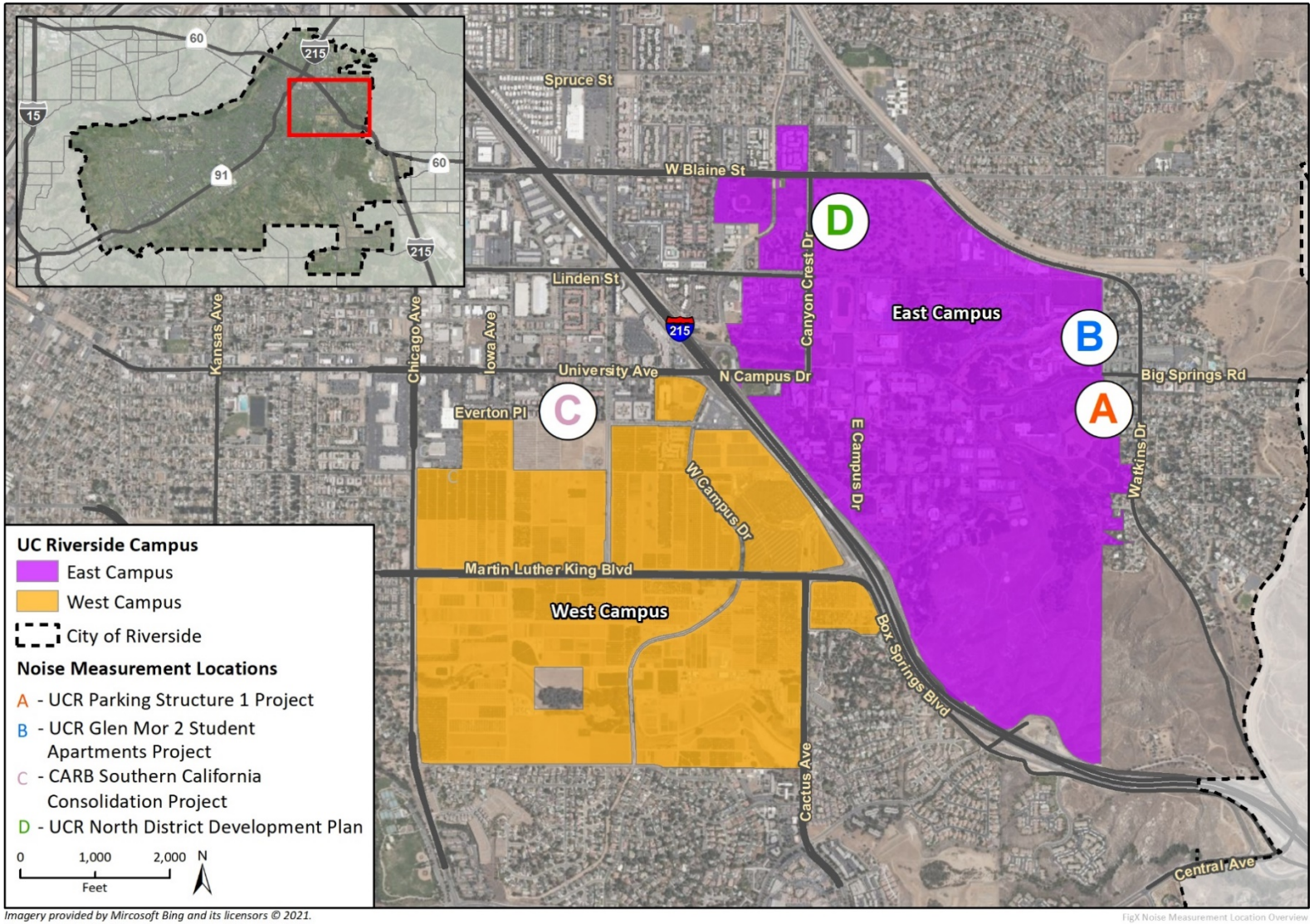
Measurement [1]	Measurement Location	L_{eq} (dBA)
D1	Abderdeen-Inverness Residence Hall	62.2
D2	Child Development Center	55.5
D3	Stonehaven Apartments	61.6
D4	Falkirk Student Apartments	59.6

[1] Measurements performed on October 4, 2018

L_{eq} = equivalent noise level; dBA = A-weighted decibels

Source: UCR 2019

Figure 4.11-1 Noise Measurement Locations



City of Riverside General Plan Noise Contours

The City's Noise Element establishes existing (Year 2003) and future (Year 2025) noise contours for roadways, freeways, and railways, as well as noise contours for area airports (Riverside Municipal Airport, Flabob Airport, and March Air Reserve Base). The Year 2025 roadway noise contour map (Figure N-5 of the City's General Plan), identifies Martin Luther King Boulevard, University Avenue, and Iowa Avenue as having 60 CNEL, 65 CNEL, and 70 CNEL noise contours. The 60 CNEL contours on University Avenue and Iowa Avenue reach approximately 300 feet from the roadway centerlines; the 60 CNEL contour on Martin Luther King Boulevard reaches approximately 500 feet from the roadway centerline. The Year 2025 freeway noise contour map (Figure N-6 of the City's General Plan), show I-215 noise levels extending much further, with the 60 CNEL noise contour extending approximately 4,500 feet from freeway centerline, the 65 CNEL noise contour extending approximately 2,500 feet from freeway centerline, and the 70 CNEL noise contour extending approximately 1,500 feet from freeway centerline. For reference, a distance of 4,500 feet covers the majority of East Campus and West Campus; a distance of 1,500 feet extends out to campus buildings such as Pierce Hall, the Biological Sciences building, Picnic Hill, and Anderson Hall.

The 2025 railroad noise contour map (Figure N-7 of the City's General Plan), shows the railroad tracks that traverse adjacent to the northeastern corner of UCR, with a 60 CNEL railroad noise contour extending approximately 400 feet from the railway centerline. UCR is not located in noise contours for any area airports (Figures N-8 and N-9 of the City's General Plan).

Traffic Noise Levels

Existing noise levels from roadway traffic was calculated using the Baseline (Year 2018) Scenario from the LRDP's Traffic Operations Analysis (Reed 2021). These noise levels are shown in Table 4.11-5 and are representative of existing peak hour noise levels at 50 feet from the roadway centerlines in the area.

Table 4.11-5 Existing Calculated Traffic Noise Levels

Roadway	Segment	Approximate Peak Hour Noise Level (dBA L_{eq} at 50 feet from Roadway Centerline)
3rd Street	West of the I-215/SR 60 Freeway SB Ramps	63
	Between the I-215/SR 60 Freeway Ramps	66
Big Springs Road	West of Watkins Drive	58
	East of Watkins Drive	56
Blaine Street	West of Canyon Crest Drive	64
	East of Canyon Crest Drive	64
Campus Drive	South of University Avenue	61
Canyon Crest Drive	North of Blaine Street	56
	Between Blaine Street and West Linden Street	60
	Between West Linden Street and Campus Drive	62
	North of Martin Luther King Boulevard	64
	South of Martin Luther King Boulevard	68
Central Avenue	West of the I-215/SR 60 Freeway SB Ramps	68
	Between the I-215/SR 60 Freeway Ramps	68
	East of the I-215/SR 60 Freeway NB Ramps	68
West Linden Street	West of Canyon Crest Drive	59
	East of Canyon Crest Drive	60
Martin Luther King Boulevard	West of Canyon Crest Drive	68
	East of Canyon Crest Drive	68
	Between the I-215/SR 60 Freeway Ramps	66
University Avenue	West of the I-215/SR 60 Freeway SB Ramps	63
	Between the I-215/SR 60 Freeway Ramps	62
	Between the I-215/SR 60 Freeway NB Ramps and Campus Drive	62
Watkins Avenue	North of Big Springs Road	63
	South of Big Springs Road	62

See Methodology for calculation parameters; traffic volumes for the 2018 baseline scenario from Fehr & Peers (Reed 2021).

dBA = A-weighted decibels; Leq = equivalent noise level; I-215 = Interstate 215; SR 60 = State Route 60; SB = Southbound; NB = Northbound

Construction Noise

Construction occurs regularly on campus. Noise generated by construction activities is primarily isolated and limited to the immediate vicinity of each campus project site. The actual noise levels generated by construction vary by site and on a daily and hourly basis, depending on the activity that is occurring, and the types and number of pieces of equipment that are operating. Typical construction equipment noise levels are described under Methodology.

Special Event Noise

Noise is also generated by occasional special events at the UCR campus. These include events such as athletic meets at the campus track and outdoor concerts in the Academic Center and recreational areas of the campus. The loudest of these special events are outdoor concerts. Specific noise levels for each concert event cannot be defined since sound level expectations are different for various types of music; each act provides their own sound equipment, and each act selects the location of the speakers. In general, country music is presented at average sound levels in audience areas of approximately 90 dBA L_{eq}, while rock music typically averages sound levels of approximately 105 dBA L_{eq} (UCR 2005). The noise levels generated by the special events on East Campus primarily affect the academic, administrative, and student housing uses on campus, although they may be audible from off-campus residential neighborhoods to the north and east. No special events are anticipated on West Campus, as there are no existing or proposed facilities under the 2021 LRDP that would accommodate such events.

Campus Noise Control Programs

UCR implements numerous programs to reduce on- and off-campus noise levels. These programs are discussed below.

STATIONARY SOURCE NOISE CONTROLS

In order to provide a relatively quiet environment on the campus that is conducive to the educational process and to be mindful of off-campus sensitive uses (e.g., residential neighborhoods), noise-generating uses such as parking areas and heating, ventilation, and air conditioning (HVAC) units are designed and evaluated when designing specific individual new facilities to minimize the potential for noise impacts to adjacent campus buildings and off-campus sensitive uses (e.g., residential neighborhoods). In addition, building setbacks, architectural features, and orientation are used to reduce intrusive noise at sensitive student residential and educational building locations near main campus access routes.

LANDSCAPE BUFFERING

The campus provides landscaped buffering along the east edge of East Campus (Valencia Hill Drive Landscape Buffer Area) and central West Campus (Martin Luther King Boulevard Landscape Buffer Area). There is also landscaping (trees) along Canyon Crest Drive and University Avenue in West Campus that may accomplish sound reduction of campus noises to the adjacent community. These buffers increase the distance between on-campus uses and the surrounding area and provide an acoustically soft environment to further reduce noise levels. They also reduce noise levels that are generated in the surrounding area (primarily roadway noise) that are heard within the campus. Likewise, they reduce the noise levels that are generated on campus that are heard in the surrounding area. These buffers are implemented, in part, through the UCR Physical Design Framework, which states: “Provide sensitive land use transitions and landscaped buffers where residential neighborhoods might experience noise or light from UCR activities.”

CONSTRUCTION NOISE CONTROLS

As a standard condition of approval, UCR limits the hours of exterior construction activities from 7:00 a.m. to 9:00 p.m. Monday through Friday and 8:00 a.m. to 6:00 p.m. on Saturday, except under rare circumstances where such time limits are infeasible (e.g., for time sensitive construction work such as concrete pouring, excessive heat warnings/temperatures during the summer, operational

emergencies). No exterior construction activities shall occur on federal holidays. Transportation routes for construction traffic onto campus have typically been through Blaine Street to Canyon Crest Drive; University Avenue to Canyon Crest Drive, West Campus Drive, or Iowa Avenue; or through Martin Luther King Boulevard to Canyon Crest Drive or Iowa Avenue.

VEHICULAR TRAFFIC NOISE CONTROLS

UCR is served by several modes of alternative transportation, including public bus services. The campus also implements an Alternative Transportation program that facilitates and promotes the use of transit, carpools, vanpools, and bicycling. (See Section 4.15, *Transportation,* for additional information.) The goal of the program is to reduce the total number of vehicle trips made to campus by faculty, staff, and students. While these programs were not implemented to reduce noise levels, they do have the positive effect of reducing the number of motor vehicle trips and associated noise that might otherwise be generated in association with the campus. By reducing the number of potential motor vehicle trips, the potential noise levels that could be experienced in the surrounding vicinity are, likewise, reduced.

Sensitive Receivers

Noise exposure goals for various types of land uses reflect the varying noise sensitivities associated with those uses. Noise sensitive uses typically include single- and multi-family residential (including residence halls), churches, hospitals and similar health care institutions, convalescent homes, libraries, laboratories, and schools. Noise sensitive receivers near the project site include single- and multi-family residences and churches. Noise sensitive receivers are also located throughout campus with residence halls, classrooms, laboratories, and the Tomás Rivera Library.

Vibration sensitive receivers are similar to noise sensitive receivers, such as residences and institutional uses (e.g., schools, libraries, and religious facilities). Vibration sensitive receivers also include laboratory uses. Vibration sensitive receivers near the project site include single- and multi-family residences and churches. Vibration sensitive receivers are also located throughout campus with residence halls, classrooms, laboratories, and the Tomás Rivera Library.

4.11.2 Regulatory Setting

Federal

Federal agencies that have developed noise standards include the Federal Highway Administration (FHWA), the Department of Housing and Urban Development, the Federal Interagency Committee on Urban Noise, and the Federal Aviation Administration. None of these federal noise laws, regulations, or policies for construction-related noise and vibration apply to the UCR campus.

However, aspects of the Federal Transit Administration (FTA) guidelines have been used for guidance in the analysis of the proposed 2021 LRDP's potential impacts. The FTA's *Transit Noise and Vibration Impact Assessment Manual* (FTA 2018) provides standards for specific vibration-sensitive land uses such as laboratory settings. The FTA lists a "Residential Day" International Standards Organization (ISO) use, which is vibration that is barely felt and adequate for low-power optical microscopes, as having a vibration criteria of 78 vibration decibels (equivalent to 0.032 in./sec. PPV. For the purposes of analysis, a "Residential Day" ISO use is considered representative of laboratory settings on campus.

State

California Noise Control Act of 1973

California Health and Safety Code Sections 46000 through 46080, known as the California Noise Control Act, find that excessive noise is a serious hazard to public health and welfare and that exposure to certain levels of noise can result in physiological, psychological, and economic damage. The act also finds that there is a continuous and increasing bombardment of noise in urban, suburban, and rural areas. The California Noise Control Act declares that the State of California has a responsibility to protect the health and welfare of its citizens by the control, prevention, and abatement of noise. It is the policy of the State to provide an environment for all Californians that is free from noise that jeopardizes their health or welfare.

California Building Code

The UC has adopted the CBC as its building code for campus development. Requirements for sound transmission between adjacent dwelling or sleeping units, and between public areas and dwelling units or sleeping units is described under Part 2, Volume 1, Chapter 12, Section 1206 of the 2019 CBC (CBC 2019). Per Section 1206.4 of this revised CBC, allowable interior noise levels attributed to external sound sources must not exceed 45 dB CNEL (or Ldn). Section 1206.5 directs the reader to the California Green Building Standards Code, Chapter 5, Division 5.5 for additional sound transmission requirements (as they relate to non-residential land uses).

Title 24, Part 11, Section 5.507 specifies environmental comfort with regard to noise exposure for non-residential buildings. Except buildings having few or no occupants, or where occupants are not likely to be affected by exterior noise, the subsections therein provide means of acoustical controls through which building assembly and component requirements are used to assess exterior noise issues. Section 5.507.4 stipulates two compliance approaches. The prescriptive method is utilized when occupied structures are planned with a 65 dBA CNEL contour of an airport, railroad, highway traffic, or industrial noise source. In this case, the wall and roof-ceiling assemblies are required to achieve a composite sound transmission class (STC) rating of at least 50, or a composite outdoor-indoor transmission class (OITC) rating of not less than 40. Additionally, exterior windows are required to be rated with a minimum STC of 40, or OITC of 30. The performance method does not require specific STC and OITC ratings; however, it requires that the interior noise environment attributable to outdoor noise sources not exceed 50 dBA L_{eq} (1 hour). This noise level can be achieved by means of building envelope construction and/or exterior features such as noise walls or berms. The performance method requires an acoustical analysis documenting compliance with the interior sound level limits.

Caltrans Vibration Guidelines

The *Transportation and Construction Vibration Guidance Manual* provides guidance on vibration issues associated with the construction, operation, and maintenance of Caltrans projects (Caltrans 2020a). These guidelines address vibration-related annoyance to people, vibration-related damage to structures, and vibration-related adverse effects to sensitive equipment. This manual also addresses vibration prediction and screening assessment for construction equipment, methods that can be used to reduce vibration effects from transportation and construction sources, general procedures for addressing vibration issues, and vibration measurement and instrumentation.

For human annoyance potential, as shown in Table 4.11-6, Caltrans' vibration level threshold at which transient vibration sources (such as construction equipment) are considered to be distinctly perceptible is 0.24 in./sec. PPV.

Table 4.11-6 Human Response to Transient Vibration

PPV (in./sec.)	Human Response
2.0	Severe
0.9	Strongly perceptible
0.24	Distinctly perceptible
0.035	Barely perceptible

Source: Caltrans 2020a

PPV = peak particle velocity; in./sec. = inches per second

Maximum recommended vibration limits for preventing damage to structure listed by Caltrans from the American Association of State Highway and Transportation Officials (AASHTO) are identified in Table 4.11-7.

Table 4.11-7 AASHTO Maximum Vibration Levels for Preventing Damage

Type of Situation	Limiting Velocity (in./sec.)
Historic sites or other critical locations	0.1
Residential buildings, plastered walls	0.2–0.3
Residential buildings in good repair with gypsum board walls	0.4–0.5
Engineered structures, without plaster	1.0–1.5

Source: Caltrans 2020a

AASHTO = American Association of State Highway and Transportation Officials; in,/sec. = inches per second

Regional and Local (Non-Binding)

As noted in Section 4, "University of California Autonomy," UCR, a constitutionally-created State entity, is not subject to municipal regulations of surrounding local governments for uses on property owned or controlled by UCR that are in furtherance of the university's educational purposes. However, UCR may consider, for coordination purposes, aspects of local plans and policies of the communities surrounding the campus when it is appropriate and feasible but is not bound by those plans and policies in its planning efforts.

Riverside County Airport Land Use Commission

The Riverside County Airport Land Use Compatibility Plan (ALUCP) establishes various policies and compatibility maps for individual ALUCP airports, including the March Air Reserve Base/Inland Port Airport. Riverside County Airport Land Use Commission (ALUC) review is required when a project is located within the boundaries of an Airport Influence Area and the project proposes a legislative action like a General Plan Amendment, Specific Plan Amendment, Zone Change, or Zoning Ordinance. Riverside County ALUCP also identifies noise contours from the airport.

4.11.3 Environmental Impacts and Mitigation Measures

Significance Criteria

UCR utilizes the following 2020 CEQA Guidelines Appendix G significance criteria questions related to Noise and Vibration.

Would the proposed 2021 LRDP result in:

a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the LRDP in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

b) Generation of excessive groundborne vibration or groundborne noise levels?

c) Exposure to people residing or working in the project area to excessive noise levels for a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport?

Issues Not Evaluated Further

All criteria questions related to Noise and Vibration are addressed herein.

Analysis Methodology

For the purposes of analysis of threshold "a," noise impacts would be considered significant if the campus project resulted in the following:

- Construction activities lasting more than 1 day that increase the ambient noise levels by 10 dBA L_{eq} or more over an 8-hour period at on-campus or off-campus noise-sensitive land uses
- A permanent (i.e., long term operational) increase of 5 dBA L_{eq} over ambient noise levels at on-campus or off-campus noise-sensitive land uses

As discussed previously in this section, a noise level increase of 3 dBA is barely perceptible to most people, a 5 dBA increase is readily noticeable, and an increase of 10 dBA would be perceived as a doubling of loudness.

The CEQA Guidelines also do not define the levels at which groundborne vibration or groundborne noise is considered "excessive." Therefore, the following Caltrans and FTA vibration standards are used in this analysis:

- For human receivers, the vibration level threshold to determine significance is 0.24 in./sec. PPV, which is the level at which transient vibration sources (such as construction equipment) are considered to be distinctly perceptible.
- For residential structures, the vibration level threshold to determine significance is 0.4 in./sec. PPV.
- For historical structures, the vibration level threshold is 0.1 in./sec. PPV.
- For on-campus laboratory uses, the vibration threshold is 0.032 in./sec. PPV.

Construction Noise

Construction noise was estimated using the FHWA Roadway Construction Noise Model (RCNM) (FHWA 2006). RCNM predicts construction noise levels for a variety of construction operations based on empirical data and the application of acoustical propagation formulas. RCNM provides reference noise levels for standard construction equipment, with an attenuation of 6 dBA per doubling of distance for stationary equipment. Using RCNM, potential construction noise levels were estimated at noise-sensitive receivers near the proposed 2021 LRDP development area. The development area under the proposed 2021 LRDP would occur primarily in previously disturbed areas, adjacent to previously developed areas, surface parking areas, generally along North/South/East/West Campus Drive, and generally along University Avenue, Canyon Crest Drive, Big Springs Road, Aberdeen Drive, and West Linden Street. Additionally, development under the 2021 LRDP would primarily be infill development or expansion of already developed areas. New development on West Campus may occur in the Agricultural/Campus Research, Student Neighborhood, Campus Support, and University Avenue Gateway designations. Some minor development may occur in other areas of campus (e.g., maintenance shed construction, restroom construction, UCR Botanic gardens interpretative center, etc.).

Variation in power imposes additional complexity in characterizing the noise source level from construction equipment. Power variation is accounted for by describing the noise at a reference distance from the equipment operating at full power and adjusting it based on the duty cycle of the activity to determine the L_{eq} of the operation (FHWA 2018). Each phase of construction has a specific equipment mix, depending on the work to be accomplished during that phase. Each phase also has its own noise characteristics; some will have higher continuous noise levels than others, and some have high-impact noise levels.

For general construction activities, construction noise would typically be higher during the heavier periods of initial construction (i.e., site preparation and grading work) and would be lower during the later construction phases (i.e., interior building construction). Typical heavy construction equipment during project grading and site preparation would include bulldozers, excavators, front-end loaders, dump trucks, and graders. Activities known to generate high noise levels, such as pile driving, breaking, and blasting, are not anticipated to occur under the proposed 2021 LRDP. Typical construction equipment noise levels from RCNM that may be used on campus are provided in Table 4.11-8.

Table 4.11-8 Typical Construction Equipment Noise Levels

Equipment	Acoustical Usage Factor (%)[1]	dBA L_{max} at 50 feet
Auger Drill Rig	20	84
Backhoe	40	78
Compactor (ground)	20	83
Concrete Mixer Truck	40	79
Crane	16	81
Dozer	40	82
Dump Truck	40	76
Excavator	40	81
Flat Bed Truck	40	74
Front End Loader	40	79
Generator	50	81
Grader	40	85
Pickup Truck	40	75
Pneumatic Tools	50	85
Roller	20	80
Scraper	40	84
Warning Horn	5	83
Welder/Torch	40	74

[1] The average fraction of time each piece of construction equipment is operating at full power (i.e., its loudest condition) during a construction operation.

Source: FHWA 2006

dBA = A-weighted decibels; L_{max} = highest root-mean-square

It is assumed conservatively that diesel engines would power all construction equipment. Construction equipment would not all operate at the same time or location due to the different tasks performed by each piece of equipment. In addition, construction equipment would not be in constant use during the day. Specific construction-related details (e.g., location, schedule, equipment) for individual campus projects are unknown at this time. Therefore, example construction noise impacts were modeled assuming an excavator, loader, and dump truck operating together due to their potential of being used in conjunction with one another and therefore a conservative scenario for the greatest noise generation during general construction activities. Using RCNM to estimate noise associated with construction equipment, maximum hourly noise levels are calculated to be 79.9 dBA L_{eq} at 50 feet (RCNM calculations are included in Appendix I).

Groundborne Vibration

There are no substantial vibration sources associated with operation of UCR which would be affected by buildout under the 2021 LRDP. Thus, only construction activities have the potential to generate ground-borne vibration affecting nearby sensitive receivers, especially during grading and excavation of a campus project site. The greatest vibratory source during construction in a project area would be a vibratory roller. Activities known to generate high vibration levels, such as pile driving, breaking, and blasting, are not anticipated to occur under the proposed 2021 LRDP. Construction vibration estimates are based on vibration levels reported by the FTA (FTA 2018).

Table 4.11-9 shows typical vibration levels for various pieces of construction equipment used in the assessment of construction vibration.

Table 4.11-9 Vibration Levels Measured during Construction Activities

Equipment	PPV at 25 feet (in./sec.)
Vibratory Roller	0.210
Hoe Ram	0.089
Large Bulldozer	0.089
Caisson Drilling	0.089
Loaded Trucks	0.076
Jackhammer	0.035
Small Bulldozer	0.003

Source: FTA 2018

PPV = peak particle velocity; in./sec. = inches per second

Although groundborne vibration is sometimes noticeable in outdoor environments, it is almost never annoying to people who are outdoors and the vibration level threshold for human perception is assessed at occupied structures (FTA 2018). Therefore, vibration impacts are assessed at the structure of an affected property.

Operational Noise Sources

Operational noise sources would include landscape maintenance which occurs under baseline conditions, general site activities (e.g., students conversing), mechanical equipment associated with buildings (e.g., HVAC units), emergency generators, parking structures, special events, and vehicular traffic. Landscape maintenance and general site activities are not considered substantial noise generators due to the distances and low noise levels associated with these sources, the short duration of use, and the lack of anticipated change associated with development of the 2021 LRDP; therefore, those two areas are not discussed further. Similar to construction noise impacts, operational noise impacts are also analyzed at exterior use areas of "frequent human use[1]."

MECHANICAL EQUIPMENT

Mechanical HVAC units would have the potential to generate noise levels that run continuously during the day and night. HVAC units are assumed to be installed on the rooftops of each building. Specific planning information is not available for the HVAC units at this time; modeling assumed the use of large rooftop units, Trane QuietCurb units, that can range from 20 to 130 tons. The unit's exhaust fan return generates a sound power level of 97.1 dBA. Manufacturer's specifications for the HVAC unit are included in Appendix I.

EMERGENCY GENERATORS

During normal campus operation, the emergency generators would not be operated other than for periodic testing, maintenance requirements, and during emergencies. To ensure the generators

[1] Caltrans defines areas of "frequent human use" as areas where people are exposed to noise for an extended period of time on a regular basis (Caltrans 2020b).). For example, Caltrans states that a parking lot would not be an area of frequent human use as people are only in a parking lot for a few minutes, whereas areas with amenities for people to use (e.g., benches, barbeque facilities, covered group picnic areas, and uncovered picnic tables) would be used for hours at a time.

would be operational during an emergency, testing is anticipated to occur once a month for approximately 30 minutes to 1 hour. Other than the testing of the generators, they would only be in use during emergency situations.

PARKING STRUCTURES

Noise sources associated with the operation and use of parking structures include both intermittent and continuous sources of noise. The most prevalent intermittent sources include tire noise, car alarms, vehicle engine idling, and shutting of vehicle doors. Based on FTA guidance (FTA 2018), reference sound exposure levels (SEL) for a parking structure with 1,000 vehicle car capacity at peak hour is 92 dBA at the center of the structure, and noise levels at 50 feet may be estimated from the following equation:

$$L_{eq(1-hour)} = SEL_{reference} - 35.6$$

Therefore, per the equation, noise levels at 50 feet from a center of a parking structure during peak hour with 1,000 vehicles are estimated to be 56.4 dBA Leq (1 hour).

SPECIAL EVENTS

Under the 2005 LRDP, noise would continue to be generated by occasional special events at the UCR campus, such as athletic meets at the campus track and outdoor concerts in the Academic Center and recreational areas of the campus. The loudest of these would continue to be the outdoor concerts. These special events would be similar to those that occur under the existing baseline conditions.

TRAFFIC NOISE

LRDP-generated traffic would increase noise levels on surrounding roadways, including on 3rd Street/Blaine Street, Big Springs Road, Blaine Street, North/South/East/West Campus Drive, Canyon Crest Drive, Central Avenue, West Linden Street, Martin Luther King Boulevard, University Avenue, and Watkins Drive. To determine the off-site traffic noise level increase from the proposed 2021 LRDP, traffic noise was modeled using FHWA's Traffic Noise Model (TNM) traffic noise-reference levels. The model is a conservative, straight line model that does not consider attenuation from topography or buildings. Traffic noise was modeled for the following scenarios provided in the proposed 2021 LRDP Traffic Operations Analysis (Reed 2021): Baseline (2018), Baseline Plus Project (2018), Cumulative (2035), and Cumulative Plus Project (2035). The provided average daily trips (ADT) volumes are shown in Table 4.11-10. The traffic speeds utilized in the model, determined by the most applicable speed limit signs on or near each segment, are also shown in Table 4.11-11. Please see Section 4.15, *Transportation*, for additional information regarding transportation impact analyses, including cumulative growth assumptions.

Table 4.11-10 Existing and Future Traffic Volumes

Roadway	Segment	Speed Limit	Traffic Counts (Average Daily Trips)			
			Baseline (2018)	Baseline Plus Project (2018)	Cumulative (2035)[1]	Cumulative Plus Project (2035)
3rd Street	West of the I-215/SR 60 Freeway SB Ramps	40	25,822	27,698	34,074	35,951
	Between the I-215/SR 60 Freeway Ramps	40	27,873	32,802	36,809	41,738
Big Springs Road	West of Watkins Drive	30	5,374	8,205	7,092	9,922
	East of Watkins Drive	30	3,562	3,721	4,707	4,866
Blaine Street	West of Canyon Crest Drive	40	18,079	24,789	23,866	30,576
	East of Canyon Crest Drive	40	18,635	24,725	24,598	30,688
North/South/ East/West Campus Drive	South of University Avenue	25	11,480	11,893	15,153	15,566
Canyon Crest Drive	North of Blaine Street	25	3,800	3,800	5,009	5,009
	Between Blaine Street and West Linden Street	35	9,000	11,655	11,862	14,517
	Between West Linden Street and Campus Drive	35	13,706	17,792	18,079	22,165
	North of Martin Luther King Boulevard	45	14,342	18,333	18,937	22,928
	South of Martin Luther King Boulevard	45	43,662	43,662	57,639	57,639
Central Avenue	West of the I-215/SR 60 Freeway SB Ramps	50	30,004	30,004	39,592	39,592
	Between the I-215/SR 60 Freeway Ramps	50	29,463	30,099	38,892	39,528
	East of the I-215/SR 60 Freeway NB Ramps	50	34,377	36,444	45,380	47,447
West Linden Street	West of Canyon Crest Drive	40	6,471	10,192	8,538	12,259
	East of Canyon Crest Drive	25	8,014	12,148	10,574	14,708
Martin Luther King Boulevard	West of Canyon Crest Drive	50	33,915	40,276	44,775	51,136
	East of Canyon Crest Drive	50	34,965	44,823	46,159	56,017
	Between the I-215/SR 60 Freeway Ramps	50	21,561	26,379	28,462	33,279
University Avenue	West of the I-215/SR 60 Freeway SB Ramps	35	16,552	17,665	21,847	22,960
	Between the I-215/SR 60 Freeway Ramps	35	15,248	17,999	20,130	22,881
	Between the I-215/SR 60 Freeway NB Ramps and Campus Drive	35	14,930	19,414	19,716	24,200

Roadway	Segment	Speed Limit	Traffic Counts (Average Daily Trips)			
			Baseline (2018)	Baseline Plus Project (2018)	Cumulative (2035)[1]	Cumulative Plus Project (2035)
Watkins Drive	North of Big Springs Road	35	16,043	17,745	21,195	22,897
	South of Big Springs Road	35	14,867	16,950	19,637	21,720

[1] See Section 4.15, *Transportation,* for additional information regarding transportation impact analyses, including cumulative growth assumptions

Source: Reed 2021

I-215 = Interstate 215; SR 60 = State Route 60; SB = Southbound; NB = Northbound

Table 4.11-11 Noise Levels Generated by Truck Activity at Delivery Areas

Noise-Generating Activity	Noise Level (dB L_{max}) at 50 feet
Idling 18-wheel heavy truck	64-65
Truck with trailer driving at 5 mph	65
Truck with trailer driving at 10 mph	66-68
Truck revving engine	69-80
Truck releasing air brakes at a stop	74-86

dB = decibel; L_{max} = highest root-mean-square; mph = miles per hour

Source: University of California, Santa Cruz 2021

To determine the vehicle classification mix for modeling for roadway segments, a typical, industry standard traffic mix was used: 94 percent automobiles, 4 percent medium trucks, and 2 percent heavy trucks. In accordance with the Traffic Operations Analysis assumptions, peak hour traffic was assumed to be 6.3 percent of ADT (Reed 2021).

2021 LRDP Objectives and Policies

There are no objectives or policies in the proposed 2021 LRDP related to noise and vibration.

Impact Analysis

Impact N-1 Generate Substantial Temporary or Permanent Increase in Ambient Noise Levels.

Construction equipment used during construction and mechanical equipment used during operation of the proposed 2021 LRDP would result in noise level increases that would exceed applicable noise thresholds, resulting in a significant impact. Mitigation measure MM N-1 would reduce construction noise levels to the extent feasible, but impacts would remain significant and unavoidable. Mitigation Measure MM N-2 would reduce operational noise levels to less than significant.

Construction

The nearest noise-sensitive receivers to construction activities undertaken under the proposed 2021 LRDP would be on-campus uses such as residential and academic/lab areas, and off-site single-family and multi-family residential areas. Other noise sensitive uses are in proximity to the UCR Campus; however, construction noise levels would be reduced at these locations in comparison to these structures, due to their increased distance from the campus and associated construction

activity. Construction noise was evaluated at exterior use areas (i.e., outdoor areas of frequent human use) for the noise-sensitive receivers. Caltrans defines areas of "frequent human use" as areas where people are exposed to noise for an extended period of time on a regular basis (Caltrans 2020b). For example, Caltrans states that a parking lot would not be an area of frequent human use as people are only in a parking lot for a few minutes, whereas areas with amenities for people to use (e.g., benches, barbeque facilities, covered group picnic areas, and uncovered picnic tables) would be used for hours at a time. This analysis uses the Caltrans definition to determine where noise impacts may occur.

As discussed above, UCR includes limits on construction hours from 7:00 a.m. to 9:00 p.m. Monday through Friday and 8:00 a.m. to 6:00 p.m. on Saturday as a standard condition of approval. While exceptions are made for time-sensitive construction work, such as concrete pouring and operational emergencies or during excessive heat/temperature, which can disturb neighboring sensitive receivers and students sleeping or studying, these construction hours do not occur often compared to the overall duration of the construction activities. Over the course of a typical construction day, construction equipment would be located as close as 25 feet to the nearest noise-sensitive campus uses and to the nearest off-site multi-family residential buildings (the multi-family complexes to the west of East Campus on West Linden Street) and approximately 50 feet to the nearest off-site single-family residences (to the east of East Campus across Valencia Hill Drive), but would typically be located at an average distance further away due to the nature of construction (i.e., each piece of construction equipment would work in different locations throughout the day and average a further distance). Therefore, it is conservatively assumed that over the course of a typical construction day, the construction equipment would operate, on average, approximately 75 feet from the nearest noise-sensitive campus uses and off-campus multi-family residences and approximately 100 feet from the nearest off-site single-family residential buildings. These distances are assumed to exterior use areas (i.e., outdoor areas of frequent human use) for the noise-sensitive receivers.

At 75 feet and 100 feet, an excavator, loader, and a dump truck would generate a noise level of 76.4 dBA L_{eq} (8 hour) and 73.9 dBA L_{eq} (8 hour), respectively (RCNM calculations are included in Appendix I). As shown in Table 4.11-1, Table 4.11-2, and Table 4.11-4, ambient noise levels on and near the East Campus ranged from 48.0 dBA L_{eq} to 62.5 dBA L_{eq}. As shown in Table 4.11-3, ambient noise levels near the West Campus ranged from 41.6 dBA L_{eq} to 64.7 dBA L_{eq} (the lowest noise levels occurring south of Cranford Avenue, approximately 1,000 feet from the nearest main throughfare in an agricultural area). Therefore, potential construction noise levels of up to 76.4 dBA L_{eq} (8 hour) would exceed on-campus and off-campus ambient noise levels at exterior use areas by more than 10 dBA L_{eq} (8-hour), and construction noise impacts would be **significant**.

Operation

Existing campus and off-campus noise-sensitive receivers may periodically be subject to new noise associated with new uses under the proposed 2021 LRDP, which includes stationary noise from mechanical equipment, parking structures, special events similar to baseline conditions, on-campus gatherings, loading docks, and increased traffic, as discussed below. However, redevelopment of existing structures may also result in acoustical benefits, as older equipment is replaced with modern, quieter, more efficient equipment. Additionally, new structures can act as acoustical barriers to existing noise sources, depending upon their location.

MECHANICAL EQUIPMENT

For exterior use areas of noise-sensitive receivers, which are typically located on the ground level, and given that campus buildings would be multiple stories in height, an extra 30 feet was added to the horizontal distance to the nearest noise-sensitive receivers to account for the vertical distance. While buildings may be placed near existing on-campus and off-campus noise sensitive receivers, there would be setback distances and the HVAC systems would typically be located at an inner location of rooftops. It is assumed that there would be setback distances of 20 feet from the nearest exterior use areas, plus another 50 feet from the rooftop edge. In addition, as HVAC units would be located at a setback from the rooftop edge, the rooftop edge would provide a shielding affect by blocking the line-of-sight between the unit and the exterior use areas at ground level. This is conservatively assumed to result in a 5 dBA reduction at exterior use areas.

With distance attenuation and rooftop screening, a 130-ton Trane QuietCurb would generate an approximate noise level of 54.4 dBA L_{eq} at 100 feet (the total distance from the unit to the exterior use areas of the nearest noise-sensitive receivers). As shown in Table 4.11-1 through Table 4.11-4, ambient noise levels on and near the campus ranged from 41.6 dBA L_{eq} to 64.7 dBA L_{eq}. Therefore, where ambient noise levels are 49.4 dBA L_{eq} or lower, HVAC units may exceed 5 dBA above ambient. Operational noise impacts from mechanical equipment would be **significant**.

EMERGENCY GENERATORS

During normal campus operation, the emergency generators would not be operated other than for periodic testing and maintenance requirements. To ensure the generators would be operational during an emergency, testing is anticipated to occur once a month for approximately 30 minutes to 1 hour during the daytime hours (i.e., 6:00 a.m. to 5:00 p.m.). Other than testing, generators would only be used during emergency operations for continued periods of time during rare power outages or building equipment malfunctions and, therefore, do not substantially contribute to permanent increases in average ambient noise levels. In addition, noise generated due to emergency work is typically exempt from noise ordinances; for example, Section 7.35.020 of the City of Riverside Municipal Code exempts emergency sound from City noise standards. Thus, due to the infrequent, intermittent, and temporary use characteristics of these noise sources, in combination with the fact that typical maintenance activity would occur during the less sensitive times of the day and be cognizant of sensitive uses, noise generated from new emergency generators would not be considered a substantial permanent increase in noise that could result in noise level increases that would exceed applicable noise thresholds and impacts would be **less than significant**.

PARKING STRUCTURES

Per Figure F3.5, Circulation Framework, of the Draft LRDP, proposed parking structures are envisioned along the periphery of campus in Parking Lot 30 north of Martin Luther King Boulevard and west of Canyon Crest Drive, at the UCR Extension site between University Avenue and Everton Place and east of Iowa Avenue, west of Canyon Crest Drive and south of West Linden Street, and two parking structures in the North District Development area between West Linden Street and Blaine Street and west of Watkins Drive. As described under Methodology, a parking structure with a 1,000-vehicle car capacity at peak hour would generate a noise level of 56.4 dBA L_{eq} at 50 feet from the center of the parking structure. A parking structure could be similar in size to Parking Structure 1, which is approximately 300 feet by 300 feet in size (UCR 2020). A conservative assumption would be for a parking structure to be adjacent to an exterior use area of a noise-sensitive land use, with a 50-foot setback buffer, which would result in a 200-foot distance from

parking structure center to the receiver. This would result in a noise level of 44.4 dBA L_{eq}. As shown in Table 4.11-1, Table 4.11-2, and Table 4.11-4, ambient noise levels on and near the East Campus ranged from 48.0 dBA L_{eq} to 62.5 dBA L_{eq}. Therefore, parking structure noise would not exceed the ambient noise level by more than 5 dBA, and impacts would be **less than significant**.

SPECIAL EVENTS

Implementation of the proposed 2021 LRDP would not necessarily increase the number of special events. No specific plans related to future locations, type, and frequency of special events have been identified. However, the actual noise levels generated by future special events would be similar to existing conditions. Large events, such as graduation and student orientation, concerts such as Spring Splash and Block Party, are a part of the existing conditions, occur infrequently, and are required to follow UC policies regarding large events, obtaining the applicable permits when necessary. Noise generated by additional numbers of persons assembled at an event (because of proposed increase in campus population) would typically not be the primary source of noise when compared to noise from amplified systems. In addition, special events on interior portions of the campus would be screened from adjacent locations by campus buildings. As such, these events would not result in substantial temporary or periodic increases in ambient noise levels compared to existing conditions that include similar events. Impacts would be **less than significant**.

ON-CAMPUS GATHERINGS

Development throughout campus as implemented under the proposed 2021 LRDP would likely include small gathering spaces such as courtyards where groups would occasionally meet, such as for student clubs or academic functions. Although these on-campus gatherings would not utilize broadly amplified sound through large loudspeakers, small, portable speakers may occasionally be used to project music or speech in the direct vicinity of the gathering. Such gatherings would involve a small number of people, occur intermittently and would be required to follow all UCR policies related to noise and events. In addition, these events are similar to activities occurring under existing conditions. Therefore, on-campus gatherings are not anticipated to expose off-site receivers to noise levels that would exceed applicable standards. Impacts would be **less than significant**.

LOADING DOCKS

Some buildings constructed as part of the 2021 LRDP may have loading docks or designated areas for receiving shipments by commercial trucks. Noise generated by loading docks would be similar in nature by virtue of the primary noise source for both uses being truck activity. Noise sources from truck activity associated with delivery areas are usually short-term and can include activities such as vehicle idling, engine revving, and the release of air brakes on heavy trucks. Measured noise levels for these noise-generating activities are summarized in Table 4.11-11. Most of the noise-generating activities listed in Table 4.11-11 last for a period ranging from a few seconds (e.g., release of air brakes) to a few minutes (e.g., idling) and can reoccur multiple times during a single truck visit. As shown in Table 4.11-11, the loudest measured truck-related noise is the release of a truck's air brakes after it comes to a stop, which generates noise levels as high as 86 dB L_{max} at 50 feet. Based on the highest noise level (86 dB L_{max} at 50 feet) listed in Table 4.11-11, noise levels would attenuate to not exceed 46.6 dBA L_{eq} (5 dBA over the lowest measured ambient noise level) at a distance of 5,000 feet. Depending on the distance to noise-sensitive receivers, intervening shielding, and noise-reduction features incorporated into the loading dock, on- or off-campus noise-sensitive receivers located close to on-site delivery areas could be exposed to noise levels that exceed 5 dBA over ambient, and impacts would be **significant**.

CORPORATION YARD

The 2021 LRDP proposes that the Corporation Yard moves from East Campus to the Campus Support land use area on West Campus. The new location of the Corporation Yard on West Campus would be proximate to the I-215/SR 60 freeway, agricultural fields, International Village, and off-campus multiple-family residences along Everton Place.

The Corporation Yard would continue to be used for storage of fleet vehicles and equipment (e.g., garbage trucks, maintenance trucks), as well as for providing operational maintenance and support facilities such as vehicle fueling facilities, repair facilities, and office space. Noise generated by the Corporation Yard activities would be similar in nature by virtue of the primary noise source for both uses being vehicular activity. Noise sources from vehicular activity associated with the Corporation Yard are usually short-term and can include activities such as vehicle idling, engine revving, and the release of air brakes on heavy trucks. This would generate similar noise levels to the truck activity at delivery areas analyzed in Table 4.11-11. Based on the highest noise level (86 dB L_{max} at 50 feet) listed in Table 4.11-11, noise levels would attenuate to not exceed 46.6 dBA L_{eq} (5 dBA over the lowest measured ambient noise level) at a distance of 5,000 feet. Depending on the distance to noise-sensitive receivers, intervening shielding, and noise-reduction features incorporated into the corporation yard, on- or off-campus noise-sensitive receivers located close to the Corporation Yard could be exposed to noise levels that exceed 5 dBA over ambient, and impacts would be **significant**.

OFF-SITE TRAFFIC NOISE

Table 4.11-12 summarizes the traffic noise modeling results. As shown in the table, existing noise levels would increase by up to 2 dBA under the Baseline Plus Project scenario and 1 dBA under the Cumulative Plus Project scenario, which would not exceed the 3 dBA criteria for off-site traffic noise impacts. Therefore, traffic generated under the proposed 2021 LRDP would not result in a substantial permanent increase in ambient noise levels above levels existing without the 2021 LRDP-generated traffic. Impacts would be **less than significant**.

As described under *Effects of Noise on People*, effects of noise can be placed into three general categories: annoyance, interference with activities (e.g., speech, sleep, studying, etc.), and physiological effects (e.g., hearing loss). The potential for the previously identified construction and operational noise levels that exceed the ambient noise increase thresholds are discussed for their potential to result in annoyance, interference, or physiological effects below.

Construction noise was identified as a potentially significant impact as construction noise levels would potentially exceed 10 dBA L_{eq} over ambient. Construction noise may have the potential to be annoying or to interfere with activities such as speaking or studying. In addition, those who are having their speech or studying interfered with can typically relocate to a quieter location. Construction noise would typically not occur at nighttime when sleep may be disturbed. Hearing loss occurs at loud, sustained noise levels such as 90 dBA for 8 hours per day; noise-sensitive receivers would not be exposed to these noise levels.

Operational noise was identified as a potentially significant impact as noise levels from HVAC units, loading docks, and the Corporation Yard would potentially exceed 5 dBA L_{eq} over ambient. These sources may have the potential to be annoying or to interfere with activities such as speaking or studying. Loading docks and the Corporation Yard would typically not be used during the nighttime hours and would not disturb sleep. Although HVAC units could run during the nighttime, HVAC noise levels would typically not reach such a high level to be disturbing enough to interrupt sleep. Hearing loss occurs at loud, sustained noise levels such as 90 dBA for 8 hours per day; noise-sensitive receivers would not be exposed to these noise levels from these operational sources.

Table 4.11-12 Traffic Noise Levels

Roadway/Segment	Roadway Noise (dBA CNEL)[1]							
	Baseline	Baseline + Project	Noise Level Increase	Exceed Criteria?[2]	Cumulative	Cumulative + Project	Noise Level Increase	Exceed Criteria?[2]
3rd Street								
West of the I-215/SR 60 Freeway SB Ramps	66	66	0	No	67	67	0	No
Between the I-215/SR 60 Freeway Ramps	68	68	0	No	69	69	0	No
East of the I-215/SR 60 Freeway NB Ramps	69	70	1	No	70	71	1	No
Big Springs Road								
West of Watkins Drive	60	62	2	No	61	62	1	No
East of Watkins Drive	58	58	0	No	59	59	0	No
Blaine Street								
West of Canyon Crest Drive	66	67	1	No	67	68	1	No
East of Canyon Crest Drive	66	67	1	No	67	68	1	No
North/South/East/West Campus Drive								
South of University Avenue	63	63	0	No	64	65	1	No
Canyon Crest Drive								
North of Blaine Street	58	58	0	No	60	60	0	No
Between Blaine Street and West Linden Street	62	63	1	No	63	64	1	No
Between West Linden Street and Campus Drive	64	65	1	No	65	66	1	No
North of Martin Luther King Boulevard	65	66	1	No	67	67	0	No

Roadway/Segment	Roadway Noise (dBA CNEL)[1]							
	Baseline	Baseline + Project	Noise Level Increase	Exceed Criteria?[2]	Cumulative	Cumulative + Project	Noise Level Increase	Exceed Criteria?[2]
South of Martin Luther King Boulevard	70	70	0	No	71	71	0	No
Central Avenue								
West of the I-215/SR 60 Freeway SB Ramps	69	69	0	No	71	71	0	No
Between the I-215/SR 60 Freeway Ramps	69	69	0	No	70	71	1	No
East of the I-215/SR 60 Freeway NB Ramps	70	70	0	No	71	71	0	No
West Linden Street								
West of Canyon Crest Drive	61	63	2	No	62	64	2	No
East of Canyon Crest Drive	62	63	1	No	63	64	1	No
Martin Luther King Boulevard								
West of Canyon Crest Drive	70	71	1	No	71	72	1	No
East of Canyon Crest Drive	70	71	1	No	71	72	1	No
Between the I-215/SR 60 Freeway Ramps	68	69	1	No	69	70	1	No
University Avenue								
West of the I-215/SR 60 Freeway SB Ramps	65	65	0	No	66	66	0	No
Between the I-215/SR 60 Freeway Ramps	64	65	1	No	66	66	0	No
Between the I-215/SR 60 Freeway NB Ramps and Campus Drive	64	66	2	No	66	66	0	No

Roadway/Segment	Roadway Noise (dBA CNEL)[1]							
	Baseline	Baseline + Project	Noise Level Increase	Exceed Criteria?[2]	Cumulative	Cumulative + Project	Noise Level Increase	Exceed Criteria?[2]
Watkins Avenue								
North of Big Springs Road	65	65	0	No	66	66	0	No
South of Big Springs Road	64	65	1	No	66	66	0	No

[1] The modeled locations were at 50 feet from the roadway centerline.

[2] Criteria includes an increase of 5 dBA over existing traffic noise levels, or an increase of 3 dBA over existing traffic noise levels where the future resulting noise level would exceed 70 dBA CNEL.

CNEL = Community Noise Equivalent Level; dBA = A-weighted decibels; I-215 = Interstate 215; SR 60 = State Route 60; SB = Southbound; NB = Northbound

Mitigation Measures

MM N-1 Construction Noise Reduction Measures

To reduce construction noise levels to on-campus and off-campus noise sensitive receivers, UCR shall implement the following measures:

- Hours of exterior construction activities shall be limited to 7:00 a.m. to 9:00 p.m. Monday through Friday and 8:00 a.m. to 6:00 p.m. on Saturday, as feasible, except under circumstances where such time limits are infeasible (e.g., for time sensitive construction work such as concrete pouring, excessive heat warnings/temperatures during the summer, operational emergencies). No exterior construction activities shall occur on federal holidays.
- Construction traffic shall follow routes so as to minimize the noise impact of this traffic on the surrounding community, to the greatest extent feasible.
- Contract specifications shall require that construction equipment be muffled or otherwise shielded. Contracts shall specify that engine-driven equipment be fitted with appropriate noise mufflers.
- Where available and feasible, construction equipment with back-up alarms shall be equipped with either audible self-adjusting backup alarms or alarms that only sound when an object is detected. Self-adjusting backup alarms shall automatically adjust to 10 dBA over the surrounding background levels. All non-self-adjusting backup alarms shall be set to the lowest setting required to be audible above the surrounding noise levels.
- Stationary construction equipment material and vehicle staging shall be placed to direct noise away from sensitive receivers to the greatest extent feasible.
- Meetings shall be conducted, as needed, with on-campus constituents to provide advance notice of construction activities to coordinate these activities with the academic calendar, scheduled events, and other situations, as appropriate.
- Communication would be provided, as needed, with constituents that are affected by campus construction to provide advance notice of construction activities and ensure that the mutual needs of the particular construction project and of those impacted by construction noise are met, to the extent feasible.
- A sign shall be provided at the construction site entrance, or other conspicuous location, that includes a 24-hour telephone number for project information, and to report complaints. An inquiry and corrective action will be taken if necessary, in a timely manner.
- Where deemed necessary and feasible, installation of temporary sound barriers/blankets to break the line-of-sight between the construction equipment and exterior use areas of noise-sensitive receivers. The temporary barriers/blankets shall be of sufficient height to break the line-of-sight between the construction equipment and noise-sensitive receivers.

MM N-2 HVAC Noise Reduction Measures

The campus shall reduce HVAC equipment noise levels located in close proximity to noise-sensitive buildings and uses through noise control measures such as, but not limited to:

- Mechanical equipment screening (e.g., parapet walls)
- Equipment setbacks
- Silencers

- Acoustical louvers
- And other sound attenuation devices as made available

If a method other than mechanical equipment screening (e.g., parapet walls) is chosen, a project-specific design plan demonstrating that the noise level from operation of HVAC units does not generate noise levels that exceed 5 dBA above ambient at noise-sensitive receivers shall be completed.

MM N-3 Loading Dock Noise Reduction Measures

The campus shall reduce loading dock noise levels through measures such as, but not limited to:

- Noise levels from loading docks at noise-sensitive receivers shall not exceed 5 dBA over ambient noise levels, the effectiveness of which shall be determined on a project-level basis by an acoustical professional.
- As feasible, design and build sound barriers near loading docks and delivery areas that block the line of sight between truck activity areas and noise-sensitive receivers. Sound barriers may consist of a wall, earthen berm, or combination thereof.

MM N-4 Relocated Corporation Yard Noise Reduction Measures

If and when the campus Corporation Yard is relocated, the campus shall reduce Corporation Yard noise levels through measures such as, but not limited to:

- Noise levels from the Corporation Yard at noise-sensitive receivers shall not exceed 5 dBA over ambient noise levels, the effectiveness of which shall be determined on a project-level basis by an acoustical professional.
- As feasible, design and build sound barriers near the Corporation Yard that block the line of sight between truck activity areas and noise-sensitive receivers. Sound barriers may consist of a wall, earthen berm, or combination thereof.

Significance After Mitigation

With implementation of Mitigation Measure **MM N-1**, per manufacturer's specifications of sample equipment (see Appendix I), construction noise levels would be reduced by at least 10 dBA to 66.4 dBA L_{eq} (8 hour) at the closest exterior use areas of noise-sensitive receivers. However, these noise levels would still exceed median ambient noise levels by more than 10 dBA. Therefore, construction noise impacts would be **significant and unavoidable**.

Generally, blocking the line of sight from a noise source to a receiver will provide at least a 5 dBA reduction in source noise levels at the receiver (FHWA 2017). Therefore, with the implementation of Mitigation Measure **MM N-2**, operational noise levels would be reduced to 49.4 dBA L_{eq} at the exterior use areas of noise-sensitive receivers, which would not exceed 5 dBA above ambient noise levels. Impacts would be **less than significant**.

With implementation of Mitigation Measure **MM N-3**, measures to reduce loading dock noise such as barriers or site design to shield noise-sensitive receivers (verified by an acoustical professional on the project-level) would ensure that noise levels do not exceed 5 dBA over ambient at noise-sensitive receivers. Impacts would be **less than significant**.

With implementation of Mitigation Measure **MM N-4**, measures to reduce the relocated Corporation Yard noise such as barriers or site design to shield noise-sensitive receivers (verified by

an acoustical professional on the project-level) would ensure that noise levels do not exceed 5 dBA over ambient at noise-sensitive receivers. Impacts would be **less than significant**.

Impact N-2 GENERATE EXCESSIVE GROUNDBORNE VIBRATION OR GROUNDBORNE NOISE LEVELS.

VIBRATION FROM THE PROPOSED 2021 LRDP CONSTRUCTION MAY EXCEED APPLICABLE STANDARDS. THIS IS A POTENTIALLY SIGNIFICANT IMPACT THAT WOULD BE REDUCED TO LESS THAN SIGNIFICANT WITH MITIGATION.

Construction

The greatest anticipated source of vibration during build-out of the proposed 2021 LRDP would derive from a vibratory roller, which may be used during paving activities but would likely not be needed for some anticipated construction projects. The second greatest source of anticipated vibration would be from a large bulldozer. A large bulldozer is used in this analysis to conservatively represent all other heavy-duty construction equipment (other than a vibratory roller).

Vibration-sensitive receivers would include humans, residential structures, campus laboratories, and historical buildings on campus (see Section 4.5, *Cultural Resources*). The distances at which these pieces of equipment would reach or exceed the applicable vibration thresholds are shown in Table 4.11-13.

Table 4.11-13 Screening Distances for Vibration-Sensitive Receiver Type and Source

Receiver Type	Vibration Threshold (in./sec. PPV)	Distance from Vibration Source (feet)[1]	
		Vibratory Roller	Large Bulldozer[2]
Distinctly Perceptible Human Annoyance	0.24	25	15
Historic Sites	0.1	40	25
Residential Buildings	0.4	20	10
Laboratory[3]	0.032	90	50

[1] These distances are based upon typical vibration levels for a vibratory roller and large bulldozer of approximately 0.210 in./sec. PPV and 0.089 in./sec. PPV at 25 feet, respectively (FTA 2018).

[2] A large bulldozer conservatively represents all heavy-duty construction equipment, other than a vibratory roller.

[3] The FTA lists a "Residential Day" ISO use, which is vibration that is barely felt and adequate for low-power optical microscopes, as having a vibration criteria of 78 vibration decibels (equivalent to 0.032 in./sec. PPV). For the purposes of analysis, a "Residential Day" ISO use is considered representative of laboratory settings on campus.

in./sec. = inches per second; PPV = peak particle velocity

With typical setbacks from the construction equipment and setbacks to buildings on nearby properties, a piece of equipment would not be anticipated to be within 25 feet of a receiver. Therefore, vibration impacts within 25 feet or closer are assumed to not occur, and significant vibration impacts would not occur to human annoyance and residential buildings. However, vibratory rollers have the potential to operate within 40 feet of a historical site (see Section 4.5, *Cultural Resources*, for a list of potential historical resources), and vibration impacts are considered significant. In addition, a vibratory roller or bulldozer have the potential to operate within 90 feet and 50 feet of a laboratory use, respectively, and vibration impacts are considered **significant**.

Operation

Implementation of the proposed 2021 LRDP would not involve substantial vibration sources associated with operation. Operational vibration impacts would be **less than significant**.

Mitigation Measures

MM N-5 Construction Vibration Reduction Measures

If construction equipment were to be operated within the specified distances listed in Table 4.11-13 of the Draft EIR, the campus shall reduce construction vibration levels through the following noise control measures:

- All academic and residential facilities within the listed distances shall be notified if the listed equipment is to be used during construction activities so that the occupants and/or researchers can take necessary precautionary measures to avoid negative effects to their activities and/or research.
- In addition, one of the following measures shall be implemented:
  - Use of the equipment shall not occur within the specified distances in Table 4.11-13 or
  - A project-specific vibration impact analysis shall be conducted that shall consider the type of equipment used and potential vibration levels at structures within the specified distances. If, after consideration of the type of equipment used and other factors of the environment, vibration levels do not exceed the applicable criteria, construction may proceed without additional measures. If, after consideration of the type of equipment used and other factors of the environment, vibration levels exceed the applicable criteria, additional measures shall be implemented to reduce vibration levels below threshold, if feasible. These measures may include, but not limited to, use of different equipment that results in an acceptable vibration level as listed in Table 4.11-13.

Significance After Mitigation

Through the project-specific vibration impact analysis and/or restrictions on vibration-generating construction equipment, impacts associated with vibration from construction activities would be **less than significant** with implementation of Mitigation Measure **MM N-5**.

Impact N-3 EXPOSURE TO PEOPLE RESIDING OR WORKING IN THE PROJECT AREA TO EXCESSIVE NOISE LEVELS FOR A PROJECT LOCATED WITHIN THE VICINITY OF A PRIVATE AIRSTRIP OR AN AIRPORT LAND USE PLAN OR, WHERE SUCH A PLAN HAS NOT BEEN ADOPTED, WITHIN 2 MILES OF A PUBLIC AIRPORT OR PUBLIC USE AIRPORT.

IMPLEMENTATION OF THE PROPOSED 2021 LRDP WOULD NOT EXPOSE PEOPLE RESIDING OR WORKING IN UCR TO EXCESSIVE NOISE LEVELS FROM AIRPORTS WITHIN TWO MILES OF THE CAMPUS AND NOISE IMPACTS WOULD BE LESS THAN SIGNIFICANT.

The Initial Study for the proposed 2021 LRDP noted that Flabob Airport is approximately 4.7 miles west of the UCR main campus, and March Air Reserve Base is approximately 6 miles southeast of the UCR main campus. As discussed in Section 4.9, *Hazards and Hazardous Materials*, UCR is in Area E of the (March ARB/IPA ALUCP) influence area. The ALUCP categorizes the noise level in Area E as "low" because Area E is beyond the 55-CNEL corridor, where only occasional overflights occur that would be "intrusive to some outdoor activities." (Riverside County ALUC 2014).

Under existing case law "CEQA generally does not require an analysis of how existing environmental conditions will impact a project's future users or residents." (*California Bldg. Industry Assn. v. Bay Area Air Quality Management District* (2015) 62 Cal.4th 369, 386.) The proposed 2021 LRDP would not exacerbate flights patterns and their associated noise. Furthermore, new development on

campus would comply with Title 24 building standards, including noise insulation requirements (CBC Section 1207), which would ensure that new residents and students would not be adversely affected by existing noise sources. Exterior areas of campus would be exposed to aircraft noise levels that are lower than 55 CNEL, which is well below typical noise compatibility standards for residential or school uses (e.g., the City of Riverside General Plan Noise Element identifies noise levels of 60 CNEL or below as normally acceptable (City of Riverside 2018)). Additionally, ALUCP Zone "E" contains no limitations on indoor or outdoor uses. (ALUCP, Table MA-2).

Therefore, implementation of the proposed 2021 LRDP would not expose people residing or working in UCR to excessive noise levels from airports within two miles of the campus and noise impacts are determined to be **less than significant.**

Mitigation Measures

No mitigation is required.

Significance After Mitigation

Impacts would be less than significant without mitigation.

4.11.4 Cumulative Impacts

Construction-related noise and vibration are typically considered localized impacts, affecting only receivers closest to construction activities. Nevertheless, cumulative projects, including those proposed under the 2021 LRDP or those occurring off campus as identified in Table 4-1, occur in close proximity to each other (i.e., several hundred feet), and simultaneously, noise and vibration from individual construction projects and individual project components have a small chance of combining to create significant cumulative impacts. As discussed under Impact N-1, the project's contribution to cumulative noise from construction work is considered cumulatively considerable. As also discussed under Impact N-2, the project's contribution to cumulative vibration impacts from construction work is considered cumulatively considerable. As identified above, Mitigation Measure **MM N-1** would be implemented to reduce the project's cumulatively considerable contribution from general construction noise on campus to the extent feasible, however construction noise Impact N-1 would remain **cumulatively considerable with mitigation**. Mitigation Measure **MM N-5** would be implemented to reduce potentially significant impacts from construction vibration (Impact N-2) to **less than significant, and therefore would not be cumulatively considerable with mitigation**.

As discussed under Impact N-1, future traffic noise was analyzed in a cumulative, future scenario (Cumulative Plus Project), and traffic noise increases would not exceed the impact criteria. Even though traffic in the vicinity of the campus would gradually increase over the course of development of the proposed 2021 LRDP, the contribution of traffic noise impacts would not be cumulatively considerable. New development associated with cumulative projects (see Table 4-1), would include noise associated with parking facilities, mechanical equipment (HVAC units), loading docks, and the relocated Corporation Yard. As outlined in greater detail under Impact N-1, the proposed 2021 LRDP's contribution to cumulative impact N-1 is considered **cumulatively considerable**.

For campus projects, Mitigation Measures **MM N-2 through MM N-4** require HVAC equipment, loading dock, and the relocated Corporation Yard noise to be designed and located in such a way that noise is minimized at the nearest noise-sensitive receivers. Implementation of the proposed 2021 LRDP would not involve substantial vibration sources associated with operation, and the types

of surrounding land uses (residential and commercial) to campus would not be expected to involve substantial vibration sources that would cumulatively combine with UCR vibration sources. With implementation of Mitigation Measures **MM N-2 through MM N-4,** potentially significant impacts from operational noise would be **less than significant, and therefore would not be cumulatively considerable with mitigation**.

As implementation of the LRDP would occur from 2021 to 2035, it is likely that there would be some overlap in noise impacts from construction. Although it would be speculative to analyze this impact due to the lack of available details on construction scheduling to estimate timing, location, and combined noise levels of such overlapping details in greater detail, there is the potential for construction noise levels from the project and from other projects to result in a cumulatively considerable noise impact. Therefore, **cumulative noise impacts are significant**.

No new airports or expansion of airports are included in the cumulative project list. The proposed 2021 LRDP does not include a new airport of expansion of an airport. Therefore, cumulative noise impacts from airports (Impact N-3) are **less than significant (not cumulatively considerable)**.

4.11.5 References

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4.12 Population and Housing

This section describes the existing and projected population and housing conditions at UCR, the change in population (i.e., students, student's families, faculty, and staff) related to the proposed 2021 LRDP and whether the proposed 2021 LRDP would result in any environmental impacts associated with unplanned population growth.

4.12.1 Environmental Setting

State

California Population Forecasts

California's 2020 population is approximately 39.8 million, with total population projected to reach 45 million by 2050. While the State's population is aging, and it is projected that by 2030 about one in five Californians will be 65 or older. Generally, the State's population is slightly younger than that of the rest of the nation. According to 2018 Census Bureau estimates, California has the fifth youngest population in the country with a median age of 36.7, compared to 38.2 for the entire country (Public Policy Institute of California [PPIC] 2020a).

Approximately 10.7 percent of California residents are between the ages of 18 and 25 (DOF 2021). As shown in Table 4.12-1, the population is expected to continue to grow 8.5 percent between 2020 and 2035 and will see the most growth between 2025 and 2030, then decrease between 2030 and 2035. Overall, there is a projected growth of over 36,000 residents statewide over the next 15 years in this age bracket.

Table 4.12-1 Population Projections for Residents Age 18-25 in California

Population Segment	2020 Population	2025 Projection	2030 Projection	2035 Projection	Difference 2020-2035	Percent Increase 2020-2035
Residents aged 18-25	4,091,113	4,053,774	4,143,279	4,104,500	13,387	0.3

Source: DOF 2021

Statewide Housing

California currently has approximately 14.3 million housing units (DOF 2020). An average of 80,000 homes have been built in the state per year since 2007, far below the 180,000 annually estimated to be demanded by California's growing population from 2015 through 2025 (California Housing and Community Development 2017). Housing costs have fluctuated over the previous decade, but California home values have risen significantly since the Great Recession of 2007-2009. Additionally, California has six of the nation's 15 most-expensive, large metropolitan rental markets, and a lower vacancy rate for renters and homeowners than the national average (PPIC 2020b).

Educational Attainment Levels and Trends

Educational attainment has increased for Californian residents over the past 50 years, with over 30 percent of residents aged 25 and older attaining a bachelor's degree (California Legislative Analyst's Office 2019). Higher education enrollment among traditional college-aged students is increasing. In

2000, 35 percent of Californians between 18 and 24 years of age reported attending an institution of higher education in California; in 2015, that figure was 47 percent. A recent study found that about 14 percent of current high school graduates are eligible for the UC (PPIC 2020c).

University of California

UC Population

STUDENTS

UC's 9 undergraduate campuses enrolled 46,677 freshmen students and 21,015 transfer students in Fall 2018 (UC 2020). Transfer students are those who are admitted as sophomore to a UC institution from another college institution or California-based community college.

Currently, about 10 percent of California's high school graduates attend a UC campus. Out-of-state residents make up an increasingly large share of UC enrollment, approximately 33,000 students, which was 15 percent of total enrollment as of the 2016/2017 academic year. However, the California State legislature enacted legislation to limit the number of non-resident students at UC campuses by academic year 2029/2030 (California Legislative Analyst's Office 2019). More specifically, the State's Budget Act of 2016 called for the Regents to adopt a policy limiting the number of undergraduate non-residents as a condition for receiving certain funding. On May 18, 2017, the Regents adopted a policy on non-resident enrollment. Under that policy, non-resident enrollment will be capped at 18 percent at five UC campuses. At the other four campuses where the proportion of non-residents exceeds 18 percent — UC Berkeley, UC Irvine, UC Los Angeles, and UC San Diego — non-resident enrollment will be capped at the proportion that each campus enrolls in the 2017–18 academic year.

The incoming class for academic year 2019/2020 also includes the largest number ever of new California transfer students, consistent with the high priority the Governor and members of the legislature placed on expanding opportunities for transfer enrollment (UCOP 2019).

FACULTY AND STAFF

The UC system is California's largest employer, with approximately 23,300 faculty, 157,400 staff, 47,000 academic staff, and 96,000 represented employees across its 10 campuses, five medical centers, and three laboratories (UCOP 2020). One widely used measure of academic quality is the student-faculty ratio, which reflects resources available for instruction and the average availability of faculty members to every student. Lower ratios are preferable for students, as they will generally receive more focused resources for instruction. The student-faculty ratio has increased at various times throughout the history of the UC, particularly during the last decade. In the lower division, full-time permanent faculty generally teach large lecture classes. Non-permanent faculty, such as lecturers, generally teach lecture sections and smaller classes. In the upper-division, student contact with full-time permanent faculty is evenly distributed across classes of all sizes. Graduate academic students are almost uniformly taught by full-time permanent faculty in classes with fewer than 50 students (UC 2020).

Regional

Riverside is the county seat of Riverside County, and it is also part of a larger geographic area known as Inland Southern California, which includes western Riverside and southwestern San Bernardino

counties and portions of the Pomona Valley in easternmost Los Angeles County. The three-county area includes housing within a reasonable commute of UCR (approximately 1 hour each way).

The Southern California Association of Governments (SCAG) serves as the Metropolitan Planning Organization for the southern California region. SCAG projects major growth indicators for its region, including Riverside, San Bernardino, Los Angeles, Imperial, Orange, and Ventura counties. Population, household, and employment estimates and forecasts are maintained at the jurisdictional and county unincorporated level and provide the basis for developing the regional growth forecast for the region (SCAG 2020). Table 4.12-2 and Table 4.12-3 provide population and housing estimates and forecasts for 2020 and 2035 for major cities in the Riverside-San Bernardino-Ontario metropolitan area, based on estimates from the California Department of Finance (DOF) and the 2016 SCAG forecast.

Population

Based on SCAG's population forecast provided in Table 4.12-2, the City currently has, and is projected to continue to have, the highest population of the major cities in Inland Southern California.

Table 4.12-2 Regional City Population Forecast

City Name	2020 Population[1]	2035 Population[2]	Change 2020-2035
Chino	89,109	114,200	25,091
Chino Hills	82,409	89,000	6,591
Corona	168,248	170,500	2,252
Eastvale	66,413	63,400	-3,013
Fontana	213,000	266,300	53,300
Grand Terrace	12,426	13,900	1,474
Highland	55,323	65,700	10,377
Jurupa Valley	107,083	112,900	5,817
Loma Linda	24,535	28,700	4,165
Moreno Valley	208,838	250,200	41,362
Norco	27,564	31,800	4,236
Ontario	182,871	248,800	65,929
Rancho Cucamonga	175,522	198,300	22,778
Redlands	70,952	83,400	12,448
Rialto	104,553	111,400	6,847
Riverside	**328,155**	**384,100**	**55,945**
San Bernardino	217,946	256,400	38,454
Upland	78,814	81,600	2,786
Total	**2,213,761**	**2,570,600**	**356,839**

[1]DOF 2020

[2]SCAG 2016a

The population of cities in this area are projected to increase by 2035, with the population of the City expected to increase by approximately 56,000. By 2035, the City is projected to have 384,100 residents, or approximately 15 percent of the total population (2,570,600 residents) in the region.

Housing

Migration to the Inland Empire from coastal regions in California is anticipated to continue as housing costs in coastal cities remain high. Historically, rising property costs have driven people with diverse incomes and educational backgrounds to migrate inland for homes or rentals they can afford. However, income inequality remains a factor in Riverside and San Bernardino counties, similar to other counties in the state (SCAG 2018). The SCAG estimates provided in Table 4.12-3 indicate that Riverside has the highest number of housing units of the major cities in the region.

Table 4.12-3 Regional Housing Forecast

City Name	2020 Housing Units[1]	2035 Housing Units[2]	Change 2020-2035
Chino	25,621	32,200	6,579
Chino Hills	25,850	27,400	1,550
Corona	49,941	51,300	1,359
Eastvale	17,067	16,000	-1,067
Fontana	55,093	70,000	14,907
Grand Terrace	4,727	5,600	873
Highland	16,845	20,200	3,355
Jurupa Valley	28,735	29,900	1,165
Loma Linda	9,853	11,500	1,647
Moreno Valley	57,523	71,200	13,677
Norco	7,329	9,100	1,771
Ontario	51,283	72,200	20,917
Rancho Cucamonga	59,440	70,200	10,760
Redlands	27,129	31,600	4,471
Rialto	27,595	31,000	3,405
Riverside	**101,414**	**117,700**	**16,286**
San Bernardino	65,654	76,600	10,946
Upland	28,000	28,800	800
Total	**659,099**	**772,500**	**113,401**

[1]DOF 2020

[2]SCAG 2016a

The overall number of housing units is projected to increase in the region by more than 113,400 units between 2020 and 2035. The number of housing units in the City is projected to grow by approximately 16,286 housing units by 2035, when SCAG projects the total number of housing units for cities in this area to be approximately 772,500. The City will account for the highest total number of housing units in the area by 2035, comprising approximately 15 percent of the total, although Ontario is projected to increase its housing supply the most in terms of unit volume. Table 4.12-4 lists the most recent vacancy rate and persons per household for major cities in the region.

Table 4.12-4 Regional Housing Vacancy Rates

City Name	2020 Vacancy Rates (%)	2020 Persons Per Household
Chino	5.7	3.46
Chino Hills	3.6	3.30
Corona	3.6	3.48
Eastvale	3.9	4.05
Fontana	4.5	4.04
Grand Terrace	5.2	2.75
Highland	5.7	3.47
Jurupa Valley	4.7	3.88
Loma Linda	7.1	2.60
Moreno Valley	6.0	3.85
Norco	1.9	3.32
Ontario	3.7	3.68
Rancho Cucamonga	4.0	3.03
Redlands	7.0	2.72
Rialto	5.1	3.97
Riverside	**4.9**	**3.28**
San Bernardino	7.2	3.47
Upland	2.8	2.87
Average	**4.8**	**3.40**

[1]DOF 2020

As shown, the average vacancy rate for the region is 4.8 percent, equal to approximately 31,637 housing units, and the average persons per household is 3.40.

Local

City of Riverside Population

UCR is located entirely within Riverside. In Riverside's recent history, population growth has been a steady constant, adding approximately 40,000 new residents each decade since the 1960s. Even during times of economic recession, Riverside has continued to grow (City of Riverside 2018a). Between 2000 and 2018, the total population of Riverside increased by 70,694 to 325,860, or by 27.7 percent. During this time, the 21-34-year-old age group experienced the largest increase in share, growing from 21.3 to 26.1 percent (SCAG 2019).

City of Riverside Housing

Riverside currently has 101,414 housing units. Between 2000 and 2018, homeownership rates decreased, and the share of renters increased. In 2018, approximately 45.8 percent of residents rented, and 54.2 percent owned a home.

Most housing stock in Riverside consists of single-family units and over 60 percent of the housing units were built after 1970 (SCAG 2019). The City's housing stock is shown in Table 4.12-5. The City

defines 12,086 units of housing as "group quarters", which can include college student residential housing (DOF 2020).[1]

Table 4.12-5 City of Riverside Housing Stock

Housing Type	Number of Units	Percent of Stock
Single-Family Homes (attached and detached)	68,560	67.6
Multi-Family Homes	30,627	30.2
Mobile Homes	2,227	2.2
Total	**101,414**	**100**

Source: DOF 2020

In 2018, the City re-designated 57 sites, comprising 308 acres, to either mixed-use or multiple-family zones to allow for residential development at a density sufficient to accommodate its housing needs. The City has a surplus in its Regional Housing Needs Assessment (RHNA) allocation of 1,831 potential units that could be affordable to lower-income households (City of Riverside 2018b). As of January 2020, the City had a vacancy rate of 4.9 percent, lower than the state average of 8.7 percent[2]. The City also has an average of 3.28 persons per household, higher than the state average of 2.93 (DOF 2020).

UNIVERSITY NEIGHBORHOOD PLAN

The City's University Neighborhood Plan was adopted in 2008 and covers the area north and east of the UCR campus, generally bordered by Chicago Avenue to the west, Spruce Street to the north, and Box Springs Mountain Reserve to the east and northeast. The University Neighborhood Plan designated most of the area west of UCR and Watkins Drive as medium or hillside residential and the area north of the I-215/SR 60 freeway, east of Iowa Avenue, and west of Watkins Drive as primarily high-density residential with pockets of medium and medium-high residential and mixed-use urban. The blocks immediately surrounding University Avenue north of West Campus were designated mixed-use urban, with business/office park, commercial, and public facilities in the area south of the I-215/SR 60 freeway. Densities are permitted up to 60 dwelling units per acre, depending upon location and proximity to transit (City of Riverside 2008).

The Plan objectives as they relate to housing include the following:

- Allow for the growth and expansion of the UCR while ensuring preservation and enhancement of surrounding residential neighborhoods
- Provide a diversity of housing opportunities throughout the University Neighborhood
- Enhance the University Neighborhood's quality of life by protecting single family areas, providing quality, affordable housing and enhancing neighborhood shopping
- Recognize and preserve existing rural lifestyles within the University Neighborhood by recognizing topographical constraints to conventional urban development

[1] College dorm group quarters population is defined as student population living in residence halls and apartment units located on or near college campuses.
[2] Vacancy rates are based on 2010 Census benchmark data, adjusted to incorporate the directional changes described by the latest available American Community Survey data. Exact data on foreclosures or other housing market indicators are not reliably available to adjust vacancy rates and are not used.

COLLEGE AND UNIVERSITY STUDENT HOUSING

As home to multiple colleges and universities, including UCR, California Baptist University, La Sierra University, and Riverside City College, Riverside has many students, faculty, and associated workforce who live in the community. These institutions collectively enroll over 40,000 students each year and employ thousands more. State Housing Element law, Government Code section 65583(a)(7), defines "special needs" groups to include senior households, disabled persons, large households, female-headed households, single-parent families, farmworkers, and people who are homeless. Due to their numbers in Riverside, college students are considered to have special housing needs (City of Riverside 2018a).

Although Riverside educational institutions are building student housing, there has been a shortage. In recent years, for-profit developers have built or remodeled multiple housing complexes to serve students, including the University Village Apartments (166 units totaling 525 beds), the GrandMarc at University Village (approximately 500 beds), the Sterling University Palms Apartments (160 units totaling 635 beds), and the Sterling Highlander Apartments (216 units totaling 598 beds) (City of Riverside 2018b).

University of California, Riverside

Campus Population

Population typically refers to residents in a particular jurisdiction. For the purposes of analyzing campus population, the proposed 2021 LRDP includes undergraduate students, graduate students, faculty, and staff. Other people who may be present on campus, such as vendor support staff and visitors, are assumed to already be included in population estimates and forecasts for the jurisdictions in which they reside; therefore, they are not included in Campus Population values provided here.

Between 2009 and 2018, freshman applications increased by approximately 54 percent (from 31,884 students to 49,079 students) and transfer applications increased by 103 percent (from 6,060 students to 12,309 students). Likewise, student enrollment steadily increased during this time (UCR 2020a). Fall headcount[3] for academic years 2015/2016 to 2019/2020 is shown in Table 4.12-6 and details student enrollment increases over the past 5 years. Enrollment has continued the upward trend that UCR has experienced since the 1990s.

Table 4.12-6 Fall Headcount Student Enrollment

Academic Year Student Type	2015/2016	2016/2017	2017/2018	2018/2019	2019/2020
Undergraduate	18,608	19,799	20,069	20,581	22,055
Graduate	2,931	3,122	3,209	3,341	3,493
Total	**21,539**	**22,921**	**23,278**	**23,922**	**25,548**

Source: UCR 2020a

The total campus population in academic year 2018/2019 is shown in Table 4.12-7. Academic personnel include instructional faculty and other academic appointments. Academic and non-academic personnel counts exclude students employed by UCR to prevent double counting.

[3]Fall headcount conducted at the end of the third week of Fall quarter.

Table 4.12-7 Academic Year 2018/2019 Total Campus Population

Category	Population
Students (i.e., undergraduates and graduates)	23,922
Academic Personnel (i.e., faculty, staff)	1,702
Non-Academic Personnel (i.e., staff)	3,037
Total	**28,661**

Source: UCR 2020a, 2020b

UCR-Affiliated Campus Housing

UCR currently provides UCR-affiliated housing for qualified students, totaling 6,511 beds, and does not offer housing for faculty and staff. Therefore, UCR housed approximately 27 percent of its enrolled students in campus housing (approximately 23 percent of total campus population). Faculty and staff, as well as students who do not qualify for or obtain UCR-affiliated housing, are distributed throughout the region in non-UCR-affiliated housing. Therefore, approximately 77 percent of the total campus population requires non-UCR-affiliated housing under baseline conditions.

Nearly 15 percent of housed freshman in academic year 2018/2019 were a third person in a two-person room (512 residents in 2,943 rooms) (see page 6 of Appendix B LRDP Supporting Information). UCR-affiliated housing includes four residence halls and apartment complexes, the locations of which are shown on Figure 4.12-1. One residence hall (Dundee) and two apartment complexes (International Village and Stonehaven) are available to students but not owned or managed by UCR. All residence halls and apartment complexes are located on East Campus except for the International Village.

Between Fall 2007 and Fall 2017, the total campus student population grew more than 35 percent. During this period, 1,300 apartment-style beds were added in the two phases of the Glen Mor housing development and approximately 860 apartment-style beds were added with the acquisition of Oban Apartments and Falkirk Apartments (UCR 2019a).

The two newest UCR-affiliated housing developments include Dundee Residence Hall and the North District. Dundee Residence Hall, located east of Aberdeen-Inverness Residence Hall and south of West Linden Street, opened Fall 2020 and features more than 800 beds in two, seven-story residential towers (UCR 2020c). The North District is a multi-phase redevelopment of the former Canyon Crest Family Housing site, bordered by West Linden Street to the south, Canyon Crest Drive to the west, Blaine Street to the north, and the Child Development Center and Corporation Yard to the east. Phase 1 of the North District Project is currently under construction which includes approximately 1,500 apartment-style beds; Phase 1 of the North District Project is planned to be opened Fall 2021. When complete, overall North District Project will include modern, higher density residence halls and apartments, including approximately 5,200 beds, as well as dining facilities and recreation/athletic fields (UCR 2020d). Table 4.12-8 lists the existing housing facilities at UCR and associated student type.

Figure 4.12-1 Location of Campus Residence Halls

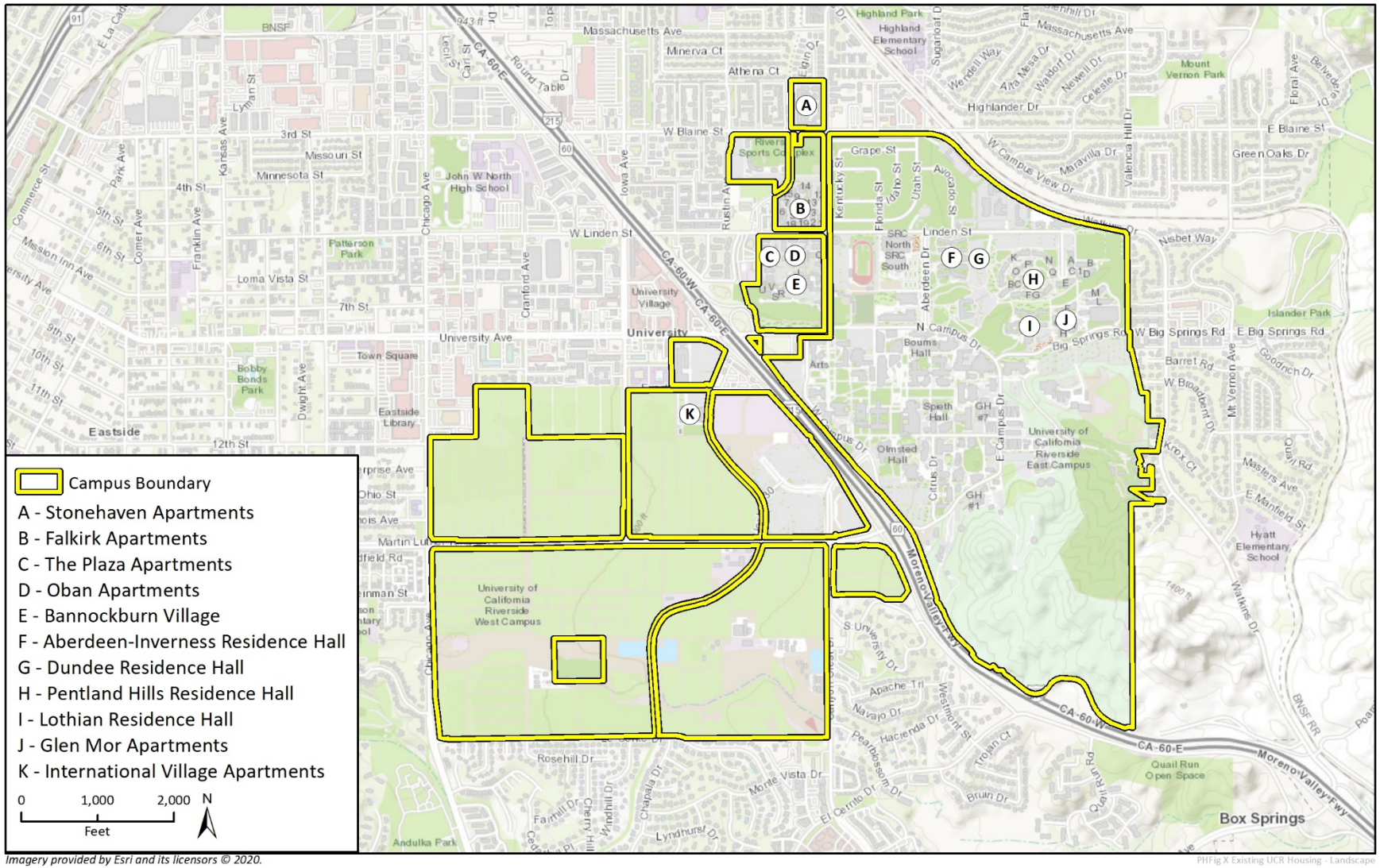


Table 4.12-8 Baseline (2018/2019) and Interim/Future UCR Student Housing Facilities

Housing Facility	Type of Housing					Approximate Number of Student Beds
	Incoming Freshmen	Continuing Students	Transfer Students	Graduate Students	Students with Family	
Residence Halls						
Aberdeen-Inverness Residence Hall	X	X	X			892
Lothian Residence Hall	X	X	X			1,035
Pentland Hills Residence Hall	X	X	X			1,228
Total Residence Halls						**3,155**
Apartments						
Bannockburn Village Apartments		X	X	X		420
Falkirk Apartments		X	X	X		565
Glen Mor Apartments		X	X	X		1,300
The Plaza Apartments		X	X	X		180
Stonehaven Apartments		X	X	X		455
Oban Family Housing Apartments					X	136
Total Apartments						**3,056**
Interim/Future Housing						
Dundee Residence Hall	X	X	X	X		820
North District (Full Build-out)[1]	X	X	X	X		4,000-6,000
Total Interim/Future Housing						**4,820-6,820**
Total Housing						**11,031-13,031**

Note: International Village is a P3 property that is programmed to serve International Student affiliate with University Extension. The campus has periodically housed regularly enrolled students at International Village when there is available space and the campus has a need for that space. However, the campus does not include the International Village housing in its demand review and considers this temporary lease of beds.

[1]North District Phase 1 is currently underway with the construction of 1,500 apartment-style beds; anticipated construction completion Summer 2021.

Source: UCR 2019b

Non-UCR-Affiliated Campus Housing

UCR provided the most recent zip code information available for UCR students, faculty, and staff for use in this Draft EIR analysis. See Appendix J for more information. Zip code data was analyzed to determine how many average miles from campus the campus population is reasonably assumed to reside. Approximately 15 percent of the total provided zip codes were outside of an assumed "reasonable" commute radius (approximately 1 hour each way) and likely represent home (i.e., parent) addresses of students rather than campus population residences. These zip codes were not included in this analysis.

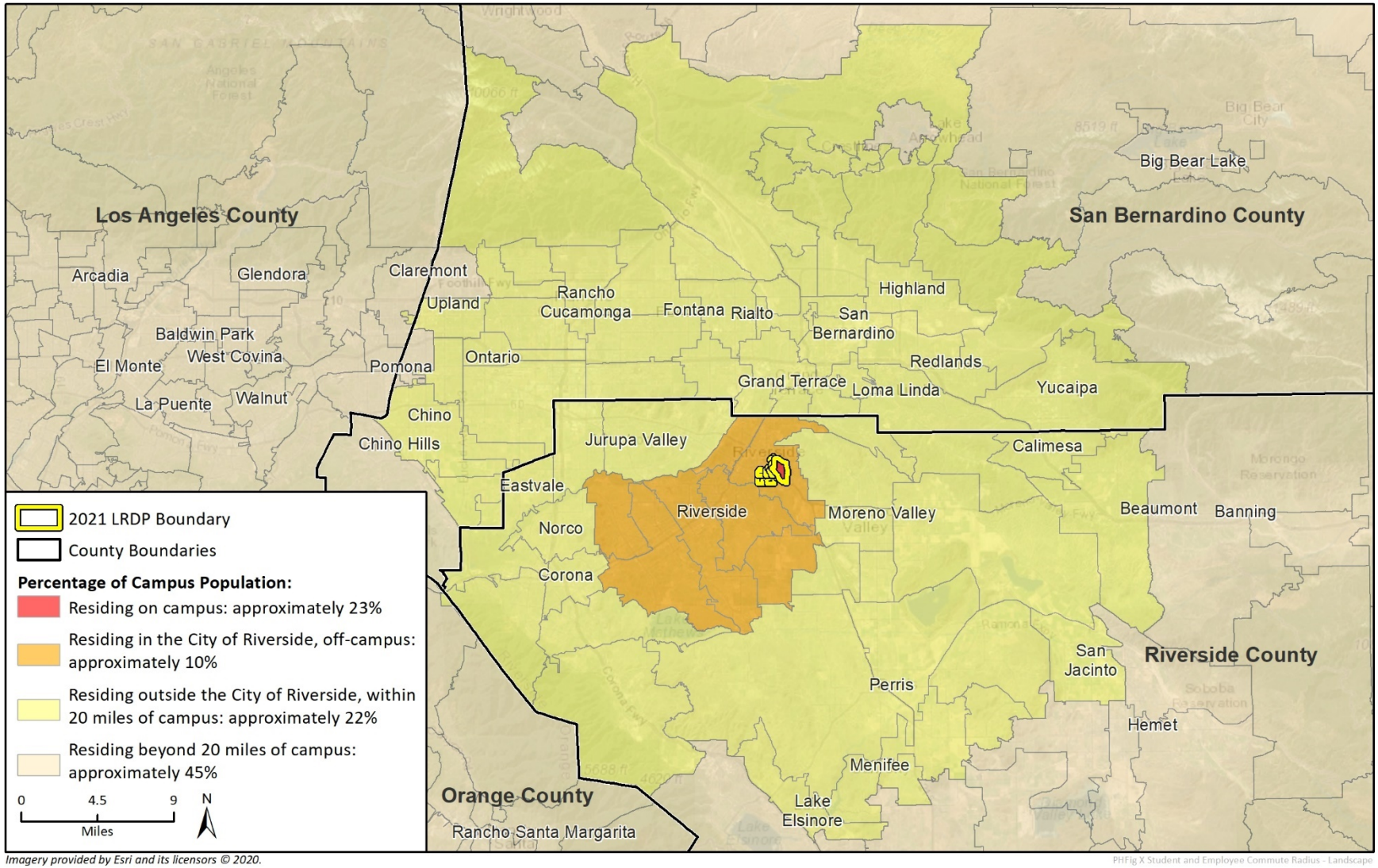
As shown in Table 4.12-9, approximately 23 percent of the analyzed campus population resides in UCR-affiliated housing, approximately 10 percent reside in other housing within the City limits, approximately 22 percent reside outside of the City but within 20 miles of the UCR campus, and approximately 45 percent reside in locations greater than 20 miles from the UCR campus. The 20-mile distance was chosen as it is approximately the average vehicle miles traveled for the campus population, as discussed in Section 4.15, *Transportation*. Figure 4.12-2 illustrates the campus population residence distribution.

Table 4.12-9 Baseline UCR Campus Population Residence Distribution

Residence	Percent of Total
UCR-Affiliated Housing	23
City of Riverside	10
Outside the City of Riverside but within 20 miles of the UCR campus[1]	22
More than 20 miles from the UCR campus	45
Total	**100**

[1] The 20-mile distance is approximate; if most of an identified zip code was included within the 20-mile radius, then data for the entire zip code was used.

Figure 4.12-2 Campus Population Residence Distribution



4.12.2 Regulatory Setting

Federal

There are no federal regulations related to population and housing that would be applicable to the proposed 2021 LRDP.

State

Regional Housing Needs Assessment

California Housing Element law requires each city and county to develop local housing programs to meet their "fair share" of the future statewide housing growth needs for all income groups, as determined by the DOF. (Gov. Code § 65583.) The regional councils of government, including SCAG, are then tasked with determining the regional housing needs allocation, referred to as the Regional Housing Needs Assessment (RHNA) process. SCAG is the lead agency responsible for overseeing the RHNA process for jurisdictions in the City and Riverside County.

Accessory Dwelling Units

An accessory dwelling unit (ADU) is an attached or detached residential dwelling unit that provides complete independent living facilities for one or more persons and is located on a lot with a proposed or existing primary residence. It must include provisions for living, sleeping, eating, cooking, and sanitation on the same parcel as the single- or multiple-family dwelling. Manufactured homes and efficiency units are also ADUs.

The legislature passed new laws governing ADUs that restrict a City's ability to regulate these units. (SB 13 [2019], AB 68 [2019], AB 881 [2019], AB 670 [2019], AB 587 [2019], AB 671 [2019].) Effective January 1, 2020, all ADU approvals, including what are called Junior ADUs are ministerial in nature and are not subject to public hearing. Cities must allow ADUs in single-family and multiple-family zones subject to limited exceptions. Cities can impose certain standards on the ADUs, including parking, height, setback, landscape, architectural review, maximum size of units, lot coverage requirements and the like. However, there are categories of ADUs proposed in residential and mixed-use zones that a City must approve including 1) one ADU or Junior ADU on a single-family lot with an existing or proposed single-family residence, subject to certain conditions, 2) one detached, newly constructed ADU that does not exceed 4-foot side and rear-yard setbacks and 16 feet in height, 3) multiple ADUs no larger than 800 sf in areas of existing multiple dwelling structures such as garages and attics, and 4) up to two ADUs detached from an existing multiple-family dwelling structure with a 16-foot height limit and 4-foot side and rear-yard setbacks. Cities may not require correction of nonconforming zoning conditions as a condition for these mandatory ADU approvals. In all cases, cities may require compliance with applicable Building Code requirements.

California Education Code

The California Education Code contains several provisions mandating certain enrollment plans and admissions practices. Section 66202.5 of the Education Code states the following:

> The State of California reaffirms its historic commitment to ensure adequate resources to support enrollment growth, within the systemwide academic and individual campus plans to

accommodate eligible California freshmen applicants and eligible California Community College transfer students, as specified in Sections 66202 and 66730.

The University of California and the California State University are expected to plan that adequate spaces are available to accommodate all California resident students who are eligible and likely to apply to attend an appropriate place within the system. The State of California likewise reaffirms its historic commitment to ensure that resources are provided to make this expansion possible and shall commit resources to ensure that students from enrollment categories designated in subdivision (a) of Section 66202 are accommodated in a place within the system.

Similarly, Section 66011(a) of the California Education Code provides that all resident applicants to California institutions of public higher education who are determined to be qualified by law or by admission standards established by the respective governing boards should be admitted to either a district of the California Community Colleges, in accordance with Section 76000, the California State University, or the University of California. Section 66741 of the California Education Code requires acceptance of qualified transfer students at the advanced standing level.

Additionally, under the California Master Plan for Higher Education, the UC system guarantees access to the top 12.5 percent of California's public high school graduates and qualified transfer students from California Community Colleges (UCOP n.d).

University of California

University of California Annual Operating Budget/Enrollment Plan

Each campus in the UC system provides varying amount of on-campus housing. The State of California does not plan, budget, or direct a set amount of planned or desired housing for campuses in California. Each UC campus provides student housing in the overall objective of meeting the UC mission of teaching, research, and public service for California. Based on local housing markets, historic construction rates at each campus, availability of campus land and infrastructure to support additional housing, and student desires related to housing type, location, and affordability, each campus plans for housing needs and new housing projects.

The UC budget plan for 2019/2020 represents the first year of a multi-year framework designed to further the University's longstanding goals of access, excellence, and affordability. The budget plan includes investments in the following four broad expenditure categories:

- Enrollment growth to maintain access for projected increases in UC-eligible high-school graduates and transfer-ready California Community College students. The plan proposes enrollment growth of 2,500 California resident undergraduates, 1,000 graduate students, and 800 non-resident undergraduate students—all of whom have the potential to contribute to the state's economic vitality upon graduation.
- Investments to improve student graduation rates and reduce time-to-degree, including investments in faculty hiring, course availability, academic advising, student services, instructional technology, and related areas. The plan includes a targeted investment of $60 million in 2019-2020 for this purpose to fund programs and priorities at each UC campus.
- Addressing the University's most critical capital needs—such as life-safety and seismic upgrades— by taking further advantage of the University's ability to use a portion of its operating budget for capital investments.

- Other conservative but crucial expenditures to maintain reasonable faculty and staff compensation programs, retiree benefits, and non-personnel expenditures (e.g., utilities) (UCOP 2019).

University of California President's Student Housing Initiative

On January 20, 2016, UC President Janet Napolitano announced a housing initiative aimed at supporting current students and future enrollment growth across the UC system. Through the initiative, UC expected to expand the pool of student housing through 2020 and to accelerate the timetable for completing student housing developments that were already in the planning phase. Estimates projected that UC could add nearly 14,000 new affordable student housing beds to the campuses' stock by Fall 2020. This would include the creation of new beds for undergraduates in residence halls and the addition of more graduate student housing and other apartments that are generally open to all students. All housing projects have since been completed, adding approximately 15,000 beds across the UC system. The completion of the projects surpassed the targeted goal of initiative established in 2016 (UCOP 2021).

University of California, Riverside

UC Riverside Housing Policy

UCR policy is to guarantee eligible freshman students the option of on-campus housing for their first year (UCR 2020d). These offers of housing are not mandatory and UCR does not require students to live on campus or in a certain distance of campus. Eligible freshman must meet housing deadlines, and typically demand has outstripped supply but only by a certain factor given constraints of affordability and students who chose to reside at their home address when in proximity to the UCR campus. Transfer students are provided housing based on availability.

Regional and Local (Non-Binding)

As noted in Section 4, "University of California Autonomy," UCR, a constitutionally-created State entity, is not subject to municipal regulations of surrounding local governments for uses on property owned or controlled by UCR that are in furtherance of the university's educational purposes. However, UCR may consider, for coordination purposes, aspects of local plans and policies of the communities surrounding the campus when it is appropriate and feasible but not bound by those plans and policies in its planning efforts. Information pertinent to population growth and housing from the City and/or County general plans is included here for informational purposes and would be applicable to cumulative non-UCR development.

Southern California Association of Governments Regional Housing Needs Assessment

The RHNA is mandated by State Housing law as part of the periodic process of updating local housing elements. RHNA quantifies the need for housing in each jurisdiction during specified planning periods. SCAG is in the process of developing the 6th cycle RHNA allocation plan, which will cover the planning period October 2021 through October 2029. Communities use the RHNA in land use planning, to prioritize local resource allocation, and in deciding how to address identified existing and future housing needs resulting from population, employment, and household growth. The RHNA does not necessarily encourage or promote growth but rather requires communities to anticipate growth, so that collectively the region and subregion can grow in ways that enhances

quality of life, improves access to jobs, promotes transportation mobility, and addresses social equity and fair share housing needs. All cities and counties located in SCAG's jurisdiction are subject to the SCAG RHNA requirements. SCAG has proposed updated RHNA numbers for all Riverside County's 167,177 units. The RHNA factors in the housing needs generated by universities in the region, including UCR.

SCAG Regional Transportation Plan/Sustainable Communities Strategy

On April 7, 2016, SCAG's Regional Council adopted the 2016-2040 Regional Transportation Plan/ Sustainable Communities Strategy (RTP/SCS). The RTP/SCS is a long-range visioning plan that balances future mobility and housing needs with economic, environmental, and public health goals. The RTP/SCS charts a course for closely integrating land use and transportation. It outlines more than $556.5 billion in transportation system investments through 2040. The RTP/SCS was prepared through a collaborative, continuous, and comprehensive process with input from local governments, county transportation commissions, tribal governments, non-profit organizations, businesses, and local stakeholders in the counties of Riverside, San Bernardino, Los Angeles, Orange, Imperial, and Ventura.

City of Riverside General Plan

The Housing Element of the City's General Plan was last updated in 2018 to respond to the 2014-2021 housing element cycle (5th cycle RHNA allocation). The City of Riverside most recently received its RHNA allocation of 18,458 housing units for the 2021-2029 Housing Element Cycle. As part of this process the City has provided a buffer of approximately 5,500 dwelling units (approximately 30 percent over and above the RHNA allocation), and the City will identify space for up to 24,000 new homes for the 2021–2029 RHNA cycle. The City has initiated an update to the its Housing Element to accommodate and address the upcoming RHNA cycle. The Housing Element contains the housing needs assessment based on demographic characteristics and anticipated changes, a constraints analysis for the development of housing by income groups and special needs, an inventory of housing resources, and objectives, policies, and implementation programs to address the development, improvement, and conservation of housing in Riverside.

4.12.3 Environmental Impacts and Mitigation Measures

Significance Criteria

Would the proposed 2021 LRDP:

a) Induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?

b) Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?

Issues Not Evaluated Further

While both criteria questions related to Population and Housing were scoped out of the Draft EIR analysis pursuant to the Initial Study (Appendix A), concerns related to campus population growth and potential impacts of increased housing demand on the surrounding community were raised by the City during the public scoping period. UCR determined it to be prudent to examine potential

impacts related to campus population growth in more detail. Therefore, the criteria questions are addressed herein.

Analysis Methodology

Impacts related to population are generally social or economic in nature. Under CEQA, a social or economic change generally is not considered a significant effect on the environment unless the changes can be directly linked to a physical change. (CEQA Guidelines section 15131.) As further discussed under CEQA Guidelines Section 15126.2(e), "[I]t must not be assumed that growth in any area is necessarily beneficial, detrimental, or of little significance to the environment." The purpose behind looking at growth is to determine whether increases in the population may tax existing community service facilities, requiring construction of new facilities that could cause significant environmental effects.

For purposes of this analysis, "substantial" unplanned population growth is defined as growth from construction of new homes, businesses, roads, or other infrastructure that would result in population growth that significantly exceeds planned growth in the SCAG projections. For impacts to be considered significant under the thresholds above, the project would also have to result in a significant environmental impact not already disclosed.

The impact analysis examines the population and housing impacts that would result from the population added to the study area as a result of campus growth. For purposes of analysis, it was assumed that full development under the proposed 2021 LRDP would occur by 2035. The examination of population, employment, and housing conditions is based in part on data found in the proposed 2021 LRDP, UCR enrollment information, and other university resources as cited.

2021 LRDP Objectives and Policies

Campus Population Growth

A primary goal of the proposed 2021 LRDP is to expand enrollment capacity up to 35,000 students through 2035, a net increase of approximately 11,000 students or a 46 percent increase from the 2018/2019 academic year student population. Furthermore, to align student/staff and student/faculty ratios with UC system-wide averages, it is anticipated that approximately 7,545 total faculty and staff would be needed to support the projected student enrollment in 2035, a net increase of approximately 2,800 faculty and staff, or an approximately 60 percent increase from the 2018/2019 academic year.

Student Housing

A primary goal of the proposed 2021 LRDP is to expand on-campus residential facilities to include approximately 14,000 beds (40 percent of the student population) in University-managed or controlled housing in proximity to the Academic Center (an increase from the current 27 percent currently housed on campus). This equates to housing approximately 68 percent of the increase in student population in UCR controlled housing (i.e. 7,489 new beds / 11,078 increased student population). The proposed 2021 LRDP contains the following objectives and policies supportive of the increased enrollment and housing goals and directly relevant to population growth and student housing:

Mobility (M)

- Objective M1 – Reduce future vehicular traffic, parking demand, and GHG emissions, by increasing student housing on campus up to 40 percent of the projected enrollment in 2035.
  - Policy: Continue to grow and support on-campus residency by focusing on more affordable student housing options, as well as the capacity for returning students (upperclassmen) and graduate students.
  - Policy: Promote public transit as a convenient and preferred mode of commuting to campus and connecting campus residents to the community and regional destinations.
  - Policy: Develop the University Avenue and Canyon Crest Drive Gateway streetscapes to support increased use and functional efficiency of the RTA system, improved clarity of drop-off and pick-up locations for ride-sharing services, reduced conflict, and improved safety for cyclists, pedestrians, and emerging micro-mobility solutions in these increasingly busy mixed-mode circulation areas.[4]
  - Policy: Improve access to public transit on campus by providing connectivity to access points via pathways or shuttles, as well as comfortable waiting facilities, proximate to commuter related services, where appropriate.
  - Policy: Advocate and support the development of a Metrolink train platform along Watkins Drive adjacent to campus to provide direct access and significantly reduce commute times. Consider dedicated vanpools or shuttles to nearby stations in the interim.
- Objective M2 – Invest in infrastructure to increase bicycle use and support other active transportation modes to integrate desired routes with the campus' and City's circulation framework.
  - Policy: Support and facilitate City-led initiatives to extend bikeways to campus from every direction, including routes proposed along Canyon Crest Drive, Martin Luther King Boulevard, and the Gage Canal.
  - Policy: Develop wayfinding systems to interconnect preferred bicycle routes and invest in safe and secure pathways along all bicycle routes.
  - Policy: Provide adequate support amenities to facilitate and encourage the use of bicycles and other alternative transportation modes.
  - Policy: Develop a comprehensive improvement plan for Campus Drive to improve function, safety and utility for each mode of travel, as incremental growth occurs.
- Objective M3 – Emphasize safe and pleasing passage for pedestrians and bicycle riders through the careful, continued development and integration of the campus' multi-model circulation framework and its extensions into the immediate community.
  - Policy: Identify and address gaps within the existing non-motorized circulation network, both on-campus and within the adjacent community.
  - Policy: Implement University policies to improve pedestrian safety and encourage social interaction in zones of high pedestrian activity.

[4] Micro-mobility is a category of modes of transport that are provided by very light vehicles such as electric scooters, electric skateboards, shared bicycles and electric pedal assisted bicycles. The primary condition for inclusion in the category is a gross vehicle weight of less than 500 kg.

Land Use (LU)

- Objective LU5 – Continue to grow on-campus student housing to 40 percent and increase student life facilities.
  - Policy: Provide increased housing capacity and student life facilities in existing student neighborhoods in the northern portions of East Campus.

Impact Analysis

Impact PH-1 Induce Substantial Unplanned Population Growth.

The proposed 2021 LRDP would accommodate the anticipated regional population forecasts. Furthermore, the proposed 2021 LRDP does not include installation or extension of significant roads or infrastructure that would result in further population growth or housing needs. Direct and indirect impacts related to unplanned population growth would be less than significant. No mitigation measures are required.

Construction – Direct and Indirect Impacts

The proposed 2021 LRDP envisions new and renovated structures and facilities on the UCR campus which would require construction. While the development accommodated under the proposed 2021 LRDP would result in limited short-term construction employment opportunities, the City had an unemployment rate of 3.6 percent in 2019 and the county had an unemployment rate of 4.2 percent (California Employment Development Department 2020). Additionally, regional construction jobs occur on a temporary basis, which allows construction workers to move onto new jobs in the region. Given these factors, it is anticipated that there is a sufficient construction work force within the City and surrounding county area to meet the proposed 2021 LRDP needs. While some construction workers may choose to temporarily stay in the City or nearby areas in the county, it is assumed that the majority of workers would remain in their current residences in the local area, and few would require the accommodations of hotels and motels in the City or near UCR campus. Therefore, construction of the proposed 2021 LRDP would not result in substantial unplanned population growth. Construction impacts related to substantial unplanned population growth under the proposed 2021 LRDP would be **less than significant**.

Operation – Direct Impacts

The proposed 2021 LRDP plans for the development of on-campus housing, academic/ administrative space, and supporting uses to accommodate the undergraduate student, graduate student, and faculty/staff populations through the 2035/2036 academic year. The faculty and academic staff population would increase to fulfill UCR's educational goals. New housing, facilities, and related support services on campus would develop incrementally to serve the increasing campus population.

UCR projects student enrollment will grow to 35,000 students (Fall quarter headcount) by the 2035/2036 academic year (42,545 total campus population). As shown in Table 4.12-10, the proposed 2021 LRDP would incrementally accommodate an additional 7,419 undergraduate students and 3,659 graduate students, plus 2,806 faculty and staff, resulting in a net increase to the campus population of approximately 13,884 people by the 2035 horizon year. However, approximately 68 percent of the increase in student population would be housed in new UCR-affiliated housing.

Table 4.12-10 Campus Population Growth

Category[1]	Baseline (2018/2019)	2021 LRDP (2035/2036)	Net 2021 LRDP Increase from Baseline	Percent Increase from Baseline
Undergraduate Student Population	20,581	28,000	7,419	36.1
Graduate Student Population	3,341	7,000	3,659	109.5
Total Student Population	***23,922***	***35,000***	***11,078***	***46.3***
Academic Faculty and Staff	1,702	2,545	843	49.5
Non-Academic Staff	3,037	5,000	1,963	64.6
Total Faculty/Staff Population	***4,739***	***7,545***	***2,806***	***59.2***
Total Population	**28,661**	**42,545**	**13,884**	**48.4**

[1]Fall quarter headcount

Source: UCR 2021 LRDP

The proposed 2021 LRDP establishes a goal of housing 40 percent of total enrolled students (14,000 beds) to live in University-managed or controlled housing, equal to approximately 7,489 net new beds. The 40 percent benchmark is based on several factors including:

- University's previously observed absorption rates for student beds
- Local students' preference to live with family to save on housing costs
- Available land area
- Financial capacity and ability to build new housing supply
- Privately-owned housing options in the neighboring community
- Projected new supply created by private developers
- Future expansion of transit options that will expand the campus' physical reach farther into the community

Table 4.12-11 shows the approximate number of current and proposed on-campus beds for students. The 2021 LRDP would more than double the number of on-campus beds for students over 2018 conditions.

Table 4.12-11 Proposed 2021 LRDP UCR-Affiliated Housing

Housing Type	Baseline (2018/2019)	2021 LRDP (2035/2036)	Net 2021 LRDP Increase from Baseline	Percent Increase from Baseline
UCR-Affiliated Residential (beds) (includes Freshman, Triples, Continuing students, and Family housing)	6,511	14,000	7,489	115.0

UCR = University of California, Riverside

Source: UCR 2021 LRDP

Some of the student housing capacity accommodated under the proposed 2021 LRDP would occur through strategic infill and selective replacement of existing housing facilities in the northern half of East Campus. One of the objectives of the proposed 2021 LRDP is to replace aging, low-density student housing units while considering affordability, financial feasibility, and physical site constraints. Over 1,100 existing beds are located in three apartment complexes: Bannockburn,

Falkirk, and Oban. These structures are in relatively poor condition. The planned transformation of Canyon Crest Drive into a higher density, mixed-use student neighborhood assumes that the buildings in these complexes would be redeveloped at a greater density, as described in Section 2, *Project Description*.

The proposed 2021 LRDP assumes approximately 6,395 new students and faculty/staff would require non-UCR-affiliated, off-campus housing (13,884 net increase to the campus population – 7,489 new on-campus beds) between the baseline (2018/2019) and buildout (2035/2036) years. Using a conservative estimate of even population growth each year, approximately 380 new residents could move to the region each year and need housing between the baseline (2018/2019) and buildout (2035/2036) years.[5] The estimate of average increased housing needs each year is highly conservative and does not factor in the existing population that may happen to attend UCR or get a job at UCR in the future. In 2018, approximately 59 percent of new California freshmen enrollees and 64 percent of new California transfer enrollees at UCR previously resided in a home within a 50-mile radius of the campus (UC 2019).

It is reasonable to assume that a portion of the new undergraduate and graduate student population would continue to reside in the same household during their studies and not occupy a new residence. It is also unlikely that every student would occupy a single housing unit; the region has on average 3.28 persons per household (City of Riverside 2021). It can also be assumed that some new faculty and staff would already reside in the region prior to working at UCR.

As discussed above, approximately 85 percent of the entire campus population currently lists an address within a "reasonable" commute radius (approximately 1 hour each way). It is reasonable to assume that these trends will continue through academic year 2035/2036. Therefore, much of the off-campus housing needs projected in the proposed 2021 LRDP would be in the Inland Southern California region. The net increase of 6,395 housing units by academic year 2035/2036 represents 5.6 percent of the net increase of total regional housing unit projections for 2035 (6,395 net increase in off-campus housing units/113,401 net increase in regional housing units).

The City of Riverside most recently received its RHNA allocation of 18,458 housing units for the 2021-2029 Housing Element Cycle. As part of this process the City has provided a buffer of approximately 5,500 dwelling units (approximately 30 percent over and above the RHNA allocation), and the City will identify space for up to 24,000 new homes for the 2021–2029 RHNA cycle. Furthermore, if the vacancy rate for the region remains in line with 2020 at 4.8 percent, then approximately 37,080 available housing units would be available (772,500 regional housing units/ 4.8 percent) in the region in 2035. Therefore, the new campus population residing in non-UCR-affiliated housing could be absorbed into the existing housing stock, and there would be no need to construct new housing or infrastructure as a direct result of the proposed 2021 LRDP.

The net increase of 13,884 people by academic year 2035/2036 would be accommodated by the 356,839 net increase in regional population. According to data from UC, approximately 82 percent of UCR students are in-state residents, meaning that they resided in California prior to attending UCR. More precisely, approximately 60 percent of the undergraduate student population lived within a 50-mile radius of the UCR campus prior to enrolling at the University (UC 2019). Furthermore, according to available zip code information for UCR students, faculty, and staff, approximately 85 percent of the campus population currently resides within a "reasonable" commute radius (approximately 1 hour each way). It is reasonable to assume that these trends will continue, and that much of the campus population projected in the proposed 2021 LRDP will have

[5] 2035-2018 = 17 years; 6,395 students/staff divided by 17 years equals approximately 380 new residents per year

already been accounted for in existing and/or projected population growth in the Inland Empire region.

Population growth under the 2021 LRDP was included as part of SCAG's planned growth. There would be no additional environmental impacts beyond those already analyzed in the other resource section of this EIR. As such, the student population growth assumed for the proposed 2021 LRDP is not considered unplanned, and direct impacts related to this growth are **less than significant**.

Operation – Indirect Impacts

Typically, population growth can occur indirectly when infrastructure, such as roadways or utilities, are extended to areas not currently serviced by such infrastructure. For example, an area that currently has no roadway access would become accessible and potentially developed following construction of a road through the area. The UCR campus is in a heavily urbanized area that contains existing infrastructure, including roadways, electricity, sanitary sewer, potable water, telecommunications, and natural gas. The development accommodated in the proposed 2021 LRDP would be serviced by existing infrastructure in the area, with minor connections to roadways and utilities, generally on campus. The proposed 2021 LRDP would not require infrastructure into undeveloped areas or rural areas where infrastructure is not currently present. As such, the proposed 2021 LRDP would not induce secondary, unplanned growth in the region, and indirect impacts related to the proposed 2021 LRDP are **less than significant**.

Mitigation Measures

No mitigation measures are required.

Significance After Mitigation

Impacts would be less than significant without mitigation.

Impact PH-2 DISPLACE SUBSTANTIAL NUMBERS OF EXISTING PEOPLE OR HOUSING NECESSITATING THE CONSTRUCTION OF REPLACEMENT HOUSING ELSEWHERE.

THE PROPOSED 2021 LRDP WOULD NOT DISPLACE SUBSTANTIAL NUMBERS OF EXISTING PEOPLE OR HOUSING, NECESSITATING THE CONSTRUCTION OF REPLACEMENT HOUSING. IMPACTS WOULD BE LESS THAN SIGNIFICANT. NO MITIGATION MEASURES ARE REQUIRED.

Construction

The proposed 2021 LRDP intends to construct on-campus housing for up to 40 percent of the eligible student population (approximately 68 percent of the increase in student population). Under the proposed 2021 LRDP, no housing would be permanently removed, nor would any actions occur to substantially displace people. Students may be displaced temporarily as a result of redevelopment or remodeling of UCR housing facilities, but it is likely that redevelopment and/or remodeling would occur over the summer months, when student populations are reduced and such displacement would only temporarily occur during construction activities. Furthermore, consistent with existing practice, as development occurs on campus as part of the proposed 2021 LRDP, UCR would monitor on-campus population and stagger the opening of new housing facilities to correspond with any temporary decreases in housing availability, such that the level of on-campus housing is maintained or increased year-to-year and does not decrease. The proposed 2021 LRDP does not include proposed development of properties beyond the campus boundaries. Therefore,

no permanent displacement of UCR students or area residents would result from construction projects implemented through the proposed 2021 LRDP.

In addition, an estimated 6,395 new students and faculty/staff would require non-UCR-affiliated, off-campus housing. As described in Impact PH-1, the region is anticipated to absorb the incremental population increase over the 15-year life of the proposed 2021 LRDP, and no new housing or infrastructure would be needed as a direct result of the proposed 2021 LRDP. Therefore, no direct displacement of residents or housing would be anticipated as a result of the proposed 2021 LRDP, and no replacement housing would be necessary.

The proposed 2021 LRDP would not displace substantial numbers of people or housing, necessitating the construction of replacement housing elsewhere. Impacts would be **less than significant**.

Operation

Impacts related to the displacement of substantial numbers of existing people or housing, necessitating the construction of replacement housing, are limited to construction impacts. **No significant operational impacts** would occur.

Mitigation Measures

No mitigation measures are required.

Significance After Mitigation

Impacts would be less than significant without mitigation.

4.12.4 Cumulative Impacts

Cumulative Unplanned Population Growth

Cumulative development within the region would result in construction jobs, as outlined in the SCAG population projections. While the development accommodated under the proposed 2021 LRDP and cumulative development would result in limited short-term construction employment opportunities, the City had an unemployment rate of 3.6 percent in 2019 and the county had an unemployment rate of 4.2 percent (California Employment Development Department 2020). Additionally, regional construction jobs occur on a temporary basis, which allows construction workers to move onto new jobs in the region. Given these factors, it is anticipated that there is a sufficient construction work force within the City and surrounding county area to meet the proposed 2021 LRDP needs and cumulative development. While some construction workers may choose to temporarily stay in the City or nearby areas in the county, it is assumed that the majority of workers would remain in their current residences in the local area, and few would require the accommodations of hotels and motels in the City or near UCR campus. Therefore, construction of the proposed 2021 LRDP in combination with cumulative development would not result in substantial unplanned population growth. Cumulative construction impacts related to substantial unplanned population growth (Impact PH-1) under the proposed 2021 LRDP would **be less than significant (not cumulatively considerable)**.

DIRECT

The geographic context for cumulative impacts on population and housing is the Inland Empire region, as detailed in Table 4.12-2 and Table 4.12-3. SCAG's population projections account for the region's population growth and is based on the data collected from individual municipalities' general plans and community plans. The regional population is expected to increase by approximately 356,839 people between 2020 and 2035 and is expected to reach approximately 2,570,600 people in 2035. The regional housing stock is expected to increase during this same period by approximately 113,400 units, for a total of approximately 772,500 housing units in 2035. Because these population and housing projections are accounted for in regional future models and area plans (i.e., general plans, community plans), the increases described above do not constitute unplanned population growth. Therefore, the anticipated housing stock increase as a direct result of this population growth, is also considered to be planned. Thus, there would be a less-than-significant direct impact related to cumulative unplanned population growth.

The proposed 2021 LRDP would incrementally accommodate a net increase to the campus population of approximately 13,884 people by the 2035/2036 horizon year. It can logically be assumed that many students, faculty, and staff would be from the region; however, for purposes of this analysis, it is conservatively assumed the entire new campus population would be from outside the region, necessitating relocation upon enrollment or employment with UCR.

The proposed 2021 LRDP establishes a goal of housing 40 percent of eligible students in University-managed or controlled housing, equal to approximately 7,489 net new beds (approximately 68 percent of the increase in student population). The increase in University-managed or controlled housing is anticipated to accommodate 14,000 eligible students. Furthermore, the proposed 2021 LRDP would result in approximately 6,395 new students and faculty/staff who would require non-UCR-affiliated, off-campus housing between baseline (2018/2019) and buildout (2035/2036) years. As discussed in the analysis above, the off-campus housing needs projected in the proposed 2021 LRDP will be accommodated in the Inland Empire region. Therefore, the direct cumulative impacts related to unplanned population growth (Impact PH-1) would be **less than significant (not cumulatively considerable)**.

INDIRECT

The Riverside County Transportation Commission (RCTC) continues to work on traffic management plans that include projects to expand highways near the campus (I-215/SR 60 and SR 90). A recent long-range transportation study states that "while recent improvements to I-215 have been made, it is likely that there will be a need for continued investment in ground transportation systems to accommodate increasing volumes at March [Air Reserve Base]" (RCTC 2019). Furthermore, the study considers mobility innovations that will expand types of transportation and the way those systems are managed to accommodate future need. These projects are included in the SCAG 2016-2040 RTP/SCS Plan and its updates. These projects are included as part of regional transportation planning (SCAG 2016b) and is accounted for in this analysis.

The proposed 2021 LRDP includes policies to support public transit options for the campus population, including the development of a Metrolink train platform along Watkins Drive adjacent to campus. The Watkins Drive platform is not included in the Metrolink 10-Year Strategic Plan (SCRRA 2016). Currently, there are no actual plans to construct the train platform. If the Watkins Drive train platform was constructed, it would accommodate the projected needs of the campus population and would not encourage new unplanned population growth.

As described in Section 4.14, *Recreation* and Section 4.15, *Transportation,* the proposed 2021 LRDP includes extensions of key on-campus bicycle and pedestrian corridors where notable gaps exist and would direct access and connection improvements throughout the campus, plan for connection to on and off campus existing and proposed pedestrian and bicycle circulation paths, and improve pedestrian safety and experience along entrances and at gateways. The County and City of Riverside have each identified potential, near term projects to develop or expand bicycle and pedestrian trails, including the multi-use, multi-County Santa Ana River Trail, and the Gage Canal Trail north of campus. These projects would provide recreational and transportation opportunities for the current and projected campus, City, and regional population.

Other infrastructure, including sewer and water systems, are discussed in detail in Section 4.17, *Utilities and Service Systems*. Increased growth near the campus would likely include the need for associated infrastructure that has been accounted for in the City's General Plan. Campus projects would be accommodated by existing infrastructure on campus.

New housing and associated infrastructure projects could increase the population in the area, but not beyond what is accounted in local and regional planning documents. Projects implemented under the 2021 LRDP would not contribute significantly to cumulative indirect impacts to population growth. Therefore, the cumulative indirect secondary impacts related to unplanned population growth (Impact PH-1) would be **less than significant (not cumulatively considerable)**.

Cumulatively Displace Substantial Numbers of Existing People or Housing

Displacement occurs regionally, and in part, when the cost of housing outstrips the earning potential of residents. Displacement can also occur when projects remove housing to construct other kinds of development, such as commercial or office units and transportation infrastructure. Finally, "gentrification" can transform a neighborhood where housing was once affordable for a range of incomes to a place where only the higher income tiers can carry the cost of living there. The increased demand throughout the state coupled with a range of factors that inhibit increased development have resulted in an imbalance that jurisdictions across the state are working to resolve (SCAG 2016b).

The City has a median household income of $65,000, commensurate with the rest of the county, but is characterized by a widely diverse income range, such that housing prices and rental costs also span a range (City of Riverside 2018a). The City's Housing Element notes that while costs are more affordable in Riverside than other areas, there are still problems of overcrowding, overpayment, and housing in need of rehabilitation or replacement. As such, the RHNA numbers for Riverside for the period 2014 to 2021 are 8,283 units, which includes units for very low- and low- income households. SCAG has proposed updated RHNA numbers for Riverside County as a whole of 167,177 units. The RHNA factors in the housing needs generated by universities in the region, including UCR. The City of Riverside most recently received its RHNA allocation of 18,458 housing units for the 2021-2029 Housing Element Cycle. As part of this process the City has provided a buffer of approximately 5,500 dwelling units (approximately 30 percent over and above the RHNA allocation), and the City will identify space for up to 24,000 new homes for the 2021–2029 RHNA cycle. The City has initiated an update to the its Housing Element to accommodate and address the upcoming RHNA cycle.

Cumulative development in the region would be designed to facilitate development of diverse housing types and prices that are high quality, built in a sustainable manner, and meet the varied housing needs of residents. They would also increase opportunities for low- and moderate-income residents and workforce members to find suitable ownership and rental housing in Riverside.

Additionally, new State requirements related to Accessory Dwelling Units discussed above in Section 4.12.2, make their approval subject to a ministerial process which will also increase cumulative access to residential structures. Finally, development would seek to provide adequate housing and supportive services to assist in meeting the requirements of residents with special housing needs, including students (City of Riverside 2018a).

The 2021 LRDP facilitates redevelopment of existing student residential units, including in areas where existing student apartments are located. The proposed 2021 LRDP would increase the campus housing stock to accommodate approximately 40 percent of eligible students (a 115 percent increase from the percent of students accommodated in UCR-affiliated housing from baseline year 2018/2019), which would reduce the demand for off-campus residences. The City Housing Element encourages the production of housing for students, faculty, and employees of educational institutions. As such, increased campus housing development as indicated would not displace populations but would create more housing for the special-needs student category.

Cumulative development throughout the City would be encouraged in a way that balances affordability and livability, along with neighborhood character and identity (City of Riverside 2018a, policies H-1.6, H-1.8). Even though new development under specific plans near UCR could remove existing housing, they would necessarily replace and increase housing opportunities in those planning areas such that the overall housing stock would increase and provide housing opportunities for all income levels.

As described in Impact PH-1, the region is anticipated to absorb the incremental population increase over the 15-year life of the proposed 2021 LRDP and with redevelopment and infill as described in the 2021 LRDP, along with new housing throughout the City and region, substantial populations would not be displaced. Implementation of the 2021 LRDP would not contribute to cumulative displacement of population or loss of housing and cumulative impacts would not be cumulatively considerable. Cumulative impacts (Impact PH-2) would be **less than significant (not cumulatively considerable)**.

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4.13 Public Services

This section characterizes existing and proposed public services related to supporting UCR and evaluates changes to the physical environment that may result from the expansion of such services under the proposed 2021 LRDP. The analysis that follows evaluates the increase to campus population and new development under the proposed 2021 LRDP and the associated demand for potential impacts related to public services, including fire protection and public schools. Existing fire protection and public school services are described below in the Environmental Setting to provide a context for the impact analysis. Impacts associated with recreation services (i.e., parks and other facilities related to recreation) are evaluated in Section 4.14, *Recreation*.

4.13.1 Environmental Setting

Fire Protection

City of Riverside Fire Department

The City of Riverside Fire Department (RFD) provides fire protection, fire inspection services, community education, and emergency preparedness and training for the City, including UCR. The RFD is composed of 220 uniformed members, as well as six fire inspectors, two plan checkers, a public education specialist, and additional support staff at 14 separate fire stations strategically located throughout the City. RFD operates under six divisions: Administration Division, Office of Emergency Management, Operations Division, Prevention, Training, and Urban Search and Rescue (City of Riverside 2016a). The nearest fire stations to UCR are listed in Table 4.13-1.

RFD sponsors several programs under its operation including the Community Emergency Response Team (CERT). CERT members learn basic disaster response skills such as fire safety, light search and rescue, team organization, and disaster medical operations. Additionally, CERT members can help assist others in their neighborhoods and workplace when professional responders are not immediately available. In addition to providing emergency response services and firefighting services, RFD is responsible for enforcing fire codes, providing fire inspections, assisting in planning and development standards for High Fire Hazard Areas (and enforcing such standards), and community education and outreach. RFD maintains mutual and/or automatic aid agreements with the City of Corona Fire Department, City of Colton Fire Department, one military fire department, Riverside County Fire Department, and San Bernardino County Fire Department (City of Riverside 2016a).

RFD responded to 38,918 incidents in 2020, which is comparable to other operational years; for example, RFD responded to approximately 32,000 calls in 2015 (City of Riverside 2017). Medical assistance accounted for 23,718 (approximately 61 percent) of the incidents in 2020 (City of Riverside 2021). Station 4, which responds to calls at the UCR campus was the fourth busiest station (City of Riverside 2021). Approximately 90 percent of Station 4's calls are for medical emergencies (Ramirez 2018).

Table 4.13-1 Nearest RFD Fire Stations to UCR

RFD Station and Address	Staff	Equipment	Approximate Distance and Time to West Campus[1]	Approximate Distance and Time to East Campus[1]
Station 4 3510 Cranford Ave	1 captain 1 engineer 1 firefighter 1 firefighter/paramedic	1 engine 1 water tender	0.7 mile to UCR Extension 3 minutes	0.6 mile to Plaza Apartments 2 minutes
Station 14 725 Central Ave	1 captain 1 engineer 1 firefighter 1 firefighter/paramedic	1 engine 2 quads 1 utility truck	1.4 miles to Parking Lot 30 4 minutes	1.6 miles to Parking Lot 6 4 minutes
Station 1 3401 University Ave	1 battalion chief 2 captains 2 engineers 2 firefighters 3 firefighter/paramedic	1 quint truck 1 brush truck 1 utility truck 1 squad 1 engine 1 all-terrain vehicle (ATV)	3.1 miles to UCR Extension 6 minutes	3.3 miles to Parking Lot 1 7 minutes
Station 6 1077 Orange St	1 captain 1 engineer 1 firefighter 1 firefighter/paramedic	1 engine	3.2 miles to Parking Lot 50 8 minutes	3.4 miles to Parking Lot 1 7 minutes
Station 3 6395 Riverside Ave	2 captains 2 engineers 1 firefighter 2 firefighter/paramedic	1 engine 1 quint truck 1 utility truck 2 quads 1 heavy rescue vehicle 1 boxed trailer for animal rescue	5.5 miles to Parking Lot 50 10 minutes	5.7 miles to Parking Lot 1 10 minutes

[1] Approximate distance via local roadways and/or SR 91/SR 60/I-215 to the nearest campus facility. Time based on Google Maps input and a conservative estimation since emergency vehicles can reach a speed greater than the speed limit, use traffic signal preemption, and have roadway priority. The fastest time was used when there were multiple route options.

RFD = City of Riverside Fire Department; UCR = University of California, Riverside

Source: City of Riverside 2016b

RFD Service Goals and Response Times

RFD's goal is to improve total response time by breaking down the components of response goals as follows:

- Call processing at 1 minute 30 seconds for 90 percent of all incidents
- Turnout at 1 minute 30 seconds for 90 percent of all incidents
- Travel time at 5 minutes for 90 percent of all incidents
- Total response time at 7 minutes, 30 seconds for 90 percent of all incidents

In 2017, the most recent available information, 90 percent performance for all incident response times was 7 minutes and 45 seconds. RFD is also seeking a turnout time to under 2 minutes at all fire stations. Approximately 93 percent of the RFD vehicle fleet meet the National Standard (City of

Riverside 2017) turnout time. Turnout time measures the time elapsed from when the emergency dispatcher informs the fire unit of an emergency and when the unit leaves the fire station (Reglen and Scheller 2018). During October-December 2019, turnout time for all 14 RFD fire stations was 2 minutes and 10 seconds (City of Riverside 2020a).

Other department goals include maintaining current service and improving service in areas that are less served than others (City of Riverside 2017).

CITY OF RIVERSIDE MEASURE Z FUNDING

In 2018, the City voters approved a 5-year Measure Z spending plan that included 17 new fire vehicles, a revised fire vehicle replacement and maintenance plan, and additional fleet mechanics for RFD (City of Riverside 2020a). Using Measure Z funds, the City has installed improvements at fire stations and purchased radio equipment, 17 fire vehicles, and turnouts, extractors, hazmat monitors. The City's adopted 2020-21 budget accommodates funding for 234 full time equivalent staff for fire services. As of March 2020, 14 full time equivalent positions were vacant. Fire trucks are currently operating with a four-person crew (City of Riverside 2020b).

UCR Fire Prevention Program

The UCR Fire Prevention program is intended to ensure responsible and consistent protection for persons and property in, on, and exposed to UCR administered properties pursuant to State statues, regulations, and University policy. The program addresses emergency incident response, fire, panic, explosion, and disaster preparedness (UCR 2020).

UCR's Building & Safety Division, Fire Prevention, Office of Emergency Management, Facilities Services, Environmental Health & Safety, and/or other UCR departments and staff is responsible for inspection, fire protection engineering, and fire prevention/training. The campus has historically maintained a Memorandum of Understanding (MOU) with the State Fire Marshal to provide additional support, and the Campus Fire Marshal is a designated Deputy State Fire Marshal. All UCR employees are trained in fire safety, evacuation, and emergency procedures. UCR complies with State regulations to minimize impairments or interruptions to fire protection systems. On-campus student housing fire incidents have historically been low, with three total incidents in 2016, four incidents in 2017, and only one incident in 2018. On-campus fire incident statistics for the years 2016 through 2018 are shown in Table 4.13-2 below.

Table 4.13-2 On-Campus Housing Fire Statistics

Facility	2016	2017	2018
Aberdeen-Inverness	0	2	0
Bannockburn Village	0	1	0
Canyon Crest Family Housing[1]	0	0	n/a
Falkirk	0	1	0
Glen Mor	1	0	0
International Village	0	0	0
Lothian	0	0	0
Oban Family Housing	2	0	0
Pentland Hills	0	0	0
The Plaza	0	0	0
Stonehaven	0	0	1
Total Incidents	**3**	**4**	**1**

[1] Canyon Crest Family Housing was taken offline and no longer used as a housing facility as of October 2017.

Source: UCR 2019

County of Riverside Fire Department

Riverside County Fire Department (RCFD), in cooperation with CAL FIRE, provides fire and emergency services to residents of unincorporated areas of Riverside County and to 20 partner cities, including Moreno Valley, Eastvale, Norco, Corona, Temecula, Jurupa Valley, and other cities located near Riverside. All hazards emergency response services are provided from 95 fire stations using about 1,050 firefighters (CAL FIRE), 276 administrative and support personnel, and about 150 reserve volunteer firefighters (RCFD 2020a).

The closest RCFD station to the UCR campus, Station 38, is approximately 3.9 miles northwest of West Campus at 5721 Mission Boulevard. The County of Riverside also provides fire protection planning and engineering, in which county fire protection specialists review plans for all new residential developments, commercial, and industrial buildings proposed in unincorporated Riverside County and the contract cities (County of Riverside 2015).

The RCFD is also the Operational Area Coordinator for the California Fire and Rescue Mutual Aid System for all fire service jurisdictions in the county (including municipal, tribal, State and federal). Upon receipt of a call for mutual aid through Riverside County's Emergency Command Center, Riverside County's mutual aid coordinator will determine whether a city or the County of Riverside will provide a response. The Emergency Command Center is a combined Riverside County, State of California and local agency dispatch center responsible for alerting and handling incidents over a 7,200-square mile area. RCFD responded to 170,103 incidents in 2019. Most calls were for medical emergencies (RCFD 2019).

RCFD's Strategic Planning department works with the County's Economic Development Agency to plan future stations that are located in a manner to best achieve emergency response standards, serve the local community, and are designed in a manner that maximizes operational, energy, and cost efficiencies. The most recent stations were completed in 2012 in the cities of Mecca and Thermal (RCFD 2020b).

Facility planning considers the geographic area of concern, response mapping, number of responders and types of apparatus that would respond from that station for various types of calls and comparison with department standards of cover for that type of area and its hazards, and evaluation of the response time and resources that would be dispatched to fire and emergency medical service calls from other stations. RCFD travel time goals are 4 minutes (urban), 8 minutes (rural), and 15 minutes (outlying areas). A 2016 study found that almost the entire area of the county can be reached within 15 minutes and that most of western Riverside County could be reached within 8 minutes (RCFD 2016).

To fund construction and land acquisition for future fire stations, training facilities, and capital purchases for RCFD, the County set up a Construction & Land Acquisition Fund. The fund balance is from previous mitigation fees and solar impact capital funds. The restricted fund balance is expected to be $1.5 million, which is anticipated to be eliminated in 5 to 10 years based on completed construction or land acquisition (County of Riverside 2020).

Schools

City of Riverside School Districts

There are three school districts within the City's boundary: Alvord Unified School District, Riverside Unified School District (RUSD), and Moreno Valley Unified School District. Table 4.13-3 shows public school student enrollment in the City from 2014 to 2018. Student enrollment trended slightly downward during this time.

Table 4.13-3 City of Riverside Public School Student Enrollment 2014-2018

Grade Level	2014	2016	2018
Kindergarten-6th Grade	29,303	28,846	28,467
Grades 7-9	14,006	13,923	13,861
Grades 10-12	16,468	16,226	16,298
Total	**59,777**	**58,995**	**58,626**

Source: SCAG 2019

UCR is in the RUSD service area, which serves a large portion of Riverside, as well as the nearby unincorporated areas of Highgrove and Woodcrest (City of Riverside 2007). RUSD, the largest of the three districts, currently serves nearly 42,000 students in preschool through 12th grade throughout the City. RUSD schools include 29 elementary schools, seven middle schools, five comprehensive high schools, three alternative schools, and one science, technology, engineering, arts, and mathematics (STEAM) specialty school. There are a variety of preschool options at different schools, as well as transitional kindergarten classes at each elementary school (RUSD 2019).

Children residing in the neighborhoods near UCR and attending public schools would likely attend the Riverside STEAM Academy, Highland Elementary, Longfellow Elementary, University Heights Middle School, and John W. North High School, because these are the closest RUSD public schools to the campus. Table 4.13-4 shows the current enrollment and capacity at each school.

Table 4.13-4 Public School Enrollment and Capacity

School	2018/2019 Enrollment[1]	Total Capacity[2]	Remaining Capacity
Riverside STEM Academy	636	900	264
REACH Leadership STEAM Academy	573	645	72
Highland Elementary	704	850	101
Longfellow Elementary	741	750	9
University Heights Middle School	850	900	50
John W. North High School	2,228	2,500	272

Source: [1]Education Data (Ed Data) Partnership 2021a (Riverside STEM Academy enrollment data derived from 2016 RUSD Long Range Facilities Master Plan); [2]RUSD 2016

RUSD's median enrollment standards are:

- 750 students per elementary school
- 900 students per middle school
- 2,500 students per high school (RUSD 2016).

Other School Districts

Table 4.13-5 lists the school districts most likely to serve the campus population.

Table 4.13-5 School District Student Enrollment

School District	2018/2019 Student Enrollment	2019/2020 Student Enrollment
Alvord Unified School District	18,504	18,170
Chino Valley Unified	28,063	28,169
Colton Joint Unified	22,014	21,469
Corona-Norco Unified	53,002	52,557
Fontana Unified	36,355	36,160
Moreno Valley Unified	32,763	32,299
Murrieta Valley Unified	23,251	23,470
Redlands Unified	21,240	21,062
Rialto Unified	25,066	25,186
Riverside Unified	42,153	41,617
Palm Springs Unified	22,691	22,439
Perris Elementary	5,796	5,606
Perris Union High	10,893	10,853
Yucaipa-Calimesa Joint Unified	9,982	9,831

Source: Ed-Data 2021b. Census Day Enrollment was used.

4.13.2 Regulatory Setting

Federal

Fire Protection

HIGHER EDUCATION OPPORTUNITY ACT

The Campus Fire Safety Right-to-Know Act in the Higher Education Opportunity Act was signed by President Bush on August 1, 2008. Specifically, the legislation requires that a Fire Safety Report be distributed by the University containing statistics concerning the following in each on-campus student housing facility during the most recent calendar year for which data are available:

- The number of fires and the cause of each fire
- The number of injuries related to a fire that resulted in treatment at a medical facility
- The number of deaths related to a fire
- The value of property damage caused by a fire
- A description of each on-campus student housing facility's fire safety system, including the fire sprinkler system
- The number of regular mandatory supervised fire drills
- Policies or rules on portable electrical appliances, smoking, and open flames (such as candles), procedures for evacuation and policies regarding fire safety education and training programs provided to students, faculty, and staff
- Plans for future improvements in fire safety, if determined necessary by such institution

Public Schools

There are no federal regulations related to public schools that would be applicable to the proposed 2021 LRDP.

State

Fire Protection

2019 CALIFORNIA STRATEGIC FIRE PLAN

The 2019 California Strategic Fire Plan (Fire Plan) is a cooperative effort between the State Board of Forestry and Fire Protection and the California Department of Forestry and Fire Protection (CALFIRE 2019). The 2019 Fire Plan reflects a focus on fire prevention, suppression activities, and natural resource management to maintain the state's forests as a resilient carbon sink to meet California's climate change goals and to serve as important habitat for adaptation and mitigation. Major components center on accomplishing the following goals by 2023:

- Improve core capabilities
- Enhance internal operations
- Ensure health and safety
- Build an engaged, motivated, and innovative workforce

STATE HAZARD MITIGATION PLAN

The State Hazard Mitigation Plan (SHMP) intends to significantly reduce deaths, injuries, and other losses attributed to natural and human-caused hazards in California. The SHMP provides guidance for hazard mitigation activities emphasizing partnerships among local, State, and federal agencies as well as the private sector. The SHMP is federally required under the Disaster Mitigation Act of 2000 in order for the State to receive federal funding in case of disaster. The California Office of Emergency Services prepares the California SHMP, which identifies hazard risks, and includes a vulnerability analysis and a hazard mitigation strategy (California Office of Emergency Services 2018).

California Fire and Building Codes (2019)

The California Fire Code is Chapter 9 of California Code of Regulations (CCR) Title 24. It establishes the minimum requirements consistent with nationally recognized good practices to safeguard public health, safety, and general welfare from the hazards of fire, explosion, or dangerous conditions in new and existing buildings, structure, and premises, and to provide safety and assistance to firefighters and emergency responders during emergency operations. It is the primary means for authorizing and enforcing procedures and mechanisms to ensure the safe handling and storage of any substance that may pose a threat to public health and safety. The California Fire Code regulates the use, handling, and storage requirements for hazardous materials at fixed facilities. The California Fire Code and the California Building Code (CBC) use a hazard classification system to determine what protective measures are required to ensure fire safety and protect lives. These measures may include construction standards, separations from property lines and specialized equipment. To ensure that these safety measures are met, the California Fire Code employs a permit system based on hazard classification. The provisions of this code apply to the construction, alteration, movement, enlargement, replacement, repair, equipment, use and occupancy, location, maintenance, removal, and demolition of every building or structure or any appurtenances connected or attached to such building structures throughout California.

More specifically, the Fire Code is included in Title 24 of the California Code of Regulations. Title 24, part 9, Chapter 7 addresses fire-resistances-rated construction; CBC (Part 2), Chapter 7A addresses materials and construction methods for exterior wildfire exposure; Fire Code Chapter 8 addresses fire related interior finishes; Fire Code Chapter 9 addresses fire protection systems. Chapter 9 prescribes the minimum requirements for active fire protection equipment systems to perform the functions of detecting a fire, alerting the occupants or fire department of a fire emergency, mass notification, gas detection, controlling smoke, and controlling or extinguishing the fire. Section 701A.3.2 of the CBC requires that new buildings located in any Fire Hazard Severity Zone in State Responsibility Areas , any Local Agency Very-High Fire Hazard Severity Zone (VHFHSZ), or any Wildland-Urban Interface Fire Area designated by the enforcing agency for which an application for a building permit is submitted, shall comply with all sections of the Chapter.

Fire Code Chapter 10 addresses fire-related means of egress, including fire apparatus access road width requirements. Fire Code Section 4906 also contains existing regulations for vegetation and fuel management to maintain clearances around structures. These requirements establish minimum standards to protect buildings in Fire Hazard Severity Zones in State Responsibility Areas and wildland-urban interface fire areas. This code includes provisions for ignition-resistant construction standards for new buildings.

California Public Resources Code

The California Public Resources Code (PRC) includes fire safety regulations that restrict the use of equipment that may produce a spark, flame, or fire, require the use of spark arrestors on construction equipment that use an internal combustion engine, specify requirements for the safe use of gasoline-powered tools in fire hazard areas, and specify fire suppression equipment that must be provided on-site for various types of work in fire-prone areas.

These regulations include the following:

- Earthmoving and portable equipment with internal combustion engines would be equipped with a spark arrestor to reduce the potential for igniting a wildland fire (PRC § 4442)
- Appropriate fire suppression equipment would be maintained during the highest fire danger period—from April 1 to December 1 (PRC § 4428)
- On days when a burning permit is required, flammable materials would be removed to a distance of 10 feet from any equipment that could produce a spark, fire, or flame, and the construction contractor would maintain the appropriate fire suppression equipment (PRC § 4427)
- On days when a burning permit is required, portable tools powered by gasoline-fueled internal combustion engines would not be used within 25 feet of any flammable materials (PRC § 4431)

CALIFORNIA OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION

In accordance with CCR Title 8 Section 1270, "Fire Prevention," and Section 6773 "Fire Protection and Fire Equipment," the California Occupational Safety and Health Administration has established minimum standards for fire suppression and emergency medical services. The standards include guidelines on the handling of highly combustible materials, fire hose sizing requirements, restrictions on the use of compressed air, access roads, and the testing, maintenance and use of all firefighting and emergency medical equipment.

For additional information on Fire Safety related regulations, please see Section 4.18.2, *Wildfire Regulatory Setting*.

Public Schools

CALIFORNIA CODE OF REGULATIONS

The California Code of Regulations, Title 5 Education Code, governs all aspects of education in the State. California State Assembly Bill (AB) 2926 – School Facilities Act of 1986 – was enacted by the State of California in 1986 and added to the California Government Code (Section 65995). It authorizes school districts to collect development fees, based on demonstrated need, and generate revenue for school districts for capital acquisitions and improvements. It also established that the maximum fees which may be collected under this and any other school fee authorization are $1.50 per square foot for residential development and $0.25 per square foot for commercial and industrial development.

AB 2926 was expanded and revised in 1987 through the passage of AB 1600, which added Section 66000 *et seq.* of the Government code. Under this statute, payment of statutory fees by developers serves as total mitigation under CEQA to satisfy the impact of development on school facilities. However, subsequent legislative actions have alternatively expanded and contracted the limits placed on school fees by AB 2926.

SENATE BILL 50

The Leroy F. Greene School Facilities Act of 1998, or Senate Bill (SB) 50, restricts the ability of a local agency to deny project approvals on the basis that public school facilities (classrooms, auditoriums, etc.) are inadequate. Under the provisions of SB 50, school districts may collect fees, at the time building permits are issued, to offset the costs associated with increasing school capacity as a result of development. These fees are used by the local schools to accommodate the new students added by the project, thereby reducing potential impacts on schools. Payment of school fees is required by SB 50 for all new residential development projects and is considered full and complete mitigation of school impacts. According to Section 65995(h), the payment of statutory fees is "deemed to be full and complete mitigation of the impacts of any legislative or adjudicative act, or both, involving, but not limited to, the planning, use, or development of real property, or any change in governmental organization or reorganization...on the provision of adequate school facilities." The Riverside School Districts, and other school districts in Riverside County, collect fees from new residential and commercial/industrial development based on square footage.

ELEMENTARY AND HIGH SCHOOL SITING REGULATIONS

The siting of elementary and high schools (including charter schools) is subject to Title 5 of the CCR, including the following sections. Section 14010(q) and (p) require districts to consider environmental factors including light, wind, noise, aesthetics, and air pollution, as well as fire protection, police protection, public transit, and trash disposal in their site selection process. Section 14030 requires safety and vehicle circulation considerations, sound-conditioning, and sound considerations. Section 11969.3, which requires noise suitability to be considered. Additionally, Section 11969.3(c)(1) lists factors to determine whether the condition of facilities is reasonably equivalent to the condition of comparison group schools. Finally, Section 14030(m) addresses acoustical considerations and requires hearing conditions to promote good sound control in the school buildings. Title 24 Section 1.9.2 includes additional safety requirements for proposed school buildings.

University of California

MOU with University of California Office of the President

As a public university, UCR falls under the authority of the California Office of the State Fire Marshal (OSFM). The UC system maintains a Memorandum of Understanding (MOU) with the OSFM to allow UC personnel to serve as local campus fire marshals, deputy fire marshals, and fire inspectors. Both the Campus Fire Marshal and Deputy Fire Marshal are trained and certified through OSFM's Designated Campus Fire Marshal (DCFM) program. The Campus Fire Marshal oversees the Title 24 construction project code compliance work including fire protection consultation on campus projects, engineering design criteria for fire and life safety, code interpretations, and recommendations to Planning, Design & Construction staff on campus building construction and renovation activities. The Campus Fire Marshal reviews and approves all construction plans and inspects buildings during construction/
renovation, including acceptance tests for fire alarms, sprinkler systems, and other fire safety systems.

The Deputy Fire Marshal oversees the Title 19 inspection program, performing comprehensive fire code compliance inspections of all campus buildings on an annual basis and monitoring necessary follow-up activities. The Deputy Fire Marshal also assists with the Title 24 program.

Both the Campus Fire Marshal and Deputy Fire Marshal also assist UCR Housing Services with conducting annual fire drills for campus residential facilities to provide general guidance on the California Fire Code to the campus community.

In the event of a fire requiring a formal cause and origin or criminal investigation, the Campus Fire Marshal coordinates with sworn law enforcement investigators from the Office of the State Fire Marshal, CAL FIRE, and the UC Police Department.

University of California, Riverside

MOU with RFD

UCR and RFD are currently in the process of drafting an MOU for fire protection services. The MOU outlines the roles and responsibilities between UCR and RFD for tasks such as emergency response, fire investigation, management of unsafe structures, plan review, construction inspection, fire and life safety testing and inspection of systems, special events, and fire watch.

UCR Emergency Operations Plan

The UCR Emergency Operations Plan (EOP) is currently being updated. The EOP establishes emergency management tasks, specifies policies and procedures while defining preparedness efforts that align with first responding agencies protocols and addresses all-hazard preparedness, prevention, mitigation, and recovery components of emergency management on campus. The EOP includes national and statewide systems such as the Standardized Emergency Management System (SEMS) and the federal National Incident Management System (NIMS) that align with California Government Code Section 8607(a), and the Department of Homeland Security emergency response standards. The EOP also incorporates the *Policy on SafeGuard Security* and *Emergency Management* directives, as described in the UC Facilities Manual (Volume 6: Chapter 4.6 Emergency Preparedness).

Regional and Local (Non-Binding)

As noted in Section 4, "University of California Autonomy," UCR, a constitutionally-created State entity, is not subject to municipal regulations of surrounding local governments for uses on property owned or controlled by UCR that are in furtherance of the university's educational purposes. However, UCR may consider, for coordination purposes, aspects of local plans and policies of the communities surrounding the campus when it is appropriate and feasible but not bound by those plans and policies in its planning efforts.

Fire Protection

RIVERSIDE MUNICIPAL CODE

Chapter 16.32.020 of the City's Municipal Code adopts the Uniform Fire Code. This code involves the regulation of actions involving hazards regarding fire and explosions and recognizes safe practices to reduce hazards that can possibly occur from fire and explosions.

CITY OF RIVERSIDE GENERAL PLAN

The City's General Plan provides multiple policies that reduce response times for emergency services and mitigate fire hazards related to urban development. These policies also direct the City

to provide outreach and education to the community to increase awareness of fire and crime prevention measures.

Public Schools

RIVERSIDE MUNICIPAL CODE

Chapter 16.65.040 of the City's Municipal Code requires payment of school development fees prior to the issuance of a building permit for a proposed residential development or a mobile home set up.

CITY OF RIVERSIDE GENERAL PLAN

Multiple policies from the City's General Plan involve accommodating growth needs, improving the planning process for schools by ensuring well-planned infill development.

RUSD MASTER FACILITIES PLAN

In 2016, the RUSD prepared the Long Range Facilities Master Plan (LRFMP), which is a roadmap to help guide school facility decisions for the next 15-20 years. A copy of the LRFMP is available online at: http://www.riversideunified.org/UserFiles/Servers/Server_580721/File/Facilities/RUSD%20-%20Long%20Range%20Facilities%20Master%20Plan%202016_%20Reduced%20File.pdf.

4.13.3 Environmental Impacts and Mitigation Measures

Significance Criteria

UCR utilizes the following 2020 CEQA Guidelines Appendix G significance criteria questions related to Public Services.

Would the proposed 2021 LRDP:

a) Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the public services:
   1. Fire protection
   2. Police protection
   3. Schools
   4. Parks
   5. Other public facilities (e.g., libraries)

Issues Not Evaluated Further

Police Protection (Criterion a2)

The Initial Study for the 2021 LRDP (Appendix A) concluded that the need for police services on campus would incrementally increase in student, staff, and faculty population anticipated under the proposed 2021 LRDP. The increased on-campus population would require additional routine services to provide additional patrols of the campus and maintain police presence; additional

administrative staff may be necessary to support the increases in patrol personnel, and the UCPD may need to purchase additional equipment and/or hire more personnel, which may result in the need for further facility space. However, it is anticipated that the proposed 2021 LRDP would accommodate these facility needs as part of the approximately 896,229 asf (1,344,344 gsf) new administrative and support facility space proposed in the buildout of the proposed 2021 LRDP, and there would be no additional environmental impacts beyond those already being analyzed as part of the proposed 2021 LRDP.

Furthermore, the Initial Study determined planning for new or physically altered Riverside Police Department (RPD) stations is based on an assessment of Riverside's need for new facilities based on cumulative City growth. The incremental contribution to demand for increased RPD protection services would be offset by payment of proportionate property taxes and sales taxes to the City by the residents. Likewise, property taxes and sales taxes from new residents in neighboring jurisdictions would support the appropriate police protection agency. Therefore, no further evaluation is required. Additional details are included in Appendix A.

Parks (Criterion a4)

Impacts to parks and recreational facilities are discussed in Section 4.14, *Recreation*.

Other Public Facilities (Criterion a5)

The Initial Study for the 2021 LRDP (Appendix A) concluded that the increased population from implementation of the proposed 2021 LRDP would not require new or altered library or other public facilities beyond those facilities already proposed as part of the LRDP in order to meet the relatively small increase in service demand. Planning for new or physically altered public facilities is based on an assessment of the cumulative need for new facilities. Furthermore, potential environmental impacts related to the construction of new or expanded public facilities would be assessed on a project-specific level by the applicable lead agency. Therefore, this impact would be less than significant and is not evaluated further.

Analysis Methodology

Evaluation of fire protection and public school impacts was based on identifying current levels of service and service standards and then assessing whether future demand from population growth, and new buildings under the proposed 2021 LRDP would result in the need for new or physically altered fire protection or public school facilities. The following subsection describes the current conditions for public schools as they relate to UCR.

Public School Facilities

Kindergarten through 12th grade students associated with UCR would typically attend the schools designated for their neighborhood by the school district.

To estimate the number of UCR students living with children in 2018, information was used from a survey conducted by the UC in 2016. According to this survey, approximately 1.7 percent of UCR undergraduate students and approximately 14 percent of graduate students responded they were parents living with children (UC 2019). In 2018, UCR had an undergraduate population of 20,581 and a graduate student population of 3,341. Using the data from the UC survey as a guide, an estimated 350 undergraduate students (20,581 x 1.7 percent) were parents living with children and 468

graduate students (3,341 x 14 percent), or 818 total students, were parents living with children. It is assumed in this analysis that each student occupied an individual housing unit.

To estimate the number of UCR faculty and staff living with children in 2018, information was used from the U.S. Census. There were 4,739 UCR faculty and staff in 2018. It is assumed in this analysis that each faculty and staff member occupied an individual housing unit. Approximately 37 percent of housing units in Riverside County have children under the age of 18 (U.S. Census 2019). Using this information, it is estimated that 1,753 of these housing units contained children (4,739 x 37 percent).

Therefore, it is estimated that 818 student housing units and 1,753 faculty and staff housing units, or 2,571 UCR-affiliated housing units, included children under the age of 18 in 2018. However, this figure includes all children under the age of 18, not only school-age children. To estimate the number of housing units with school-age children, information from the U.S. Census was applied. Eighty-three percent of housing units with children in Riverside County had at least one child between the ages of 6 and 17 (U.S. Census 2019). Using that information as a guide, approximately 2,134 UCR-affiliated housing units contained school-age children (2,571 x 83 percent).

The next step is to estimate the total number of school-age children that resided in UCR-affiliated housing units. The average family size in Riverside County is 3.85 persons (U.S. Census 2019). Assuming an average of 1.85 children per housing unit based on this information, these 2,134 UCR-affiliated housing units included an estimated 3,948 school-age children (2,134 x 1.85). Table 4.13-6 provides an overview of the estimated number of school-age children from UCR-affiliated housing units in 2018/2019.

Table 4.13-6 Estimate of School-Age Children of Campus Population (2018/2019)

2018/2019 UCR Population	Total Population[1]	Living with Children[2] (%)	Housing Units with Children	Housing Units with School-Age Children[3] (%)	Housing Units with School-Age Children	Average Children per Housing Unit[4]	Number of School-Age Children
Undergraduate Students	20,581	1.7	350	83	291	*1.85*	538
Graduate Students	3,341	14	468	83	388	*1.85*	718
Faculty/Staff	4,739	37	1,753	83	1,455	*1.85*	2,692
Total	**28,661**		**2,571**		**2,134**		**3,948**

[1]UCR 2021 LRDP

[2]UC 2019; U.S. Census 2019

[3]U.S. Census 2019

[4]U.S. Census 2019

UCR = University of California, Riverside

The total number of school-age children that resided in UCR-affiliated housing units presented in Table 4.13-6 is a conservative estimate. Currently, Oban Family Housing is the only family student housing on the UCR campus. In 2018, there were 125 children under the age of 18. Assuming all 125 children are school-aged children, the total number of school-aged children residing on campus is well below the estimate presented in Table 4.13-6 and used in this analysis.

2021 LRDP Objectives and Policies

There are no objectives or policies in the proposed 2021 LRDP related to public services.

Impact Analysis

Impact PS-1 Impacts Associated with Fire Protection Facilities.

The proposed 2021 LRDP would not increase demand to a level that would require new fire protection facilities or substantial alterations to existing facilities. Impacts would be less than significant. No mitigation measures are required.

Construction

Construction activity would not affect fire protection responses times such that new fire protection facilities would be needed. UCR regularly has ongoing construction activity on campus under baseline conditions, which would continue to comply with fire safety regulations discussed in Section 4.13.2. More specifically, UCR would comply with fire safety regulations which restrict the use of equipment that may produce a spark, flame, or fire, require the use of spark arrestors on construction equipment that use an internal combustion engine, specify requirements for the safe use of gasoline-powered tools in fire hazard areas, and specify fire suppression equipment that must be provided on-site for various types of work in fire-prone areas (see also Section 4.18.2, *WildFire Regulatory Setting*, and Title 24, Cal Code Regs. Part 9, Chapter 33). As such, impacts related to fire protection services during construction activities are considered to be **less than significant**.

Operation – Direct Impacts

As discussed in Section 4.12, *Population and Housing*, the proposed 2021 LRDP would incrementally accommodate a net increase to the campus population of approximately 13,884 people by the 2035/2036 academic year. The proposed 2021 LRDP establishes a goal of housing 40 percent of enrolled students (14,000 beds) to live in University-managed or controlled housing, equal to approximately 7,489 net new beds (approximately 68 percent of the increase in student population). Approximately 6,395 new students and faculty/staff would be anticipated to reside in non-university housing between baseline (2018/2019) and buildout (2035/2036) years (13,884 net increase to the campus population minus 7,489 new on-campus beds).

The increase in campus population accommodated by the proposed 2021 LRDP would increase demand for RFD services, as its service area includes the UCR campus and the City. Traffic, development, and workload (number of calls) can also affect fire protection response time to incidents. The proposed 2021 LRDP would not expand the geographic range of the UCR campus and would not expand the RFD service boundary. However, the proposed 2021 LRDP would incrementally increase the service population of RFD by 2035/2036.

As development occurs under the proposed 2021 LRDP, there is a potential for increases in the number of vehicles on-campus and in the surrounding community. The additional vehicles could increase delays for emergency response vehicles during peak commute hours. However, emergency responders maintain response plans which include use of alternate routes, sirens, and other methods to bypass congestion and minimize response times. Furthermore, California law requires drivers to yield to the right-of-way to emergency vehicles and remain stopped until the emergency vehicle passes. Therefore, fire service response times are not expected to be notably affected by

campus development under the proposed 2021 LRDP and are not directly proportional to increases in regional VMT.

As discussed in Section 4.12, *Population and Housing*, the City's population is anticipated to increase by 16,286 residents between 2020 and 2035. It can be anticipated that RFD would potentially need to increase fire protection staff, and potentially additional equipment, to accommodate an increased call volume. As continuing best practice, UCR would continue its partnership with RFD to ensure adequate fire and emergency service levels to UCR facilities. This partnership includes consultation on the adequacy of emergency access routes to all new UCR buildings. UCR would also continue to work closely with external fire management partners related to regional wildfire prevention, including the CAL FIRE, and other local fire jurisdictions. As mentioned previously, UCR and RFD is currently working on preparing an updated MOU.

Implementation of the proposed 2021 LRDP would also develop approximately 5.5 million gsf of new facility space on campus. However, the proposed 2021 LRDP would not fundamentally change the nature of campus operations, and several older structures would be retrofitted or replaced with modern structures requiring compliance with current and more stringent fire code requirements, providing fire safety benefits in comparison to the baseline structures. Proposed developments would primarily be infill development in locations generally already served by existing fire access lanes and emergency infrastructure such as hydrants, water lines, and call boxes. Additionally, campus development under the proposed 2021 LRDP would be designed to comply with building and fire codes and include appropriate fire safety measures and equipment, including but not limited to, use of fire retardant building materials, inclusion of emergency water infrastructure (fire hydrants and sprinkler systems), installation of smoke detectors and fire extinguishers, emergency response notification systems, and provision of adequate emergency access ways for emergency vehicles. The UCR Fire Marshal would review and approve all development plans and conduct an inspection to ensure adequate fire access, as well as fire prevention, for each new project in accordance with current California building and fire codes. The campus would also continue to implement the UCR Emergency Management Plan, which addresses the campus community's planned response to emergency access on the campus. The UCR Fire Marshal and staff would continue to implement campus-wide fire prevention programs. These actions, mandated by State law, would limit the number of incidents requiring the RFD to respond to on-campus calls, further minimizing additional demand for fire protection services.

The increase in campus population accommodated by the proposed 2021 LRDP may increase the RCFD's call volume, although to a lesser degree than RFD. As described in Section 4.14, *Population and Housing*, the proposed 2021 LRDP off-campus population would be distributed throughout the Inland Southern California region and, subsequently, across fire protection districts. The RCFD provides fire protection services to several cities in Riverside County, including cities neighboring Riverside, such as Moreno Valley, Eastvale, and Jurupa Valley.

Fire protection facility maintenance and acquisition needs in the region are regularly evaluated by jurisdictions with respect to population growth, locational needs, and budget. The City's ongoing budget process assesses the needs for RFD service and infrastructure to meet goals and standards. Likewise, the County's budget and RCFD's strategic planning process for new stations evaluates multiple factors for new stations, including area needs and land acquisition costs. Through the collection of development impact fees and tax revenue, increases in the demand for public services, including fire facilities, would be addressed as part of general plan implementation for the respective jurisdictions.

The proposed 2021 LRDP's incremental contribution to demand for new fire protection services would be offset by payment of proportionate property taxes, sales taxes, and/or Development Impact Fees to the jurisdictions that would result from increased population growth. New on-campus structures envisioned in the proposed 2021 LRDP would be in the existing service area of RFD and would not require expansion of the service area or for the RFD to respond to calls in a new or more distance area. The population growth accommodated under the proposed 2021 LRDP would be negligible compared to the existing service population of the RFD and would not require the construction of new or expanded fire protection facilities. Population growth accommodated under the proposed 2021 LRDP may contribute to a cumulative need for additional fire protection, but would not, by itself, necessitate the need for substantial new fire protection facilities (see Section 4.13.4 below).

The proposed 2021 LRDP would not result in in substantial adverse physical impacts associated with the provision of new or physically altered fire protection facilities, or the need for new or physically altered fire protection facilities in order to maintain acceptable service ratios, response times or other performance objectives, and impacts would be **less than significant.**

Mitigation Measures

No mitigation is required.

Significance After Mitigation

Impacts would be less than significant without mitigation.

Impact PS-2 Impacts on School Facilities.

Implementation of the proposed 2021 LRDP would incrementally increase the enrollment of students in regional public schools by an estimated 2,575 students, which would be accommodated by the existing and planned capacity of local school districts. Therefore, the proposed 2021 LRDP would not result in the need for the provision of new or physically altered schools. Impacts would be less than significant. No mitigation measures are required.

Construction

The proposed 2021 LRDP envisions new and renovated structures and facilities on the UCR campus which would require construction. While the development accommodated under the proposed 2021 LRDP would result in limited short-term construction employment opportunities, the City had an unemployment rate of 3.6 percent in 2019 and the county had an unemployment rate of 4.2 percent (California Employment Development Department 2020). Additionally, regional construction jobs occur on a temporary basis which allows construction workers to move onto new jobs in the region. Given these factors, it is anticipated that there is a sufficient construction workforce in the City and surrounding county area to meet the proposed 2021 LRDP needs. While some construction workers may choose to temporarily stay in the City or nearby areas in the county, it is assumed that the majority of workers would remain in their current residences in the local area, and few would require the accommodations of hotels and motels in the City or near the UCR campus. Therefore, construction of the proposed 2021 LRDP would not result in the need for additional housing and services. Therefore, the construction workforce would not substantially increase student enrollment at schools in the project area, such as those listed in Table 4.13-4.

Construction impacts related to increased student populations under the proposed 2021 LRDP would be **less than significant**.

Operation – Direct Impacts

This analysis estimates the number of school-age children that would be accommodated under the proposed 2021 LRDP by using the methodology described in Section 4.13.3. This analysis assumes that the percent of UCR students living with children would be similar to results from the 2016 UC survey (1.7 percent of undergraduate students and 14 percent of graduate students). The analysis also assumes that the percent of housing units in Riverside County with children and average household size for housing units with children would remain steady in future years; however, it should be noted that average household sizes are anticipated to decline slightly in southern California between 2016 and 2040 (SCAG 2016). This trend has continued in California through the 2020 pandemic year, with a decline in 14,000 newborns in comparison to 2019 (Los Angeles Times 2020). Therefore, this analysis is conservative.

The proposed 2021 LRDP would accommodate an additional 7,419 undergraduate students and 3,659 graduate students by 2035/2036. Using the data from the 2016 UC survey as a guide, an estimated 126 undergraduate students (7,419 x 1.7 percent) and 512 graduate students (3,659 x 14 percent), or a total of 638 students, would be parents living with children. It is assumed in this analysis that each student would occupy an individual housing unit.

The proposed 2021 LRDP would accommodate an additional 2,806 faculty and staff by 2035/2036. It is assumed in this analysis that each faculty and staff member would occupy an individual housing unit. Assuming the percent of housing units with children in Riverside County remains the same in 2035/2036, it is estimated that 37 percent of these housing units, or 1,038 housing units, would contain children (2,806 x 37 percent).

Therefore, it is estimated that 638 student housing units and 1,038 faculty and staff housing units, or a total of 1,676 UCR-affiliated housing units, would live with children in 2035/2036. However, this figure includes all children under the age of 18, not only school-age children. Assuming that the percent of housing units with children in Riverside County with at least one school-age child remains the same in 2035/2036, it is estimated that 83 percent of these housing units, or approximately 1,392 housing units, would contain school-age children (1,676 x 83 percent).

The next step is to estimate the total number of school-age children that resided in UCR-affiliated housing units. Assuming the average family size in Riverside County remains 3.85 persons with an average of 1.85 children per housing unit, these 1,392 UCR-affiliated housing units would include an estimated 2,575 school-age children (1,392 x 1.85). Table 4.13-7 provides an overview of the estimated increase in school-age children from UCR-affiliated housing units that would be accommodated by the proposed 2021 LRDP.

Table 4.13-7 Estimate of School-Age Children of Campus Population (2035/2036)

Campus Population	New UCR Population Accommodated by the Proposed 2021 LRDP[1]	Living with Children[2] (%)	Housing Units with Children	Housing units with School-Age Children[3] (%)	Housing units with School-Age Children	Average Children per Housing Unit[4]	Number of School-Age Children
Undergraduate Students	7,419	1.7	126	83	105	1.85	194
Graduate Students	3,659	14	512	83	425	1.85	786
Faculty/Staff	2,806	37	1,038	83	862	1.85	1,595
Total	**13,884**		**1,676**		**1,392**		**2,575**

[1]UCR 2021 LRDP

[2]UC 2016; U.S. Census 2019

[3]U.S. Census 2019

[4]U.S. Census 2019

UCR = University of California, Riverside

The approximately 2,575 new school-age children anticipated under the proposed 2021 LRDP would attend schools in the Inland Southern California. These school-age students would be added incrementally between 2018/2019 and 2035/2036. It is likely that some of these students would already attend the school prior to their parent/guardian attending UCR as a student or employed as a member of faculty or staff and that some of them would attend a non-public school.

As discussed in Section 4.12, *Population and Housing*, the proposed 2021 LRDP would provide housing for a portion of the student population living with children in on-campus family housing. It is anticipated that the 6,395 new students and faculty/staff residing in non-UCR housing would live in areas across the region and be distributed across school districts. It can be expected, based on existing trends that a portion of the population residing in non-UCR-affiliated housing would reside in the City. School-age students living on campus or in the City would likely be served by RUSD.

The RUSD Facilities Planning and Development Department evaluates the need for new and existing schools in the district. This complex task is based on an ongoing analysis of demographics, including projecting growth in the population of school age children from kindergarten through high school. Upon implementation of its Facilities Master Plan, which guides development for the next 15-20 years, RUSD will be able to accommodate approximately 45,500 students district-wide, an increase of approximately 3,500 students (RUSD 2016). As stated above, the proposed 2021 LRDP is anticipated to add approximately 2,575 new school-age students. If all these students attended RUSD schools, the district would have capacity for these students. However, the likelihood that all 2,575 new school-age students would attend RUSD schools is extremely low, based on a survey of the existing distribution of the campus population as described in Section 4.12, *Population and Housing*. Furthermore, as noted above, many of these students may already be residing in the school district and not constitute new students.

The RUSD Facilities Master Plan prioritizes replacing temporary portable facilities with permanent facilities, renovating gymnasiums, undertaking energy efficient upgrades, constructing maker labs and STEAM facilities, and constructing multi-purpose rooms to meet the needs of a growing student population. Potential environmental impacts related to the construction of new or expanded school facilities would be assessed on a project-specific level (RUSD 2016). In 2016, residents in the RUSD

service area voted on a $392 million bond measure to upgrade and improve aging RUSD campuses and classrooms, including building new facilities and new schools (RUSD 2020a).

Approximately 641[1] school-age children would be accommodated in on-campus family housing. School-age students in housing units on campus or in the neighborhoods near UCR would likely attend Highland Elementary, Emerson Elementary, Riverside STEAM Academy, University Heights Middle School, John W. North High School, and Longfellow Elementary, because these are the closest RUSD public schools to the campus. Table 4.13-8 shows the current enrollment and capacity at each school upon implementation of the long-term facility plans described above.

Table 4.13-8 Public School Enrollment and Capacity

School	Approximate Distance to UCR LRDP Boundary (miles)	Grades Served	2019-20 Enrollment[1]	Total Capacity[2]	Remaining Capacity
Highland Elementary	0.14	Kindergarten-6th	658	850	192
Emerson Elementary	0.20	Kindergarten-6th	670	900	230
Riverside STEAM Academy	0.25	Kindergarten-6th	604	900	296
University Heights Middle School	0.25	7th-8th	870	900	30
John W. North High School	0.39	9th-12th	2,254	2,500	246
Longfellow Elementary	0.76	Kindergarten-6th	724	750	26

UCR = University of California, Riverside; LRDP = Long Range Development Plan

Source: [1]Education Data Partnership 2021, census day enrollment used; [2]RUSD 2016

As shown in Table 4.13-8, some schools such as Longfellow Elementary and University Heights Middle School have limited capacity for additional enrollment after implementation of long-term facility plans. However, RUSD does not guarantee space at a specific school in the district. The district uses an assignment process that matches a student with the closet available school, considering space limitations or class size constraints and other factors such as sibling continuity (RUSD 2020b). Additionally, RUSD may revise the attendance boundaries for schools at capacity, which would change enrollment without the need to add facilities. If that is not feasible, schools might add temporary portable classrooms (A. Gonzalez 2020). The addition of portable classrooms typically does not result in significant environmental impacts. Therefore, implementation of the proposed 2021 LRDP would not result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities.

Additionally, applicants for new development would be required to pay State-mandated school impact fees (as applied under the 1987 Mitigation Fee Act and codified in Section 66000 of the California State Legislature). RUSD and all other school districts are authorized to collect a fee per square foot for new residential development pursuant to Government Code Section 65995(b)(2) for new private industrial, commercial, or residential construction that exceeds 500 square feet (RUSD

[1] Based on the housing demand model spreadsheet (September 22, 2019), there would be approximately 356 family housing units with buildout of the 2021 LRDP. Assuming an average of 1.85 children per housing unit, there would be approximately 641 children (assuming all are school-age children).

2020b). UCR provides family housing options for a portion of its student population. Developer fees are not collected for on-campus housing development, as this regulation does not apply to public institutions, including UCR facilities. However, non-campus-affiliated housing constructed to support an increase in population would be required to pay school impact fees.

Furthermore, any project associated with expanding school facilities, whether related to the construction of new facilities or modernization of existing facilities, would be subject to project-specific environmental review and mitigation pursuant to CEQA. It is the responsibility of the school districts to comply with CEQA requirements. Compliance with federal, State, and local regulations would be required prior to the construction of the new facilities.

Therefore, the proposed 2021 LRDP would not result in significant environmental impacts associated with the need for the provision of new or physically altered schools, and impacts would be **less than significant**.

Mitigation Measures

No mitigation measures are required.

Significance After Mitigation

Impacts associated with the provision or need for new or physically altered school facilities would be less than significant without mitigation.

4.13.4 Cumulative Impacts

Fire Protection Facilities

The RFD has an existing need for new equipment and potential facilities. For example, Measure Z, which was passed in November 2016, identified the need to replace RFD vehicles. The proposed 2021 LRDP may contribute to a cumulative need for a new fire station, due to existing need for new facilities and equipment because of previous years of deferment. However, as this is a need that currently exists, the addition of the proposed 2021 LRDP would not independently create this need. Additionally, revenue from Measure Z since 2016 has helped fund the RFD and replace some of the needed vehicles. There are no specific plans at this point for new RFD facilities, such as a new fire station or expansion of an existing station. If new RFD facilities are needed in the future, such facilities will undergo their own environmental review pursuant to CEQA when details about the project are known. While there are no specific plans at this juncture for a new RFD facility, in the event a new fire station is required, it would be in the city limits of Riverside. Development of fire stations typically only disturb between 0.5 and 1 acre of land. A new RFD station would likely be on an infill lot (between 0.5 and 1 acre), since most of the City is highly developed and urbanized. The development at such a scale (a two-story high fire station on less than 1 acre of land) is unlikely to result in a significant and unavoidable environmental impact.

Given the nature of such a project (fire station) and its size, the environment documents pursuant to CEQA for a fire station construction or expansion would typically require a categorical exemption or negative declaration. Additionally, the City's planning process has already accounted for potential growth that may require an expansion of fire services throughout the City in its General Plan. Fire protection services are maintained and expanded through property taxes and collection of fees that grow incrementally as development occurs within a service area. Providing for new equipment, facilities and staffing is assessed as part of the City's annual fiscal budget process. The growth

projections of the City's General Plan and County General Plan used as the basis of the cumulative impacts analysis in this Draft EIR take into consideration future growth anticipated in the region. Therefore, based on such acknowledgment of, and planning for, future growth in the City and Riverside County, and the regional fire protection needs, significant cumulative impacts related to adverse physical impacts from new or physically altered fire protection facilities (Impact PS-1), would not occur. Cumulative impacts would be **less than significant and not result in a cumulatively considerable contribution to cumulative impacts**.

School Facilities

The geographic context for cumulative effects associated with demand for school facilities is the Inland Southern California region. Growth in the region may contribute more school-aged children that could enroll in the public-school system. A portion of the school-age students associated with the increase in student enrollment and faculty/staff would occur in the RUSD service area. Upgraded school facilities already planned by RUSD would adequately serve cumulative student growth. For example, the RUSD 2016 Facilities Master Plan would facilitate an increase in student enrollment of approximately 3,500 students (RUSD 2016).

Development projects associated with increased population growth would also be required to pay impact fees consistent with local jurisdiction requirements to ensure the adequate provision of future facilities associated with public services, including schools. As part of the renovation and revitalization process, school projects would undergo project-specific environmental review under CEQA and be required to comply with federal, State and local regulations related to their physical impacts on the environment. For some projects, adherence to regulations may not adequately avoid or reduce incremental impacts and require additional project-specific mitigation measures. Overall, however, the proposed 2021 LRDP's incremental increase in demand for school facilities (Impact PS-2) would be **less than significant and not result in a cumulatively considerable contribution to cumulative impacts.**

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4.14 Recreation

This section describes the recreational resources on and in the area surrounding the UCR campus. It analyzes potential impacts related to development under the proposed 2021 LRDP. The analysis considers contribution to the physical deterioration of public parks or other recreational facilities and physical impacts associated with construction or expansion of recreational facilities arising from the proposed 2021 LRDP.

4.14.1 Environmental Setting

Existing Regional Parks and Recreational Facilities

Federal

There are four National Park and Recreation areas in the region, including Joshua Tree National Park, the Santa Rosa and San Jacinto Mountains National Monument, the San Bernardino National Forest, and the Cleveland National Forest. The closest federal park lands to the UCR campus are in the San Bernardino National Forest in San Bernardino County, approximately 20 miles northeast of campus.

State

The California Department of Parks and Recreation manages and operates four State parks and two State Recreation Areas in Riverside County:

- California Citrus State Historic Park (248 acres)
- Lake Perris State Recreation Area (8,800 acres)
- Mount San Jacinto State Park (14,000 acres)
- San Timoteo Canyon Park Property (2,100 acres) (Rivers and Lands Conservancy 2019)
- Indio Hills Palms Park Property (2,206 acres)
- Salton Sea State Recreation Area (California Department of Parks and Recreation 2020).

The nearest State park is California Citrus State Historic Park, approximately 5.5 miles southwest of the campus. This park has a museum and a visitor center/museum, which provides ticketed tours of the adjacent citrus grove, subject to reservations. The Citrus State Park can also host weddings and special events, subject to a reservation.

Riverside County

COUNTY PARKLAND

The Riverside County Regional Park and Open Space District (RPOSD) currently maintains 35 regional parks, encompassing roughly 22,300 acres (Riverside County 2015). In addition, the Riverside County RPOSD maintains 27 neighborhood and regional parks occupying approximately 71,700 acres of land that includes 150 miles of multi-purpose recreational trails, seven archaeological sites, 16 wildlife reserves, and natural areas. Furthermore, the RPOSD operates one boxing facility, manages four nature centers, patrols six historic sites, and provides annual interpretive programs (Riverside County 2015).

The nearest county park to the UCR campus is the Box Springs Mountain Reserve, located 0.6 mile east of the campus. The Reserve is on 3,400 acres of land east of Riverside with several miles of multi-use trails (Riverside County 2020a). The system includes a wide variety of formal and informal trails.

Riverside County maintains sections of a major regional multi-use trail, the Santa Ana River Trail. This trail is a multi-use trail complex that runs alongside the Santa Ana River and is part of a planned regional trail extending across multiple jurisdictions from the Pacific Ocean in Orange County through Riverside County to the San Bernardino Mountains in San Bernardino County. When completed, it will be the longest multi-use trail in Southern California, spanning 110 miles through San Bernardino, Riverside, and Orange counties. As envisioned, the trail connecting these three counties would consist of a dual-track facility consisting of paved Class I and Class II bikeways for cyclists and pedestrians and a decomposed granite-surfaced riding and hiking trail for equestrians, mountain bicyclists, and hikers. The Santa Ana River Trail is about 60 percent complete, with two gaps in the trail: from Green River Drive in Orange County to Hidden Valley Wildlife area in Riverside County and from Waterman Avenue in San Bernardino to the National Forest boundary line near Mentone (Riverside County 2020b). An existing portion of the Santa Ana River Trail is approximately 2.9 miles west of West Campus.

The RPOSD Special Revenue Fund is funded mainly by revenues from taxes, rents and concessions, aid from other governmental agencies, and charges for services (Riverside County 2019).

REGIONAL BICYCLE AND TRAIL NETWORK

There are 150 miles of hiking, biking, and equestrian trails in Riverside County. The County's General Plan includes a trail system to provide connectivity among various existing recreational areas and regional trails; it also has policies to ensure coordination of trails with future development. Regional trails are the primary long-distance trails in Riverside County and are usually designed to link communities, regional parks, and open space areas (Riverside County 2015).

City of Riverside

CITY PARKLAND

The Riverside Park System includes nearly 2,942 acres of developed and undeveloped park land, including approximately 226 acres of neighborhood parks and approximately 370 acres of community parks (City of Riverside 2020a). The City has 59 developed and natural parks totaling approximately 2,592 acres and undeveloped park land totaling approximately 350 acres. Notable City park land and recreational amenities include the following:

- Fairmount Park, an approximately 280-acre City park adjacent to the Santa Ana River on the City's northwestern edge, approximately 4 miles from campus. The historic park offers lakes, playgrounds, and community spaces. Fairmount Park has many facilities including restrooms, boat house, golf and lawn bowling clubhouses, and several buildings that can be rented for private events (City of Riverside 2020a).
- Frank A. Miller Mount Rubidoux Memorial Park (Mount Rubidoux) is a popular approximately 169-acre park and landmark on the western edge of downtown Riverside, about 5 miles west of campus. The isolated, 1,337-foot-tall granite hill rises above the downtown area and has long been a landmark to travelers and residents since the 1880s, when Riverside emerged as one of the dominant southern California citrus towns. The mountain was named for one of its nineteenth century ranchero owners, Louis Rubidoux (City of Riverside 2016a).

- The Ameal Moore Nature Center, approximately 0.8 mile south of campus, sits at the main trailhead entrance to the Sycamore Canyon Wilderness Park, a 1,500-acre park that is one of eight protected core reserves designated by the Riverside County Habitat Conservation Agency for the federally-listed endangered Stephens' Kangaroo rat. The center offers visitors scheduled naturalist-led nature walks, exhibits, opportunities for experiential, hands-on learning, and other programmed events (City of Riverside 2016b).

Parks in the City system include pocket parks, neighborhood parks, community parks, regional parks, and joint-use and special-use facilities. Across the various park types, numerous recreational opportunities are available, including active sports fields, playgrounds, recreation centers, passive recreation amenities, and access to 12 community centers, three senior centers, eight swimming pools (including one joint-use pool), 23.7 miles of trails, and 94.5 miles of bike lanes (City of Riverside 2020a). The City also maintains facility joint-use agreements with local school districts, Riverside City College, and UCR (for the Riverside Sports Complex).

The closest City-run parks to the UCR campus are Andulka Park, approximately 0.1 mile southwest of West Campus (approximately 1 mile from International Village), Islander Park, approximately 0.3 mile east of East Campus at the base of the Box Springs Mountains (approximately 0.3 mile from Glen Mor), and Bordwell Park, approximately 0.3 mile west of the West Campus (approximately 0.9 mile from International Village). Other parks near the UCR campus include Highlander Park, approximately 0.2 mile northeast of East Campus (approximately 0.2 mile from Falkirk Apartments), and Mt. Vernon Park, approximately 0.7 mile northeast of East Campus (approximately 0.7 mile northeast of Glen Mor).

COMMUNITY CENTERS

The City's 12 community centers host a variety of programs, classes, activities, and sports. Most community centers have meeting rooms, gymnasiums, and multi-purpose rooms available to rent (City of Riverside 2020a). The Bordwell Park/Stratton Center is approximately 0.4 mile west of campus and the Center Bobby Bonds Park/César Chávez Center is approximately 0.5 mile northwest of the campus. The City operates eight public swimming pools, the closest to campus being the Islander Pool, approximately 0.3 mile east of campus, and the Sippy Woodhead/Bobby Bonds Pool, approximately 0.4 mile west of campus.

BICYCLE AND TRAIL NETWORK

Riverside operates 23.7 miles of multi-purpose recreational trails surfaced with stabilized decomposed granite for equestrian, biking, hiking, and pedestrian use. The nearest of these trails to the UCR campus are in Sycamore Canyon Wilderness Park, approximately 0.7 mile south of campus. Other signature trails include those at Frank A. Miller Mount Rubidoux Memorial Park, approximately 2.6 miles west of campus, Islander Park, approximately 0.3 mile east of campus, with a park loop trail, the Gage Canal Trail, which follows the historic Gage Canal between Arlington Boulevard, and Central Avenue, approximately 2 miles southwest of the UCR campus (City of Riverside 2016c).

There are 17 miles of Class I bikeways that provide travel on a paved right-of-way completely separated from any street or highway. There are an additional 26.4 miles of Class I bikeways on non-standard trails. There are 101.5 miles of Class II bikeways, often referred to as a bike lane, provided as striped and stenciled lanes for one-way travel on a street or highway. The City does not contain

Class III bikeways, which are shared-use lanes with motor vehicle traffic and identified only by signage (City of Riverside 2016c).

Riverside has two official off-street bike paths: the Santa Ana River Trail and Rosanna Scott Memorial Bicycle Trail along Victoria Avenue, a tree-lined parkway with parallel bicycle and equestrian paths. The path is listed on the National Register of Historic Places and connects multiple schools and neighborhoods, parts of which serve as part of the Safe Route to School program. The path gives way to orange groves as it exits the residential neighborhoods and connects with multiple on-street bicycle facilities (Riverside County 2018).

Existing UCR Parks and Recreational Facilities

UCR Botanic Gardens

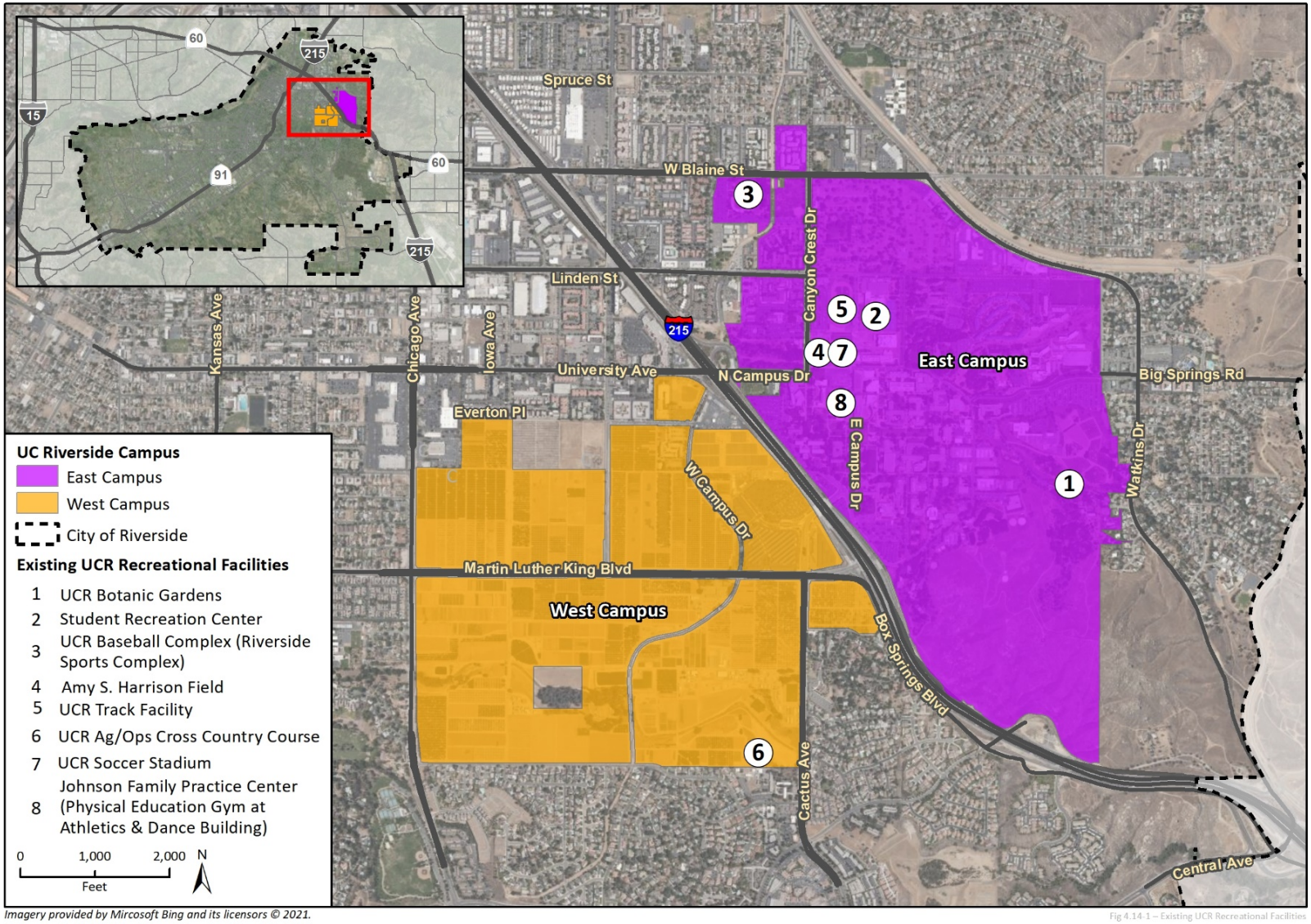
The UCR Botanic Gardens is an approximately 40-acre "living plant museum" in the southeastern area of East Campus in the foothills of the Box Springs Mountains. Since 1963, it has served as a regional resource for outdoor education, relaxation, and enjoyment. Its mission is to "serve as UCR's focal point for campus and community engagement in the science of nature, gardens, and conservation" (UCR 2020a). The gardens are comprised of a series of pedestrian pathways, which offer viewing opportunities for the UCR collection. About a third of the UCR Botanic Gardens remains unplanted and hosts native plant communities, including coastal sage scrub and annual grassland. Natural features in the UCR Botanic Gardens include two prominent arroyos with steep slopes and intermittent water flow in one (Chancellor's Canyon), and a spectacular assemblage of huge, weathered granite boulders in the upper reaches of the other (Alder Canyon). The UCR Botanic Gardens is open to the public, hosts events throughout the year, and receives over 75,000 annual visitors.

UCR Recreation and Athletic Facilities

Under the 2005 LRDP, the campus has approximately 67.5 acres of designated Recreation & Athletics land. These facilities are shown in Figure 4.14-1. UCR recreation and athletic facilities serve UCR athletic teams, students, spectators, faculty, staff, and the public. Certain UCR athletic facilities may also be rented for outside use. Students have access to seven outdoor recreation fields. The use of the fields located north of the Glen Mor Apartments at the southwest corner of the intersection of Valencia Hill Drive and Watkins Drive are limited from late-evening use to conform with an agreement with off-campus residents. UCR has a National Collegiate Athletic Association Division I program and includes intramural sports and club sports (UCR 2020b).

These recreational facilities do not all have quantifiable participant capacity and depend upon activities, which can vary on a day-to-day basis. If certain facilities are being used (i.e., soccer field), individuals may elect to participate in ongoing activities, wait for activities to end, or choose alternate activities in the area. While certain facilities have limited seating capacity, that capacity is not necessarily applicable for all events being hosted at that location, e.g., non-sporting entertainment.

Figure 4.14-1 UC Riverside Recreational Facilities



STUDENT RECREATION CENTER (SRC)

UCR's 155,000-square-foot UCR Student Recreation Center (SRC) is the central hub for recreational, intramural, and club sports on campus. SRC is divided into two sections: SRC North and SRC South. Both SRC sections are in the northern portion of East Campus south of West Linden Street, east of the UCR Track Facility, and northeast of the Amy S. Harrison Field and UCR Soccer Field. The SRC is home to an extensive intramural program for students, and the facility includes the 22,000-square foot SRC Arena (maximum capacity of 3,000), multi-purpose rooms, conference and training rooms, a large swimming pool and spa, tennis courts, an indoor running track, a gym with multiple courts, classroom kitchen, outdoor gear rental shop, cardio and weight space, and an indoor climbing wall. The SRC is available for use by students, faculty and staff, and UCR or UC alumni. Student memberships are included in tuition fees; UCR faculty and staff and UCR or UC alumni may purchase quarterly memberships or day passes for admission (UCR 2020c). Through the University of California Recreation Reciprocity Program, UCR students are allowed to use any UC recreation center at no cost (UCR 2020c). In Fall 2018, there were 27,653 student memberships and 722 non-student memberships, for a combined total of 28,375 memberships to the SRC (UCR 2020d).

UCR BASEBALL COMPLEX

The UCR Baseball Complex (Riverside Sports Complex), known as "The Plex," is in the northwest corner of East Campus just south of Blaine Street and east of Rustin Avenue and is used for all UCR Baseball practices and games, as well as for several high school events. The stadium seats 2,500 and there are home team locker facilities and a pair of hitting cages (UCR 2020b). UCR also has a shared-use agreement with the City of Riverside through 2027 on the recreational fields located at the intersection of Canyon Crest Drive and Blaine Street, immediately east of the UCR Baseball Complex.

AMY S. HARRISON FIELD

The Amy S. Harrison Field is located at the northeast corner of University Avenue and Canyon Crest Drive and is used for all UCR Softball practices and games. The field has grandstand seating for 600 spectators (UCR 2020b).

UCR TRACK FACILITY

The track facility is an eight-lane, Rekortan M99[1] world championship surface with an additional inside lane for jogging. The facility is open to the public (UCR 2020b).

UCR AG/OPS CROSS-COUNTRY COURSE

The UCR long-distance running track course is the Agricultural Operations (Ag/Ops) Cross Country Course in West Campus, located south of Martin Luther King Boulevard and west of Canyon Crest Drive. The UCR Men's and Women's Cross-country Teams practice and race on the course, which features a long loop that winds through groves of citrus trees and crosses over irrigation canals with options for 5K, 6K, and 8K courses (UCR 2020b).

[1] Rekortan M99 is a 15-milimeter, impermeable, full-pour track surface system featuring three specialized layers (APT 2020).

UCR SOCCER STADIUM

The UC Riverside Men's and Women's Soccer Teams play their home matches at the UCR Soccer Stadium. The stadium seats 878 people along the western sideline opposite the team benches, and there is room for an additional 278 persons on the grass on either side of the stadium seating. The field has an artificial surface field state-of-the-art scoreboard, lighting, windscreens to the fencing around the stadium, team rooms in the south end zone, and shelters over the team benches (UCR 2020b).

JOHNSON FAMILY PRACTICE CENTER

Opening with the campus in 1954, the Johnson Family Practice Center (Physical Education Gym at Athletics & Dance Building), known for decades as the Physical Education gym, includes a new ceiling, floor, lighting, a sound system, acoustics, and scoreboards. The Johnson Family Practice Center is also used for community sports programs (UCR 2020b).

UCR Campus Open Space Network

A fabric of outdoor malls, courtyards, gathering spaces and pathways weaves together the different precincts of the UCR campus, mostly on the East Campus, making up the UCR campus open-space network. West Campus does not have a large open-space network, although there are some common recreational areas in the International Village apartments.

The southeastern East Campus contains the Open Space Reserve, which is largely preserved as a natural habitat. This reserve contains informal transitions from natural spaces to the formal malls and courtyards of the campus intended to provide space for contemplation, habitat for wildlife, and to allow for water flow in arroyos and drainages. Picnic Hill, also located in southern East Campus, is characterized by rocky outcropping and steep terrain. The restored University Arroyo space by Glen Mor Apartments also contains these informal transitions.

The original core of campus features a clear organization of linear malls, which constitute UCR's primary and defining open space. These malls are framed by buildings, vistas, walkways, and large mature trees. Carillon Mall is the primary open space on East Campus, defined by the UCR Bell Tower and the Rivera Library arcade. At its cross axis, Library Mall traverses south, and Commons Mall traverses north to North Campus Drive. The Arts Mall includes a prominent open space positioned north-south at the western terminus of Carillon Mall.

Courtyards and plazas, often adjacent to building entries, provide places for seating and public interaction. Arcades reinforce the pedestrian walk system, especially alongside major malls, by providing vertical structure and shade. Existing courtyards feature interactive gathering areas, fountains, dining terraces, outdoor classrooms and amphitheaters, small informal lawn areas, and thematic gardens.

Thematic gardens include the UCR Botanic Gardens, the Director's Garden, the Avocado and Macadamia Tree Collection, the Watkins Herb Garden, and the Medicinal Herb Garden. Spaces adjacent to buildings and campus circulation enhance the aesthetic look of the campus but are not used for recreational purposes. Please see the 2021 LRDP Figure F3.4 for a depiction of the East Campus Open Space.

Existing UCR Campus Bicycle and Trail Network

Class II bike facilities that pass through or near the UCR campus include the following:

- Iowa Avenue: Bike lanes are north of University Avenue on both sides of the street.
- Canyon Crest Drive: Bike lanes are provided north of University Avenue and south of the I-215/SR 60 freeway on both sides of the street.
- Watkins Drive: Bike lanes are provided between Blaine Street and the I-215/SR 60 freeway on both sides of the street.
- Blaine Street/3rd Street: Bike lanes are provided between Valencia Hills Drive and Market Street on both sides of the street.
- Linden Street: Bike lanes are provided between Aberdeen Drive and Niki Way on both sides of the street. A bike lane is provided in the westbound direction between Chicago Avenue and Niki Way.
- University Avenue: Bike lanes are provided between Canyon Crest Drive and Lime Street on both sides of the street.
- Big Springs Road: Bike lanes are provided between Campus Drive and Mt. Vernon Avenue on both sides of the street.
- Martin Luther King Boulevard: Bike lanes are provided between Canyon Crest Drive and Chicago Avenue.
- Aberdeen Drive: Bike lanes are provided between West Linden Street and Campus Drive.
- Campus Drive: Bike lanes are provided on the campus loop road between the Parking Lot 1 Driveway and Aberdeen Drive.

Class II bike facilities that pass through or near the UCR campus include the following:

- University Avenue: A protected two-way cycle track is provided on the east side of University Avenue between Campus Drive and Canyon Crest Drive.
- Canyon Crest Drive: A two-way cycle track is provided on the east side of Canyon Crest Drive between University Avenue and the Bannockburn Village Driveway.

Figure 5 in Appendix J identifies the existing bicycle facilities in the study area.

The City Bicycle Master Plan proposes Class II bicycle lanes near the UCR campus along Chicago Avenue from Blaine Street to Le Conte Drive (City of Riverside 2020b). Information on the city and campus bicycle network is further discussed in Section 4.15, *Transportation*.

As discussed in Section 4.1, *Aesthetics*, the Academic Center in East Campus contains a network of pedestrian pathways connecting buildings, malls, and plazas for UCR affiliates. The UCR Botanic Gardens contains a network of nature trails through the gardens and native plant areas, which are accessed by all visitors to the UCR Botanic Gardens. UCR affiliates can access City and county trails as described above.

4.14.2 Regulatory Setting

Federal

There are no applicable federal regulations regarding parkland and recreational resources that would be applicable to the proposed 2021 LRDP or the campus.

State

There are no applicable State regulations regarding parkland and recreational resources that would be applicable to the proposed 2021 LRDP or the campus. UCR is not subject to Quimby Act requirements, because it is not a local government entity. The Quimby Act is listed here for informational purposes in the subsequent analysis.

The Quimby Act

The Quimby Act (California Government Code Section 66477) establishes guidelines for developers' exactions and in-lieu fees that may be used for parkland development. The act authorizes local governments to establish ordinances requiring developers of new subdivisions to dedicate land for parks, pay an in-lieu fee, or perform a combination of the two. The Quimby Act provides two standards for the dedication of land for use as parkland (1) if the existing area of parkland in a community is three acres or more per 1,000 persons, then the community may require dedication based on a standard of 5 acres per 1,000 persons residing in the subdivision, (2) if the existing amount of parkland in a community is less than 3 acres per 1,000 persons, then the community may require dedication based on a standard of only 3 acres per 1,000 persons residing in the subdivision. The Quimby Act also requires a city or county to adopt standards for recreational facilities in its general plan recreation element if it is to adopt a parkland dedication/fee ordinance. The amount of land dedicated, or fees paid, shall be based upon the residential density, determined based on the approved or conditionally approved tentative map or parcel map and the average number of persons per household.

University of California

Office of the President Policies and Procedures

UCOP establishes systemwide policies and procedures that guide various operational and functional areas. Systemwide policies are guiding principles that express the institutional culture, goals, and philosophy. Policies promote consistency and operational efficiency and enhance the UC's mission. Procedures are step-by-step descriptions of the tasks required to support and carry out organizational policies. Procedures articulate the process for accomplishing controls, documenting actions accomplished in a defined order, and ensuring the consistent and repetitive approach to achieve control activities (UCOP 2020a). The UCOP Facilities and Resources policies and procedures establish requirements for the maintenance of real property and equipment (UCOP 2019).

Office of the President Facilities Manual

UCOP Facilities Manual Volume 6, "Plant Operations and Maintenance," establishes operation and maintenance policies for the UC (UCOP 2020b). *Maintenance* is defined as the upkeep of property, machinery, systems, and facilities, including buildings, utility infrastructure, roads, and grounds. Maintenance consists of those activities necessary to keep facilities and systems operational and in good working order; it consists of the preservation, but not the improvement, of buildings and grounds or other real property improvements and their components.

University of California, Riverside

UCR Recreation Center Fees

The UCR tuition fees includes recreation center fees that helps pay the cost of construction, maintenance, and operation of the Student Recreation Center and recreation expansion fee that helps pay the cost of the expanded facility that accommodates the growing student population (UCR 2020e).

Regional and Local (Non-Binding)

As noted in Section 4, "University of California Autonomy," UCR, a constitutionally-created State entity, is not subject to municipal regulations of surrounding local governments for uses on property owned or controlled by UCR that are in furtherance of the university's educational purposes. However, UCR may consider, for coordination purposes, aspects of local plans and policies of the communities surrounding the campus, when it is appropriate and feasible but not bound by those plans and policies in its planning efforts.

City of Riverside

MUNICIPAL CODE

As directed in Chapter 16 of the City of Riverside Municipal Code, the City can require four types of park development fees: a Regional/Reserve Fee, Local Fee, Aquatic Facility Fee, and Trail Fee. Generally, the required development fees are paid prior to the issuance of a building permit for new development. Local park development fees are deposited into a Special Capital Improvement Fund for the acquisition and/or development and/or improvement of neighborhood or community parks in general conformance with the priorities established by the City's General Plan.

GENERAL PLAN – OPEN SPACE AND CONSERVATION ELEMENT

The City has a goal of 3 acres of local parks per 1,000 population, consisting of 0.75 acre of community park per 1,000 population and 2.25 acres of neighborhood park per 1,000 population (City of Riverside 2019).

The City's General Plan envisions a "necklace" of parks and open space that exists on and/or defines the edges of the City with connectivity occurring between these spaces and Riverside's neighborhoods with landscaped parkways and trails accessible to pedestrians and cyclists. The General Plan identifies 13 specific objectives to develop the Riverside trail system into a comprehensive trail network.

UNIVERSITY NEIGHBORHOOD PLAN

The University Neighborhood Plan contains policies related to parks and recreation:

- Development of a comprehensive park improvement plan that is consistent with the Park Master Plan to preserve, upgrade, or enhance public parks as needed, including Highland Park, Islander Park, and Mt. Vernon Park
- Preservation of the Box Springs Mountain Reserve Park through access restrictions and prevention of off-road vehicles in the open spaces

- Exploration of the possibility of constructing or establishing the Gage Canal Citywide Bikeway and Hiking Trail
- Exploration of a suitable location for a Community/Senior Center
- Encouragement of the provision of public gathering spaces within all new high density and mixed-use developments

RIVERSIDE COMPREHENSIVE PARK, RECREATION & COMMUNITY SERVICES MASTER PLAN

The City adopted the Riverside Comprehensive Park, Recreation & Community Services Master Plan in February 2020 (City of Riverside 2020a). The plan serves as a guide and implementation tool for the management and development of parks and recreational facilities and programs for the City. The Riverside Comprehensive Park, Recreation & Community Services Master Plan is part of the defined strategy to address the primary actions and policies enacted in the Parks and Recreation Element of the General Plan.

The Riverside Comprehensive Park, Recreation & Community Services Master Plan identifies $4.2 million in funded projects and nearly $241 million of unfunded deferred maintenance projects. According to the plan, the City identified several undeveloped parcels, totaling approximately 350 acres that are adjacent to existing parks and could be considered for future park development. This acreage includes:

- City Citrus State Park—64.79 acres (owned by Riverside Public Utilities)
- Golden Star Park—19.32 acres
- Hole Lake—61.09 acres (Trail Head and Rutland Park Expansion)
- Mission Ranch Park—12.04 acres
- Mount Vernon Park—8.35 acres (owned by Riverside Public Utilities)
- Savi Ranch Park—36.85 acres (Ownership is City 40 percent/County 60 percent)
- Seven Mile Trail—22.67 acres
- Tequesquite Open Space—116.10 acres (Land north and west of Ryan Bonaminio Park)
- Victoria Cross Park—7.84 acres

Additionally, the City has undeveloped areas at existing facilities that are available for future park development, including:

- Undeveloped portions of Fairmount Park including the Camp Evans Wilderness Area
- Undeveloped portions of Islander Park
- Undeveloped portions of Castleview Park

There are also undeveloped areas in Riverside Public Utilities-owned properties that may be available for future park development, including:

- Mockingbird Reservoir site
- 64-acre site adjacent to Reid Park

BICYCLE MASTER PLAN

The City's General Plan and Bicycle Master Plan have identified 67.3 miles of planned trail improvements, including a proposed bicycle trail along the section of the Gage Canal that traverses through West Campus, eventually joining with an existing bikeway along Central Avenue (City of

Riverside 2007). The City proposes a pedestrian trail following Canyon Crest Drive/West Campus Drive from Blaine Street to Martin Luther King Boulevard, which would head eastward to join the proposed bicycle path along the Gage Canal. The City also proposes a bikeway extension along Chicago Avenue from Blaine Street to Oroblanco Avenue, adjacent to the western edge of West Campus. A bikeway is also proposed along Martin Luther King Boulevard/Canyon Crest Drive that would turn south after passing under the I-215/SR 60 freeway before linking up with a bikeway along Central Avenue.

CAPITAL IMPROVEMENT PROGRAM

Capital expenditures for the City's Parks, Recreation, and Community Services Department are budgeted in the General Fund, the Local Parks Fund, and the Regional Parks Fund. Neighborhood park improvements are funded through the Local Parks Fund, while regional park improvements are funded through the Regional Parks Fund. Major revenue sources include General Fund Revenues and Development Fees. Local Park Fee and Regional Park Fee revenues are dependent on development (City of Riverside 2017).

4.14.3 Environmental Impacts and Mitigation Measures

Significance Criteria

UCR uses the following significance criteria questions related to recreation.

Would the proposed 2021 LRDP:

a) Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?
b) Require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?

Additionally, for impacts to be considered significant, development of these new recreational facilities would also have to result in a significant physical environmental impact not already analyzed and disclosed in the other resource chapters of this Draft EIR.

Analysis Methodology

Impacts related to parks and recreational facilities were determined by evaluating whether the proposed 2021 LRDP campus population will increase use of existing park and recreational facilities and whether this would lead to the substantial deterioration or degradation of existing recreational facilities or require the construction or expansion of recreational facilities, which would have an adverse physical effect on the environment, which was not considered as part of the proposed 2021 LRDP. In determining the level of significance, the analysis assumes that projects implemented under the proposed 2021 LRDP would comply with relevant federal and State laws and regulations. Substantial physical deterioration is recognized as a decline in the quality of current conditions of a park or facility beyond regular wear and tear.

2021 LRDP Objectives and Policies

The proposed 2021 LRDP contains objectives and policies relevant to parkland and recreational facilities:

Land Use (LU)

- Objective LU5 – Continue to grow on-campus student housing to 40 percent and increase student life facilities.
  - Policy: Provide increased housing capacity and student life facilities in existing student neighborhoods in the northern portions of East Campus.

Open Space (OS)

- Objective OS1 – Preserve and enhance major open spaces (malls, courtyards, streetscapes, quads, and pedestrian corridors), which contribute to the unique character and beauty of UCR.
  - Policy: Limit future campus development from intruding into major open spaces as defined by the Open Space Framework Diagram, while allowing for supporting elements like individual project site design, landscaping, signage, etc. but ensuring those are sensitively integrated.
- Objective OS3 – Provide opportunities to engage with informal, naturalized landscapes with a special focus on internal campus Open Space Reserve areas and the UCR Botanic Gardens.
  - Policy: Ensure safe, accessible entry points to informal landscape areas for passive recreational opportunities to benefit the entire campus population.

Mobility (M)

- Objective M2 – Invest in infrastructure to increase bicycle use and support other active transportation modes to integrate desired routes with the campus' and City's circulation framework.
  - Policy: Support and facilitate City-led initiatives to extend bikeways to campus from every direction, including routes proposed along Canyon Crest Drive, Martin Luther King Boulevard, and the Gage Canal.
  - Policy: Develop wayfinding systems to interconnect preferred bicycle routes and invest in safe and secure pathways along all bicycle routes.
  - Policy: Provide adequate support amenities to facilitate and encourage the use of bicycles and other alternative transportation modes.
  - Policy: Develop a comprehensive improvement plan for Campus Drive to improve function, safety, and utility for each mode of travel, as incremental growth occurs.
- Objective M3 – Emphasize safe and pleasing passage for pedestrians and bicycle riders through the careful, continued development, and integration of the campus' multi-modal circulation framework and its extensions into the immediate community.
  - Policy: Identify and address gaps in the existing non-motorized circulation network, both on-campus and in the adjacent community.
  - Policy: Implement University policies to improve pedestrian safety and encourage social interaction in zones of high pedestrian activity.

Impact Analysis

Impact REC-1 Increase the Use of Existing Neighborhood and Regional Parks or Recreational Facilities Such that Substantial Physical Deterioration of the Facility Would Occur or be Accelerated.

The proposed 2021 LRDP would include most existing recreational facilities and parkland on the UCR campus and incrementally develop new recreational facilities and open spaces that would adequately serve the campus population. The proposed 2021 LRDP would not increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of those facilities would occur or be accelerated. Impacts related to increased use of parks and recreational facilities would be less than significant. No mitigation measures are required.

Construction

Criterion a) assesses the impacts to parks and recreational facilities as a result of increased use. During construction, there would be a temporary increase in construction workers on campus. These construction workers would likely originate from an existing local pool of construction employees in the region and would not likely relocate their households as a consequence of the 2021 LRDP. Therefore, the increased employment of construction workers on campus would not result in an increase in the residential population of the area surrounding UCR. Accordingly, there would not be a corresponding demand or use of the existing parks and recreation facilities during this time as construction workers are more likely to use parks and recreation facilities near their places of residence. It is anticipated that construction workers would not use nearby parks during their lunch break; it is not likely they would leave the construction site for lunch, as lunch breaks are not typically long enough for workers to take advantage of such facilities and return to work within the typical 30- to 60-minute lunch break. Thus, project construction workers would not generate an increase in demand for park and recreation facilities such that it would result in the accelerated physical deterioration of a park or recreation facilities. Construction impacts related to an increased use of parks or recreational facilities under the proposed 2021 LRDP are considered to be **less than significant**. Construction impacts related to the actual construction of new parks and recreational facilities are addressed in Impact REC-2 below.

Operation – On-Campus

As discussed in Section 4.12, *Population and Housing*, the proposed 2021 LRDP would incrementally accommodate a net increase to the campus population of approximately 13,884 people by the 2035/2036 academic year. As discussed in Section 2.3.5.3, *Project Description,* the UCR Campus currently has seven outdoor recreational fields, and 211,061 gsf of indoor recreational facilities. While buildout of the proposed 2021 LRDP would remove some existing recreational facilities, the proposed 2021 LRDP would also incrementally develop an additional 97,740 gsf of indoor recreation space and four additional outdoor fields on the UCR campus to serve the increased campus population.

UCR Botanic Gardens

Due to the proposed increase in campus population under the proposed 2021 LRDP, the UCR Botanic Gardens would be expected to have an increase in the number of annual visitors, events, and educational and research activities.

The proposed 2021 LRDP would create a UCR Botanic Gardens land use designation to encompass approximately 43.7 acres on East Campus. The predominant UCR Botanic Gardens land uses under the proposed 2021 LRDP would include demonstration gardens, habitat restoration and management areas, and incidental facilities, such as interpretive centers, seating and viewing areas, and other amenities typically consistent with a botanic garden program. Secondary permissible uses may include support facilities for the UCR Botanic Gardens and parking.

The existing UCR Botanic Gardens contain a series of pedestrian pathways that do not have a quantifiable capacity. Furthermore, increased pedestrian pathways are not subject to substantial physical deterioration from increased usage. The facility is also gated and can limit access if necessary, as occurred during campus COVID restrictions (UCR 2020f). Furthermore, existing policies described in 4.14.2 and the proposed 2021 LRDP include policies for continued maintenance and preservation of the UCR Botanic Gardens. The facility also requests visitor admission donations, which would therefore increase funding with increased visitors. Impacts related to potential increased use and physical deterioration of UCR Botanic Garden facilities would be **less than significant**.

UCR Recreation and Athletic Facilities

Guidance for recreational facilities development needs can be found in "Space Planning Guidelines for Campus Recreational Sports Facilities" published by The National Intramural and Recreational Sports Association (NIRSA) in 2009. However, while this resource provides guidance of recreational facilities, there is no uniform standard available to determine adequate service. NIRSA maintains comparative data but not standards. There are wide variances in the use of facilities at different university campuses that depend on a multitude of factors such as campus location in urban or suburban settings or whether the campus supports Intercollegiate Athletics and day-to-day changes in activities.

Assuming the projected increase in campus population would be directly proportionate to the increase in visitors to on-campus recreational facilities, recreational facilities use would increase by about 48.4 percent. The increase in campus population would result likely in increased use of existing UCR recreational facilities.

UCR manages and maintains on-campus recreational facilities that are shared with UCR Athletics. On-campus facilities are heavily utilized but have been upgraded in recent years and undergo a regular maintenance program, consistent with existing UCR policies discussed in Section 4.14.2. UCR employs technicians, mechanics, and maintenance staff to maintain and repair fitness equipment, as well as heating, ventilation, and air conditioning equipment, plumbing, pools, and other recreational facility components that would provide services to any new recreational facilities developed under the proposed 2021 LRDP. A landscape and turf crew maintain the grass and synthetic turf fields. Management and maintenance of campus facilities would be provided throughout the implementation of the proposed 2021 LRDP. As discussed in Section 4.14.2, UCR tuition fees include a recreation center fee and recreation center expansion fee that would provide increased funding for maintenance and operational expenses associated with increased student enrollment and the use of recreation center.

UCR would increase its staff during the lifespan of the proposed 2021 LRDP as needed, including staff for recreational facilities and maintenance services. Additionally, new recreational facilities and spaces would be developed under the proposed 2021 LRDP in areas of campus designated Recreation & Athletics and student neighborhoods that would accommodate some of the increased demand for existing recreational facilities. The 2021 LRDP would develop an additional 97,740 gsf of

indoor recreation space and four additional outdoor fields on the UCR campus to serve the increased campus population. Furthermore, the 2021 LRDP further notes that development of the North District will incorporate outdoor recreation amenities in their planning in close coordination with student recreation. As such, because new recreational facilities are proposed and maintenance of existing facilities would continue to occur, substantial deterioration of on-campus athletic and recreational facilities is not anticipated. Therefore, impacts related to potential increased use and physical deterioration of existing on-campus recreation and athletic facilities would be **less than significant**.

CAMPUS OPEN SPACE NETWORK

The 2021 LRDP proposes a campus open space framework that represents the network of green spaces that together contribute to its unique character. As shown in Figure 2-1, this network includes the land use designations of Open Space Reserve and the UCR Botanic Gardens. The network of green spaces is also characterized by the interconnected framework of Primary Open Spaces, Secondary Open Spaces, and Planned Open Space in all the 2021 LRDP land use categories, as shown in LRDP Figure F3.4. Each of these open space designations represent a distinct typology of open space, with each playing a critical role in defining the overall campus organization. The 2021 LRDP proposes four types of open space: Open Space Reserve, UCR Botanic Gardens, Primary Open Spaces (Campus Malls, Streetscapes), Second Open Spaces (Minor Malls and Corridors, Plazas, Courtyards, Arcades). Each of these open space designations represent a distinct typology of open space. Many of these locations include pedestrian pathways, hiking paths, and social gathering locations, which do not have a quantifiable capacity. Furthermore, increased pedestrian pathways are not subject to substantial physical deterioration from increased usage.

The proposed 2021 LRDP emphasizes preserving and activating existing spaces, integrating new outdoor spaces, and providing shaded connections in the form of tree-lined pathways or arcades integrated into buildings. Objective and policies included in the proposed 2021 LRDP that are discussed above would direct this development.

As such, because new open space opportunities are proposed and maintenance of existing spaces would continue to occur, substantial physical deterioration of the campus open space network is not anticipated. Therefore, impacts related to potential increased use and physical deterioration of existing on-campus open space network would be **less than significant**.

CAMPUS BICYCLE AND TRAIL NETWORK

The proposed 2021 LRDP contains objective and policies to increase opportunities for enhanced and expanded bicycle and pedestrian pathways. The proposed 2021 LRDP would also direct the preservation of the UCR Botanic Gardens, including its existing trail network. Increased usage of bike paths and pedestrian facilities do not typically result in substantial deterioration, rather bike and pedestrian facilities are typically deteriorated by tree roots and natural phenomena. Additionally, increased use of bike paths would be in line with typical and appropriate bike path use. It is reasonable to assume the nominal increase would not result in substantial deterioration of the bike paths.

Because the proposed 2021 LRDP would direct new opportunities for bicycle and pedestrian pathways, connections, and improvements and maintenance of the existing bicycle network and trails would continue to occur, substantial deterioration of bicycle and pedestrian pathways is not anticipated to occur or be accelerated due to the proposed 2021 LRDP. Therefore, impacts related

to potential increased use and physical deterioration of existing on-campus bicycle and trail networks would be **less than significant**.

OVERALL ON-CAMPUS

While campus population growth assumed under the proposed 2021 LRDP would likely increase the use of existing campus parks or other recreational facilities, regular maintenance of such facilities under established parks and recreation programs, increased funding, and increased recreational space would avoid the potential for substantial physical deterioration. Pursuant to the UCOP Facilities Manual, the UCR construction and maintenance policy outlines procedures for preventative maintenance, general replacement and repair, electrical repairs, ventilation, plumbing, painting, and furniture/cabinetry work. In addition, UCR tuition fees would include a recreation center fee and recreation center expansion fee, which would provide increased funding for maintenance and operational expenses associated with increased student enrollment and the use of recreation center. Therefore, since regular maintenance of existing recreational facilities would continue to occur, substantial physical deterioration of on-campus recreational facilities is not anticipated. Impacts would be **less than significant**.

Operation – Off-Campus

The campus population would continue to have full access to on-campus parks and recreational facilities, which would reduce the need to use off-campus community facilities. However, the proposed 2021 LRDP would incrementally result in an increase in off-campus residents of approximately 6,395 people (13,884 net increase to the campus population – 7,489 new on-campus beds) by academic year 2035/2036. There are four State parks and two State Recreation Areas near the UCR campus that the campus population may utilize. Additionally, there are five off-campus parks near the UCR campus that the campus population may utilize. The closest off-campus parks to the UCR campus are Andulka Park, approximately 0.1 mile southwest of West Campus (approximately 1 mile from International Village), Islander Park, approximately 0.3 mile east of East Campus at the base of the Box Springs Mountains (approximately 0.3 mile from Glen Mor), and Bordwell Park, approximately 0.3 mile west of the West Campus (approximately 0.9 mile from International Village). Other parks near the UCR campus include Highlander Park, approximately 0.2 mile northeast of East Campus (approximately 0.2 mile from Falkirk Apartments) and Mt. Vernon Park, approximately 0.7 mile from East Campus (approximately 0.2 mile northeast of Glen Mor). However, because these facilities are not in the immediate vicinity of UCR, they are unlikely to be used by campus population on a regular basis, especially when considering UCR provides more, as well as a variety of different recreational facilities than is accessible at these regional and community parks. As described above, students are primarily expected to use on-campus recreational facilities. The closest off-campus parks to campus, such as Andulka Park and Bordwell Park have facilities such as basketball courts, tennis courts, and baseball fields. If certain facilities are being used (i.e., turf area, tennis courts), individuals may elect to participate in ongoing activities or choose alternate activities in the area. The impacts of increased use of parks would not result in substantial deterioration.

Park and recreational facility maintenance and acquisition needs in the region are regularly evaluated by jurisdictions with respect to population growth, locational needs, and budget. It is the responsibility of each jurisdiction to provide and maintain recreational facilities, and it is anticipated that this would occur pursuant to its General Plan and/or community plans. For example, as noted in the City of Riverside's Comprehensive Park, Recreation & Community Services Master Plan, the City identified several undeveloped parcels that could be considered for park development and

numerous opportunities for parkland improvements. As future residential development projects in various jurisdictions are approved, development fees for parks or donation of parkland (pursuant to the Quimby Act) would be required as part of the individual projects. Funding for maintenance of new and existing facilities is provided through property assessments and taxes that are distributed to jurisdictions.

It is anticipated the new campus population accommodated under the proposed 2021 LRDP would mostly utilize on-campus recreational facilities and to the extent they use off-campus facilities, they would use bicycle and trail networks in the region. Increased usage of bike paths does not typically result in substantial deterioration, rather bike facilities are typically deteriorated by tree roots and natural phenomena. Additionally, increased use of bike paths would be in line with typical and appropriate bike path use. It is reasonable to assume the nominal increase would not result in substantial deterioration of the bike paths. Furthermore, bicycle paths and trails would be subject to regular maintenance funded by taxes collected by the local jurisdiction. Fees collected by a city or county from new development under the Quimby Act may be used for trails. The proposed 2021 LRDP would not preclude implementation of any city or county parkland or trails, including the proposed City of Riverside bicycle trail along the section of the Gage Canal that traverses through West Campus. The maintenance of existing parkland, recreational facilities, and bicycle and trail networks would be funded by taxes collected by City and County jurisdictions, and the necessary funding and/or land to develop parkland to serve campus populations living off campus would be provided to local jurisdictions as part of the Quimby Act requirements during the development of new residences in order to meet regional parkland goals. The proposed 2021 LRDP would not result in substantial physical deterioration or accelerate the physical deterioration of existing off-campus parkland, community centers, or bicycle or trail networks, and impacts would be **less than significant.**

Mitigation Measures

No mitigation is required.

Significance After Mitigation

Impacts would be less than significant without mitigation.

Impact REC-2 Include Recreational Facilities or Require the Construction or Expansion of Recreational Facilities Which Might Have an Adverse Physical Effect on the Environment.

The proposed 2021 LRDP would incrementally develop new on-campus recreational facilities and open spaces, the construction of which may have an adverse physical effect on the environment. Environmental impacts would be less than significant without additional mitigation.

The proposed 2021 LRDP anticipates that campus population growth would necessitate the need for new construction or expansion of park and recreational facilities. Development of new recreational facilities are one component of the overall LRDP program, and as such, are part of the whole of the action that in analyzed in this EIR.

The Recreation & Athletics land use category in the proposed 2021 LRDP permits construction or expansion of recreational facilities to accommodate intercollegiate athletics and campus recreation, such as large-scale indoor and outdoor athletic facilities, playfields, and courts. Secondary permissible uses in the Recreation & Athletics land use designation include parking, food service,

administrative areas, office and meeting space, and other supporting uses. Additionally, the proposed Student Neighborhood and Canyon Crest Gateway land use designations in the northern portions of East Campus could accommodate appropriately scaled recreation and athletic facilities.

The proposed 2021 LRDP would include approximately 28.7 acres specifically designated as Recreation & Athletics land. Large-scale recreation spaces would be consolidated, while other recreation spaces would be integrated among other land use designations. This would include the incremental development of an additional 97,740 gsf of indoor recreation space and four new outdoor fields which has been included as part of buildout of the proposed 2021 LRDP.

The Recreation & Athletics land uses would be concentrated in two areas in the northern portion of East Campus and include the SRC, the track facility, tennis courts, and the baseball stadium on Blaine Street. Additional neighborhood-scale facilities would be interspersed in student neighborhoods, as indicated in the Student Neighborhood land use, to improve student access, and create a more dynamic student experience by allowing access into the evenings and on weekends.

The 2021 LRDP proposes having up to 11 outdoor recreation fields by academic year 2035/2036, which is four more than what currently exists. Because outdoor recreation fields have a large physical footprint and are limited in the time in which they are intensely used, the proposed 2021 LRDP underscores the need to be strategic and flexible in providing adequate access to recreation amenities for a larger student population. Proposed campus development, including the development of the North District, and the redevelopment and densification of existing student housing complexes would incorporate outdoor recreation amenities in their specific planning in close coordination with Student Recreation.

Furthermore, the proposed 2021 LRDP also contains a policy to ensure safe, accessible entry points to informal landscape areas for passive recreational opportunities to benefit the entire campus population. The proposed 2021 LRDP would preserve and enhance open spaces such as the Carillon Mall and directs such open spaces to be extended outward towards the perimeter of the campus to connect the Academic Center to the edges of East Campus. The proposed 2021 LRDP also includes the creation of Citrus Mall extending west from Anderson Hall to a future extension of the Library Mall through the University Theater Plaza and the Olmsted arches. The Recreation Mall would continue to be developed and extended as the North District neighborhood is buildout. Together, these open space additions would increase landscape and pedestrian connectivity as future growth increases across East Campus.

The proposed 2021 LRDP includes extensions of key bicycle and pedestrian corridors where notable gaps exist, including the future Science Walk corridor, in order to create a pedestrian-focused connection between multiple research buildings in the southeast quadrant of the campus and a connection between South Campus Drive and Eucalyptus Drive. The proposed 2021 LRDP would direct access and connection improvements throughout the campus, plan for connection to on- and off-campus existing and proposed pedestrian and bicycle circulation paths, and improve pedestrian safety and experience along entrances and at gateways (see Section 4.15, *Transportation*). This would encourage and facilitate use of existing and future campus bicycle and pedestrian networks.

The impact from construction and operation of these new recreational facilities have been analyzed as part of the proposed 2021 LRDP buildout in this Draft EIR, and there would be no additional impacts. Therefore, impacts are considered to be **less than significant without additional mitigation**.

Mitigation Measures

No additional mitigation is required.

Significance After Mitigation

Impacts related to Recreation would be less than significant without additional mitigation.

4.14.4 Cumulative Impacts

A project's environmental impacts are "cumulatively considerable" if the "incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects" (*CEQA Guidelines* Section 15065[a][3]). The geographic context for the analysis of cumulative recreational impacts is Riverside County. The cumulative projects (see Table 4-1 in Section 4, *Environmental Impact Analysis*) include those that may occur as part of future development in accordance with the various jurisdictional General Plans, community plans, or specific plans that include park and recreational facilities.

This additional recreational space would be expected to reduce the anticipated campus population's need to use regional park and recreational facilities.

The proposed 2021 LRDP would incrementally result in an increase in off-campus residents of approximately 6,395 people by academic year 2035/2036. As described in Section 4.14, *Population and Housing*, the proposed 2021 LRDP off-campus population and park and recreational facility need would be distributed throughout the Inland Southern California region.

Deterioration of Existing Parks and Recreational Facilities

Cumulative, regional population growth would increase the use of parks and recreational facilities throughout Riverside County, as discussed in Table 4-1 and Table 4-2. Many recreational facilities do not all have quantifiable participant capacity and depend upon activities, which can vary on a day-to-day basis. If certain facilities are being used (i.e., soccer field), individuals may elect to participate in ongoing activities, wait for activities to end, or choose alternate activities in the area. While certain facilities have limited seating capacity, that capacity is not necessarily applicable for all events being hosted at that location, e.g., non-sporting entertainment. Increased usage of bike paths and pedestrian facilities do not typically result in substantial deterioration, rather bike and pedestrian facilities are typically deteriorated by tree roots and natural phenomena. Additionally, increased use of bike paths would be in line with typical and appropriate bike path use.

Additionally, as future cumulative residential development projects in various jurisdictions are approved, in-lieu fees for parks or donation of parkland (pursuant to the Quimby Act) would be required as part of the individual project. In addition, grants from State and county bond sources would be available to fund park and recreational facilities. These funding sources would provide maintenance and new, expanded, or improved neighborhood and community parkland and recreational facilities in the various jurisdictions to satisfy demand from future population growth. Funding for maintenance of those facilities would be provided through property assessments and taxes that are distributed to jurisdictions in the region. As discussed in Section 4.14.1, the City also maintains facility joint-use agreements with local school districts, Riverside City College, and UCR (for the Riverside Sports Complex).

Therefore, while cumulative population growth would increase the use of existing parks and recreational facilities, increased use would not cause substantial deterioration of the existing parks and recreational facilities and cumulative impacts (Impact REC-1) would be **less than significant, and the project's contribution would not be cumulatively considerable**.

Construction or Expansion of Recreational Facilities

It is anticipated that, to accommodate future cumulative demand for park and recreational facilities, new park and recreational facilities would be developed and constructed throughout the region. As described in Section 4.14.1, the County and City of Riverside have each identified potential, near-term projects to develop or expand parkland and trails, including the multi-use, multi-county Santa Ana River Trail and the Gage Canal Trail Project north of campus. In addition, some existing parks and recreational facilities may be improved or redeveloped to be able to provide universal access. However, the renovation of existing facilities or construction of new facilities, other facilities planned throughout the region.

Local jurisdictions require environmental review and documentation pursuant to CEQA for parks and recreation projects, as well as analysis of those projects for consistency with the goals, policies, and recommendations of their general plans. In general, compliance with federal, State, and local regulations would preclude incremental impacts associated with new construction or expansion of new parks or recreational facilities. As described in Section 4.12, *Population and Housing*, the project growth would not exceed regional growth projections and induce additional services, such as recreation.

Park and recreational facility projects implemented as part of the proposed 2021 LRDP would adhere to the policies of the proposed 2021 LRDP, UCR development guidelines, and applicable federal and State regulations to address potentially significant impacts. Therefore, cumulative impacts related to the construction or expansion of parks and recreational facilities (Impact REC-2) would be **less than significant, and the project's contribution would not be cumulatively considerable**.

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4.15 Transportation

This section describes the existing transportation system serving and surrounding UCR. It analyzes impacts pertaining to vehicle miles traveled (VMT); transit, bicycle, pedestrian, and facilities; roadway hazards; and emergency access that would result from implementation of projects under the proposed 2021 LRDP. The analysis in this section is based on the Transportation Impact Analysis (TIA) prepared by Fehr & Peers for the proposed 2021 LRDP project (Appendix J).

4.15.1 Environmental Setting

Roadway System

UCR is within the eastern portion of the City of Riverside (City), in western Riverside County. It takes access from the I-215/SR 60 freeway and arterial roadways that lead to the downtown area and west side of Riverside, and Corona, Ontario, and beyond. Access ramps are available to the I-215/SR 60 freeway from both West Campus and East Campus areas. Other key roadways in the study area are described below. The TIA area identified for use in the transportation analysis is shown in Figure 4.15-1, and includes the following highways and roadway segments:

Regional Highways

The I-215/SR 60 freeway is an interstate highway in Southern California. As a combined route, the I-215/SR 60 freeway traverses in a north/south direction from Moreno Valley to Riverside. The I-215/SR 60 freeway diagonally bisects the campus. Near the project study area, it is an eight-lane facility (four lanes in each direction). Access to the I-215/SR 60 freeway near the project study area is provided at Blaine Street, University Avenue, Martin Luther King Boulevard, and Central Avenue.

Local Access Roads

Iowa Avenue is a north-south four-lane facility that bisects portions of the West Campus and will be widened to six lanes in the future.[1] Iowa Avenue is designated as an arterial by the City's General Plan. It has a speed limit of 45 miles per hour (mph).

Canyon Crest Drive is a north-south facility that widens from a 66 foot (ft) two-lane collector into an 88 ft four-lane arterial. Canyon Crest Drive bisects portions of East Campus and provides access to the campus core. It has a variable speed limit ranging between 25 and 40 mph.

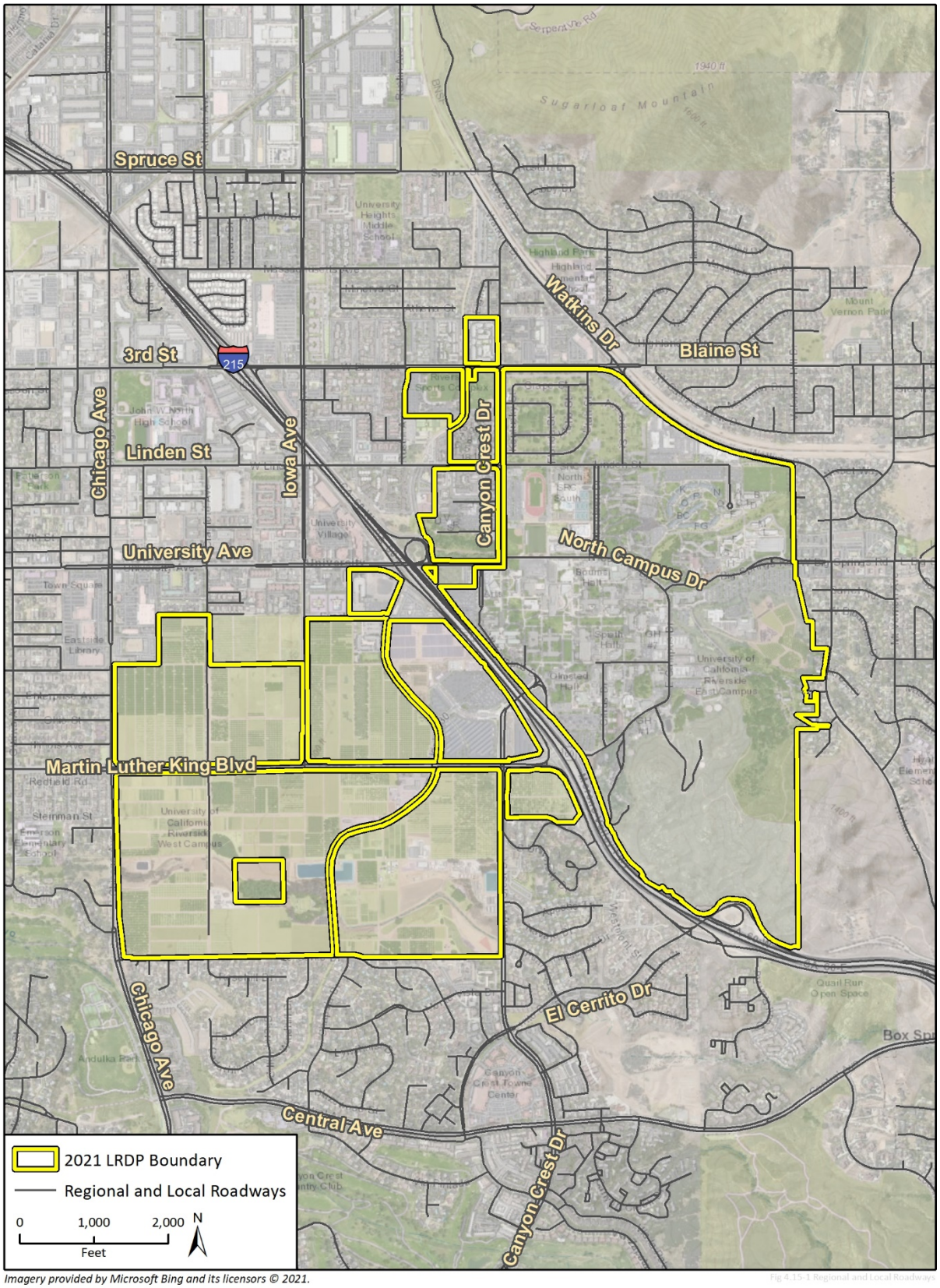
Watkins Drive is a north-south two-lane facility that is along the western edge of East Campus. Watkins Drive is designated as an arterial by the City's General Plan. It has a variable speed limit ranging between 35 and 40 mph.

Blaine Street is an east-west four-lane facility that is along the northern edge of East Campus. It is designated as an arterial in the City's General Plan. It has a speed limit of 40 mph.

West Linden Street is an east-west facility that bisects portions of the East Campus. It is designated as a two-lane 80 ft collector east of the I-215/SR 60 freeway in the City's General Plan. It has a speed limit of 40 mph.

[1] The TIA includes the widening of this roadway in the modeling as part of the traffic analysis.

Figure 4.15-1 Regional and Local Roadways



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University Avenue is an east-west four-lane facility that provides access to the campus core, where it narrows to two lanes in the segment east of the I-215 overpass until it transitions to Canyon Crest Drive. It is designated as a parkway in the City's General Plan. It has a speed limit of 35 mph.

Martin Luther King Boulevard is an east-west four-lane facility that bisects West Campus. It is designated as an arterial in the City's General Plan. It has a speed limit of 50 mph.

Big Springs Road is an east-west two-lane facility on East Campus. It has a speed limit of 25 mph.

North/South/East/West Campus Drive is a two-lane facility that encompasses the Academic Center of East Campus. It has a speed limit of 25 mph.

Campus Travel Characteristics

Campus travel characteristics describe the purpose for which commuters travel to and from the site. Land uses, such as agricultural research, academic instruction, and campus administration, may dictate the number of trips necessary to be on the campus for different types commuters (e.g., faculty, graduate researchers, staff). The UCR campus has a mix of medical, education, employment, recreation, and residential uses, with some supporting uses, such as utility plants, facilities buildings, and agricultural research supporting facilities. Traffic volumes that occur at campus gateways inform campus travel at different times of the day. The proposed 2021 LRDP provides long-term planning for the land uses, activities, and facilities on the UCR campus. Predominant uses can be described by the primary facilities, programs, and/or activities within a geographic area on campus used to achieve specific planning objectives.

Travel to and from campus includes on-campus or campus-adjacent commutes, regional commutes from the greater Inland Southern California or beyond, and longer distance commutes from Los Angeles and other metropolitan areas. Generally, undergraduate and graduate students live on campus or locally in Riverside and surrounding inland communities, commuting by automobile, public transportation, bicycle, or on foot. For the most part, campus staff and faculty reside in the region, in Riverside, and in nearby communities. They may drive, use public transportation, bicycle, or walk to campus. Adjunct faculty may commute from more distant areas, such as Orange County, Los Angeles, or beyond. Whereas most drive, many may employ carpools or vanpools, or use the Metrolink regional train system. The TIA describes the data sources for campus trip distribution (see Appendix J).

Vehicle Travel

The following describes baseline VMT levels in the study area. Baseline VMT levels for the campus and the region are in Table 4.15-1. The data demonstrates that the campus produces a lower VMT per Service Population than does the region as a whole and would continue to do so. This is likely primarily a result of fewer trips and trips of shorter length associated with students living on or near campus or from students and staff using transit to access the campus and the areas near the campus.

Table 4.15-1 Campus Baseline (2018) VMT Compared to Regional VMT Baseline (2018)

	VMT	Service Population	VMT per Service Population
UCR Campus Baseline	518,486	28,661	18.09
WRCOG Region Baseline	67,532,979	2,357,270	28.65
UCR Campus Baseline Plus Project (2021 LRDP)	750,916	42,545	17.65

Note: WRCOG = Western Riverside Council of Governments; VMT = Vehicle Miles Traveled; LRDP = Long Range Development Plan
Service population includes employees, residential students, and non-residential students/commuters
Source: Appendix J

Campus Gateways and Off-Ramp Queuing

Primary vehicular access points to the campus occur at Canyon Crest Drive as it enters West Campus north of Martin Luther King Boulevard, and University Avenue as it enters East Campus and transitions to Canyon Crest Drive traveling north. Figure 4.15-2 illustrates the trip distribution for travel on major arterials and the highway to the campus.

A freeway off-ramp queuing analysis was conducted at eight locations near the campus to determine queuing conditions at the off-ramps. Each intersection was configured according to its existing (and future, if applicable) arrival conditions, including signal timing and physical geometry. Off-ramp queue storage would be considered significant if projects implemented under the proposed 2021 LRDP increase the calculated 95th percentile queue length by movement exceeding 85 percent of the available storage length during the a.m. or p.m. peak hours.

Queuing results for the 2018 baseline conditions are detailed in the TIA and reflect findings that show queuing did not exceed 85 percent of the storage length at any ramp terminal intersections (Appendix J).

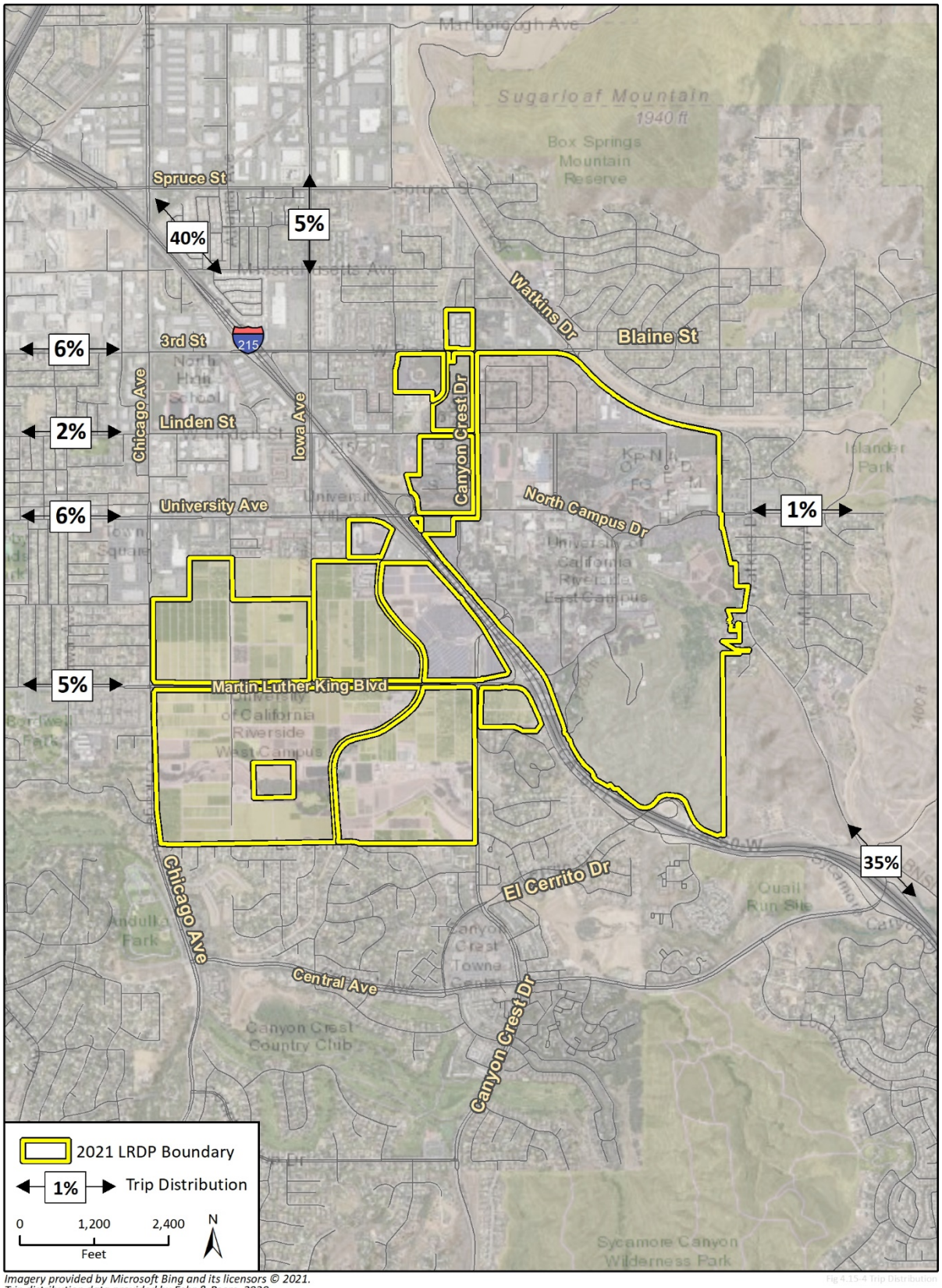
Site Access

Multiple roadways provide access to the campus, including Martin Luther King Boulevard, University Avenue, West Linden Street, Blaine Street, and Big Springs Road to the east and west, and Canyon Crest Drive, Watkins Drive, and Iowa Avenue to the north and south. Three interchanges along the I-215/SR 60 freeway at Blaine Street, University Avenue, and Central Avenue provide regional connectivity. Changes to vehicular access are not proposed as part of the proposed 2021 LRDP implementation.

On-site Circulation

On-site circulation is and would continue to be provided by a series of roadways and multi-modal paths connecting the buildings on the campus to the internal parking facilities and adjacent street network. North/South/East/West Campus Drive distributes vehicles to the perimeter of the Academic Center from the various external access points. Development of parking facilities at the campus edges prioritizes active transportation modes in the Academic Center by creating better access and pedestrian-oriented circulation.

Figure 4.15-2 Project Trip Distribution



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Trip distribution data provided by Fehr & Peers, 2020.

Parking

UCR actively manages parking demand through a tiered parking permit system where users purchase permits for various parking facilities at different price points, based on distance to the Academic Center. This Campus permit program generally necessitates mode choice and parking decisions before an individual initiates a trip to Campus. Campus parking supply and demand are reviewed regularly to identify the adequacy of the parking facilities. The University typically experiences peak parking demand in the first few weeks of the fall quarter. Based on past observations, historical parking data suggests that the campus' parking inventory has been able to accommodate 86% of this peak demand. The shortfall has typically been addressed through interim strategies including utilizing available capacity at the Hunter Park Metrolink Station and temporary leases of parking capacity in private ownership within reasonable proximity of the campus, coordination with RTA to improve transit access and increase ridership, and promotion of the Campus Transportation Demand Management (TDM) measures and UPASS (described in greater detail below). On average, 67 percent of parking spaces are occupied on campus during peak periods (UCR 2016a). UCR is also currently in the process of completing a new parking structure with approximately 1,079 space (Parking Structure 1), with construction completion anticipated in Summer 2021. The proposed 2021 LRDP projects that campus growth would create a net demand of up to 3,100 parking spaces on campus for a total projected capacity of approximately 12,700 spaces. To meet projected demand, the proposed 2021 LRDP includes construction of four new parking structures in addition to Parking Structure 1. However, this demand figure is likely conservative in light of the fact that the proposed 2021 LRDP includes housing for 68 percent of the increase in student population and because most development proposed within the LRDP is contained within a transit priority area, as shown in Figure 4.15-5 below.

In addition to the active parking management the UCR implements, the City has implemented residential parking permit programs on some residential streets near the campus. This residential parking program helps minimize the effect of UCR staff, students, and visitors from parking off-campus and walking onto campus. UCR staff work with the City and surrounding neighborhoods to develop solutions to parking related concerns on residential streets. Given all of these factors, UCR does not anticipate that individuals searching for parking will affect the trip length or otherwise affect the VMT analysis.

Pedestrian and Bicycle Facilities

Pedestrian connectivity is important for students, faculty, staff, and visitors to access campus facilities. Once on campus, walking is the primary mode of travel within and between school facilities. The pedestrian system consists of a network of walkways that connect parking areas with the Academic Center, athletic facilities, and student services. Pedestrian facilities include sidewalks, crosswalks, and pedestrian signals. Sidewalks are generally provided on most streets that border and traverse the campus, including the following:

- Iowa Avenue
- Canyon Crest Drive
- Watkins Drive
- Blaine Street
- West Linden Street
- University Avenue
- Martin Luther King Boulevard

- Big Springs Road
- North/South/East/West Campus Drive
- Aberdeen Drive

Pedestrian access to bus stops near and on campus occur along Canyon Crest Drive, West Campus Drive, Blaine Street, Big Springs Road, and at Parking Lot 30. The major streets that provide access to campus include Martin Luther King Boulevard, University Avenue, West Linden Street, Blaine Street, Canyon Crest Drive and Big Springs Road. These roadways have well-connected and maintained sidewalk networks near the campus. These streets currently provide access for pedestrians to the bus stops located near and on campus along Canyon Crest Drive, West Campus Drive, Blaine Street, Big Springs Road, and at Parking Lot 30.

Near UCR, the City has implemented bicycle facilities within rights-of-way of various classes. These include Class II facilities, striped lanes located next to curbs or parking lanes for the exclusive use of bicycle riders; and Class IV facilities, separated bikeways designed exclusively for bicycle travel and protected from vehicular traffic by some kind of separation (e.g., flexible posts, inflexible physical barriers, on-street parking).

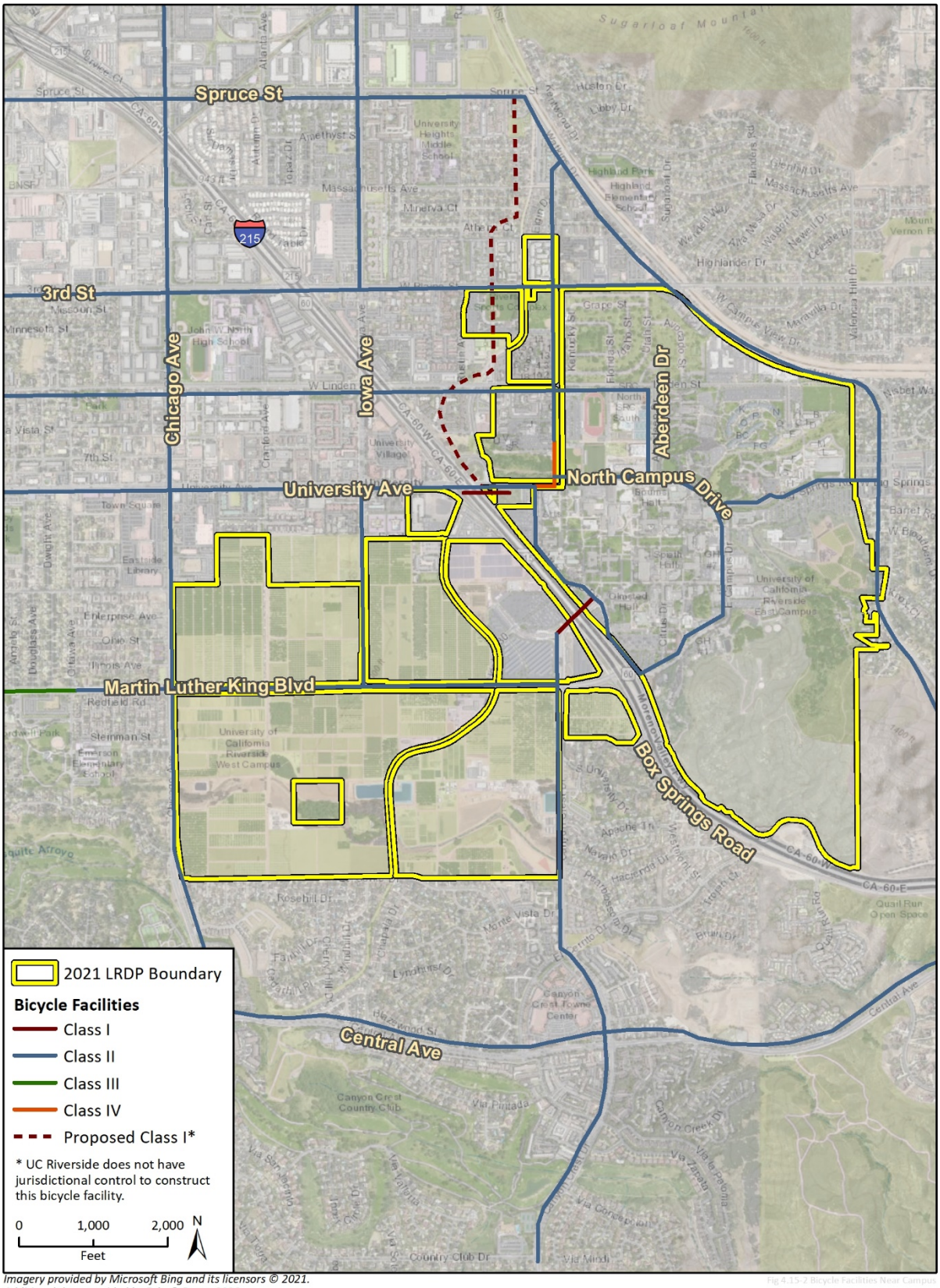
UCR seeks to expand its integrated network of bicycle and pedestrian facilities throughout the campus and actively promote use of these modes of alternative transportation. A campus-wide assessment of infrastructure to promote bicycle use was conducted in 2018 to evaluate existing conditions and recommend potential programs that could increase ridership, facilitate on-campus bicycle parking, and increase programs to support bicycle safety for the UCR community. This would also align with the City's goal to improve the bicycle network, increase cycling as a transportation mode, and eliminate barriers to cycling throughout the City, including to UCR (City of Riverside 2007, 2012). UCR current policies that support cycling to campus include offering free State bicycle registration to students and employees and information about bike safety.

Table 4.15-2 lists the bicycle facilities on nearby roadways and Figure 4.15-3 illustrates their locations.

Table 4.15-2 Bicycle Facilities near UCR

Roadway	Type	Location
Iowa Avenue	Class II on both sides of street	North of University Avenue
Canyon Crest Drive (north of University Avenue)	Class II on west side of street Class II on both sides of street Class IV on east side of street	Between University Avenue & Bannockburn Village driveway Between Bannockburn Village Driveway and Blaine Street Between University Avenue & Bannockburn Village driveway
Canyon Crest Drive (South of University Avenue)	Class I on both sides of street Class II on both sides of street	Between Martin Luther King Boulevard to the I-215/SR 60 freeway Martin Luther King Boulevard to West Campus Drive Between the I-215/SR 60 freeway to West Campus Drive
Watkins Drive	Class II on both sides of street	Between Blaine Street & the I-215/SR 60 freeway
Blaine Street	Class II on both sides of street	Between the I-215/SR 60 freeway & Iowa Avenue
West Linden Street	Class II on both sides of street	Between Aberdeen Drive & Iowa Avenue
University Avenue	Class II on both sides of street Class IV on south side of street	Between Canyon Crest Drive & Iowa Avenue Between West Campus Drive & Canyon Crest Drive
Big Springs Road	Class II on both sides of street	Between East Campus Drive & Mt. Vernon Avenue
Martin Luther King Boulevard	Class II on both sides of street	Between Canyon Crest Drive & Chicago Avenue
Aberdeen Drive	Class II on both sides of street	Between West Linden Street and North Campus Drive
North/South/East/West Campus Drive	Class II on both sides of street	On campus loop between Parking Lot 1 driveway and Aberdeen Drive

Figure 4.15-3 Bicycle Facilities Near Campus



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Additional data provided by Fehr & Peers, 2020.

Fig 4.15-2 Bicycle Facilities Near Campus

Disruptive Trends in Travel

Transportation and mobility are being transformed by several forces that range from new technologies, personal preferences, and the unique effects of unprecedented events such as the coronavirus 2019 (COVID-19) pandemic. The combination of these forces could alter travel demand relationships in unknown ways in the near- and long-term. These disruptive trends increase uncertainty in forecasting travel conditions, especially considering that new technologies, such as automated vehicles (AV) may operate on future networks within the planning horizon for the proposed 2021 LRDP.

The COVID-19 pandemic brings associated federal, State, and local government actions to curtail mobility and encourage physical distancing (i.e., limit in-person economic and social interactions) that temporarily but profoundly changed travel conditions during 2020/2021. While travel activity will likely return to some form of normality after government shelter-in-place orders lift and the pandemic abates, it is possible that some of these temporary changes will influence people's travel choices into the future, including either accelerating or diminishing some of the emerging trends in transportation already underway prior to the pandemic, that include the following:

- Substituting internet shopping and home delivery for some shopping or meal-related travel.
- Participating on social media platforms instead of social/recreational travel.
- Substituting telework for in-office work/commute travel.
- Using new travel modes and choices such as private transportation companies, car sharing, bicycle/scooter sharing, and on-demand micro transit services that contributed to changes in traditional travel demand relationships.
- Transitioning to Automated Vehicles for both passenger vehicles and commercial vehicles and trucks, research, development, and deployment testing of which is ongoing.[2]
- Connected vehicles can communicate wirelessly with their surroundings, including other vehicles, bicyclists, pedestrians, roadway infrastructure (i.e., traffic signals, toll facilities, and traffic management facilities) and the internet. The influence that connected vehicles may have is still speculative, but includes potential for reduction in collisions and congestion, and greater overall network performance optimization.

Transit Services

The Riverside Transit Agency (RTA) provides fixed route, commuter, and dial-a-ride bus service in western Riverside County. The City's Riverside Special Services offers Americans with Disabilities Act (ADA) transit support and all buses on fixed routes are equipped with bike racks that hold two bicycles. RTA routes that serve the UCR campus include routes 1, 10, 13, 14, 16, 51, 52, 204, 208, and RapidLink Gold Line, the times and stops of which are listed in Table 4.15-3. Figure 4.15-4 illustrates the transit routes near campus. Detailed schedule information is provided in Appendix J.

UCR partners with RTA in providing students, faculty, and staff free access to public transportation. Faculty, staff, and graduate students who commute daily using public transit are eligible to participate in the UPASS program. Faculty and staff enrolled in UPASS are also eligible to participate

[2] AVs do not require an operator and navigate roadways autonomously. Forecasts of how quickly research, development, and deployment testing will transition to full deployment and marketing of AVs vary widely on the pace of the transition, and the market acceptance of fully automated operation, and regulatory approval. More uncertainty exists around the behavioral response to AVs. In terms of VMT impacts on the transportation system and the environment, the worst-case scenario would be one in which AVs are privately owned, as they are now, but the automated function of AVs would cause them to be used more as described above.

in a Regional Ride Home Program offered through IE Commuter that reimburses the cost of up to two emergency rides home per year using private ride services. Transit ridership has increased five-fold since the UPASS program began in 2007, from 100,000 rides in the first year to approximately 600,000 rides between fall 2018 to fall 2019.

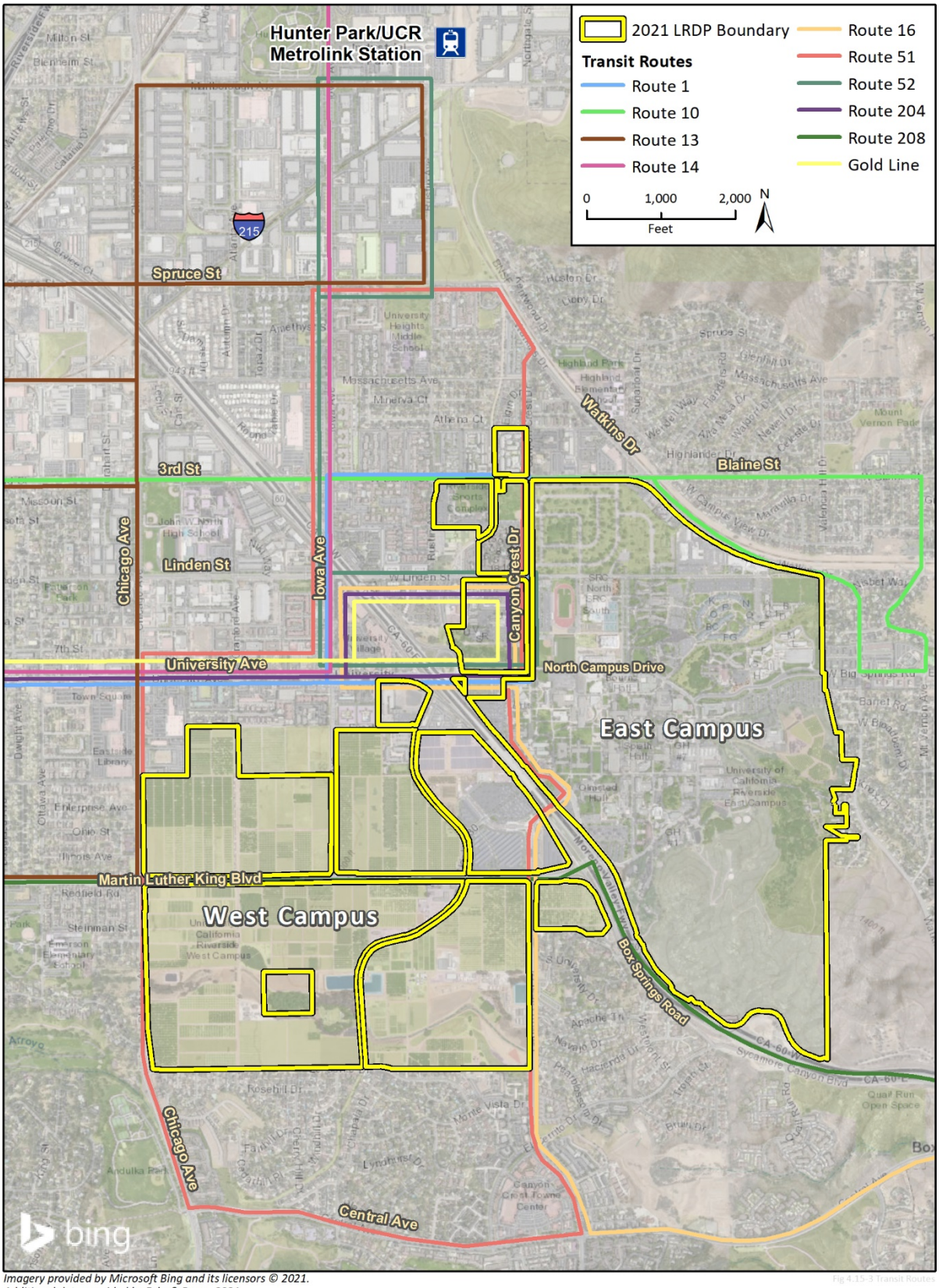
Metrolink, operated by the Southern California Regional Rail Authority is the regional commuter rail system that serves the Riverside region. Metrolink provides rail service to a six-county region, including Los Angeles, Ventura, Riverside, San Bernardino, Orange, and San Diego counties. It offers a discount for students and a cost-reduction incentive program for faculty and staff who use Metrolink for their daily commutes. Metrolink serves the campus with two local stations: Downtown Riverside and Hunter Park/UCR, approximately 2.8 miles west and 1.8 miles north of campus, respectively. Metrolink's 91/Perris Valley line runs from Los Angeles Union Station to the Downtown Riverside station at 5:45 am and from 3:35 pm to 7:15 am Monday through Friday; it offers service to the Hunter Park/UCR station from 3:35 pm to 5:30 pm Monday through Friday, and 3:15 pm to 7:12 pm Saturday and Sunday (Metrolink 2020).

Table 4.15-3 2018 Academic Year Transit Schedule to UCR

Route	Stops/Route	Operational Times
1	UCR – Downtown Riverside – Corona Metrolink Station	4:27 am to 11:17 pm, weekdays, every 20 minutes 5:37 am to 11:04 pm, weekends, every 30 minutes
10	Big Springs Road & Watkins Drive – Downtown Riverside – Galleria at Tyler	5:58 am to 9:06 pm, weekdays, every 60 minutes 8:04 am to 7:41 pm, weekends, every 90 minutes
13	Hunter Park/UCR Metrolink Station – Downtown Riverside – Galleria at Tyler	4:47 am to 8:17 pm, weekdays, every 60 minutes 7:26 am to 6:10 pm, weekends, every 60 minutes
14	Galleria at Tyler – Downtown Riverside– Loma Linda VA hospital	5:53 am to 8:17 pm, weekdays, every 75 minutes 7:15 pm to 5:42 pm, weekends, every 60 minutes
16	Moreno Valley Mall – UCR	4:24 am to 11:02 pm, weekdays, every 30 minutes 6:37 pm to 9:50 pm, weekends, every 30 minutes
51	UCR – Canyon Crest Town Center	7:00 am to 5:40 pm, weekdays, every 40 minutes
52	Hunter Park/UCR Metrolink Station – UCR	4:48 am to 7:30 pm, weekdays, every 40 minutes
204	UCR – Downtown Riverside – Ontario Mills Mall – Montclair Transit Center	6:33 am to 8:47 pm, weekdays, every 60 minutes
208	Temecula – Moreno Valley – Downtown Riverside	6:15 am to 8:49 pm, weekdays, every 40 minutes
Rapidlink Gold	Corona – Downtown Riverside – UCR	7:35 am to 9:35 am and 2:45 pm to 6:45 pm, weekdays, every 15 minutes

Source: Appendix J

Figure 4.15-4 Transit Routes near Campus



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Additional data provided by Fehr & Peers, 2021.

4.15.2 Regulatory Setting

Federal

No federal plans, policies, regulations, or laws related to transportation and circulation apply to the proposed 2021 LRDP. Federal regulations relating to the Americans with Disabilities Act (ADA), Title VI, and environmental justice do apply to transit service and access.

State

California Global Warming Solutions Act of 2006 (Assembly Bill 32 and Senate Bill 32)

The "California Global Warming Solutions Act of 2006," (Assembly Bill [AB] 32), outlines California's major legislative initiative for reducing GHG emissions. AB 32 codifies the statewide goal of reducing GHG emissions to 1990 levels by 2020 and requires California Air Resources Board (CARB) to prepare a Scoping Plan that outlines the main State strategies for reducing GHG emissions to meet the 2020 deadline. In addition, AB 32 requires CARB to adopt regulations to require reporting and verification of statewide GHG emissions. Based on this guidance, CARB approved a 1990 statewide GHG level and 2020 target of 431 million metric tons (MMT) of carbon dioxide equivalents (CO_2e), which was achieved in 2016. CARB approved the Scoping Plan on December 11, 2008, which included GHG emission reduction strategies related to energy efficiency, water use, and recycling and solid waste, among others (CARB 2008). Many of the GHG reduction measures included in the Scoping Plan (e.g., Low Carbon Fuel Standard, Advanced Clean Car standards, and Cap-and-Trade) have been adopted since the Scoping Plan's approval.

CARB approved the 2013 Scoping Plan update in May 2014. The update defined the CARB's climate change priorities for the next five years, set the groundwork to reach post-2020 statewide goals, and highlighted California's progress toward meeting the "near-term" 2020 GHG emission reduction goals defined in the original Scoping Plan. It also evaluated how to align the State's longer term GHG reduction strategies with other State policy priorities, including those for water, waste, natural resources, clean energy, transportation, and land use (CARB 2014).

On September 8, 2016, Governor Brown signed Senate Bill (SB) 32 into law, extending the California Global Warming Solutions Act of 2006 by requiring the State to further reduce GHG emissions to 40 percent below 1990 levels by 2030 (the other provisions of AB 32 remain unchanged). On December 14, 2017, the CARB adopted the 2017 Scoping Plan, which provides a framework for achieving the 2030 target. The 2017 Scoping Plan relies on the continuation and expansion of existing policies and regulations, such as the Cap-and-Trade Program, and implementation of recently adopted policies and legislation. The 2017 Scoping Plan also puts an increased emphasis on innovation, adoption of existing technology, and strategic investment to support its strategies. As with the 2013 Scoping Plan update, the 2017 Scoping Plan does not provide project-level thresholds for land use development. Instead, it recommends that local governments adopt policies and locally appropriate quantitative thresholds consistent with statewide per capita goals of six metric tons (MT) of CO_2e by 2030 and two MT of CO_2e by 2050 (CARB 2017). As stated in the 2017 Scoping Plan, these goals may be appropriate for plan-level analyses (city, county, sub-regional, or regional level).

Senate Bill 375

SB 375, signed in August 2008, enhances the State's ability to reach AB 32 goals by directing CARB to develop regional GHG emission reduction targets to be achieved from passenger vehicles for 2020

and 2035. In addition, SB 375 directs each of the State's 18 major Metropolitan Planning Organizations (MPO) to prepare a "sustainable communities strategy" (SCS) that contains a growth strategy to meet these emission targets for inclusion in the Regional Transportation Plan (RTP). On March 22, 2018, CARB adopted updated regional targets for reducing GHG emissions from 2005 levels by 2020 and 2035. Southern California Association of Governments (SCAG) was assigned targets of an 8 percent reduction in GHGs from transportation sources by 2020 and a 19 percent reduction in GHGs from transportation sources by 2035. In the SCAG region, SB 375 also provides the option for the coordinated development of subregional plans by the subregional councils of governments and the county transportation commissions to meet SB 375 requirements.

Senate Bill 743

Senate Bill 743 was signed into law on September 27, 2013 and declares that "automobile delay, as described solely be level of service or similar measures of vehicular capacity or traffic congestion shall not be considered a significant impact on the environment." It further directed the Office of Planning and Research (OPR) to develop revisions to the CEQA Guidelines to establish new criteria for determining the significance of transportation impacts. SB 743 was enacted, in part, as further implementation of California's Climate Action Plan to meet California Global Warming Solutions Act (AB 32) GHG emission reduction targets.

SB 743 seeks to reduce criteria air pollutants and GHG emissions in the transportation sector by reducing VMT. SB 743 changed the approach to transportation impact analysis by establishing measures such as VMT, VMT per capita, or automobile trip generation rates as the primary measures of transportation impacts and eliminates the traditionally used measures of auto delay, level of service (LOS), and other measures of traffic congestion as a basis for determining significant impacts. In December 2018, OPR adopted and promulgated its changes to the CEQA Guidelines (14 California Code of Regulations Section 15000 et seq.) and OPR's Advisory on Evaluating Transportation Impacts in response to SB 743.

Section 15064.3 of the CEQA Guidelines contains the operative language for implementing the goals of SB 743 when determining the significance of a project's transportation impacts. There are four key aspects of CEQA Guidelines Section 15064.3 that apply in the case of the projects under the proposed 2021 LRDP:

1. A project's effect on automobile delay shall not constitute a significant environmental impact (Section 15064.3[a]).
2. For a land use project like the proposed 2021 LRDP, "Vehicle miles traveled exceeding an applicable threshold of significance may indicate a significant impact… Projects that decrease VMT in the project area compared to existing conditions should be presumed to have a less than significant transportation impact" (Section 15064.3[b][1]).
3. A lead agency has discretion to choose the most appropriate methodology to evaluate a project's VMT, including whether to express the change in absolute terms, per capita, per household or in any other measure" (Section 15064.3[b][(4]).
4. The terms and conditions of Section 15064.3 apply prospectively, and a lead agency may elect to be governed by the provisions of [15064.3] immediately. Beginning on July 1, 2020, the provisions of [15064.3] shall apply statewide" (Section 15064.3[c]).

CEQA Guidelines Section 15064.3(b)(1) also states that "Generally, projects within one-half mile of either an existing major transit stop or a stop along an existing high quality transit corridor should be presumed to cause a less than significant transportation impact." This was based upon OPR's

Statement of Reasons for Regulatory Action which explained that "A significant body of research indicates that projects located close to existing transit will enable lower vehicle use because of the availability of transit. (See, e.g., Cervero, R. (2002). *Built Environments and Mode Choice: …*This reduction in vehicle miles traveled is most pronounced within one-half mile of transit. Notably, because many other programs and other statutory provisions focus on one-half mile surrounding transit, using that distance in the presumption promotes consistency with other policies. (See, e.g., Public Resources Code § 21155(b)…")

TECHNICAL ADVISORY ON EVALUATING TRANSPORTATION IMPACTS IN CEQA

To aid in SB 743 implementation, Governor's Office of Planning and Research (OPR) released a Technical Advisory on Evaluating Transportation Impacts in CEQA (Technical Advisory) in December 2018. The Technical Advisory provides advice and recommendations to CEQA lead agencies on how to implement SB 743 changes (OPR 2018). This includes technical recommendations regarding the assessment of VMT, thresholds of significance, VMT mitigation measures, and screening thresholds for certain land use projects. Lead agencies may consider and use these recommendations at their discretion.

The Technical Advisory identifies screening thresholds to quickly identify when a project should be expected to cause a less-than-significant impact without conducting a detailed study. The Technical Advisory suggests that projects meeting one or more of the following criteria should be expected to have a less-than-significant impact on VMT:

- Small projects—projects consistent with a SCS and local general plan that generate or attract fewer than 110 trips per day.
- Projects near major transit stops—certain projects (residential, retail, office, or a mix of these uses) proposed within 0.5 mile of an existing major transit stop or an existing stop along a high-quality transit corridor.
- Affordable residential development—a project consisting of a high percentage of affordable housing may be a basis to find a less-than-significant impact on VMT.
- Local-serving retail—local-serving retail development tends to shorten trips and reduce VMT. The Technical Advisory encourages lead agencies to decide when a project will likely be local-serving, but generally acknowledges that retail development including stores larger than 50,000 square feet might be considered regional-serving. The Technical Advisory suggests lead agencies analyze whether regional-serving retail would increase or decrease VMT (i.e., not presume a less-than-significant impact).
- Projects in low-VMT areas—residential and office projects that incorporate similar features (i.e., density, mix of uses, transit accessibility) as existing development in areas with low VMT will tend to exhibit similarly low VMT.

The Technical Advisory also identifies recommended numeric VMT thresholds for residential, office, and retail projects, as described below.

- Residential development that would generate vehicle travel exceeding 15 percent below existing residential VMT per capita may indicate a significant transportation impact. Existing VMT per capita may be measured as a regional VMT per capita or as city VMT per capita.
- Office projects that would generate vehicle travel exceeding 15 percent below existing regional VMT per employee may indicate a significant transportation impact.

- Retail projects that result in a net increase in total VMT may indicate a significant transportation impact.

For mixed-use projects, the Technical Advisory suggests evaluating each component independently and applying the significance threshold for each project type included. Alternatively, the lead agency may consider only the project's dominant use.

The VMT threshold guidance in OPR's Technical Advisory was based upon the *California Air Resources Board 2017 Scoping Plan-Identified VMT Reductions and Relationship to State Climate Goals* (CARB 2019). Consistent with that guidance, one of the thresholds for project-generated VMT is whether the project would result in a VMT per service population, which is 15 percent below the Existing Conditions VMT per service population for the WRCOG region. As explained in the Technical Advisory:

> Based on OPR's extensive review of the applicable research, and in light of an assessment by the California Air Resources Board (CARB) quantifying the need for VMT reduction in order to meet the State's long-term climate goals, OPR recommends that a per capita or per employee VMT that is 15 percent below that of existing development may be a reasonable threshold. [¶] Fifteen percent reductions in VMT are achievable at the project level in a variety of place types. [¶] Moreover, a 15 percent reduction is consistent with SB 743's direction to OPR to select a threshold that will help the State achieve its climate goals. As described above, section 21099 states that the criteria for determining significance must "promote the reduction in greenhouse gas emissions." In its document the CARB 2017 Scoping Plan-Identified VMT Reductions and Relationship to State Climate Goals, CARB assesses VMT reduction per capita consistent with its evidence-based modeling scenario that would achieve State climate goals of 40 percent GHG emissions reduction from 1990 levels by 2030 and 80 percent GHG emissions reduction levels from 1990 by 2050. Applying California Department of Finance population forecasts, CARB finds per-capita light-duty vehicle travel would need to be approximately 16.8 percent lower than existing, and overall per-capita vehicle travel would need to be approximately 14.3 percent lower than existing levels under that scenario. Below these levels, a project could be considered low VMT and would, on that metric, be consistent with 2017 Scoping Plan Update assumptions that achieve climate state climate goals… [¶] In summary, achieving 15 percent lower per capita (residential) or per employee (office) VMT than existing development is both generally achievable and is supported by evidence that connects this level of reduction to the State's emissions goals (OPR 2018).

The Project proposes to increase the number of students, faculty, staff, and residential beds on campus, which are the same uses considered in OPR's Technical Advisory setting proposed VMT thresholds. While all these population components are responsible for an increase in trips and VMT generated by the UCR campus, management of residential and employment VMT has been found to help the State reach emissions goals. The methodology utilized in the VMT analysis accounts for residential and employment VMT as well as additional VMT generated by nonresidential students who commute to the campus each day. The VMT threshold used in this study of 15 percent below the WRCOG baseline demonstrates that the UCR is balancing its increase in campus population while managing VMT and helping the State achieve emission goals.

Similarly, OPR's Technical Advisory further explains that a "project that falls below an efficiency-based threshold that is aligned with long-term environmental goals and relevant plans would have no cumulative impact distinct from the project impact. Accordingly, a finding of a less-than-significant project impact would imply a less than significant cumulative impact, and vice versa."

The Technical Advisory also provides guidance on transit. More specifically, OPR's Technical Advisory on Evaluating Transportation Impacts under CEQA explains "When evaluating impacts to multimodal transportation networks, lead agencies generally should not treat the addition of new transit users as an adverse impact" (OPR 2018). As also discussed in OPR's SB 743 amendment package transmittal letter "Legislative findings in Senate Bill 743 plainly state that CEQA can no longer treat vibrant communities, *transit,* and active transportation options as adverse environmental outcomes" (OPR 2017). As an example, the Technical Advisory suggests that "an infill development may add riders to transit systems and the additional boarding and alighting may slow transit vehicles, but it also adds destinations, improving proximity and accessibility. Such development also improves regional vehicle flow by adding less vehicle travel onto the regional network" (OPR 2018).

California Department of Transportation

Caltrans is responsible for planning, designing, constructing, operating, and maintaining the State highway system. Federal highway standards are implemented in California by Caltrans. Any improvements or modifications to the highway system, including ramps and access points, within the study area would need to be approved by Caltrans. The following Caltrans planning documents emphasize the State of California's focus on transportation infrastructure that supports mobility choice through multimodal options, smart growth, and efficient development.

- Smart Mobility 2010: A Call to Action for the New Decade (Smart Mobility Framework) (Caltrans 2010a)
- Complete Streets Implementation Action Plan (Caltrans 2010b, Caltrans 2013)
- Strategic Management Plan 2020-2024 (Caltrans 2021a)
- California Transportation Plan 2050 (Caltrans 2021b)

In the study area, Caltrans projects on the I-215/SR 60 freeway would occur outside the vicinity of the project study area.

Caltrans Encroachment Permit Requirements

Any work within the existing right of way would have to comply with Caltrans permitting requirements. This includes a traffic control plan that adheres to the standards set forth in the California Manual of Uniform Traffic Control Devices (MUTCD) (Caltrans 2021c). As part of these requirements, there are provisions for coordination with local emergency services, training for flagmen for emergency vehicles traveling through the work zone, temporary lane separators that have sloping sides to facilitate crossover by emergency vehicles, and vehicle storage and staging areas for emergency vehicles. MUTCD requirements also provide for construction work during off-peak hours and flaggers.

Executive Order B-48-18: Zero-Emission Vehicles

On January 26, 2018, Governor Brown signed Executive Order B-48-18 requiring all State entities to work with the private sector to have at least 5 million zero-emission vehicles (ZEVs) on the road by 2030, as well as install 200 hydrogen fueling stations and 250,000 electric vehicle (EV) charging stations by 2025. It specifies that 10,000 of the EV charging stations should be direct current fast chargers. This order also requires all State entities to continue to partner with local and regional governments to streamline the installation of ZEV infrastructure. The Governor's Office of Business and Economic Development (GO-Biz) published a Plug-in Charging Station Design Guidebook in July

2019 (GO-Biz 2019) and updated the Hydrogen Station Permitting Guidebook in September 2020 (GO-Biz 2020) to aid in these efforts. All State entities are required to participate in updating the 2016 Zero-Emissions Vehicle Action Plan, along with the 2018 ZEV Action Plan Priorities Update, which includes and extends the 2016 ZEV Action Plan (Governor's Interagency Working Group on Zero-Emission Vehicles 2016, 2018), to help expand private investment in ZEV infrastructure with a focus on serving low-income and disadvantaged communities.

Executive Order N-79-20

Governor Gavin Newsom signed Executive Order N-79-20 in September 2020, which sets a statewide goal that 100 percent of all new passenger car and truck sales in the State will be zero-emissions by 2035. It also sets a goal that 100 percent of statewide new sales of medium- and heavy-duty vehicles will be zero emissions by 2045, where feasible, and for all new sales of drayage trucks to be zero emissions by 2035. Additionally, the Executive Order targets 100 percent of new off-road vehicle sales in the State to be zero emission by 2035. CARB is responsible for implementing the new vehicle sales regulation.

University of California

UC Policy on Sustainable Practices

The UC established the UC Policy on Sustainable Practices, effective July 2020, which applies to all campuses and has the following goals related to reducing vehicle travel:

- Policy D.1: Each location will reduce GHG emissions from its fleet and report annually on its progress. Locations shall implement strategies to reduce fleet emissions and improve the fuel efficiency of all university-owned or operated fleet vehicles and equipment where practical options exist through acquisition and fleet operation protocols.
  - By 2025, zero-emission vehicles or hybrid vehicles shall account for at least 50 percent of all new light-duty vehicle acquisitions. Lawrence Berkeley National Laboratory will follow federal fleet requirements in the case where federal and UC fleet requirements conflict.
- Policy D.2: The University recognizes that single-occupant vehicle (SOV) commuting is a primary contributor to GHG emissions and localized transportation impacts.
  - By 2025, each location shall strive to reduce its percentage of employees and students commuting by SOV by 10 percent relative to its 2015 SOV commute rates.
  - By 2050, each location shall strive to have no more than 40 percent of its employees and no more than 30 percent of all employees and students commuting to the location [campus] by SOV.
- Policy D.3: Consistent with the State of California goal of increasing alternative fuel – specifically electric – vehicle usage, the University shall promote purchases and support investment in alternative fuel infrastructure at each location.
  - By 2025, each location shall strive to have at least 4.5 percent of commuter vehicles be ZEV.[3]
  - By 2050, each location shall strive to have at least 30 percent of commuter vehicles be ZEV.
- Each location (campus) will develop a business-case analysis for any proposed parking structures serving University affiliates or visitors to campus to document how a capital investment in

[3] ZEV stands for a zero-emissions vehicle.

parking aligns with each campus' Climate Action Plans and/or sustainable transportation policies.

University of California, Riverside

UCR Transportation Demand Management (TDM) Program

Transportation Demand Management programs include multi-pronged efforts such as marketing, incentives, expanded vanpool offerings, on- and near-campus housing amenities, parking pricing, and more. UCR encourages students to use designated bike paths to commute to and travel within the campus. Registered bicyclists or walkers are eligible to receive a complimentary parking allotment and are eligible to utilize the day-use locker and shower facilities at the Student Recreation Center without charge. UCR encourages ride-sharing services, and partners with Waze Carpool, an app-based resource that helps riders find someone to share rides to campus. The average vehicle ridership has increased from approximately 1.36 to 1.57 occupants per vehicle over the last 15 years.

UCR Standard Conditions during Construction Activities

Contractors are required to follow standard conditions during construction, including, but not limited to, the following:

- Construction parking must be configured to minimize traffic interference.
- Temporary traffic controls, such as a flag person, are provided during all phases of construction to maintain smooth traffic flow.
- Dedicated turn lanes are provided for movement of construction trucks and equipment on- and off-site.
- Construction activities that affect traffic flow on the arterial system are scheduled during off-peak hours, to the extent practicable.
- Improvements to traffic flow by signal synchronization are implemented, to the extent feasible.
- Vehicles and equipment are required to be properly tuned and maintained according to manufacturers' specifications.
- Construction trucks are rerouted away from congested streets or sensitive receptor areas, to the extent feasible.

Regional and Local (Binding)

Southern California Association of Governments Regional Transportation Plan & Sustainable Communities Strategy

Every 4 years, the Southern California Association of Governments (SCAG) updates its Regional Transportation Plan (RTP) for the 191-city SCAG region. The RTP assembles a regional project list based on input from cities, counties, transit agencies, congestion management agencies, regional transportation planning agencies, and Caltrans. This project list is then combined with population and employment growth forecasts. Beginning with the 2012 RTP, SB 375 required the inclusion of a Sustainable Communities Strategy (SCS) in RTPs prepared by metropolitan planning organizations (MPOs) such as SCAG. The key goal of the SCS is to achieve GHG emission reduction targets through integrated land use and transportation strategies, although SB 375 did not require any modification of the regional project list contained in the RTP. Instead, the focus is on other transportation and

land use strategies that influence vehicle travel; a key objective is for planners and developers to consider how land use patterns influence travel demand.

Riverside Traffic Analysis Model (RivTAM)

The Riverside Traffic Analysis Model (RivTAM) was used to develop traffic volume and VMT forecasts for this study.[4] The current RivTAM uses a 2008 base year, a 2035 future year, and Socioeconomic Data (SED) consistent with the SCAG 2008 Regional Transportation Plan (RTP) model. As the RIVTAM model was prepared before the 2016 SCAG Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS),[5] the roadway networks and SED were reviewed for consistency with the 2016 RTP/SCS in the study area as described below.

WRCOG has completed a Socio-Economic Data (SED) update within the WRCOG boundaries to maintain consistency with the 2016 SCAG RTP/SCS. Consistent with the SCAG model, this SED has a 2012 base year and a 2040 future year. This WRCOG SED information was utilized in the RivTAM for both the base year and future year modeling efforts.

Baseline 2018 campus population (students, residents, faculty, and staff) and projected LRDP growth information was provided by UCR for use in this analysis. The RivTAM base year UCR land uses were adjusted to reflect the 2018 campus population conditions for the Cumulative 2035 Future Year RivTAM Without Project scenario. Future year UCR land uses were updated to reflect growth consistent with expectations provided by UCR for the Cumulative Plus 2035 Project scenario. A list of approved and pending developments was also requested from the City of Riverside, County of Riverside, and City of Moreno Valley. These lists were then reviewed with land use assumptions in the future year model to ensure that all reasonably foreseeable projects within a fifteen-mile radius of UCR were accounted for in the land uses assumed in the model under cumulative conditions. Additional details on this modeling are included in Appendix J.

Regional and Local (Non-Binding)

As noted in Section 4, "University of California Autonomy," UCR, a constitutionally created State entity, is not subject to municipal regulations of surrounding local governments for uses on property owned or controlled by UCR that are in furtherance of the university's educational purposes. However, UCR may consider, for coordination purposes, aspects of local plans and policies of the communities surrounding the campus when it is appropriate and feasible, but not bound by those plans and policies in its planning efforts.

Western Regional Council of Governments TOD Planning Framework

The WRCOG policies for Transit-Supportive Development offers principles that support compact development in existing and proposed transit center station areas with an emphasis on direct, safe, and convenient pedestrian connections to stations and other transportation modes (WRCOG 2013). It encourages urban design that emphasizes pedestrian-oriented neighborhoods that are an asset to the communities in which they occur. The circulation policies are as follows:

[4] The RivTAM model was developed by the Riverside County Transportation Department in 2009. The *RivTAM Model Development & Validation Report and Users Guide* was prepared in February 2009 as a reference to using the RivTAM model. WRCOG updated the RivTAM model to be consistent with the 2016 SCAG RTP/SCS. WRCOG is the current manager of the RivTAM model and requests for a copy of the RivTAM model can be submitted to WRCOG staff.
[5] The 2016 SCAG Regional Transportation Plan/Sustainable Communities Strategy is available online http://scagrtpscs.net/Pages/FINAL2016RTPSCS.aspx

1. Promote linkages between transit center stations and other modes of transportation, including pedestrian, bicycle, automobile, bus, Metrolink, commuter rail, and airport facilities.
2. Seek to create balanced station area circulation concepts that provide equitable access to all forms of transportation in these focused station areas.
3. Design roadways, pedestrian walkways, bikeways, and transit routes to minimize conflicts between different modes of transportation that occupy the same or proximate rights-of-way.
4. When modifying the existing street network, encourage creation of walkable blocks, and an overall system which pedestrians can perceive and understand.

City of Riverside General Plan

The City's General Plan contains objectives, policies, and tools that aim to provide and improve transportation along with circulation throughout the City. Policies concerning regional roadways focus on supporting the development and improvement of major roadways such as Community and Environmental Transportation Acceptability Process corridors (Ramona Expressway/Cajalco Road), Van Buren Boulevard/I-215 Interchange, SR 91, SR 60, I-215, and I-15 freeways. Furthermore, there are also objectives, policies and tools that aim to create various options for modes of transportation that can reduce daily trips (City of Riverside 2018).

Although UCR is not required to comply with local planning documents, as it is a State entity, the University seeks to integrate its circulation planning with that of the City, as it relates to areas adjacent to the campus. The City's General Plan Transportation and Circulation Element contains objectives to increase and maintain a mix of transportation modes and transportation system management techniques that would be supported by the proposed 2021 LRDP approach to transportation infrastructure and to increasing use of multi-modal transportation options. The proposed 2021 LRDP policies also integrate with the City's objective to cooperate in regional transportation improvements that would reduce VMT and encourage telecommunications use to reduce air and noise pollution generated by vehicular traffic. Finally, the proposed 2021 LRDP policies support the City's objective to increase pedestrian and cyclist safety near schools and in residential neighborhoods.

4.15.3 Environmental Impacts and Mitigation Measures

Significance Criteria

UCR utilizes the following 2020 CEQA Guidelines Appendix G significance criteria questions related to Transportation.

Would the proposed 2021 LRDP:

a) Conflict with an applicable program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?
b) Conflict or be inconsistent with CEQA Guidelines Section 15064.3 (b)?
c) Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?
d) Result in inadequate emergency access?

Analysis Methodology

The transportation analysis that follows is based on the TIA prepared by Fehr & Peers (Appendix J). The updated CEQA Guidelines and SB 743 changed the criteria for determining what constitutes a significant transportation-related environmental impact such that it relies upon quantification of VMT instead of LOS. The OPR determined that projects can avoid full VMT analysis if they occur in a Transit Priority Area (CEQA Guidelines Section 15064.3(b)(1).) Figure 4.15-5 shows the TPAs around the campus.

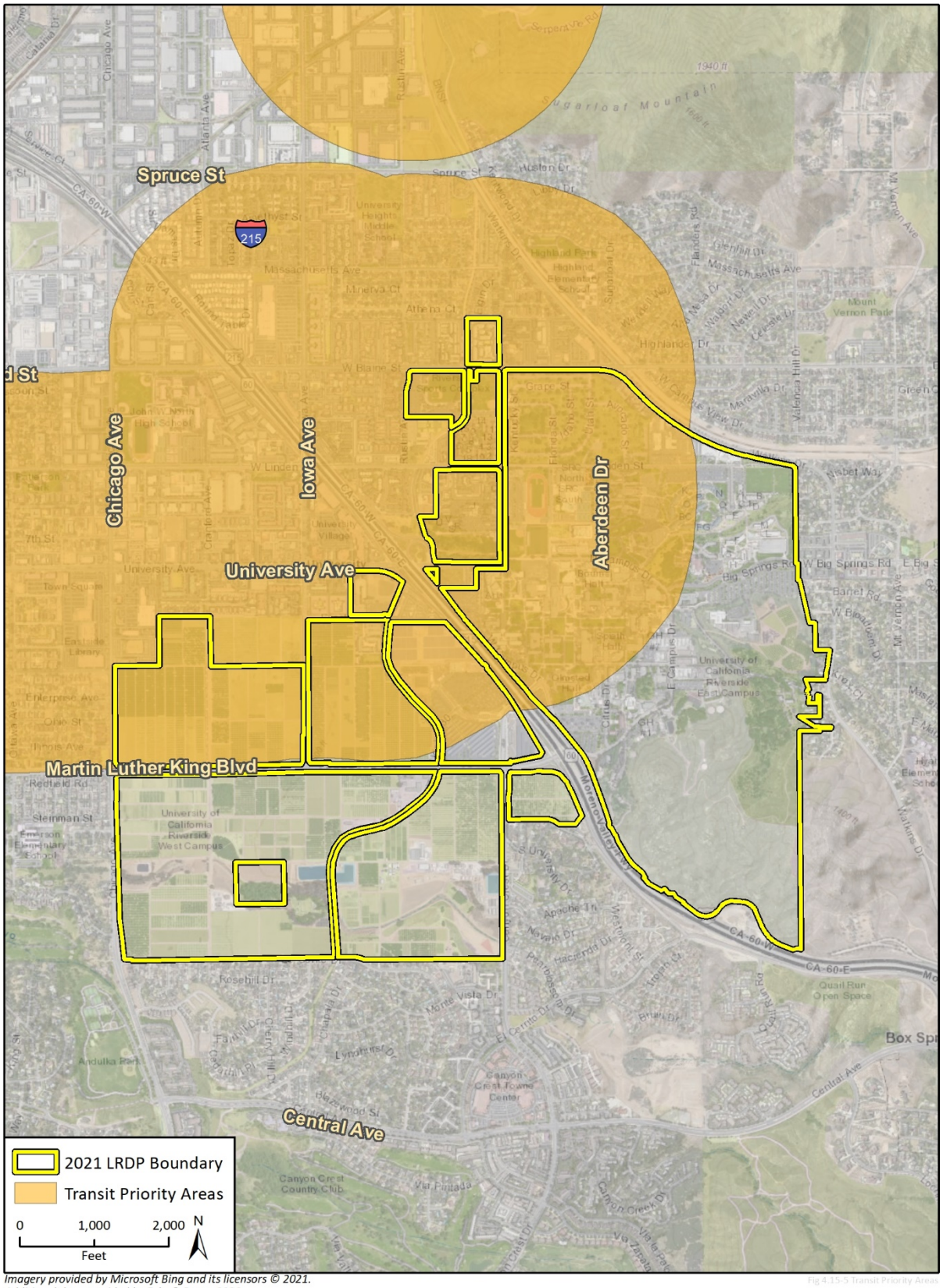
CEQA Guidelines Section 15064.3 (b)(1) states that lead agencies should generally presume projects within 0.5 mile of an existing major transit stop or a stop along an existing high-quality transit corridor will have a less than significant impact to transportation. This assumes development with better access to high-quality transit services is likely to result in more transit mode share and a reduction in VMT. In the campus vicinity, the RapidLink Gold Line qualifies as a major transit stop (Public Resources Code Section 21064.3). Most of the development anticipated to occur under buildout of the 2021 LRDP would occur within transit priority areas in the northern portions of East Campus and the northern portions of West Campus designated as Agricultural/Campus Research, Student Neighborhood, Campus Support, and University Avenue Gateway. Furthermore, the other portions of campus are connected to these areas by a series of interconnected pedestrian and bicycle paths described in Section 4.15.1.

The Technical Advisory states that “new retail development typically redistributes shopping trips rather than creating new trips,” and that “local-serving retail development tends to shorten trips and reduce VMT” by “adding retail opportunities into the urban fabric and thereby improving retail destination proximity.”

The VMT analysis reflects the number of vehicle-trips generated by operation of the campus and the expected distance that drivers will travel to and from UCR for work/school trips and other trips generated by campus visitors and students living in on-campus housing. UCR campus-wide VMT was calculated for each scenario based on the outputs of the current version of RivTAM (see Section 4.15.2 above and Appendix J for additional information on RivTAM). The metric identified for the transportation analysis is “Total VMT per Service Population.” This represents the daily VMT generated by operation of UCR divided by the number of employees, residential students, and commuter (nonresidential) students to the campus. The RivTAM was modified by adding 11,078 students, 7,489 residential beds, and 2,806 employees to assess the proposed 2021 LRDP-generated VMT per Service Population.

Project-generated VMT was estimated using the Origin/Destination method that ascertain the impact of the VMT generated by implementation of the proposed 2021 LRDP compared to the significance threshold. The Baseline (2018) Plus Project and Cumulative (2035) Plus Project VMT per Service Population calculations were determined by measuring the UCR campus-wide VMT plus the proposed 2021 LRDP population growth. These VMT measurements and associated calculations of VMT per Service Population were used to evaluate the VMT impact of UCR with the addition of the proposed 2021 LRDP projects. This calculation methodology reflects the VMT generation characteristics of the UCR campus with the inclusion of more faculty/staff, student housing residents, and commuter students proposed under the 2021 LRDP.

Figure 4.15-5 Transit Priority Areas



Imagery provided by Microsoft Bing and its licensors © 2021.
Additional data provided by Fehr & Peers, 2020.

The impact assessment for bicycle and pedestrian travel considers existing and planned bicycle and pedestrian facilities and reviews the proposed 2021 LRDP to determine if it would physically disrupt an existing facility or prevent the implementation of a planning facility. This assessment also considers whether the projects under the proposed 2021 LRDP would increase conflicts between cyclists and pedestrians and other modes of travel.

The impact assessment for transit considers existing and planned transit facilities and services and reviews the proposed 2021 LRDP to determine if it would physically disrupt an existing service or facility or prevent the implementation of a planned service or facility. This assessment also considers whether the projects under the proposed 2021 LRDP could conflict with transit performance standards established by transit operators.

The estimated increase in transit demand presumes that future background travel conditions remain relatively constant and does not account for potential changes associated with emerging travel technologies or increased mobility choices. As noted earlier, these emerging travel trends are already contributing to changes in the traditional travel demand relationships. Furthermore, the current COVID-19 pandemic and subsequent response by government agencies has reduced transit demand and shared mobility options. It is uncertain how this will translate into longer-term transit demand changes.

To determine whether the proposed 2021 LRDP would result in significant impacts under existing and cumulative scenarios related to transportation, the following thresholds would apply to criterion "b" and each independently supports the VMT significance conclusions of this EIR:

- A project would result in a significant project generated VMT impact if the Baseline (2018) Plus Project-generated VMT per Service Population exceeds 15 percent below the WRCOG baseline VMT per Service Population[6]; or the Cumulative[7] (2035) Plus Project-generated VMT per Service Population exceeds 15 percent below the WRCOG baseline VMT per Service Population.
- The proposed 2021 LRDP's effect on VMT would be considered significant if the cumulative link-level boundary WRCOG region VMT per Service Population increases under the Cumulative (2035) Plus Project condition compared to Cumulative (2035) conditions.[8]
- The WRCOG VMT per Service Population was calculated for the baseline condition using the RivTAM model to establish the regional threshold.
- The 2021 LRDP proposes to increase the population of the campus with greater numbers of students, faculty, staff, and residential beds. While all of these population components contribute to increases in trips and VMT generated by the operation of the campus, management of residential and employment VMT has been found to help the State reach emissions goals. The methodology utilized in the VMT analysis accounts for residential and employment VMT and additional VMT generated by nonresidential students who commute to the campus each day.

[6] The geographic scope of the VMT analysis utilized the geographic boundaries provided in the RivTAM model. The RivTAM model includes the geographic area of Riverside County and the SCAG area (Ventura, Los Angeles, Orange, San Bernardino, Riverside, and Imperial Counties) in the traffic modeling analysis. While the RivTAM model is used for projects located in the WRCOG region, the VMT analysis accounts for trips in the larger SCAG area.

[7] While the Campus has prepared a cumulative 2035 scenario, the 2018 analysis based upon the efficiency metrics is an independent basis for the cumulative analysis. As discussed in OPR's Technical Advisory on implementing SB 743, "project that falls below an efficiency-based threshold that is aligned with long-term environmental goals and relevant plans would have no cumulative impact distinct from the project impact. Accordingly, a finding of a less-than-significant project impact would imply a less than significant cumulative impact, and vice versa."

[8] This methodology is also described by OPR as an "Absolute" VMT metric. For further discussion and details of the legal and technical advisories, see Appendix J.

2021 LRDP Objectives and Policies

The proposed 2021 LRDP contains objectives and policies relevant to transportation including the following:

Land Use (LU)

- Objective LU5: Continue to grow on-campus student housing to 40 percent and increase student life facilities.
  - Policy: Provide increased housing capacity and student life facilities in existing student neighborhoods in the northern portions of East Campus.
- Objective LU6: Enhance Canyon Crest Drive as a new Campus "Main Street" and northern gateway.
  - Policy: Ensure that all proposed buildings increase a mix of active uses that have a street interface.
- Objective LU7: Celebrate the University Avenue corridor as the primary gateway into campus.
  - Policy: Promote new facilities in this area that serve a broad swath of the campus population, engage the community, and support multi-modal access.

Mobility (M)

- Mobility Objective M1: Reduce future vehicular traffic, parking demand, and GHG emissions by increasing student housing on campus up to 40 percent of projected enrollment in 2035.
  - Policy: Continue to grow and support on-campus residency by focusing on more affordable student housing options, as well as the capacity for returning students (upperclassmen) and graduate students.
  - Policy: Promote public transit as a convenient and preferred mode of commuting to campus and connecting campus residents to the community and regional designations.
  - Policy: Develop the University Avenue and Canyon Crest Drive Gateway streetscapes to support increased use and functional efficiency of the RTA system, improved clarity of drop-off and pick-up locations for ride-sharing services, reduced conflict, and improved safety for cyclists, pedestrians, and emerging micro-mobility solutions in these increasingly busy mixed-mode circulation areas.[9]
  - Policy: Improve access to public transit on campus by providing connectivity to access points via pathways or shuttles, as well as comfortable waiting facilities, proximate to commuter-related services, where appropriate.
  - Policy: Advocate and support the development of a Metrolink train platform along Watkins Drive, adjacent to campus to provide direct access and significantly reduce commute times. Consider dedicated vanpools or shuttles to nearby stations in the interim.
- Objective M2: Invest in infrastructure to increase bicycle use and support other active transportation modes to integrate desired routes with the campus' and City's circulation framework.

[9] Micro-mobility is a category of transportation provided by very light vehicles such as electric scooters, electric skateboards, shared bicycles, and electric pedal bicycles. The primary condition of inclusion in the category is a gross vehicle weight of less than 500 kilograms and operating at speeds typically lower than 15 mph (ITDP 2020).

  - Policy: Support and facilitate City-led initiatives to extend bikeways to campus from every direction, including routes proposed along Canyon Crest Drive, Martin Luther King Boulevard, and the Gage Canal.
  - Policy: Develop wayfinding systems to interconnect preferred bicycle routes and invest in safe and secure pathways along all bicycle routes.
  - Policy: Provide adequate support amenities to facilitate and encourage the use of bicycles and other alternative transportation modes.
  - Policy: Develop a comprehensive improvement plan for Campus Drive to improve function, safety, and utility for each mode of travel, as incremental growth occurs.
- Objective M3: Emphasize safe and pleasing passage for pedestrians and bicycle riders through the careful, continued development and integration of the campus multi-modal circulation framework and its extensions into the immediate community.
  - Policy: Identify and address gaps within the existing non-motorized circulation network, both on-campus and within the adjacent community.
  - Policy: Implement University policies to improve pedestrian safety and encourage social interaction in zones of high pedestrian activity.

2021 LRDP Alternative Transportation Features

UCR's site access and vehicular circulation plan would not change with the proposed 2021 LRDP. Under implementation of the proposed 2021 LRDP, circulation on campus would retain current services and expand as described below.

Pedestrian Access

The campus provides pedestrian access to buildings, parking areas, and surrounding neighborhoods through a system of walkways and plazas that create a pedestrian-friendly environment. These would continue to be part of new development under the proposed 2021 LRDP and the existing and added network of off-street paths will be designated as shared walkways and bikeways.

Bicycle Access

Along with pedestrian facilities, the proposed 2021 LRDP will encourage the use of bicycling as an active and sustainable mode of transportation. Shared facilities on all connecting roadways offer access to the campus from surrounding streets for bicyclists. Increased bicycle parking is also proposed throughout the campus.

Transit Access

Transit facilities are located near campus along Canyon Crest Drive, Blaine Street, Big Springs Road, and at Parking Lot 30. The proposed 2021 LRDP would not remove transit stops.

Impact Analysis

Impact T-1 Conflict with a Program, Plan, Ordinance, or Policy Addressing Roadway, Transit, Bicycle, and Pedestrian Facilities.

Implementation of the proposed 2021 LRDP would increase bicycle and pedestrian travel, but it would not physically disrupt an existing pedestrian or bicycle facility or interfere with implementation of a planned pedestrian or bicycle facility. Implementation of the proposed 2021 LRDP would not conflict with any existing programs, plans, ordinances, or policies that address the circulation systems. Impacts would be less than significant. No mitigation measures are required.

Pedestrian and Bicycle Travel

Projects implemented under the proposed 2021 LRDP would have an impact if they substantially disrupt existing pedestrian facilities, including adding new vehicular, pedestrian, or bicycle traffic at locations experiencing pedestrian safety concerns. New development implemented under the proposed 2021 LRDP would be designed to increase pedestrian connectivity, expanding the circulation system and facilitating safe movement for pedestrians on campus and in nearby or adjacent areas. As implementation of the proposed 2021 LRDP will continue UCR's investment in improving the quality, safety, and character of the pedestrian experience and ensuring it is developed with universal access in mind, the proposed 2021 LRDP would not conflict with any policies regarding pedestrian travel.

More specifically, the proposed 2021 LRDP incorporates Objective M2, which includes policies which support ongoing bike planning efforts, provide wayfinding for bicyclists, and amenities to support bicyclists. Objective M3 also includes policies to eliminate gaps in existing bicycle facilities, thereby resulting in improvements to baseline conditions. The 2021 LRDP also proposes that sections of the loop road will be improved incrementally as new buildings are built alongside the road; existing bicycle lanes will be widened, while auto travel lanes will be narrowed to slow traffic; and space for shade trees will be added to shade the sidewalk and roadway and buffer pedestrians from faster traffic. Additionally, traffic within sections of the campus loop road and internal campus streets including Eucalyptus Drive, Citrus Drive, and North Campus Drive will be transformed to pedestrian-priority routes and limited to service and emergency access only.

The proposed 2021 LRDP would continue to support initiatives that extend bicycle facilities from City streets to campus circulation routes and that invest in safe, secure pathways along all bicycle routes. Furthermore, projects implemented under the proposed 2021 LRDP would be encouraged to increase amenities that facilitate and encourage the use of bicycles and other alternative transportation modes. Implementation of the proposed 2021 LRDP would also include continued collaboration with the City to integrate its bicycle network with the campus and nearby areas where new development may occur. The proposed 2021 LRDP would, therefore, not conflict with bicycle master plans or other alternative transportation plans in the area.

Transit System Travel

As listed in Table 4.15-3, regional transit serves the campus and gives access to nearby shopping, dining, and entertainment options in areas like downtown Riverside, Moreno Valley, and the southwestern part of Riverside. Under the proposed 2021 LRDP, new development would not disrupt transit operations, and would improve access through increased connectivity along with improved access and safety. More specifically, Objective M1 includes policies which promote public

transit, provide for development of University Avenue and Canyon Crest Drive with streetscapes to improve functional efficiency of the RTA system, and advocate for the Metrolink train platform. The proposed 2021 LRDP would continue Transportation Demand Management programs, such as UPASS ride sharing, vanpooling, and other practices that encourage use of alternative transportation modes. Implementation of the proposed 2021 LRDP would not conflict with local or regional transportation plans, ordinances, or policies regarding circulation systems or transportation facilities.

Transit ridership has increased five-fold since the UPASS program began in 2007 to Fall 2019. The proposed 2021 LRDP notes that UCR will continue to partner with the City and RTA to address constraints and expand transit access for students, faculty, and staff. Furthermore, the proposed 2021 LRDP notes that UCR aspires to advocate for a new Metrolink station platform along Watkins Drive that would make campus more accessible from the larger southern California region and connect UCR to other research and learning institutions.

Primary vehicular access to the campus would continue to be provided from University Avenue, Canyon Crest Drive, West Linden Street, Watkins Drive, and secondarily, from other local streets under the proposed 2021 LRDP. Most of the development anticipated to occur under buildout of the 2021 LRDP would be infill development which would occur within transit priority areas in the northern portions of East Campus and the northern portions of West Campus designated as Agricultural/Campus Research, Student Neighborhood, Campus Support, and University Avenue Gateway. The proposed 2021 LRDP does not propose any substantive changes to the existing campus vehicular transportation network. Increased bicycle and other multi-modal networks and facilities are encouraged by objectives and policies in the proposed 2021 LRDP to make non-vehicular travel easier within the campus. The proposed 2021 LRDP includes policies to collaborate with other agencies (e.g., Metrolink, the City of Riverside) to expand transit options near the campus that extend access to nearby and more distant services by non-vehicular means.

Although UCR is not required to comply with local planning documents, as it is a State entity, the University seeks to integrate its circulation planning with that of the City, as it relates to areas adjacent to the campus. The City's General Plan Transportation and Circulation Element contains objectives to increase and maintain a mix of transportation modes and transportation system management techniques that would be supported by the proposed 2021 LRDP approach to transportation infrastructure and to increasing use of multi-modal transportation options. The proposed 2021 LRDP policies also integrate with the City's objective to cooperate in regional transportation improvements that would reduce VMT and encourage telecommunications use to reduce air and noise pollution generated by vehicular traffic. Finally, the proposed 2021 LRDP policies support the City's objective to increase pedestrian and cyclist safety near schools and in residential neighborhoods.

Because the proposed 2021 LRDP would continue to align its plans for regional connectivity with local and regional planning efforts, policies, and regulations, projects implemented under the 2021 LRDP would not conflict with those plans, programs, policies, or ordinances. Impacts would **be less than significant**.

Mitigation Measures

No mitigation measures are required.

Significance After Mitigation

Impacts would be less than significant without mitigation.

Impact T-2 Conflict or Be Inconsistent with CEQA Guidelines Section 15064.3, Subdivision (b) Related to Vehicle Miles Traveled.

Implementation of the proposed 2021 LRDP would result in additional vehicular travel associated with increased population on the campus, but VMT would continue to be below regional thresholds. Multi-use development implemented under the proposed 2021 LRDP combined with increased use of alternative modes of travel would result in lower VMT generated by the campus over time. Project-generated VMT per Service Population would be below the WRCOG 15 percent threshold. Impacts would be less than significant. No mitigation measures are required.

Construction

In situations where road closures are necessary, there are ample detour routes that are a short distance away and are not anticipated to substantially increase the miles traveled on the roadway network. Additionally, road closures can be coordinated to minimize the length of the time the road is closed or can occur during periods of time in which the campus population is low (during summer or school breaks) in an effort to minimize the number of vehicles that would be affected by a road closure. Therefore, construction impacts would be less than significant, and no mitigation measures are required.

Operation

The UCR campus is near existing residential and commercial land uses and multiple travel options, including the RapidLink Gold Line, RTA buses, and Metrolink, are available. Most of the development anticipated to occur under buildout of the 2021 LRDP would be infill development which would occur within transit priority areas in the northern portions of East Campus and the northern portions of West Campus designated as Agricultural/Campus Research, Student Neighborhood, Campus Support, and University Avenue Gateway. The intent of the proposed 2021 LRDP is to increase use of alternative modes of transportation, facilitate development that provides a mix of residential, commercial, and other services that will allow students, staff, and faculty to walk or cycle instead of drive, and to provide 40 percent of students with on-campus housing (approximately 68 percent of the increase in students).

The WRCOG VMT per Service Population was calculated for the baseline condition using the RivTAM model to establish the regional threshold. The baseline (2018) UCR campus and UCR campus with the proposed 2021 LRDP growth both operate more efficiently with a lower Project generated VMT per Service Population than the baseline (2018) WRCOG average (see Table 4.15-1). This is due to the VMT efficiency gained with the increase in the proportion of students living on campus; multimodal infrastructure throughout and around the campus which supports alternative modes of transportation; and continued use of Transportation Demand Management programs such as UPASS, ride-sharing, vanpooling, and support of other alternative modes of transportation. The 2021 LRDP growth-generated VMT is more efficient than the baseline WRCOG average, with a lower project-generated VMT per Service Population. This can be attributed to VMT efficiency gained when an increased proportion of students would live on campus with more campus housing,

multimodal infrastructure throughout and around the campus that supports alternative modes of transportation.

The CEQA Guidelines Section 15064.3(b)(1) states that "generally projects within [0.5] mile of either an existing major transit stop or a stop along an existing high quality transit corridor should be presumed to cause a less than significant transportation impact." The RapidLink Gold Line meets the requirement for a major transit stop and circulates on University Avenue, Canyon Crest Drive, West Linden Street, and Iowa Avenue directly on or within less than 0.5 mile of campus. Therefore, development that occurs near transit stops on those roadways, particularly in the proposed Canyon Crest Gateway, would have a less than significant impact under the proposed 2021 LRDP.

The proposed 2021 LRDP infill development that would form the Canyon Crest Gateway would support "an array of much needed commercial amenities and services presently unavailable on or in the immediate vicinity of campus." As noted above, increased mix of uses generally facilitates lower VMT as students can walk, cycle, or take other non-vehicular forms of transportation to services located close to where they live. New infill development facilitated by the proposed 2021 LRDP would therefore tend to reduce VMT, as supported by the RivTAM analysis and detailed in Table 4.15-1.

A threshold of 15 percent below the baseline WRCOG average VMT per Service Population was used as one threshold to identify potential project-generated impacts with the idea that the project would need to meet or fall below this level to have a less than significant impact. The baseline WRCOG average VMT was determined to be 28.65 VMT per Service Population. Applying the 15 percent below threshold to the WRCOG average resulted in a threshold of 24.35 VMT per Service Population. As reflected in Table 4.15-1, the UCR VMT per Service Population is 37 percent less than the WRCOG regional VMT. Baseline Plus Project VMT associated with 2021 LRDP implementation would be 38 percent lower than regional VMT, reflecting further reductions based on increased on-campus student residential population. VMT under the 2021 LRDP would be well below the 15 percent threshold, below baseline, and the other thresholds identified above. Impacts would be **less than significant**.

Mitigation Measures

No mitigation required.

Significance After Mitigation

Impacts would be less than significant without mitigation.

Impact T-3 Substantially Increase Hazards due to a Geometric Design Feature (e.g., Sharp Cures or Dangerous Intersections) or Incompatible Uses (e.g., Farm Equipment).

Development under the proposed 2021 LRDP would be constructed in such a way that changes would remain consistent to surrounding geometric design features and any redesign or construction of on-campus circulation paths would be designed and constructed to meet the Campus Construction and Design Standards. However, the increase in campus population under Cumulative plus Project conditions would result in an impact related to AM peak hour queueing at the I-215/SR-60 Freeway Southbound Ramps at Martin Luther King Boulevard. A mitigation measure has been proposed but its implementation is uncertain at this time. Impacts would be significant and unavoidable.

Construction

Construction management plans for each campus projects include information related to truck routes and construction site access and are reviewed and approved prior to construction activity commencing. With these review and approval procedures in place, project developed under the proposed 2021 LRDP would not result in hazardous conditions or incompatible uses. Construction management plans are prepared in accordance with the latest version of the California Manual on Uniform Traffic Control Devises and would not result in hazardous construction site features related to transportation. With inclusion of a construction management plan as standard condition of approval, construction impacts would be **less than significant**, and no mitigation measures are required.

Operation

Incompatible Uses

Existing farm equipment routes are mostly internal to West Campus, at times, the farm equipment crosses Martin Luther King Boulevard at the gates west of Iowa Avenue and at the intersection of Martin Luther King Boulevard and Parking Lot 30. There is also a farm equipment crossing point at Canyon Crest Drive and Iowa Avenue just south of the CARB facility. When there is work on East Campus, the farm equipment would travel on Canyon Crest Drive and take the campus loop (West/South/East Campus Drive) to the fields. UCR staff participates in tractor safety training and are required to abide by State law when driving farm equipment on City streets. Existing farm equipment movement processes, procedures, and safety measures would remain the same with implementation of the proposed 2021 LRDP. Impacts would be **less than significant,** and no mitigation measures are required.

Geometric Design Features

Most development under the proposed 2021 LRDP would be infill development, consistent with the existing land use context. As such, implementation of the proposed 2021 LRDP would generate a mix of traffic similar to existing conditions (primarily commuter traffic from students, faculty, and staff) that would circulate on existing internal campus streets and City roadways. The 2021 LRDP proposes that sections of the loop road will be improved incrementally as new buildings are built alongside the road; existing bicycle lanes will be widened, while auto travel lanes will be narrowed to slow traffic; and space for shade trees will be added to shade the sidewalk and roadway and buffer pedestrians from faster traffic. All development under the 2021 LRDP would be required to comply with applicable codes and regulations that govern traffic-related design features and uses,

driveways and site access, including ADA and National Association of City Transportation Officials standards.

The proposed 2021 LRDP does not include new roads that would introduce design features or re-design existing features in a manner that makes them less safe than they are under current conditions. Furthermore, the proposed infill development would not substantially change street designs, although new points of ingress and egress may be installed, depending on project-specific design. All designs would be subject to the Campus Construction and Design Standards, including those applicable to roads, parking facilities, and walkways or bicycle facilities. Therefore, no changes to circulation paths would introduce design features that would not align with Campus Construction and Design Standards. Impacts would be **less than significant,** and no mitigation measures are required.

CUMULATIVE PLUS PROJECT CONDITIONS

The increase in campus population Under Cumulative Plus Project conditions would result in an impact related to vehicle queueing at the I-215/SR-60 freeway southbound ramps at Martin Luther King Boulevard, which would occur only under AM Peak Hour Cumulative plus Project conditions. A queueing analysis was conducted to determine if there would be adequate storage capacity at the off-ramps under future conditions. Off-ramp queues were calculated using the 95th percentile queue length by movement at the off-ramp intersection. Off-ramp queue storage would be considered deficient if the proposed 2021 LRDP increases the calculated 95th percentile queue length by movement exceeds 85 percent of the available storage length during the AM or PM peak hours. Under Cumulative Plus Project conditions, freeway off-ramp queueing was found to exceed 85% of the storage length at the I-215/SR-60 freeway southbound ramps at Martin Luther King Boulevard with inclusion of proposed 2021 LRDP traffic. This is a significant impact.

Mitigation Measures

Improving the intersection is considered feasible pursuant to the following mitigation measure:

MM T-1 Intersection Queuing Improvement

Improvements to the intersection of I-215/SR-60 freeway southbound ramps at Martin Luther King Boulevard shall consist of reconfiguring the southbound approach from one left-turn lane and one shared through/right-turn lane to one shared left/through/right-turn lane and one right-turn lane. Optimizing the signal-timings with the geometric improvements shall also be required.

Significance After Mitigation

UCR does not have jurisdictional control over the identified intersection and any physical improvement would require an agreement with Caltrans. As the off-ramp is controlled by the Caltrans and physical improvements cannot be guaranteed at this time, the off-ramp queuing at this intersection is considered significant and unavoidable under the Cumulative plus Project scenario. Impacts would be significant and unavoidable. UCR recommends that Caltrans approve MM T-1. If Caltrans approves MM T-1, based on the Transportation Impact Analysis included as Appendix J to this EIR, impacts would be reduced to less than significant.

Impact T-4 Result in Inadequate Emergency Access.

Development under the Proposed 2021 LRDP would not include major changes to existing access points or on-campus circulation paths that would result in inadequate emergency access. All projects under the proposed 2021 LRDP would adhere to Campus Construction and Design Standards. They would undergo review and approval by the State Fire Marshal prior to implementation and use. Impacts would be less than significant. No mitigation measures are required.

Construction

Construction management plans for each campus projects include information related to truck route details, potential road closures/detours, and emergency access, and are reviewed and approved prior to construction activity commencing. With these review and approval procedures in place, project developed under the proposed 2021 LRDP would not result in inadequate emergency access to construction sites or nearby structures. Construction management plans are prepared in accordance with the latest version of the California Manual on Uniform Traffic Control Devises and include measures such as the following:

- Identify proposed truck routes to be used
- Include a public information and signage plan to inform student, faculty and staff of the planned construction activities, roadway changes/closures, and parking changes
- Store construction materials only in designated areas that minimize impacts to nearby roadways
- Limit the number of lane closures during peak hours to the extent possible. Inform the Campus before any partial road closure.
- Use Caltrans certified flag persons for any temporary lane closures to minimize impacts to traffic flow, and to ensure safe access into and out of the project sites
- Install traffic control devices as specified in the California Department of Transportation Manual of Traffic Controls for Construction and Maintenance Work Zones
- To minimize disruption of emergency vehicle access, affected jurisdictions (Campus Police, City Police, and City Fire Department) [are] consulted to identify detours for emergency vehicles, which will then be posted by the construction contractor
- Coordinate with local transit agencies for temporary relocation of routes or bus stops in works zones, as necessary
- Coordinate with other projects under construction near the project site, so an integrated approach to construction-related traffic is developed and implemented

Furthermore, as detailed in Section 4.18, *Wildfire*, in support of these standard practices, UCR has proposed continuing best practices (CBP) as conditions of individual project approval that would ensure, to the extent feasible, that at least one unobstructed lane in both directions on campus roadways are maintained specifically in the event of a wildfire emergency (**CBP WF-1**) and that the Campus Fire Marshal discloses roadway closures to the City of Riverside Fire Department and identify alternative travel routes, if necessary (**CBP WF-2**). As such, evacuation routes, if present within the specific roadway segment that would require temporary closure as noted above, would be similarly rerouted. Therefore, construction impacts would be **less than significant**, and no further transportation-specific mitigation measures are required.

Operation

Vehicular access to and around the UCR campus would continue to be provided from University Avenue, Canyon Crest Drive, West Linden Street, Watkins Drive, Big Springs Road, Martin Luther King Boulevard, and other local streets under the proposed 2021 LRDP. Most projects implemented under the proposed 2021 LRDP would be infill development, consistent with the existing land use context. The 2021 LRDP proposes that sections of the loop road will be improved incrementally as new buildings are built alongside the road; existing bicycle lanes will be widened, while auto travel lanes will be narrowed to slow traffic; and space for shade trees will be added to shade the sidewalk and roadway and buffer pedestrians from faster traffic. Additionally, traffic within sections of the campus loop road and internal campus streets including Eucalyptus Drive, Citrus Drive, and North Campus Drive will be transformed to pedestrian-priority routes and limited to service and emergency access only.

With more students and employees, the volume of traffic across all modes would increase, which may result in slower travel speeds for some modes. Fire and emergency access would remain the same. Providing adequate emergency vehicle access ensures emergency response vehicles can quickly answer service calls. Direct emergency access would be provided to all buildings from the surrounding streets and the multi-modal paths throughout the campus. All multi-modal paths would be designed to meet the requirements for emergency vehicle access, including provisions under the Fire Code (Chapter 10, Fire-related means of Egress and Fire Apparatus Access Road requirements), which will be reviewed by the Campus Fire Marshal during the plan review process.

New sidewalks or paths would be designed and constructed in accordance with the Campus Construction and Design Standards, and potentially applicable City standards (if within City's public right-of-way), to minimize hazardous conditions. New sidewalks or paths would undergo project-specific environmental review for project-scale safety hazards when a specific campus project advances through the development process. This would include review of means of egress, safety to life and property from fire and other hazards attributed to the built environment, and safety to fire fighters and emergency responders during emergency operations. As part of campus project-level environmental review, input from emergency services, including the campus's designated Deputy State Fire Marshal, would be solicited to ensure that emergency access meets the standards of service providers (UCR 2016b).

Because all projects implemented under the 2021 LRDP would adhere to the Campus Construction and Design Standards and State safety measures, including project-specific design and environmental review to ensure that substantial impacts would not occur. Impacts would be **less than significant**.

Mitigation Measures

No additional mitigation required.

Significance After Mitigation

Impacts would be less than significant without further mitigation.

4.15.4 Cumulative Impacts

Conflict with a Program, Plan, Ordinance, or Policy Addressing Roadway, Transit, Bicycle, and Pedestrian Facilities (Impact T-1)

Transit service providers regularly review operations and schedules and make adjustments to reflect rider demand, travel behavior, and traffic conditions. Additionally, cities regularly prepare, review, and update bicycle master plans and active transportation plans to identify new goals and policies associated with active transportation modes in the City. The identification of these goals and policies are done to reflect existing active transportation usage and plan for potential changes to usage. For example, the City of Riverside Bicycle Master Plan was adopted in 2007 and amended in 2012 and provides a blueprint for bicycle transportation and recreation in the City.

Additionally, the City is in the process of preparing an Active Transportation Plan and updating the Trails Master Plan as part of the Riverside PACT Project. These plans help the City create robust and accessible transportation options for residents and visitors well into the future. UCR has historically worked with the City to address transportation related concerns and provide insights on the development of various plans. UCR will continue to work with the City in the future as the campus and City change. Therefore, cumulative impacts related to conflicts with a program, plan, ordinance, or policy addressing roadway, transit, bicycle, and pedestrian facilities would be less than significant, and the project's contribution **would not be cumulatively considerable**.

VMT (Impact T-2)

As part of the review of future year projections in the WRCOG model, a list of approved and pending developments was also requested from the City of Riverside, County of Riverside, and City of Moreno Valley. These lists were then reviewed with land use assumptions in the future year model to ensure that all reasonably foreseeable projects within a fifteen-mile radius of UCR were accounted for in the land uses assumed in the model under cumulative conditions. A list of all approved and pending developments in the City of Riverside, County of Riverside, and City of Moreno Valley is provided in Appendix J.

The RivTAM future model was modified to reflect the baseline campus population and used to evaluate cumulative project generated VMT per Service Population. The addition of 11,078 students, 7,489 residential beds, and 2,806 employees were incorporated in the campus traffic analysis zones to assess the project-generated VMT per Service Population of the UCR campus with the proposed 2021 LRDP.

The Cumulative (2035) Plus Project scenario operates more efficiently with a lower Project generated VMT per Service Population than the identified threshold. This is due to the same notions of the Baseline (2018) Plus Project analysis. While the Campus has prepared a cumulative 2035 scenario, the 2018 analysis based upon the efficiency metrics is an independent basis for the cumulative analysis. As discussed in OPR's Technical Advisory on implementing SB 743, "project that falls below an efficiency-based threshold that is aligned with long-term environmental goals and relevant plans would have no cumulative impact distinct from the project impact. Accordingly, a finding of a less-than-significant project impact would imply a less than significant cumulative impact, and vice versa."

Overall VMT per Service Population would increase in the WRCOG region from the baseline to future year. The UCR campus follows this trend but would still be below the WRCOG average. The increase in the VMT per Service Population of the future UCR campus with the proposed 2021 LRDP

compared to the future baseline UCR campus is likely associated with the change in land use patterns in the WRCOG region in the future year, and not associated with the planning decisions in the proposed 2021 LRDP. The students and employees associated with future conditions would have more opportunities for goods and services in the WRCOG region. This increase in opportunities for goods and services along with the increase in students and employees could result in a varied trend of the VMT per Service Population Cumulative (2035) Plus Project condition as compared to the Baseline (2018) Plus Project condition.

A threshold of 15 percent below the baseline WRCOG average VMT per Service Population was used to identify potential project-generated impacts with the idea that the project would need to meet or fall below this level to have a less than significant impact. The baseline WRCOG average VMT was determined to be 28.65 VMT per Service Population. Applying the 15 percent below threshold to the WRCOG average resulted in a threshold of 24.35 VMT per Service Population. As reflected in Table 4.15-4, Cumulative (2035) Plus Project VMT associated with 2021 LRDP implementation would be 30 percent lower than regional VMT. Cumulative (2035) Plus Project VMT under the 2021 LRDP would be well below the 15 percent threshold, and below baseline conditions. Impacts would be less than significant, and the project's contribution would not be cumulatively considerable.

Table 4.15-4 Cumulative Project-Generated VMT

	VMT	Service Population	VMT per Service Population
Cumulative (2035) without project (future UCR campus)	560,180	28,661	19.55
Cumulative plus project (future UCR campus with LRDP)	848,022	42,545	19.93
WRCOG region	67,532,979	2,357,270	28.65
15% below WRCOG threshold	--	--	24.35

Note: Service population includes employees, residential students, and non-residential students/commuters

Source: Appendix J

Project effect on VMT was estimated using the boundary method on the future RivTAM model. This was completed by selecting all roadway segments in the RivTAM model within the WRCOG boundary and multiplying the number of trips on each roadway segment by the length of that roadway segment.

Project effect on VMT is a measure of the potential effects of a project because it captures the combined effect of new VMT, shifting of existing VMT to/from other neighborhoods, and/or shifts in existing VMT to alternate travel routes or modes. Project that have a positive effect on VMT result in a decrease in the regional VMT per Service Population. Conversely, projects that have a negative effect on VMT increase regional VMT per Service Population. A positive effect on VMT (i.e. a decrease in regional VMT per Service Population) is seen as improving VMT efficacy and better for the region.

As reflected in Table 4.15-5, the WRCOG VMT per Service Population under the "with project" condition does not exceed the WRCOG region, identified under the SCAG RTP/SCS condition. Cumulative impacts would be **less than significant (not cumulatively considerable)**.

Table 4.15-5 WRCOG Region Cumulative Project Effect on VMT

	Boundary VMT	Service Population	VMT per Service Population
Cumulative VMT per Service Population	64,586,173	3,568,224	18.10
Project effect on VMT per Service Population	64,665,606	3,582,108	18.05

Note: Service population includes employees, residential students, and non-residential students/commuters

Source: Appendix J

Hazardous Design or Incompatible Uses and Emergency Access (Impacts T-3 and T-4)

Hazardous design features and incompatibility with emergency access and emergency routes are typically localized impacts rather than cumulative in nature. Because all projects implemented under the 2021 LRDP would adhere to the Campus Construction and Design Standards and State safety measures, including project-specific design and environmental review to ensure that substantial impacts would not occur, project-contributable impacts would be less than significant. There are no foreseeable, wide-ranging road closures or route redirects planned in the vicinity of UCR which would, in conjunction with the implementation of the propose LRDP, result in short- or long-term cumulative impacts to emergency access or generally related to hazardous designs. Cumulative contributions would be **less than significant (not cumulatively considerable)**.

However, as described in Impact T-3, the increase in campus population under Cumulative Plus Project conditions would result in an impact related to vehicle queueing at the I-215/SR-60 freeway southbound ramps at Martin Luther King Boulevard, which would occur only under AM Peak Hour Cumulative Plus Project conditions. Feasible mitigation has been recommended, but UCR does not have jurisdictional control over the identified intersection and any physical improvement would require an agreement with Caltrans. UCR recommends that Caltrans approve MM T-1. If Caltrans approves MM T-1, based on the Transportation Impact Analysis included as Appendix J to this EIR, impacts would be reduced to less than significant. Regardless, the proposed 2021 LRDP would **contribute to significant cumulative impacts**.

4.15.5 References

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4.16 Tribal Cultural Resources

This section analyzes potential impacts related to tribal cultural resources from the implementation of the proposed 2021 LRDP. The analysis in this section has been prepared in accordance with CEQA Guidelines Section 15064.5 and considers potential impacts to Tribal Cultural Resources (TCR). This section includes a summary of TCR background information and a summary of consultation conducted by UCR with Native American groups as part of the AB 52 tribal consultation process. Potential impacts to archaeological and historical resources are addressed in Section 4.5, *Cultural Resources* and potential impacts to paleontological resources are addressed in Section 4.7, *Geology and Soils*.

4.16.1 Environmental Setting

The UCR campus lies in an area traditionally occupied by the Cahuilla, Gabrieleño/Tongva, Luiseño, and Serrano. These groups are discussed in further detail below.

Cahuilla

Traditional Cahuilla ethnographic territory extended west to east from the present-day City of Riverside (City) to the central portion of the Salton Sea in the Colorado Desert, and south to north from the San Jacinto Valley to the San Bernardino Mountains. The Cahuilla are speakers of a Cupan language. Cupan languages are part of the Takic linguistic subfamily of the Uto-Aztecan language family. Prior to European contact, Cahuilla social organization was hierarchical and contained three primary levels (Bean 1978: 580). The highest level was the cultural nationality, encompassing everyone speaking a common language. The next level included the two patrimoieties of the Wildcats (tuktum) and the Coyotes (‘istam). Every clan of the Cahuilla was in one or the other of these moieties. The lowest level consisted of the numerous political-ritual-corporate units called sibs, or a patrilineal clan (Bean 1978: 580).

Cahuilla villages were usually located in canyons or on alluvial fans near a source of accessible water. Each lineage group maintained their own houses (kish) and granaries and constructed ramadas for work and cooking. Sweathouses and song houses (for non-religious music) were also often present. Each community also had a separate house for the lineage or clan leader. A ceremonial house, or *kíšámnawet*, associated with the clan leader, held major religious ceremonies. Houses and ancillary structures were often spaced apart, and a “village” could extend over a mile or 2. Each lineage had ownership rights to various resource collecting locations, “including food collecting, hunting, and other areas. Individuals also owned specific areas or resources, e.g., plant foods, hunting areas, mineral collecting places, or sacred spots used only by shamans, healers and the like” (Bean 1990:2).

Foodstuffs were processed using a variety of tools, including portable stone mortars, bedrock mortars and pestles, basket hopper mortars, manos and metates, bedrock grinding slicks, hammerstones and anvils, and many others. Food was consumed from a number of woven and carved wood vessels and pottery vessels. The ground meal and unprocessed hard seeds were stored in large finely woven baskets, and the unprocessed mesquite beans were stored in large granaries woven of willow branches and raised off the ground on platforms to deter vermin. Pottery vessels were made by the Cahuilla and traded from the Yuman-speaking groups across the Colorado River and to the south.

The Cahuilla had adopted limited agricultural practices by the time Euro-Americans traveled into their territory. Bean has suggested that their "proto-agricultural techniques and a marginal agriculture" consisting of beans, squash, and corn may have been adopted from the Colorado River groups to the east (Bean 1978: 578). Certainly, by the time of the first Romero Expedition in 1823-24, they were observed growing corn, pumpkins, and beans in small gardens localized around springs in the thermal area of the Coachella Valley (Bean and Mason 1962: 104). The introduction of European plants such as barley and other grain crops suggest an interaction with the missions or local Mexican rancheros. Despite the increasing use and diversity of crops, no evidence indicates that this small-scale agriculture was anything more than a supplement to Cahuilla subsistence, and it apparently did not alter social organization.

Gabrieleño/Tongva

The name "Gabrieleño" denotes those people who were administered by the Spanish from the San Gabriel Mission, which included people from the Gabrieleño area proper, as well as other social groups (Bean and Smith 1978: 538; Kroeber 1925: Plate 57). Many contemporary Gabrieleño identify themselves as descendants of the indigenous people living across the plains of the Los Angeles Basin and use the native term Tongva (King 1994). This term is used in the remainder of this section to refer to the pre-contact inhabitants of the Los Angeles Basin and their descendants.

Tongva lands encompassed the greater Los Angeles Basin and three Channel Islands—San Clemente, San Nicolas, and Santa Catalina. The Tongva established large, permanent villages in the fertile lowlands along rivers and streams, specifically the Santa Ana River area. A total tribal population has been estimated of at least 5,000 (Bean and Smith 1978: 540), but recent ethnohistoric work suggests a number approaching 10,000 (O'Neil 2002). Houses constructed by the Tongva were large, circular, domed structures made of willow poles thatched with tule that could hold up to 50 people (Bean and Smith 1978). Other structures served as sweathouses, menstrual huts, ceremonial enclosures, and probably communal granaries. Cleared fields for races and games, such as lacrosse and pole throwing, were created adjacent to Tongva villages (McCawley 1996: 27). Archaeological sites composed of villages with various-sized structures have been identified.

The Tongva subsistence economy was centered on gathering and hunting. The surrounding environment was rich and varied, and the tribe exploited mountains, foothills, valleys, deserts, riparian, estuarine, and open and rocky coastal eco-niches. Like that of most native Californians, acorns were the staple food (an established industry by the time of the early Intermediate Period). Acorns were supplemented by the roots, leaves, seeds, and fruits of a wide variety of flora (e.g., islay, cactus, yucca, sages, and agave). Fresh water and saltwater fish, shellfish, birds, reptiles, and insects, as well as large and small mammals, were also consumed (Bean and Smith 1978: 546; Kroeber 1925: 631–632; McCawley 1996: 119–123, 128–131).

A wide variety of tools and implements were used by the Tongva to gather and collect food resources. These included the bow and arrow, traps, nets, blinds, throwing sticks and slings, spears, harpoons, and hooks. Groups residing near the ocean used oceangoing plank canoes and tule balsa canoes for fishing, travel, and trade between the mainland and the Channel Islands (McCawley 1996: 7). Tongva people processed food with a variety of tools, including hammerstones and anvils, mortars and pestles, manos and metates, strainers, leaching baskets and bowls, knives, bone saws, and wooden drying racks. Food was consumed from a variety of vessels. Catalina Island steatite was used to make ollas and cooking vessels (Kroeber 1925: 629, McCawley 1996: 129–138).

Luiseño

The Luiseño occupied territory along the coast between Aliso Creek and Agua Hedionda Creek that extended inland to Santiago Peak in the north and the east side of Palomar Mountain in the south, including Lake Elsinore and the Valley of San Jose (Bean and Shipek 1978). The population of the Luiseño prior to the arrival of Europeans is believed to be approximately 3,500 (O'Neil 2002). The term Luiseño was applied to the Native Americans who were administered by the Spanish from Mission San Luis Rey and later used for the Payomkawichum nation that lived in the area where the mission was founded (Mithun 2001: 539-540).

The Luiseño language belongs to the Cupan group of the Takic subfamily of languages (previously known as Southern California Shoshonean), along with their northern and eastern neighbors, the Gabrielino and Cahuilla (Bean and Shipek 1978). The Takic subfamily is part of the Uto-Aztecan language family, and its origins lie in the Great Basin (Mithun 2001:539). The language of their southern neighbors, the Ipai, is part of the Yuman family of languages, which is related to languages spoken throughout the southwest. Linguistic studies suggest that Takic-speaking immigrants from the Great Basin displaced Hokan speakers sometime after 500 BCE. Unsurprisingly, the Luiseño cultural practices were similar to other speakers of Takic languages, though they did have some things in common with their Ipai neighbors (Bean and Shipek 1978).

Prior to European contact, the Luiseño lived in permanent, politically autonomous villages, ranging in size from 50-400 people, as well as associated seasonal camps. Each village controlled a larger resource territory and maintained ties to other villages through trade and social networks. Trespassing in another village's resource area was cause for war (Bean and Shipek 1978). Villages consisted of dome-shaped dwellings (kish), sweat lodges, and a ceremonial enclosure (*vamkech*). Leadership in the villages focused on the chief, or *Nota*, and a council of elders or *puuplem*. The chief controlled religious, economic, and war-related activities. Chiefs of a religious party would lead their own patrilineal clan along with other, chiefless clans and individuals broken from other clans (Kroeber 1925; Bean and Shipek 1978).

The center of the Luiseño religion was *Chinigchinich*, the last of a series of heroic mythological figures. The heroes were originally from the stars and the sagas told of them formed Luiseño religious beliefs. Religious rituals took place in a brush enclosure that housed a representation of *Chinigchinich*. Ritual ceremonies included puberty initiation rites, burial and cremation ceremonies, hunting rituals, and peace rituals (Kroeber 1925; Bean and Shipek 1978). Puberty ceremonies for both girls and boys would include painting pictographs and petroglyphs (DuBois and Kroeber 1908:96), now categorized as the San Luis Rey style or "Luiseno Rectilinear Abstract" characterized by zigzags, chevrons, straight lines, and diamond chains (Hedges 2002).

Luiseño subsistence was focused on the acorn and supplemented by the gathering of other plant resources and shellfish, fishing, and hunting. Plant foods typically included pine nuts, seeds from various grasses, manzanita, sunflower, sage, chia, lemonade berry, prickly pear, and lamb's-quarter. Acorns were leached and served in various ways. Seeds were ground. Prey included deer, antelope, rabbit, quail, duck, and other birds. Fish were caught in rivers and creeks. Fish and sea mammals were taken from the shore or dugout canoes. Shellfish were collected from the shore and included abalone, turbans, mussels, clams, scallops, and other species (Bean and Shipek 1978).

Serrano

The Serrano occupied an area in and around the San Bernardino Mountains between approximately 1,500-11,000 feet above mean sea level. Their territory extended west of the Cajon Pass, east past

Twentynine Palms, north of Victorville, and south to Yucaipa Valley. The Serrano language is part of the Serran division of a branch of the Takic family of the Uto-Aztecan linguistic stock (Mithun 2001:539, 543). The two Serran languages, Kitanemuk and Serrano, are closely related. Kitanemuk lands were northwest of Serrano lands. Serrano was spoken originally by a relatively small group located in the San Bernardino and Sierra Madre mountains, and the term "Serrano" has come to be ethnically defined as the name of the people in the San Bernardino Mountains (Kroeber 1925:611). The Vanyume, who lived along the Mojave River and associated Mojave Desert areas and are also referred to as the Desert Serrano, spoke either a dialect of Serrano or a closely-related language (Mithun 2001:543). Year-round habitation tended to be located on the desert floor, at the base of the mountains, and up into the foothills, with all habitation areas requiring year-round water sources (Bean and Smith 1978).

Most Serrano lived in small villages located near water sources (Bean and Smith 1978:571). Houses measuring 12 to 14 feet in diameter were domed and constructed of willow branches and tule thatching and were occupied by a single extended family. Many of the villages had a ceremonial house, used both as a religious center and the residence of the lineage leaders. Additional structures in a village might include granaries and a large circular subterranean sweathouse. The sweathouses were typically built along streams or pools. A village was usually composed of at least two lineages. The Serrano were organized loosely along patrilineal lines and associated themselves with one of two exogamous moieties or "clans"—the *Wahiyam* (coyote) or the *Tukum* (wildcat) moiety.

The subsistence economy of the Serrano was one of hunting and collecting plant goods, with occasional fishing (Bean and Smith 1978:571). They hunted large and small animals, including mountain sheep, deer, antelope, rabbit, small rodents, and various birds, particularly quail. Plant staples consisted of seeds acorn nuts of the black oak, piñon nuts, bulbs and tubers, shoots, blooms, and roots of various plants, including yucca, berries, barrel cacti, and mesquite. The Serrano used fire as a management tool to increase yields of specific plants, particularly chía.

Trade and exchange was an important aspect of the Serrano economy. Those living in the lower-elevation, desert floor villages traded foodstuffs with people living in the foothill villages who had access to a different variety of edible resources. In addition to inter-village trade, ritualized communal food procurement events, such as rabbit and deer hunts and piñon, acorn, and mesquite nut-gathering events, integrated the economy and helped distribute resources that were available in different ecozones.

Contact between Serrano and Europeans was relatively minimal prior to the early 1800s. As early as 1790, however, Serrano began to be drawn into mission life (Bean and Vane 2002). More Serrano were relocated to Mission San Gabriel in 1811 after a failed indigenous attack on that mission. Most of the remaining western Serrano were moved to an *asistencia* built near Redlands in 1819 (Bean and Smith 1978:573).

A smallpox epidemic in the 1860s killed many indigenous southern Californians, including many Serrano (Bean and Vane 2002). Oral history accounts of a massacre in the 1860s at Twentynine Palms may have been part of a larger American military campaign that lasted 32 days (Bean and Vane 2002:10). Surviving Serrano sought shelter at Morongo with their Cahuilla neighbors; Morongo later became a reservation (Bean and Vane 2002). Other survivors followed the Serrano leader, Santos Manuel, down from the mountains and toward the valley floors and eventually settled what later became the San Manuel Band of Mission Indians Reservation, formally established in 1891.

Both the San Manuel Band of Mission Indians and the Morongo Band of Mission Indians are federally recognized tribes and include Serrano. People of both tribes participate in cultural programs to revitalize traditional languages, knowledge, and practices.

Existing Tribal Cultural Resources and Sensitivity

Psomas conducted a pedestrian field survey of the UCR campus on December 7, 2018 and December 11, 2018. The survey was conducted by walking open spaces and outcrops throughout the main campus, the UCR Botanic Gardens, West Campus agricultural fields, and the south campus hillside. Ground visibility ranged from 25 to 75 percent depending on location. Psomas identified and considered 17 previously conducted cultural resources studies that contained portions of the UCR campus and five previously recorded cultural resources on the UCR campus. Of the resources recorded on the UCR campus, three were prehistoric bedrock milling sites and two were built environment resources, the Gage Canal and the Barn Group. None of the previously recorded prehistoric resources were relocated during the 2018 survey, and no new resources were identified; however, physical indicators of human occupation and use could be disguised by the natural weathering of the granitic outcrops and the historical use and development that has occurred on the UCR campus (Psomas 2019).

Psomas concluded their study with an assessment of overall sensitivity of the LRDP area and indicated the southeastern portion of the LRDP area, is considered to have a high sensitivity for encountering unknown tribal cultural resources.

4.16.2 Regulatory Setting

Federal

No existing federal laws or regulations pertain to TCR within the proposed 2021 LRDP.

State

Assembly Bill 52

As of July 1, 2015, California AB 52 of 2014 was enacted and expanded CEQA by defining a new resource category, "tribal cultural resources (TCR)." AB 52 establishes that "A project with an effect that may cause a substantial adverse change in the significance of a TCR is a project that may have a significant effect on the environment" (PRC Section 21084.2). The bill further states that the lead agency shall establish measures to avoid impacts that would alter the significant characteristics of TCR, when feasible (PRC Section 21084.3). PRC Section 21074 (a)(1)(A) and (B) defines TCR as "sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American tribe" and meets either of the following criteria:

1) Listed or eligible for listing in the California Register of Historical Resources or in a local register of historical resources as defined in Public Resources Code section 5020.1(k), or
2) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resource Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.

AB 52 also establishes a formal consultation process for California tribes regarding those resources. The consultation process must be completed before a CEQA document can be certified. AB 52 requires that lead agencies "begin consultation with a California Native American tribe that is traditionally and culturally affiliated with the geographic area of the proposed project." Native American tribes to be included in the process are those that have requested notice of projects proposed in the jurisdiction of the lead agency.

Assembly Bill 275

AB 275 was designed to strengthen the California Native American Graves Protection and Repatriation Act of 2001 by revising various definitions including, among others, "the definition of 'California Indian tribe' to include both a tribe that meets the federal definition of Indian tribe and a tribe that is not recognized by the federal government, but that is a native tribe located in California that is on the list maintained by the Native American Heritage Commission," as well as the "definition of 'museum' to specify it receives state funds." AB 275 requires every state agency, as defined, with significant interaction with tribal issues, peoples, or lands, and request the Regents of the University of California, to designate one or more liaisons for the purpose of engaging in consultation with California Native American tribes on the tribal contact list and educating the agency on topics relevant to the state's relationship with those tribes. AB 275 also revises and recasts the process by which a direct lineal descendent or a California Indian tribe can request the return of human remains or cultural items.

University of California

UC's Native American Cultural Affiliation and Repatriation Policy

The UC is currently working on revising its Native American Cultural Affiliation and Repatriation Policy to incorporate new California Native American Graves Protection and Repatriation Act (CalNAGPRA) requirements as specified in AB 275. Key changes include:

- Definitions have been added or revised where needed to align with CalNAGPRA.
- As required by CalNAGPRA, deference to tribal traditional knowledge, oral histories, documentation, and testimonies is now indicated when determining State cultural affiliation, identifying cultural items under CalNAGPRA, and making decisions related to the CalNAGPRA repatriation process.
- In consultation with California Native American tribes, campuses must prepare preliminary inventories/summaries for submission to the NAHC.
- The AB 275 dispute procedures have been added.
- The AB 275 procedures for submissions of claims under CalNAGPRA have been incorporated.
- Updated flowcharts and corresponding narratives.

Regional and Local (Non-Binding)

As noted in Section 4, "University of California Autonomy," UCR, a constitutionally-created State entity, is not subject to municipal regulations of surrounding local governments for uses on property owned or controlled by UCR that are in furtherance of the university's educational purposes.

City of Riverside General Plan

The City's General Plan contains the following policy that are relevant to the evaluation of impacts to cultural resources under the proposed 2021 LRDP:

> Policy LU-4.6: Ensure protection of prehistoric resources through consultations with the Native American tribe(s) identified by the Native American Heritage Commission pursuant to Government Code Section 65352.3 and as required by the California Environmental Quality Act.

4.16.3 Environmental Impacts and Mitigation Measures

Significance Criteria

UCR utilizes the following 2020 CEQA Guidelines Appendix G significance criteria questions related to TCR.

Would the proposed 2021 LRDP:

a) Cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:

   i. Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k)?

   ii. A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resource Code section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe?

Issues Not Evaluated Further

Criterion a)i noted above is addressed in Section 4.5, *Cultural Resources* and therefore not addressed in this section.

Analysis Methodology

PRC Section 21074 defines TCR as "sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American Tribe" that are listed or determined eligible for CRHR listing, listed in a local register of historical resources, or otherwise determined by the lead agency to be a TCR. Impacts related to TCR were evaluated using the methodology outlined in Section 4.5, *Cultural Resources*, based in part on the Cultural Resource Constraints Study prepared for the proposed 2021 LRDP by Psomas in 2019, included in Appendix E and through the AB 52 tribal consultation process (see Appendix K).

To date, UCR has received six general requests for project notification pursuant to AB 52 (from the Agua Caliente Band of Cahuilla Indians (ACBCI), Torres-Martinez Desert Cahuilla Indians, Cahuilla Band of Indians, Pechanga Band of Luiseño Indians, San Manuel Band of Mission Indians, and Rincon Band of Luiseño Indians). In May 2020, UCR provided these tribes with notification of the proposed 2021 LRDP. A discussion of the AB 52 consultation process is provided below.

Agua Caliente Band of Cahuilla Indians

On June 26, 2020, the ACBCI responded, noting that the LRDP area is not located within the boundaries of the ACBCI Reservation but within the ACBCI's Traditional Use Area, and therefore, the ACBCI requested formal government-to-government consultation, a copy of the records search, cultural resources inventory, copies of any cultural resource documentation, and the presence of an approved Agua Caliente Native American Cultural Resource Monitor.

On July 27, 2020, UCR emailed the ACBCI to schedule consultation with the Tribe and provided a brief overview of the LRDP, information for the EIR Scoping Meeting, and provided a copy of the Cultural Resources Constraints Study that was prepared for the proposed 2021 LRDP that included information pertaining to the records search.

On October 23, 2020, the ACBCI provided a letter commenting on the Initial Study, which included continued AB 52 consultation, concurring a potentially significant impact determination in the Initial Study related to historic resources and archaeological resources but disagreed on the less-than-significant impact determination related to human remains. The ACBCI noted project-level mitigation should incorporate the presence of a tribal monitor for earth-disturbing activities.

On April 2, 2021, UCR emailed the ACBCI with the draft proposed mitigation measures for cultural resources/TCR for the Tribe's review and feedback and responded to the Tribe's comment on the significance determination related to human remains, noting that the university would comply with California Health and Safety Code Sections 7050.5 and 7052 and PRC Section 5097.98, such that if human remains are discovered during any construction activities, potentially damaging ground-disturbing activities in the area of the remains shall be halted immediately, and UCR shall notify the Riverside County Coroner and the NAHC immediately. A copy of the AB 52 notice and Cultural Resources Constraints Study was attached again for the Tribe's reference. UCR requested a response on the draft mitigation measures and/or whether the Tribe would like to schedule a Zoom meeting to discuss by April 16, 2021 and has yet to hear back from the Tribe.

Cahuilla Band of Indians

On May 19, 2020, the Cahuilla Band of Indians responded, noting that the LRDP area is within the Cahuilla traditional land use area and therefore requested tribal monitors from the Cahuilla Band of Indians to be present during all ground-disturbing activities and requested to be notified of all updates with campus projects moving forward.

On April 2, 2021, UCR followed up with the Cahuilla Band of Indians via email asking whether the Tribe would like to consult on the proposed 2021 LRDP AB 52 consultation process and noted that if UCR does not hear back from the Tribe by April 9, 2021, UCR would assume that the Tribe does not wish to consult. To date, the Cahuilla Band of Indians has not responded. The Tribe is included in the CEQA distribution list.

Pechanga Band of Luiseño Indians

On May 27, 2020, the Pechanga Band of Luiseño Indians responded requesting AB 52 consultation, to be included in the distribution list for public notices and circulation of all documents, and to be notified of public hearings and approvals. The Pechanga Band of Luiseño Indians notes that the LRDP area is part of *'Ataaxum* (Luiseño) and therefore within the Tribe's aboriginal territory as evidenced by the existence of cultural resources, named places, *tóota yixélval* (rock art, pictographs, petroglyphs), and an extensive *'Ataaxum* artifact record in the vicinity of the LRDP area. As such, the Pechanga Band of Luiseño Indians notes that the LRDP area is located within a Traditional Cultural

Property. The Pechanga Band of Luiseño Indians requests that no Phase II Testing or other ground-disturbing archaeological activities be conducted on the site until after the Tribe and UCR has consulted about TCR during the government-to-government consultation process. The Pechanga Band of Luiseño Indians also requested to review site plans, grading plans, and cultural and geotechnical reports. UCR responded to the Pechanga Band of Luiseño Indians, noting that no specific campus project is proposed at this time as the university is proposing an LRDP that is a long-term plan and therefore no specific site plans/grading plans have been prepared at this time. UCR provided the Pechanga Band of Luiseño Indians with the AB 52 notice again that provided a brief summary of the proposed land uses, campus population projection, and proposed development square footage through 2035 and noted that future campus projects would undergo specific CEQA analysis, at which point the Tribe would be provided with relevant plans and studies as part of the AB 52 process. UCR provided the Pechanga Band of Luiseño Indians with a copy of the Cultural Resources Constraints Study that was prepared for the proposed 2021 LRDP for the Tribe's reference.

On July 8, 2020, AB 52 consultation took place with the Tribe via Zoom to discuss potential cultural resources and that resources should be preserved and protected.

On April 2, 2021, UCR emailed the Pechanga Band of Luiseño Indians with the draft proposed mitigation measures for cultural resources/TCR for the Tribe's review and feedback. A copy of the AB 52 notice and Cultural Resources Constraints Study was attached again for the Tribe's reference. UCR requested a response back on the draft mitigation measures by April 16, 2021 and has yet to hear back from the Tribe. UCR noted that if the university does not hear back from the Tribe by the requested date, UCR would assume consultation has concluded. To date, the Pechanga Band of Luiseño Indians has not responded. The Tribe is included in the CEQA distribution list.

Rincon Band of Luiseño Indians

On June 23, 2020, UCR provided clarification to the Rincon Band of Luiseño Indians, noting that there were no specific projects, site plans, grading plans prepared for the proposed 2021 LRDP. The AB 52 notice with a brief summary of the proposed land uses, campus population projection, and proposed development square footage through 2035 was provided again. UCR also noted that future campus projects would undergo specific CEQA analysis, at which point the Tribe would be provided with relevant plans and studies as part of the AB 52 process. UCR provided the Rincon Band of Luiseño Indians with a copy of the Cultural Resources Constraints Study that was prepared for the proposed 2021 LRDP for the Tribe's reference.

A Zoom call with the Rincon Band of Luiseño Indians took place on June 26, 2020 to review the proposed 2021 LRDP, and the Tribe requested to review the proposed cultural resources/TCR mitigation measures when they were drafted, as well as the Confidential Appendix to the Cultural Resources Constraints Study.

On April 2, 2021, UCR emailed the Rincon Band of Luiseño Indians with the draft proposed mitigation measures for cultural resources/TCR for the Tribe's review and feedback. A copy of the AB 52 notice and Cultural Resources Constraints Study along with the Confidential appendix was provided at the Tribe's request. On April 23, 2021, the Rincon Band of Luiseño Indians responded requesting that the mitigation measure include archaeological and tribal monitoring for ground disturbing activities in the southeastern portion of the planning area based on the LRDP Cultural Resource Constraints Study noting the southeastern portion of the LRDP containing Val Verde Pluton geological features having high cultural sensitivity. On June 24, 2021, UCR sent an email to the Tribe noting that MM CUL-2 has been clarified noting where development occurs in the

southeastern quadrant of campus and in areas containing Val Verde Pluton geologic features considered highly sensitive to prehistoric archaeological resources, UCR shall hire a qualified archaeologist and a Native American monitor to reduce impacts to potential archaeological and/or TCR. UCR requested a response back on the updated draft mitigation measure by June 30, 2021 otherwise would assume the clarified MM CUL-2 addresses the Tribe's comment and thus would assume consultation has concluded. On June 29, 2021, the Rincon Band of Luiseño Indians responded in an email agreeing to the mitigation measures as outline below.

San Manuel Band of Mission Indians

On June 17, 2020, the San Manuel Band of Mission Indians responded, noting that the West Campus is outside of the Serrano ancestral territory; however, the East Campus area exists within the Serrano ancestral territory and therefore is of interest to the Tribe. The San Manuel Band of Mission Indians noted that given the amount of existing disturbance within the East Campus, the Tribe does not have any concerns with implementation of the LRDP as proposed at this time; however, the Tribe provided suggested proposed mitigation measures related to discovery of cultural resources, human remains, and TCR and requested that a variation of the proposed language be incorporated.

On April 2, 2021, UCR emailed the San Manuel Band of Mission Indians with the draft proposed mitigation measures for cultural resources/TCR for the Tribe's review and feedback. In regards to the San Manuel Band of Mission Indians suggested mitigation measures pertaining to human remains, UCR noted that the university would comply with California Health and Safety Code Sections 7050.5 and 7052 and PRC Section 5097, such that if human remains are discovered during any construction activities, potentially damaging ground-disturbing activities in the area of the remains shall be halted immediately and UCR shall notify the Riverside County Coroner and the NAHC immediately. A copy of the Cultural Resources Constraints Study was provided for the Tribe's reference.

On April 7, 2021, the San Manuel Band of Mission Indians responded and provided information regarding unanticipated discovery of human remains. A discussion related to human remains is provided under Impact CUL-3 in Section 4.5, *Cultural Resources*.

Torres-Martinez Desert Cahuilla Indians

On April 2, 2021, a follow-up email was sent to the Torres-Martinez Desert Cahuilla Indians, noting that the university has not heard from the Tribe on whether the Tribe would like to consult and attached the AB 52 notice for the Tribe's reference. UCR noted that if UCR does not hear back from the Tribe by April 9, 2021, UCR would assume that the Tribe does not wish to consult. To date, the Torres-Martinez Desert Cahuilla Indians has not responded.

2021 LRDP Objectives and Policies

The proposed 2021 LRDP contains objectives and policies relevant to TCR:

Open Space (OS)

- Objective OS5: Demonstrate an increased commitment to preservation and enhancement of the natural environment through the design and placement of future campus landscapes.
  - Policy: Protect the steep and natural hillsides on the southeast campus designated as an Open Space Reserve, to protect cultural resources and wildlife habitat, provide a visual backdrop to the campus, and protect against erosion.

Impact Analysis

Impact TCR-1 Substantial Adverse Change in the Significance of Tribal Cultural Resources.

Development facilitated by the proposed 2021 LRDP has the potential to impact tribal cultural resources. Impacts would be less than significant with mitigation.

Psomas conducted a pedestrian field survey of the UCR campus on December 7, 2018 and December 11, 2018. The survey was conducted by walking open spaces and outcrops throughout the main campus, the UCR Botanic Gardens, West Campus agricultural fields, and the south campus hillside. Ground visibility ranged from 25 to 75 percent depending on location. Psomas identified and considered 17 previously conducted cultural resources studies that contained portions of the UCR campus and five previously recorded cultural resources on the UCR campus. Of the resources recorded on the UCR campus, three were prehistoric bedrock milling sites and two were built environment resources, the Gage Canal and the Barn Group. None of the previously recorded prehistoric resources were relocated during the 2018 survey, and no new resources were identified; however, physical indicators of human occupation and use could be disguised by the natural weathering of the granitic outcrops and the historical use and development that has occurred on the UCR campus (Psomas 2019).

Psomas concluded their study with an assessment of overall sensitivity of the LRDP area and indicated the eastern portion of the LRDP area, especially in the southeast, is considered to have a high sensitivity for encountering cultural resources. The majority of the areas considered to have a high sensitivity for encountering cultural resources are within the proposed 2021 LRDP land use designation of Open Space Reserve or UCR Botanic Gardens.

As described previously, UCR sent notification letters to six tribes (the ACBCI, Torres-Martinez Desert Cahuilla Indians, Cahuilla Band of Indians, Pechanga Band of Luiseño Indians, San Manuel Band of Mission Indians, and Rincon Band of Luiseño Indians) in May 2020 per PRC 21080.3.1(b)(1). The AB 52 correspondence record is summarized above, and letters received are included as Appendix K.

Development under the proposed 2021 LRDP would primarily be infill development or expansion of already developed areas on the north portions of East Campus, which has low tribal cultural sensitivity. More specifically development under the proposed 2021 LRDP would occur primarily in previously disturbed areas, adjacent to previously developed areas, surface parking areas, generally along North/South/East/West Campus Drive, and generally along University Avenue, Canyon Crest Drive, Big Springs Road, Aberdeen Drive, and West Linden Street. A new interpretive center is programmatically assumed in the UCR Botanic Gardens designation on East Campus, which has high tribal cultural resource sensitivity, but no new development is currently anticipated in the Open Space Reserve in East Campus. New development on West Campus would primarily occur within infill sites designated in the proposed 2021 LRDP as Agricultural/Campus Research, Student Neighborhood, Campus Support, and University Avenue Gateway which have been previously primarily been used for agricultural uses and have low tribal cultural sensitivity.

While none of the envisioned development areas are located on sites of known prehistoric archaeological materials or TCR, there remains a potential that unrecorded prehistoric archaeological resources that may meet the definition of a TCR could be unearthed or otherwise discovered during ground-disturbing construction activities, including development in the UCR Botanic Gardens designation. As such, construction of projects under the proposed 2021 LRDP has

the potential to adversely impact TCR. Potential impacts to TCR would be less than significant with implementation of Mitigation Measures **MM CUL-2 through MM CUL-4** noted in Section 4.5, *Cultural Resources* and included below.

Mitigation Measures

CUL-2 Tribal Cultural Resources/Archaeological Monitoring

Prior to commencement of ground disturbing activities into an area with a medium or high potential to encounter undisturbed native soils including Holocene alluvium soils, as determined by UCR, UCR shall hire a qualified archaeological monitor meeting the Secretary of the Interior's Professional Qualification Standards for archaeology (National Park Service 1983) to identify archaeological resources and cultural resources of potential Native American origin. Where development occurs in the southeastern quadrant of campus, and in areas containing Val Verde Pluton geologic features considered highly sensitive to prehistoric archaeological resources, UCR shall hire a qualified archaeologist and a Native American monitor to reduce impacts to potential archaeological and/or tribal cultural resources. The monitor(s) shall be on-site during any construction activities that involve ground disturbance. The on-site monitoring shall end when project-related ground disturbing activities are completed, or, in consultation with the lead agency and tribes as appropriate and based on observed conditions, monitoring may be reduced or eliminated prior to completion of ground-disturbing activities, when the monitor(s) has indicated that the project site has a low potential to encounter tribal cultural resources (TCR)/archaeological resources. Consolidated monitoring efforts (e.g., archaeological monitoring/tribal cultural/paleontological monitoring) may occur if the individual monitor meets the applicable qualifications, except for development in the southeastern quadrant as detailed above.

CUL-3 Construction Worker Training

For projects requiring TCR/archaeological monitoring, the monitor shall provide preconstruction training for all earthmoving construction personnel prior to the start of any ground disturbing activities, regarding how to recognize the types of TCRs and/or archaeological resources that may be encountered and to instruct personnel about actions to be taken in the event of a discovery. UCR Planning, Design & Construction Project Manager/contractor shall retain documentation showing when training of personnel was completed.

CUL-4 Unanticipated Discovery of Tribal Cultural Resources/Archaeological Resources.

If previously undiscovered TCRs and/or archaeological resources are identified during construction, all ground disturbing activities within 100 feet of the resource shall halt, UCR Planning, Design & Construction staff shall be notified, and the find shall be evaluated by a qualified archaeologist meeting the Secretary of the Interior standards to determine whether it is a unique archaeological resource, as defined by CEQA. If the discovery appears to be Native American in origin, a tribal representative will be contacted within 24 hours of discovery to determine whether it is a TCR, as defined by CEQA. If the find is neither a unique archaeological resource nor a TCR, work may resume. If the find is determined to be a unique archaeological resource or TCR, the archaeologist and the tribal representative, as appropriate, shall make recommendations to UCR Planning, Design & Construction staff on the measures that will be implemented, including, but not limited to, preservation in place, excavation, relocation, and further evaluation of the discoveries pursuant to

CEQA. Preservation in place (i.e., avoidance) is the preferred method of mitigation for impacts to TCRs/archaeological resources. If UCR determines that preservation in place is not feasible, the archaeologist shall design and implement a treatment plan, prepare a report, and salvage the material, as appropriate. Any important artifacts recovered during monitoring shall be cleaned, catalogued, and analyzed, with the results presented in a report of findings that meets professional standards. Work on-site may commence upon completion of any fieldwork components of the treatment plan.

Significance After Mitigation

Implementation of Mitigation Measures **MM CUL-2 through MM CUL-4** would reduce potential impacts to tribal cultural resources to **less-than-significant** levels, because mitigation would be developed in coordination with the appropriate federal, State, and/or local agency and tribes to avoid, move, record, or otherwise treat the archaeological resource appropriately, in accordance with pertinent laws and regulations.

4.16.4 Cumulative Impacts

A project's environmental impacts are "cumulatively considerable" if the "incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future project" (*CEQA Guidelines* Section 15065[a][3]). The geographic scope for cumulative TCR impacts for the UCR campus include Cahuilla, Gabrieleño/Tongva, Luiseño, and Serrano territory. This geographic scope is appropriate for TCR, because TCR are regionally specific and determined by the local tribes. Cumulative buildout within the campus, including projects in accordance with various applicable planning documents would have the potential to adversely impact TCR. Cumulative development on the UCR campus would continue to disturb areas with the potential to contain TCR. Given the potential to damage these unknown TCR, cumulative impacts are considered significant without mitigation. Cumulative projects are reviewed separately by the appropriate jurisdiction and undergo environmental review when it is determined that the potential for significant impacts exists. In the event that future cumulative projects would result in impacts to known or unknown TCR, impacts to such resources would be addressed on a case-by-case basis and would likely be subject to mitigation measures similar to those imposed for this proposed 2021 LRDP as a result of the CEQA process. Cumulative impacts to TCR would therefore be significant.

As described under Impact TCR-1, development facilitated by the proposed 2021 LRDP would result in significant impacts without mitigation to unknown TCR, therefore the project's contribution is considered cumulatively considerable without mitigation. Mitigation Measures **MM CUL-2 through MM CUL-4** would reduce impacts to less than significant. Therefore, the project's **contribution to significant cumulative impacts to TCR would be less than significant with mitigation**.

4.16.5 References

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4.17 Utilities and Service Systems

This section analyzes impacts associated with water supplies, wastewater conveyance, treatment, and disposal, solid waste disposal, stormwater management, and telecommunications facilities to accommodate the demands and generation associated with implementation of the proposed 2021 LRDP. For additional information related to electricity and natural gas infrastructure and supplies see Section 4.6, *Energy*.

4.17.1 Environmental Setting

Water Supply

UCR receives its water supply from the RPU, which provides most of the City's water service, delivering to more than 64,000 service connections and over 300,000 people. UCR campus receives its entire water supply from the RPU, and its water demands for UCR are accounted for in the RPU's Urban Water Management Plan (UWMP), which is discussed further below. The RPU UWMP and its appendices are incorporated by reference and include discussion of regional cumulative water demand, water supplies, water supply reliability, water shortage contingency planning, future water supply projects, and climate change effects.

Locally produced groundwater resources constitute approximately 80 percent of the annual supply delivered by RPU to its service connections and, notably, all the groundwater basins that provide supply to RPU are adjudicated. This means each basin is managed pursuant to an Adjudication Judgment which is administered by a Watermaster towards the goal of maintaining sustainable groundwater conditions. A copy of the Adjudication Judgment is included as Appendix I to the 2016 RPU UWMP. As a party to the Adjudication Judgement, RPU has an established annual allocation of groundwater that it may use from the adjudicated basins, any deviation in use from what is defined in the Adjudication Judgement requires review and approval by the Watermaster. Therefore, by nature of the basins being adjudicated, they are managed to maintain sustainable conditions. Adjudication is discussed further below as relevant to the proposed 2021 LRDP and RPU.

On May 10, 2021, the Governor of California declared a state of emergency related to drought conditions in California. As outlined in the regulatory setting discussion below, this initiates temporary drought contingency measures for water suppliers and public agencies (Governor of California 2021).

City of Riverside Public Utilities

The Water Division of RPU is comprised of four groups: Engineering, Water Resources, Water Field Operations, and Water System Operations (RPU 2017). The City's water comes from both groundwater and surface water resources. Local groundwater is produced from the Bunker Hill Basin, the Rialto-Colton Basin, and the Riverside North and South Basins. RPU also receives recycled water produced by the Riverside Water Quality Control Plant (RWQCP). In addition, when needed to meet peak demands, RPU can purchase imported State Water Project (SWP) water from Western Municipal Water District (WMWD) of Riverside County. WMWD is a member agency of the Metropolitan Water District of Southern California (Metropolitan) and has a direct connection to Metropolitan's Henry J. Mills Water Treatment Plant, which is one of Metropolitan's five treatment plants, and delivers treated SWP water via gravity flow to WMWD and other member agencies as needed (RPU 2017).

Table 4.17-1 summarizes RPU's current and projected water resources to 2040, which are discussed further in the following sections.

Table 4.17-1 Current and Projected Cumulative RPU Water Supplies

Water Supplies (AFY)	2015[1]	2020	2025	2030	2035	2040
Groundwater						
Bunker Hill Basin	53,793	55,263	55,263	55,263	55,263	55,263
Riverside North	6,357	10,902	10,902	10,902	10,902	10,902
Riverside South	13,571	16,880	16,880	16,880	16,880	16,880
Rialto-Colton	1,205	2,728	2,728	2,728	2,728	2,728
Future Groundwater Extraction/ Conjunctive Use Projects[2]	0	3,000	8,000	10,800	10,800	10,800
Groundwater Total	**74,926**	**88,773**	**93,773**	**96,573**	**96,573**	**96,573**
Other Sources						
Recycled Water from RWQCP	200	6,430	6,430	6,430	6,430	6,430
Imported/Purchased Water from WMWD[3]	0	21,700	21,700	21,700	21,700	21,700
Other Sources Total	**200**	**28,130**	**28,130**	**28,130**	**28,130**	**28,130**
Supply Total	**75,126**	**116,903**	**121,903**	**124,703**	**124,703**	**124,703**

[1]Actual supplies in 2015.

[2]Includes the Banking Bunker Hill Conjunctive Use; Seven Oaks Dam Conservation Phase II (Enhanced); Bunker Hill Active Recharge 2025; Riverside North Aquifer Storage and Recovery; Box Spring Local Stream Recharge and Direct Use; and Stormwater Recharge at Columbia, Marlborough, and Kansas Detention Basins projects. These projects are accounted for in RPU's most recent Integrated Water Management Plan. Projects have planned implementation years ranging from 2020 to 2030. The Riverside North Aquifer Storage and Recovery project and Banking Bunker Hill Conjunctive Use projects are currently listed as in planning/design phase, with the Riverside North Aquifer Storage and Recovery project having completed project-specific environmental review.

[3]Imported water from WMWD is shown as a supply available to RPU. RPU intends to use this supply only if needed.

RPU = Riverside Public Utilities; AFY = acre-feet per year; RWQCP = Riverside Water Quality Control Plant; WMWD = Western Municipal Water District

Source: RPU 2016 (adapted from Table 1-3)

GROUNDWATER

RPU has historically met most of its demand from groundwater sources. In 2020, RPU estimated supplies to include approximately 88,773 acre-feet per year (AFY) of groundwater resources, 6,430 AFY of recycled water, and 21,700 AFY of purchased or imported water. Therefore, groundwater currently constitutes nearly 80 percent of the RPU potable and non-potable water supply (RPU 2016). RPU owns and operates 201 wells across the Bunker Hill, Rialto-Colton, and Riverside Basins, 50 of which extract potable water, 14 extract non-potable water, and the remainder are either inactive or used for monitoring groundwater levels and quality.

As mentioned above, all the local groundwater basins that provide supply to RPU and therefore, also to UCR, are adjudicated. The 1969 Western-San Bernardino Judgement (Adjudication Judgement) established extraction rights and allocation amounts for all approved users of the adjudicated basins. The Adjudication Judgement provides a physical solution to achieving and maintaining sustainable groundwater conditions by establishing a safe yield and fixed export rights ("use it or lose it"), as well as establishing obligations for parties to the Adjudication Judgement to maintain the integrity of the groundwater basins. The Court-appointed Watermaster collects and analyzes data and ensures that parties to the Adjudication Judgement are functioning within the limits of their authorized rights to the groundwater resources. RPU is a party to the Adjudication

Judgement and as such, has annual extraction rights to produce groundwater from the adjudicated Bunker Hill, Rialto-Colton, and Riverside Basins.

SURFACE WATER

Surface water supplies are available to RPU by purchase from WMWD, which conveys imported SWP water through Metropolitan's Henry J. Mills Water Treatment Plant in Riverside. Historically, RPU has only purchased imported SWP water when needed to meet peak demand (RPU 2016). RPU has not purchased imported water from WMWD since 2009. RPU uses recycled water to meet some of its non-potable water needs, such as outdoor irrigation and commercial uses (RPU 2017). At the time of preparation of the proposed 2021 LRDP, UCR is using some reclaimed water use for landscape irrigation. Campus agricultural fields are irrigated with water from the Gage Canal.

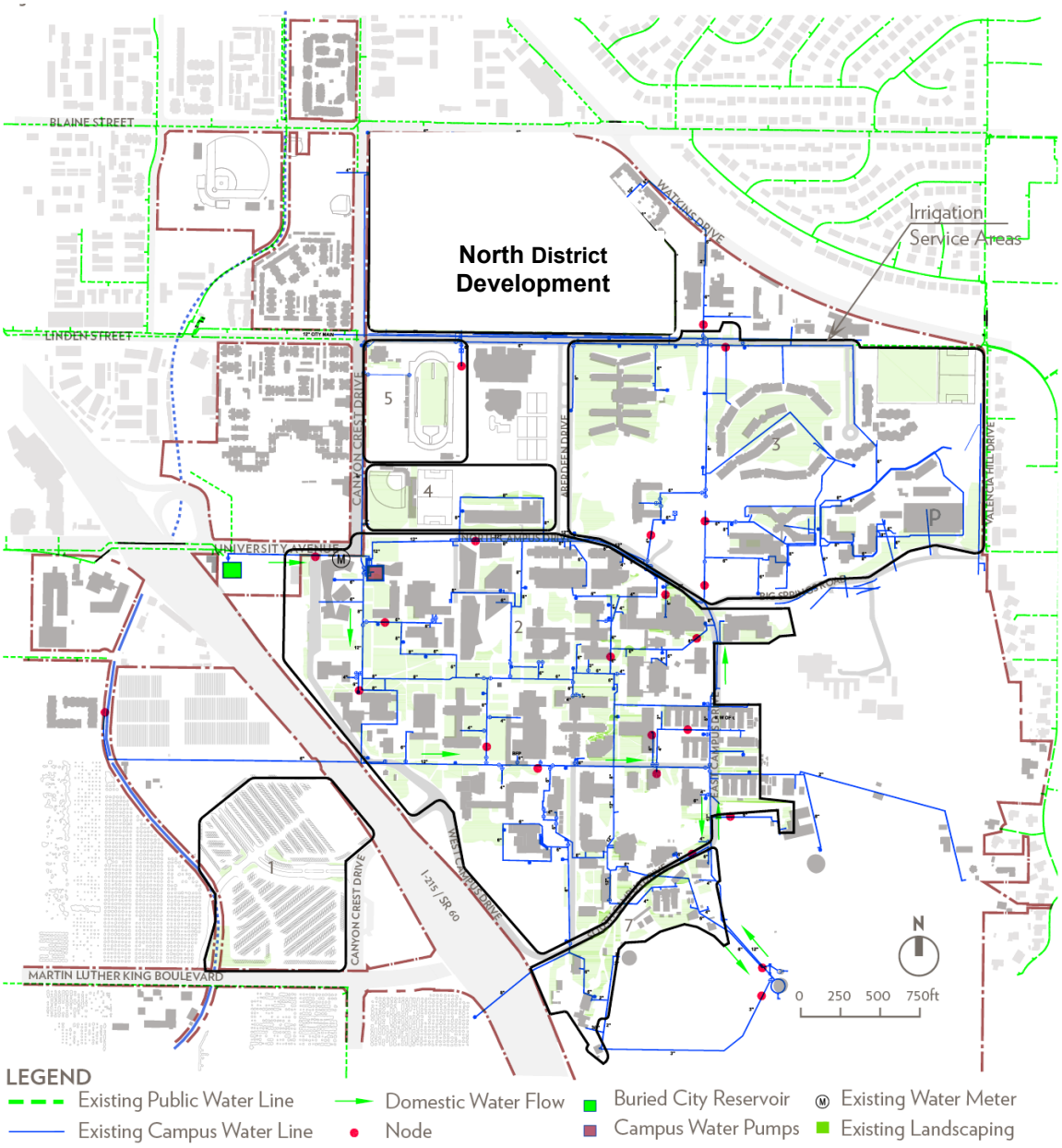
UCR Water System

UCR has a private on-campus water system that conveys water supply on campus as needed. All potable water, fire water, and irrigation water supplies are distributed through the campus-wide system (see Figure 4.17-1). UCR's water supplies (domestic, irrigation, and fire water) are conveyed to the UCR water system via a 15-inch concrete pipe connecting to a 5-million gallon City reservoir, which is buried just south of University Avenue and east of the I-215/SR 60 freeway. A pumping station for the reservoir is located east of the intersection of University Avenue and Canyon Crest Drive. This pumping station consists of a main 12-inch water meter, two reduced backflow preventers, and four 100-horsepower pumps per the East Campus Infrastructure Project Report.

A separate 12-inch City water line runs along West Linden Street and connects to the UCR water system along West Linden Street, across from Aberdeen-Inverness, through a City water meter and valve. This 12-inch water line serves as a backup supply to the campus main water network system. It also serves the off-site residential neighborhood just east of the campus. Several water laterals ranging in diameter from 4 to 8 inches branch out from the 12-inch transite (asbestos concrete) pipeline and convey water supply for the Academic Center of East Campus. The North District is mainly served by an 8-inch transite pipe running along the Canyon Crest Drive and provides the main point of connection to the 6-inch line along West Linden Street (UCR 2016). West Campus is served by existing 8-inch distribution mains in Everton Place and Iowa Avenue, an existing 16-inch transmission water main in Iowa Avenue, and an existing 20-inch transmission main in Cranford Avenue serve West Campus (CARB 2017). Several lateral pipes branching out from the main lines serve various parts of East and West Campus.

UCR has two domestic water storage tanks, with respective capacities of 1 million gallons and 50,000 gallons each. A 12-inch transite pipeline serves as the main water line for water distribution to the main campus and feeds the two campus storage tanks, located southeast of the campus. When the storage tanks are full, the pumps shut off and the tanks provide UCR's main water source. When water levels in the tanks drops below a pre-determined level, the pumps start again to fill the tanks and continue supplying water to the campus. UCR evaluated the campus' existing water system for the 2016 Physical Master Plan Study, which indicated that the existing conveyance infrastructure comprising the campus' water system adequately supports the campus water demands, including as related to water pressure and system integrity (UCR 2016).

Figure 4.17-1 Existing UCR Irrigation and Domestic Water System



Source: UCR 2016

FIRE FLOW

Fire flow is formally defined as the "flow rate of a water supply, measured at 20 pounds per square inch (psi) (138 kPa), that is available for firefighting" (IFC 200-2018 Appendix B Section B102). Water requirements for firefighting involve various factors including rate of flow, residual pressure required at that flow, flow duration, and total quantity of water required. UCR evaluated the campus's existing water system for the 2016 Physical Master Plan Study, which indicated that the existing conveyance infrastructure comprising the campus's water system adequately supports the campus water demands, including as related to water pressure and system integrity (UCR 2016). The study also determined the existing system provides sufficient pressure throughout the campus to meet the Riverside County Fire Department's minimum requirement of 20 psi (UCR 2016).

Water for fire protection on East Campus is provided by the City through two connections; the primary source is the 5 million gallon reservoir located adjacent to University Avenue east of the I-215/SR 60 freeway, and the secondary water source is a City water main located along West Linden Street. The secondary connection is only used for emergency fire protection and as a fail-safe backup to the five-MG reservoir connection. Additional storage capacity for both domestic supply and fire protection is provided by the two existing on-campus tanks. With the secondary connection to West Linden Street and the booster pumping station, all of the existing water lines currently serving the campus provide at least 1,500 gallons per minute (gpm) for a minimum duration of 2 hours and is adequate to serve the fire suppression needs for the campus (UCR 2005).

Wastewater

Wastewater generated on the UCR campus is collected and treated by the City Wastewater Division, which is responsible for wastewater flows throughout the City, as well as the community services districts of Jurupa, Rubidoux, Edgemont, and the community of Highgrove. The City's collection system consists of over 800 miles of gravity sewers ranging from 4 to 51 inches in diameter, as well as 414 miles of City-owned sewer laterals, and 20 wastewater pump stations, which range in size from less than 100 gpm to over 11,000 gpm. Wastewater treatment is conducted at the RWQCP, located at 5950 Acorn Street, Riverside, California, just south of the Santa Ana River and approximately 6 miles west of West Campus (City of Riverside 2020). In 2020, the RWQCP treated approximately 9,629 MG of wastewater, for a daily average of 26.31 million gallons per day (MGD) (R. Eland 2021). The RWQCP has a rated capacity of 40 MGD and a plant-wide expansion was completed in December 2015 that increased treatment capacity to 46 MGD average dry weather flow. Future expansion (i.e., Phase 2) to increase the plant's rated treatment capacity from 46 MGD to 52 MGD has been identified as a potential option by the City. According to the City, expansion of the RWQCP was undertaken to accommodate City of Riverside General Plan buildout through 2037. Cumulative projections indicate a wastewater flow of 39 MGD by the year 2037 (City of Riverside 2020).The RWQCP receives influent from five lines, including the Arlanza trunk, the Riverside/Hillside trunk, the Acorn trunk, the Jurupa force main, and the Rubidoux force main. The nearest lift station, or facility to move flow from lower to higher elevations, to the UCR campus is located at Canyon Crest Drive east of West Campus (City of Riverside 2020). At the time of preparation of this proposed 2021 LRDP, there are existing local capacity constraints in the City's sanitary sewer system, including Canyon Crest Drive, which will need to be addressed.

UCR Campus Wastewater and Sewer System

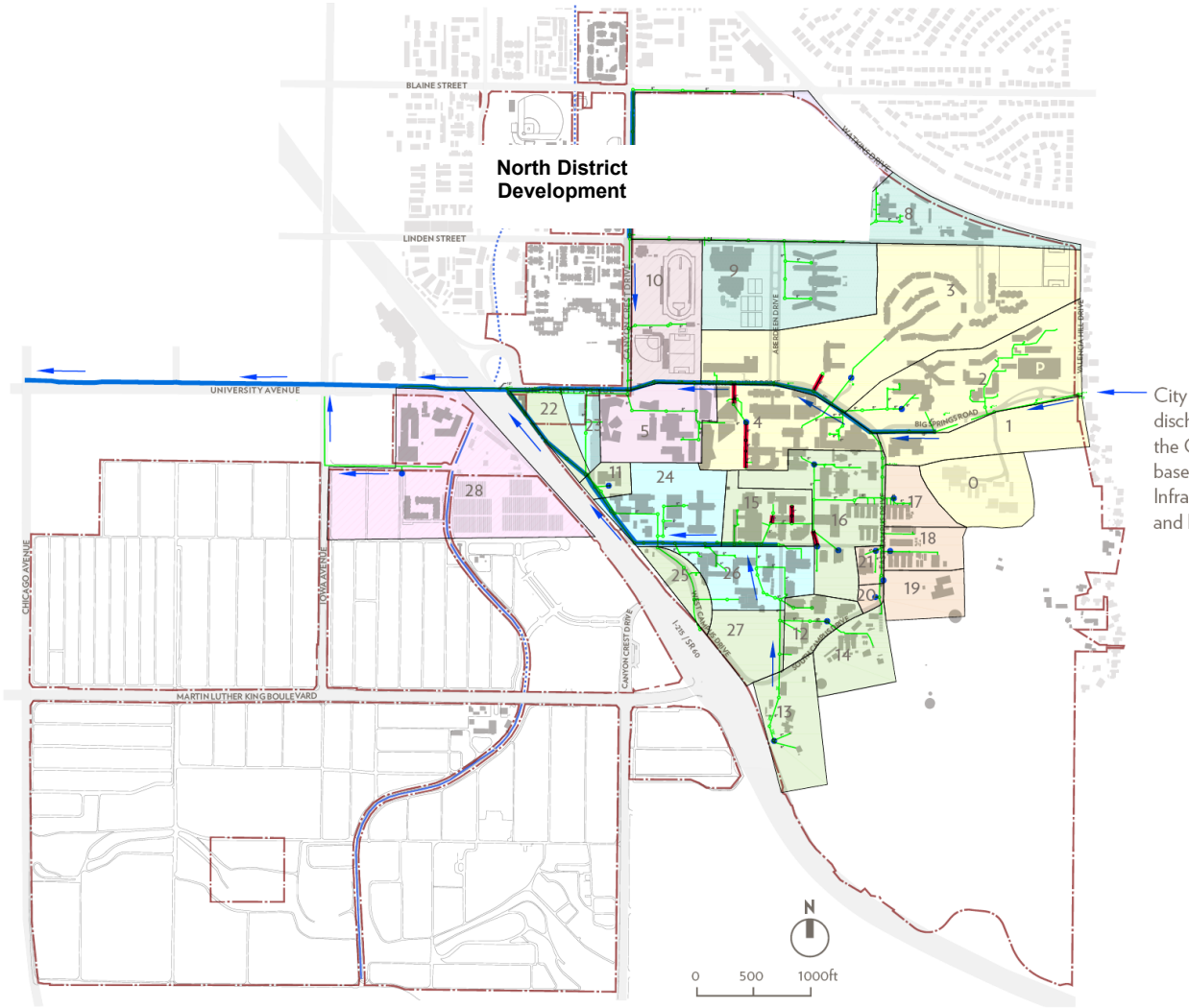
Wastewater flows and sewer flows are distinct from each other, in that wastewater flow includes any water that has been used by some domestic or industrial activity and contains waste products associated with that use, while sewer flow contains human waste. Wastewater and sewer flows are often conveyed together to a treatment and discharge location. On the UCR campus, wastewater flow is conveyed into the sanitary sewer system, which consists of a network of lines owned and maintained by UCR that connect to the City's sewer system for conveyance to the RWQCP, discussed above. The 2016 Physical Master Plan Study included an assessment of campus infrastructure systems, including the wastewater/sewer system. Based upon the population density analysis, the average daily flow rate on East Campus was calculated at approximately 1.7 MGD, which is equivalent to a peak flow rate of 2.632 cubic feet per second, and peak flow was calculated at approximately 5.6 MGD. The 2016 Physical Master Plan Study accounted for the Canyon Crest Family Student Housing facility, which was taken offline in 2017 and is therefore no longer contributing wastewater flows to the UCR system. Notably, the Canyon Crest Family Student

Housing was comprised of World War II-era buildings with comparably outdated infrastructure, including as related to the wastewater/sewer collection and conveyance system, such that the plumbing fixtures would not have been outfitted with modern efficiencies and conservation features. As a result, the inclusion of this structure in the 2016 analysis likely skewed the average daily and peak flow rates. Therefore, it is reasonably assumed that the average daily and peak flow rates currently present on the UCR campus are likely much lower than at the time of the study.

In 2019, UCR developed a Sewer System Management Plan (SSMP) to comply with State Water Resources Control Board (SWRCB) Order No. 2006-0003-DWQ, *Statewide General Waste Discharge Requirements for Sanitary Sewer Systems*. As described therein, the UCR sanitary sewer system has been in use since 1954 and comprises over 80,000 linear feet of collection pipe ranging from 4 to 15 inches in diameter. Original pipe has been replaced as upgrades or repairs have been required or new facilities have been constructed. The piping consists of a combination of vitrified clay, cast iron, polyvinyl chloride, and transite (asbestos concrete). The system is served by three major arteries: a 15-inch main located in North Campus Drive, an 8-inch main located in Canyon Crest Drive serving the North District and development along West Linden Street, and an 8-inch main branching out from the 15-inch main and serving the heart of the campus. There is an additional 8-inch sewer line that also branches out from the 15-inch main and serves some areas adjacent to West Campus Drive. Several lateral pipes branching out from the main lines serve various parts of the campus. The SSMP identified several strategic priorities, including upsizing the 8-inch main sewer line running along Canyon Crest Drive to a 15-inch pipe (UCR 2019a). The existing sanity sewer system is shown in Figure 4.17-2.

As mentioned above, the UCR wastewater/sewer system is owned and maintained by UCR. One exception to this is North Campus Drive which, although part of the UCR campus, is underlain by a City-owned 15-inch-diameter sewer line. The 15-inch sewer line serves as an interceptor for the whole campus and receives sewage flow from the residential neighborhood upstream of the campus. The 8-inch main along Canyon Crest Drive is also owned by the City. The City and UCR have a wastewater discharge agreement that allows UCR to discharge 1.55 cubic feet per second (approximately one MGD) from the campus into the portion of the City trunk line located in East Campus between Valencia Hills Drive and Canyon Crest Drive (UCR 2005).

Figure 4.17-2 Sanitary Sewer System



Source: UCR 2019a

SEWER SYSTEM OPERATION AND MAINTENANCE PROGRAM

The SSMP establishes Operation and Maintenance Program plans and activities to facilitate the proper management, operation, and maintenance of all parts of the sanitary sewer system to reduce and prevent sanitary sewer overflows. As required by the SWRCB's Order No. 2006-0003-DWQ, the SSMP includes the Operation and Maintenance Program elements and other major elements listed below.

- Maintenance of an up-to-date map of the sanitary sewer system, showing all gravity line segments and manholes, pumping facilities, pressure pipes and valves, and applicable storm water conveyance facilities.
- Description of routine preventive operation and maintenance activities by staff and contractors, including a system for scheduling regular maintenance and cleaning of the sanitary sewer system with more frequent cleaning and maintenance targeted at known problem areas. The Preventative Maintenance program should have a system to document scheduled and conducted activities, such as work orders.
- A rehabilitation and replacement plan that identifies and prioritizes system deficiencies and implements short-term and long-term rehabilitation actions to address each deficiency. The program includes regular visual and video inspections of manholes and sewer pipes, and a system for ranking the condition of sewer pipes and scheduling rehabilitation. Rehabilitation and replacement should focus on sewer pipes that are at risk of collapse or prone to more frequent blockages due to pipe defects. Finally, the rehabilitation and replacement plan should include a capital improvement plan that addresses proper management and protection of the infrastructure assets, with a time schedule for implementing the short- and long-term plans plus a schedule for developing the funds needed for the capital improvement plan.
- References to established standards for installing new sewer systems, pump stations, and other appurtenances, and for rehabilitation and repair of existing sewer systems, and to standards for inspection and testing of new or rehabilitated facilities to ensure that facilities are built to construction specifications and to detect construction defects or other issues prior to final approval and acceptance.
- An Overflow Emergency Response Plan to identify measures to protect public health and the environment in case of a sanitary sewer overflow.
- Training provided on a regular basis for staff in sanitary sewer system operations and maintenance and requirement for contractors to be appropriately trained.
- Equipment and replacement part inventories are provided, including identification of critical replacement parts.

SEWER SYSTEM INSTALLATION AND REPAIR

UCR's Office of Planning, Design & Construction (PD&C) maintains current design and construction standards that include construction specifications for installing new sewer lines, pump stations, and other appurtenances, as well as for rehabilitation and repair of existing sewer systems. These design and construction standards include specifications for items such as pipe materials, minimum sizes, minimum cover, strength, minimum slope, trench and backfill, structure standards, and other factors. Any new construction, rehabilitation, or repair of the sanitary sewer system must adhere to these design and construction standards. PD&C requires established standards for inspection and testing of new or rehabilitated facilities to ensure that facilities are built to construction specifications and to detect construction defects or other issues prior to final approval and

acceptance. Acceptance testing for gravity sewers can include: low pressure air test or water test to identify leakage, mandrel test to identify deflection of flexible pipe, water or vacuum test of manholes to identify leakage, and video inspection to identify grade variations or other construction defects (UCR 2019a).

At a minimum of every 2 years, periodic internal audits of the SSMP are conducted, a report is prepared and kept on file, and a corrective action plan is developed and implemented. This audit, as required by the SWRCB's Order No. 2006-0003-DWQ, focuses on evaluating compliance with SSMP requirements, its effectiveness, identification of any deficiencies in the SSMP, and steps to correct any identified deficiencies. The biennial audit is required to be completed by EH&S and Facilities Services. The Environmental Programs Manager is responsible for coordinating the biennial audit and corrective action plan, and the Plumbing Shop Supervisor is responsible for providing the information required to complete the biennial audit (UCR 2019a).

OVERFLOW EMERGENCY RESPONSE PLAN

The UCR Facilities Services, EH&S, and Transportation & Parking Services (TAPS) are responsible for implementing the Overflow Emergency Response Plan, which identifies measures to protect public health and the environment in case of a sanitary sewer overflow. Facilities Services is responsible for acting as initial responder to overflows by managing and conducting operational aspects of the overflow response to immediately assess the overflow, determining the appropriate response and appropriate action to control, contain, and cleanup the overflow, and identifying and implementing preventive measures to prevent recurrence. EH&S is responsible for exposure/hazard assessment and control, monitoring, measurement, and modification of program elements in the SSMP, preparation and recordkeeping of regulatory related documents, external agency notification, and interface with regulatory agency staff. Facilities Services or EH&S may also call upon TAPS to provide services when additional equipment and assistance is needed to ensure public health and safety, such as site security, traffic control, and crowd control (UCR 2019a).

Stormwater Drainage

The existing storm drain network serving the UCR campus is comprised of UCR, City, and County of Riverside drainage facilities. On-site and off-site stormwater is collected and discharged through overland flow, underground storm drains, and natural arroyos that ultimately discharge to open channel arroyos (where water can partially infiltrate) and large-diameter county drainage facilities. Detention basins are also used to capture and infiltrate stormwater into the groundwater basin (see Figure 4.10-4).

The City municipal storm drain system receives runoff from the UCR campus that does not infiltrate into the basin and ultimately discharges to the Santa Ana River. UCR is located within the Riverside County Flood Control and Water Conservation District (RCFCWCD) Master Drainage Plan areas for the Box Springs and University areas. The West Campus drains into the Box Springs Storm Drain system, with an east-west storm drain line along Martin Luther King Boulevard and a north-south storm drain line in the center of the western portion of West Campus. The majority of stormwater runoff coming from the east is collected as surface runoff near Valencia Hill Drive and Big Springs Road by an inlet structure, which conveys and discharges flows to the Gage Detention Basin north of University Avenue at Canyon Crest Drive. Flows are conveyed through aboveground swales, a 72-inch-diameter pipe, and finally a 7-foot-diameter box culvert (UCR 2016).

City-owned storm drain lines are proposed east of East Campus at Blaine Street from West Campus View Drive to Mount Vernon Park, west of East Campus from Rustin Avenue to the I-215/SR 60

freeway, and the University Wash Channel west of the I-215/SR 60 freeway (RCFCWCD 2020). Existing and proposed storm drain facilities are further discussed on in Section 4.10, *Hydrology and Water Quality*, of this Draft EIR.

Solid Waste

Solid waste includes discarded garbage and refuse that will be disposed of at a landfill, recycling facility, or compost facility. UCR's landfill-bound waste is collected and hauled by UCR trucks to the CR&R Transfer Station and Material Recovery Facility (MRF) at 1706 Goetz Road in Perris. Some recyclable materials are recovered through a sort process of the landfill waste stream, and the remainder is used for energy and concrete production. UCR's recyclable materials are hauled to the UCR transfer station just north of Parking Lot 30. The compost/food waste and recyclable materials streams are collected from the UCR transfer station by the current contracted vendor, for recycling and/or compost, as applicable. Green waste is currently being blended into the soil at Agricultural Operations. The CR&R Transfer Station and MRF accepts construction and demolition debris (CR&R 2021).

In 2018-2019, UCR generated approximately 5,000 tons of solid waste, of which approximately 3,700 tons was diverted to recycling and composting facilities, resulting in approximately 1,420 tons of waste sent to the landfill. For this same year (2018-2019), UCR generated 0.85 ton of waste per capita, and had a Municipal Solid Waste diversion rate of approximately 70 percent and a total diversion rate (including construction and demolition) of approximately 73 percent (UCOP 2019).

Solid waste that is not recycled, composted, or reused, would be disposed of at either the Badlands Landfill, El Sobrante Landfill, or the Lamb Canyon Landfill. These three landfills have a combined remaining capacity of 69.1 million tons, as shown in Table 4.17-2.

Table 4.17-2 Existing Landfills

Landfill	Location	Estimated Close Date	Maximum Permitted Daily Load (tons/day)	Maximum Permitted Capacity (tons)	Current Remaining Capacity (tons)
Badlands Landfill	31125 Ironwood Avenue Moreno Valley, California	2022	4,500	17.6M	5.7M (Jan 2016)
El Sobrante Landfill	10910 Dawson Canyon Road Corona, California	2045	16,054	209.9M	57.5M (April 2016)
Lamb Canyon Landfill	16411 Lamb Canyon Road (SR 79) San Jacinto, California	2029	5,000	15.7M	5.9M (Jan 2016)
Total			**25,554**	**243.2M**	**69.1M**

Source: CARB 2017

M = million

Telecommunications

UCR's Information Technology Solutions (ITS) department manages the core portion of the campus technology infrastructure, which includes the wireless and wired network operations, datacenters, information security, the use of technology in instruction, and enterprise software solutions to streamline day-to-day business needs (UCR 2017).

Communication Services is transitioning the campus telephone system from the traditional analog phone network to a digital VoIP (Voice over Internet Protocol) based solution. The hosted VoIP systems ensures high quality voice communications. The wireless network on campus supports most devices and is available to all Eduroam and UCR account holders. Eduroam (education roaming) is the secure, world-wide roaming wireless access service developed for the international research and education community. Eduroam, which is an encrypted (WPA2) wireless service, allows students, researchers, faculty, and staff from UCR to obtain internet connectivity across campus and when visiting other participating institutions. Members of the UCR campus can visit a campus offering Eduroam and log in using their UCR NetID and password. Similarly, visitors to UCR can log in to UCR's Eduroam network using their home campus credentials. Several software applications are available for faculty, staff, and students (UCR 2021).

4.17.2 Regulatory Setting

Federal

Clean Water Act

The CWA, enacted by Congress in 1972 and amended several times since, is the primary federal law regulating water quality in the U.S. and forms the basis for several State and local laws throughout the country. The CWA established the basic structure for regulating discharges of pollutants into the waters of the U.S. The CWA gave the US EPA the authority to implement federal pollution control programs, such as setting water quality standards for contaminants in surface water, establishing wastewater and effluent discharge limits for various industry contaminants in surface water, establishing wastewater and effluent discharge limits for various industry categories, and imposing requirements for controlling nonpoint-source pollution. At the federal level, the CWA is administered by the US EPA and USACE. At the State and regional levels in California, the CWA is administered and enforced by the SWRCB and the nine Regional Water Quality Control Boards (RWQCBs).

Safe Drinking Water Act

The Safe Drinking Water Act (SDWA) regulates public water systems that supply drinking water (42 USC Section 300(f) et seq.; 40 CFR Section 141 et seq). The SDWA authorizes the US EPA to set national standards for drinking water, called the National Primary Drinking Water Regulations, that set enforceable maximum contaminant levels in drinking water and require all water providers in the U.S. to treat water to remove contaminants. The principle objective of the SDWA is to ensure that water from the tap is potable (safe and satisfactory for drinking, cooking, and hygiene). The main components of the SDWA are to:

- Ensure that water from the tap is potable
- Prevent contamination of groundwater aquifers that are the main source of drinking water for a community
- Regulate the discharge of wastes into underground injection wells pursuant to the Underground Injection Control program (see 40 CFR Section 144)
- Regulate distribution systems

State

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act is the overarching water quality control law for California. It is implemented by the SWRCB and the nine RWQCBs. The SWRCB establishes statewide policy for water quality control and provides oversight of the regional boards' operations. The Porter-Cologne Act and the CWA overlap in many ways, as the entities established by the Porter-Cologne Act enforce and implement many federal laws and policies.

Water Conservation Act of 2009

Senate Bill (SB) X7-7, which became effective on February 3, 2010, is the water conservation component to the Delta legislative package (SB 1, Delta Governance/Delta Plan). It seeks to implement water use reduction goals established in 2008 to achieve a 20 percent statewide reduction in urban per capita water use by December 31, 2020. The bill required each urban retail water supplier to develop urban water use targets to help meet the 20 percent goal by 2020 and meet an interim 10 percent goal by 2015.

Senate Bill 610

SB 610 was signed into law in 2001. This law requires cities and counties to develop water supply assessments (WSAs) when considering approval of applicable development projects to determine whether projected water supplies can meet the project's anticipated water demand. Triggers requiring the preparation of a WSA include residential developments of more than 500 dwelling units, shopping centers or business establishments employing more than 1,000 persons or having more than 500,000 square feet of floor space, commercial office buildings employing more than 1,000 persons or having more than 250,000 square feet of floor space, and projects that would demand an amount of water equivalent to, or greater than, the amount of water required by a 500-dwelling-unit project. Because UCR is a State agency and not a City or County, it is not subject to the requirements of Section 19010 of the State Water Code, which implements SB 610, and therefore SB 610 is not applicable to the proposed 2021 LRDP. Furthermore, consistent with Water Code Section 10910(c)(2), UCR's projected water demand is less than what was assumed in the UWMP, as outlined below under Impact U-2.

Senate Bill 221

Whereas SB 610 requires a written assessment of water supply availability, SB 221 requires lead agencies to obtain written verification of sufficient water supply prior to approval of certain specified subdivision projects. For this purpose, water suppliers may rely on an UWMP (if a proposed project is accounted for within the UWMP), a WSA or other acceptable information that constitutes "substantial evidence." "Sufficient water supply" is defined in SB 221 as the total water supplies available during normal, single-dry and multiple-dry water years within the 20-year (or greater) projection period that are available to meet the projected demand associated with a proposed project, in addition to existing and planned future uses.

Water Conservation in Landscaping Act

The Water Conservation in Landscaping Act, enacted in 2006, required the California Department of Water Resources (DWR) to update the Model Water Efficient Landscape Ordinance (MWELO). In 2009, the Office of Administrative Law approved the updated MWELO, which required a retail water

supplier or a county to adopt the provisions of the MWELO by January 1, 2010, or enact its own provisions equal to or more restrictive than the MWELO provisions.

State Water Resources Control Board Drought Regulations

SWRCB adopted Resolution 2015-0032 in 2015 (SWRCB 2015), which created emergency drought regulations for statewide urban water conservation "not only for 2015, but also for another year of drought should it occur." Additional information on specific drought reduction measures taken by SWRCB in 2021 are available online at: https://www.waterboards.ca.gov/drought/.

Title 24, California Code of Regulations

California Code of Regulations (CCR), Title 24, Part 6, is California's Energy Efficiency Standards for Residential and Non-residential Buildings. The CEC established Title 24 in 1978 in response to a legislative mandate to create uniform building codes to reduce California's energy consumption and provide energy efficiency standards for residential and nonresidential buildings. The standards are updated on an approximately 3-year cycle to allow consideration and possible incorporation of new efficient technologies and methods.

In 2016, the CEC updated Title 24 standards with more stringent requirements that became effective January 1, 2017. The building efficiency standards are enforced through the local plan check and building permit process. Local government agencies may adopt and enforce additional energy standards for new buildings as reasonably necessary due to local climatologic, geologic, or topographic conditions, provided these standards exceed those provided in Title 24.

The 2019 update to the Building Energy Efficiency Standards under Title 24 applies to buildings for which an application for a building permit is submitted on or after January 1, 2020. In non-residential buildings, the standards mainly updated indoor and outdoor lighting and use of light emitting diode (LED) technology as well as HVAC ventilation and filtration requirements.

California Green Building Standards Code (2016), CCR Title 24, Part 11

The California Green Building Standards Code, commonly referred to as "CALGreen" was brought into effect on August 1, 2009 to outline architectural design and engineering principles that are in synergy with environmental resources and public welfare. CALGreen sets minimum standards for buildings, and since 2016, applies to new building construction and some alterations/additions within certain parameters. CALGreen establishes planning and design standards for sustainable site development, including water conservation measures and requirements that new buildings reduce water consumption by 20 percent below a specified baseline. CALGreen requires installations of 1.28 gallons per flush toilets and 0.5 gallons per flush urinals for all commercial projects as part of the prescriptive method of reducing indoor water use by the required 20 percent.

CALGreen lays out the minimum requirements for newly constructed residential and nonresidential buildings to reduce GHG emissions through improved efficiency and process improvements. It also includes voluntary tiers to encourage building practices that improve public health, safety, and general welfare by promoting a more sustainable design. The 2019 update includes new requirements for construction and sustainable design, and inclusion of future EV charging stations, landscaping and irrigation such as shade trees, and air filtration systems.

Urban Water Management Plan Act

The California Urban Water Management Planning Act applies to municipal water suppliers that serve more than 3,000 customers or provide more than 3,000 AFY. The act requires these water suppliers to update their UWMP every 5 years to identify short-term and long-term water demand management measures to meet growing water demands during normal, dry and multiple-dry years. The UWMP should include a description of existing and planned water sources, alternative sources, conservation efforts, reliability and vulnerability assessments, and a water shortage contingency analysis. RPU updated its UWMP in 2016 (titled the 2015 UWMP) and is currently in the process of updating its UWMP.

Regional Water Management Planning Act

Adopted by the State legislature in 2002, the Regional Water Management Planning Act, or SB 1672, authorizes preparation of integrated regional water management plans. Such plans are developed by regional water management groups, defined as three or more local public agencies, at least two of which have statutory authority over water supply. Integrated regional water management plans address qualified programs and projects relating to water supply, water quality, flood protection, or other water-related topics undertaken by the participating public agencies. Qualified projects, as detailed in the legislation, include, but are not limited to, groundwater, urban, and agricultural water management planning efforts, levee or flood control infrastructure maintenance or construction, water recycling projects, and water conservation programs.

Phase II Stormwater Discharge Permit

Phase II of the NPDES Program regulates storm water discharges from MS4s (such as schools and universities). As part of Phase II, the SWRCB adopted a General Permit for the Discharge of Stormwater from Small MS4s (WQ Order No. 2003-0005-DWQ) to provide permit coverage for smaller municipalities, including non-traditional Small MS4s, which include public campuses. The Phase II Small MS4 General Permit covers Phase II permittees statewide. On February 5, 2013, the Phase II Small MS4 General Permit was adopted and became effective on July 1, 2013 (WQ Order No. 2013-0001-DWQ) (SWRCB 2013). UCR was approved for coverage under the Phase II MS4 permit program and is required to comply with the requirements of the MS4 permit including:

- Public education and outreach
- Staff training to prevent and eliminate illicit discharges and pollution
- Illicit discharge detection and elimination
- Construction site stormwater runoff control and pollution prevention
- Post-construction site stormwater runoff control program for new development and redevelopment (including on-site capture of 85th percentile 24-hour storm runoff event)
- Facilities mapping, inventory, and assessment for pollution prevention
- SWPPPs for high-priority facilities
- Inspections, visual monitoring, and remedial action
- Storm drain system assessment, prioritization, and maintenance
- Assessment of operations and maintenance activities to reduce runoff and pollution
- Stormwater program modifications
- Reporting and documentation

Projects developed at UCR would be subject to the requirements of the Statewide General NPDES Permits, including the requirement to obtain coverage under the Statewide General NPDES Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities (NPDES No. CAS000002, California Water Resources Control Board Resolution No. 2001-046; Modification of Water Quality Order 99-08-DWQ, SWRCB, NPDES, General Permit for Stormwater Discharges Associated with Construction Activity). This permit was revised on September 2, 2009 (Construction General Permit Order 2009-0009-DWQ) and was subsequently amended by Order No. 2010-0014-DWQ and Order No. 2012-0006-DWQ. Order No. 2012-0006-DWQ became effective on July 17, 2012.

Projects require a Permit Registration Document with the SWRCB, including a SWPPP to identify, construct, implement, and maintain both source-control and treatment-control BMPs to reduce or eliminate pollutants in stormwater discharges and authorized non-stormwater discharges from the construction site during construction.

BMPs include treatment controls; operating procedures; training and education; and practices to control site runoff, spill, leaks, and waste disposal. BMPs are required to be updated accordingly to comply with any additions and/or modifications to the NPDES permit requirement or site conditions. Projects that create or replace more than 2,500 square feet of impervious surface are also subject to Phase II Small MS4 (WQ Order No. 2013-0001-DWQ NPDES No. CAS 000004) LID measures, including runoff reduction, and postconstruction stormwater management requirements, including on-site stormwater capture and infiltration. Runoff reduction must be quantified through the State's water balance calculator and a Post-Construction Stormwater Management Checklist must also be completed.

California Safe Drinking Water Act

The California SDWA (Health & Safety Code Section 116270 et seq.; CCR Title 22 Section 64400 et seq.) regulates drinking water more rigorously than the federal law. Like the federal SDWA, California requires that primary and secondary maximum contaminant levels be established for pollutants in drinking water; however, some California maximum contaminant levels are more protective of health. The act also requires the SWRCB to issue domestic water supply permits to public water systems.

Implementation of the federal SDWA is delegated to California, and the SWRCB enforces the federal and State SDWAs and regulates more than 7,500 public water systems. The SWRCB's Division of Drinking Water oversees the State's comprehensive Drinking Water Program, which is authorized to issue public water system permits.

California Plumbing Code

The California Plumbing Code is codified in CCR Title 24, Part 5. The Plumbing Code contains regulations including, but not limited to, plumbing materials, fixtures, water heaters, water supply and distribution, ventilation, and drainage. More specifically, Part 5, Chapter 4, contains provisions requiring the installation of low-flow fixtures and toilets. Existing development will also be required to reduce its wastewater generation by retrofitting existing structures with water efficient fixtures (SB 407 [2009] Civil Code Sections 1101.1 et seq.).

Integrated Solid Waste Management Act of 1989 (Assembly Bill [AB] 939)

The California Integrated Waste Management Act of 1989 created the (former) California Integrated Waste Management Board, now CalRecycle. Responsible for oversight of waste management in California, CalRecycle assists cities, counties, businesses, and organizations with meeting State waste reduction, reuse, and recycling goals. AB 939 requires that local jurisdictions meet waste diversion goals and establish a framework for program implementation, solid waste planning, and solid waste facility and landfill compliance. The California Integrated Waste Management Act was primarily intended to encourage minimization of the volume of solid waste disposed of through "transformation" (including incineration, pyrolysis, distillation, and bioconversion) and land disposal through the establishment of solid waste diversion goals for all cities and counties.

Water Quality Control Plan for the Santa Ana River Basin (Basin Plan)

The City is under the jurisdiction of the RWQCB Region 8, the SARWQCB, which provides permits for projects that may affect surface waters and groundwater locally and is responsible to prepare the Water Quality Control Plan for the Santa Ana River Basin (Basin Plan). The Basin Plan designates beneficial uses of water in the region and establishes narrative and numerical water quality objectives. Water quality objectives, as defined by the CWA Section 13050(h), are the "limits or levels of water quality constituents or characteristics which are established for the reasonable protection of beneficial uses or the prevention of nuisance within a specific area." The State has developed total maximum daily loads (TMDLs), which are a calculation of the maximum amount of a pollutant that a waterbody can have and still meet water quality objectives established by the region. The Basin Plan serves as the basis for the SARWQCB's regulatory programs and incorporates an implementation plan to ensure water quality objectives are met. Basin Plans undergo a triennial review process, with the SARWQCB's Basin Plan most recently updated in June 2019 (SARWQCB 2019).

AB 341 (Chesbro, 2011)

AB 341 builds from the goals and requirements of AB 939. It declared a State policy goal of 75 percent diversion of solid waste by the year 2020 and directed CalRecycle to develop and adopt regulations for mandatory commercial recycling.

CalGreen Construction Waste Management Requirements

CalGreen includes several requirements related to solid waste diversion. Importantly, new non-residential construction is required to achieve at least 65 percent construction and demolition waste diversion and provide recycling areas for paper, cardboard, glass, plastics, metal, and organic waste.

Updated Integrated Regional Water Management Plan Report

WMWD published the Updated Integrated Regional Water Management Plan (IRWMP) Report in May 2008 and includes the City as a designated stakeholder. While the IRWMP focuses on long-range water planning needs in WMWD's service area, the document includes a regional-scale assessment of water planning efforts, infrastructure, and pending studies and projects. The IRWMP also discusses regional water management efforts in the context of other applicable water and environmental regional plans, such as the Santa Ana Watershed Project Authority's One Water-One Watershed Program and the Multi-Species Habitat Conservation Plan (WMWD 2008).

Article IX of the California Constitution

The Regents is a Constitutional Corporation, organized under Article IX, Section 9 of the California Constitution, with full authority over governance and management of University operations. Under this authority, UCR has legal authority to prevent illicit discharges into its system, including control of inflow and infiltration sources such as storm water, chemical dumping, or debris.

University of California

UC Policy on Sustainable Practices

UCOP developed a Sustainable Practices Policy that establishes sustainability goals to be achieved by all campuses, medical centers, and the Lawrence Berkeley National Laboratory within the UC system. The UC Policy on Sustainable Practices, approved in 2003 by the Regents, and updated in July 2020, establishes goals in areas of sustainable practices for both individual building projects and overall facilities operations: green building design, clean energy, transportation, climate protection, sustainable building operations, waste reduction and recycling, environmentally preferable purchasing, sustainable foodservice, sustainable water systems, and general sustainability performance assessment (UC 2020). Most relevant to the discussion herein are the goals and policies related to energy use (i.e., green building design, clean energy, sustainable building operations), solid waste (i.e., waste reduction and recycling), and water supply (i.e., sustainable water systems). Examples of policies related to Utilities and Service Systems include the following:

GREEN BUILDING DESIGN

- Policy A.1: All new building projects, other than acute care facilities, shall be designed, constructed, and commissioned to outperform the California Building Code (CBC) energy-efficiency standards by at least 20 percent or meet the whole-building energy performance targets listed in Table 1 of Section V.A.3 of the *UC Policy on Sustainable Practices*. The University will strive to design, construct, and commission buildings that outperform CBC energy efficiency standards by 30 percent or more or meet the stretch whole-building energy performance targets listed in Table 1 of Section V.A.3 of the *UC Policy on Sustainable Practices*, whenever possible within the constraints of program needs and standard budget parameters.
- Policy A.3: No new building or major renovation that is approved after June 30, 2019 shall use onsite fossil fuel combustion (e.g., natural gas) for space and water heating (except those projects connected to an existing campus central thermal infrastructure). Projects unable to meet this requirement shall document the rationale for this decision as described in Section V.A.4 of the *UC Policy on Sustainable Practices*.
- Policy A.4: All new buildings will achieve a U.S. Green Building Council (USGBC) LEED “Silver” certification at a minimum. All new buildings will strive to achieve certification at a USGBC LEED “Gold” rating or higher, whenever possible within the constraints of program needs and standard budget parameters.

- Policy A.5: The University of California will design, construct, and commission new laboratory buildings to achieve a minimum of LEED "Silver" certification as well as meeting at least the prerequisites of the Laboratories for the 21st Century (Labs21) Environmental Performance Criteria (EPC).[1] Laboratory spaces in new buildings also shall meet at least the prerequisites of Labs21 EPC. Design, construction, and commissioning processes shall strive to optimize the energy efficiency of systems not addressed by the CBC energy efficiency standards.
- Policy A.6: All new building projects will achieve at least two points within the available credits in LEED-Building, Design, and Construction (BD+C)'s Water Efficiency category.

BUILDING RENOVATIONS

- Policy A.7: Major renovations of buildings are defined as projects 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) shall at a minimum achieve a USGBC LEED "Silver" certification as described above. Such projects shall outperform CBC Title 24, Part 6, currently in effect, by 20 percent. This does not apply to acute care facilities.
- Policy A.9: Renovation projects with a project cost of $5 million or greater that do not constitute a Major Renovation under Policy A.7 as defined above shall at a minimum achieve a LEED-ID+C Certified rating and register with the utilities' Savings by Design program, if eligible. This does not apply to acute care facilities.

CLEAN ENERGY

- Policy B.1: Each location will implement energy efficiency actions in buildings and infrastructure systems to reduce the location's energy use intensity by an average of least 2 percent annually.
- Policy B.2: Campuses and health locations will install additional on-site renewable electricity supplies and energy storage systems whenever cost-effective and/or supportive of the location's Climate Action Plan or other goals.
- Policy B.3: By 2025, each campus and health location will obtain 100 percent clean electricity. By 2018, the University's Wholesale Power Program will provide 100 percent clean electricity to participating locations.
- Policy B.4: By 2025, at least 40 percent of the natural gas combusted on-site at each campus and health location will be biogas.

SUSTAINABLE BUILDING AND LABORATORY OPERATIONS FOR CAMPUSES

- Policy E.1: Each campus will submit for certification one pilot building at a LEED-O+M "Certified" level or higher.
- Policy E.2: Each campus shall register a master site to certify campus-wide LEED-O+M credits and prerequisites to streamline the certification of multiple buildings through the LEED-O+M rating system by July 1, 2015. Each campus shall certify their campus-wide credits as soon as possible after the master site has been registered. Although the deadline of July 1, 2015 has

[1] Labs21 is a voluntary partnership program that offers training and resources to support the design and operation of high-performance laboratories. Labs21 is co-sponsored by the Department of Energy and the US EPA. The Labs21 EPC is a rating system that consists of prerequisites and credits in several laboratory-specific areas, including laboratory equipment water use, chemical management, and ventilation. Labs21 EPC is designed as a complement to LEED.

passed, this policy is still applicable to development in the project area, and the requirement for certifying campus-wide credits is continuous.

- Policy E.3: Each campus shall seek to certify as many buildings as possible through the LEED-O+M rating system, within budgetary constraints and eligibility limitations.
- Policy E.4: All campuses shall implement an ongoing Green Lab Assessment Program supported by a department on campus to assess the operational sustainability of research groups and the laboratories and other research spaces they use by Summer 2018. Although the deadline of Summer 2018 has passed, this policy is still applicable to development in the project area, and the requirements listed below are continuous.
  - At least one staff or faculty member from the campus must have the role of managing the Green Lab Assessment Program.
  - Any green lab assessment programs and related efforts will adhere to all relevant UC, State and national policies and laws. Safety will never be compromised to accommodate sustainability goals.
  - All campuses shall submit a UC Green Laboratories Action Plan by Summer 2018.

ZERO WASTE

- Policy F.1: The University will achieve zero waste through prioritizing waste reduction in the following order: reduce, reuse, and then recycle and compost (or other forms of organic recycling) as described in Section V.F.6 of the *UC Policy on Sustainable Practices*. Minimum compliance for zero waste, at all locations other than health locations, is as follows:
  - Reduce per capita total municipal solid waste generation by 25 percent per capita from FY2015/16 levels by 2025, and 50 percent per capita from FY2015/16 levels by 2030
  - Divert 90 percent of municipal solid waste from the landfill.
- Policy F.2: The University supports the integration of waste, climate and other sustainability goals, including the reduction of embodied carbon in the supply chain through the promotion of a circular economy and the management of organic waste to promote atmospheric carbon reduction. In support of this goal, waste reporting will include tracking estimated Scope 3 GHG emissions.
- Policy F.3: By 2020, the University will prohibit the sale, procurement, or distribution of packaging foam, such as food containers and packaging material, other than that utilized for laboratory supply or medical packaging and products. The University seeks to reduce, reuse, and find alternatives for packaging foam used for laboratory and medical packaging products.
  - No packaging foam or expanded polystyrene shall be used in foodservice facilities for takeaway containers.
- Policy F.4: The University is committed to the reduction and elimination of single-use items in line with the University's and the State of California's Zero Waste goals and in recognition of the severe environmental impact single-use products have globally. In recognition of this commitment, locations will reduce single-use products by taking the following actions:
  - Eliminate plastic bags in all retail and foodservice establishments in campus facilities or located on university-owned land no later than January 1, 2021
  - Replace disposable single-use plastic foodware accessory items in all foodservice facilities with reusables or locally compostable alternatives and provide only upon request no later than July 1, 2021

- Provide reusable foodware items for food consumed onsite at dine-in facilities and to-go facilities no later than July 1, 2022
- Replace single-use plastic foodware items with reusable or locally compostable alternatives at to-go facilities no later than July 1, 2022
- Phase out the procurement, sale, and distribution of single-use plastic beverage bottles. Non-plastic alternatives shall be locally recyclable or compostable.
  - Foodservice facilities will provide alternatives no later than January 1, 2023.
  - Locations are encouraged to prioritize the installation of water refill stations to support the transition from single-use plastics to reusables.
  - Locations will consider eliminating single-use plastic beverage bottles when contracting with suppliers, or upon contract renewal and/or extension if current contract terms prohibit (e.g., vending machines, departmental purchases, etc.).
- When selecting prepackaged, sealed food that is mass produced off-premises and resold at University locations (e.g., grab-and-go items, such as chips, candy, prepackaged sandwiches, etc.), preference should be given in contract award and negotiations to suppliers that utilize locally compostable or locally recyclable packaging options.

SUSTAINABLE WATER SYSTEMS

- Policy I.1: Locations will reduce growth-adjusted potable water consumption 20 percent by 2020, and 36 percent by 2025, when compared to a 3-year average baseline of FY2005/06, FY2006/07, and FY2007/08. Locations that achieve this target early are encouraged to set more stringent goals to further reduce potable water consumption. Each Campus shall strive to reduce potable water used for irrigation by converting to recycled water, implementing efficient irrigation systems, drought-tolerant planting selections, and/or by removing turf.
- Policy I.2: Each location will develop and maintain a Water Action Plan that identifies long-term strategies for achieving sustainable water systems. The next update of the plan shall be completed in December 2016.
  - Campuses will include in this update quantification of total square feet of used turf and under-used turf areas on campus as well as a plan for phasing out un-used turf irrigated with potable water.
- Policy I.3: Each location shall identify existing single-pass cooling systems and constant flow sterilizers and autoclaves in laboratories and develop a plan for replacement.
- Policy I.4: New equipment requiring liquid cooling shall be connected to an existing recirculated building cooling water system, new local chiller vented to building exhaust or outdoors, or to the campus chilled water system through an intervening heat exchange system if available.
  - Once-through or single-pass cooling systems shall not be allowed for soft-plumbed systems using flexible tubing and quick connect fittings for short term research settings.
  - If no alternative to single-pass cooling exists, water flow must be automated and controlled to avoid water waste.

GENERAL SUSTAINABILITY PERFORMANCE ASSESSMENT

- Policy K.1: All undergraduate campuses must maintain a certified Association for the Advancement of Sustainability in Higher Education Sustainability Tracking, Assessment and Rating System (STARS) report.

- Policy K.2: All campuses must achieve a Silver STARS rating and strive for Gold by 2023.

University of California, Riverside

Sewer System Management Plan

The SSMP was developed by UCR to comply with the SWRCB Order No. 2006-0003-DWQ. The SSMP directs prevention of pollution into the storm drain from sanitary sewer overflows and to prevent untreated or partially treated wastewater from discharging from storm drains into flood control channels or waters of the U.S.

Regional and Local (Binding)

Municipal Regional Stormwater NPDES Permit

On January 29, 2010, the RWQCB adopted Order R8-2010-0033, as amended by Order R8-2013-0024 (NPDES Permit and Waste Discharge Requirements for the RCFCWCD, the County of Riverside, and the incorporated cities of Riverside County in the Santa Ana Region) otherwise known as the MS4 permit. The City is a co-permittee under the Riverside County MS4 permit. One component of the MS4 permit requires the development of site-specific WQMPs for new development and significant redevelopment projects. WQMPs include site design, source control, and treatment elements to reduce stormwater pollution from urban runoff (SARWQCB 2010).

On April 7, 2015, the SARWQCB adopted Statewide Trash Provisions to address impacts of trash on surface waters in the region. The Trash Provisions outline additional requirements for co-permittees under the MS4 permit, including either installation of full capture systems for all storm drains capturing runoff from priority land uses, or a combination of full capture systems, multi-benefit projects, treatment controls, and/or institutional controls to reduce trash accumulation in surface waters (SWRCB 2021). UCR is bound by the Statewide Trash Provisions; UCR received a Water Code Section 13383 Order in June 2017 to comply with specific initial requirements.

Riverside County Drainage Area Management Plan

The Riverside County Drainage Area Management Plan (DAMP), developed by the RCFCWCD and other co-permittees to the MS4 permit, outlines programs and policies to manage urban runoff. The DAMP includes development review procedures for co-permittees, required construction BMPs and inspection frequency, annual reporting and evaluation framework, and TMDL implementation strategies. The DAMP is the primary document outlining compliance procedures for co-permittees to adhere to the requirements of the MS4 permit in Riverside County. The DAMP for the Santa Ana Region was last updated in 2017 (RCFCWCD 2017).

Riverside County Watershed Action Plan

The Riverside County Watershed Action Plan is intended to enable co-permittees under the Riverside County MS4 permit to address watershed-level water quality impacts associated with urbanization (County of Riverside 2017). The Watershed Action Plan describes the Santa Ana Watershed, applicable MS4 programs, and the development review process for new development and redevelopment projects.

Design Handbook for Low Impact Development Best Management Practices

Developed in 2011 by the RCFCWCD, the *Design Handbook for Low Impact Development Best Management Practices* describes LID guidelines for projects to reduce downstream erosion by more closely mimicking pre-project hydrology and minimizing pollutant runoff. The handbook details strategies for selecting appropriate LID BMPs, design capture volume requirements for BMPs, and sizing calculation methodology for BMP implementation in specific watersheds in the county.

City of Riverside Municipal Code Title 14, Chapter 14.12

Title 14, Chapter 14.12 regulates the discharge of wastes to the public sewer and pollutants into the storm drain systems. The City has its own publicly owned treatment works and therefore has jurisdiction under federal pretreatment standards for discharges to and from the treatment works. Section 14.12.315 of Chapter 14.12 prohibits the discharge of pollutants to the storm drainage system or any waterway, whether carrying water or not. Section 14.12.316 requires the preparation of a WQMP and installation of BMPs for new development and redevelopment projects in the City, and Section 14.12.319 outlines inspection and enforcement for post-construction requirements detailed in the project's WQMP.

Regional and Local (Non-Binding)

As noted in Section 4, "University of California Autonomy," UCR, a constitutionally-created State entity, is not subject to municipal regulations of surrounding local governments for uses on property owned or controlled by UCR that are in furtherance of the university's educational purposes. However, UCR may consider, for coordination purposes, aspects of local plans and policies of the communities surrounding the campus, when it is appropriate and feasible but is not bound by those plans and policies in its planning efforts.

City of Riverside General Plan 2025

The City adopted the General Plan 2025 in November 2007 to outline a 20-year vision for the City. The Open Space and Conservation and Public Facilities and Infrastructure elements contain policies relevant to utilities and service systems, including the following:

OPEN SPACE AND CONSERVATION ELEMENT

The Open Space and Conservation Element contains policies to minimize impacts to groundwater and surface water resources, coordinate public and private entities, which affect the consumption and quality of water resources in Riverside, enforce RWQCB and NPDES regulations regarding urban runoff and water quality standards, and protect aquifer recharge features.

PUBLIC FACILITIES AND INFRASTRUCTURE ELEMENT

The Public Facilities and Infrastructure Element contains policies to protect local groundwater resources from localized and regional contamination, reduce stormwater flows into the wastewater

system and the Santa Ana River, cooperate in regional programs to implement the NPDES program, and routinely monitor and evaluate the effectiveness of the storm drain system.

City of Riverside Municipal Code

TITLE 17, SECTION 17.16.101

Title 17 describes regulations pertaining to grading, including those intended to minimize erosion and runoff. Section 17.16.010 outlines grading permit application requirements, including noticing requirements to the SWRCB for coverage under the Statewide Construction General Permit and preparation of a SWPPP.

TITLE 19, CHAPTER 19.570

Title 19, Chapter 19.570 of the Riverside Municipal Code contains the City's Water Efficient Landscaping and Irrigation Ordinance, which is intended to promote quality landscaping as well as efficient use of water in the City. The ordinance requires preparation and implementation of a planting plan that identifies the Maximum Applied Water Allowance and the Estimated Annual Water Use of the project's landscaping, as well as irrigation design and soil management plans.

TITLE 6, SECTION 6.04

Title 6, Section 6.04 is the City's Health and Sanitation Code, which specifies the requirements for handling solid waste and recycling materials.

4.17.3 Environmental Impacts and Mitigation Measures

Significance Criteria

UCR utilizes the following 2020 CEQA Guidelines Appendix G Environmental Checklist significance criteria questions related to Utilities and Service Systems.

Would the proposed 2021 LRDP:

a) Require or result in the relocation or construction of new or expanded water, wastewater treatment or stormwater drainage, electric power, natural gas, or telecommunications facilities, the construction of which could cause significant environmental effects which have not already been analyzed as part of the proposed LRDP?
b) Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple-dry years?
c) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?
d) Generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?
e) Comply with federal, State, and local management and reduction statutes and regulations related to solid waste?

Issues Not Evaluated Further

All issues applicable to utilities and service systems listed under the significance criteria above are addressed in this section.

Analysis Methodology

For each topic addressed in this impact analysis, including water supply, wastewater, stormwater, solid waste, energy and natural gas infrastructure, and telecommunications, the activities of the proposed 2021 LRDP are compared against the significance criteria listed above, with consideration to the current environmental setting, as discussed above in Section 4.17.1. The analyses of water supply, wastewater, and solid waste are informed by topic-specific generation rates that were estimated for the proposed 2021 LRDP using topic-specific approaches, as detailed in the impact discussions provided below.

As discussed below, for some topics, the outputs from the CalEEMod air quality emissions model were used to inform assumptions regarding generation rates for the proposed 2021 LRDP; CalEEMod output data is provided in Appendix C to this Draft EIR. As an example of how CalEEMod was used to inform this analysis, CalEEMod outputs include estimates of annual water use based on rates derived from statewide water consumption by sector as reported by the Pacific Institute's *Waste Not, Want Not: The Potential for Urban Water Conservation in California* report (CAPCOA 2017). CalEEMod outputs also calculate annual waste generation based on land use-based waste disposal rates reported by CalRecycle (CAPCOA 2017). These outputs include demolition debris and operational waste generation rates, which were used to inform solid waste generation analysis for the 2016 Physical Master Plan (UCR 2016). Wastewater generation rates were obtained from sewer flow calculations prepared in support of the 2016 Physical Master Plan, which was informed by land use-based generation factors from the City of Los Angeles *Sewerage Facilities Charge Sewage Generation Factor for Residential and Commercial Categories* (UCR 2016). These methodologies are further discussed in the impact analyses below, as applicable. Thresholds "d" and "e" are addressed through a consolidated analysis below under Impact U-4.

2021 LRDP Objectives and Policies

The proposed 2021 LRDP contains objectives and policies relevant to utilities and service systems:

Open Space (OS)

- Objective OS5: Demonstrate an increased commitment to preservation and enhancement of the natural environment through the design and placement of future campus landscapes.
  - Policy: Consider the ecological and potential stormwater management functions of proposed landscapes. Utilize climate-appropriate, native/drought-tolerant, and/or low-maintenance landscape materials outside of signature campus open spaces.
  - Policy: In Open Space Reserve areas where arroyos and other natural features exist, preserve wherever feasible existing landforms, native plant materials, and trees. Where appropriate, restore habitat values.

Campus Utility Infrastructure – Potable Water and Wastewater and Irrigation (WWI)

- Objective WWI1: Commit to a multi-prong approach to conserving potable water use
  - Policy: Reduce potable water use in an existing building in the Academic Center by 20 percent

- Policy: Reduce potable water use in student residential buildings by 30 percent
- Policy: Reduce potable water use in new facilities by exceeding applicable codes by a minimum of 20 percent
- Policy: Retrofit existing urinals, toilets, showerheads, and faucets for existing buildings with higher water efficiency rated equipment

- Objective WWI2: Explore options to shift away from potable water use where feasible.
  - Policy: Design new building irrigation and efficient toilet flushing systems for use with future non-potable water sources
  - Policy: Achieve a further 20 percent reduction of potable water use for irrigation by extending Gage Canal water to also irrigate the UCR Botanic Gardens and reducing turf on campus and replacing with lower water use landscaping

Campus Utility Infrastructure – Stormwater (SW)

- Objective SW1: Transition the campus lands to manage stormwater in a manner that replicates natural drainage patterns and allow plants to filter pollutants out of runoff and promote infiltration over flowing into waterways, thus meeting regulatory requirements through innovative, attractive, and cost-efficient solutions.
  - Policy: Prepare and maintain an SWMP to account for the additional runoff from the projected new development to meet the requirements of the State of California's mandated Phase II Small Municipal Separate Storm Sewer System (MS4) Section F.5.g. (Post-Construction SWMP), including Section F.5.g.3. (Alternative Post-Construction SWMP) consistent with the Maximum Extent Practicable (MEP) standard.
  - Policy: To the extent feasible, integrate stormwater infrastructure within the open space framework of campus such that developable campus lands are minimally lost. The SWMP will include planning and design strategies to restore, enhance, and maintain hydrological function on campus and within the regional hydrological system in response to the projected development.

Impacts Analysis

Impact U-1 Relocation or Construction of New or Expanded Water, Wastewater Treatment or Stormwater Drainage, Electric Power, Natural Gas, or Telecommunications Facilities Resulting in Significant Environmental Effects.

The proposed 2021 LRDP may require the relocation or construction of new or expanded water, wastewater treatment or stormwater drainage, electric power, natural gas, or telecommunications facilities on the UCR Campus. Such relocation and construction would not result in significant environmental effects and impacts would be less than significant. No mitigation measures are required.

Development of projects under the proposed 2021 LRDP would be adjacent to existing campus development and would connect to existing utility facilities as feasible, including for water supply, wastewater treatment, stormwater drainage, electric power, natural gas, and telecommunications. Potential impacts associated with providing utility connections for projects under the proposed 2021 LRDP are discussed below under respective headings.

Water Supply Facilities

Please note, Impact U-1 is specific to impacts associated with infrastructure and facilities; water supply availability is addressed under Impact U-2, *Sufficient Water Supplies*. The UCR campus is served by existing City potable water facilities. As discussed in Section 4.17.1 under "UCR Water System," UCR has a private on-campus water system that conveys water supply on campus as needed; all potable water, fire water, and irrigation water supplies are distributed through the campus-wide system. UCR's private on-campus water facilities attach to City water facilities via a 12-inch water line that follows West Linden Street and connects to the UCR water system through a City water meter and valve. This 12-inch water line serves as a backup supply to the campus main water network system.

The proposed project would require the installation of additional water main lines, lateral connections, and hydrants on campus to serve planned facilities. The addition of new campus facilities would require additional pipes and water lines to service water for both fire and domestic uses. This infrastructure has been assessed as part of buildout of the proposed 2021 LRDP in this Draft EIR. Furthermore, such facilities would primarily be installed in the disturbance area of such projects or likely in previously disturbed areas, such as roadways. The construction of project-specific water infrastructure improvements would not further increase impacts of buildout of the proposed 2021 LRDP, the environmental impacts of which are characterized throughout this Draft EIR. Therefore, impacts with respect to new or expanded water facilities would be **less than significant**.

Wastewater Treatment Facilities

To service future development under implementation of the proposed 2021 LRDP may require the relocation and/or replacement of wastewater infrastructure on the UCR campus. Development of projects under the proposed 2021 LRDP would be adjacent to existing campus development and would connect to existing wastewater treatment or stormwater drainage infrastructure. The proposed project would require the installation of additional water main lines, lateral connections, and hydrants on campus to serve planned facilities. This infrastructure has been assessed as part of buildout of the proposed 2021 LRDP in this Draft EIR. At the time of preparation of this proposed 2021 LRDP, there are existing local capacity constraints in the City's sanitary sewer system, including West Linden Street and Canyon Crest Drive, that will likely require new pipes regardless of adoption of the LRDP.

The proposed 2021 LRDP would also result in an increase in wastewater generation relative to existing campus conditions. The 2016 Physical Master Plan Study assumed a per capita wastewater output rate of 20 gallons per on-campus individual per day. Using the same methodology as the 2016 Physical Master Plan Study, the wastewater output and sewage flow rates were calculated for the 2018/2019 baseline year and 2035/2036, as shown in Table 4.17-3. As discussed above in Section 4.17.1 under "UCR Campus Wastewater and Sewer System", wastewater flows and sewer flows are distinct from each other, in that wastewater flow includes any water that has been used by some domestic or industrial activity and contains waste products associated with that use, while sewer flow contains human waste. On the UCR campus, wastewater flow is conveyed into the sanitary sewer system, which consists of a network of lines owned and maintained by UCR that connect to the City's sewer system for conveyance to the RWQCP.

Table 4.17-3 Estimated Wastewater Flow

Scenario Year	Campus Population[1]	Wastewater Generated (gpd)[2]	Campus (gsf)	Wastewater Flow (gpd/1,000 gsf)[3]
2018/2019 Baseline Year	28,661	573,220	7,205,252	79.56
2021 LRDP Buildout Year 2035/2036	42,545	850,900	12,754,258	66.71
Difference	**+13,884**	**+277,680**	**+5,549,006**	**-12.85**

[1]Students and faculty/staff at Fall quarter headcount

[2]2016 Physical Master Plan Study (UCR 2016) assumption of per capita wastewater generation rate of 20 gallons per day

[3]Wastewater output (20) multiplied by population density

gpd = gallons per day; gsf = gross square footage

As mentioned above, the UCR campus conveys wastewater and sewage flow collectively into the City's sewer system for conveyance to the RWQCP. Table 4.17-3 indicates that with implementation of the proposed 2021 LRDP, wastewater/sewage generation on the UCR campus would increase with the campus population increase.

Wastewater generated on the UCR campus is and will continue to be treated at the City's RWQCP. As a City-owned and operated facility, City management of the RWQCP accounts for wastewater flows associated with the UCR campus. The RWQCP had a rated capacity of 40 MGD and a plant-wide expansion was completed in December 2015 that increased treatment capacity to 46 MGD average dry weather flow. Expansion of the RWQCP was undertaken to accommodate City of Riverside buildout through 2037. Cumulative projections indicate a wastewater flow of 39 MGD by the year 2037 (City of Riverside 2020).

As such, the RWQCP would have sufficient capacity to process the additional wastewater generated by the proposed 2021 LRDP under existing and cumulative conditions. Projects developed under the proposed 2021 LRDP would be connected to existing and future on-site wastewater treatment conveyance systems. UCR would perform an analysis of wastewater infrastructure needs as projects are planned and constructed and would conduct site specific infrastructure improvements as needed. For example, UCR has previously identified a potential need for upgrades to the campus's local wastewater/sewer system based on the analysis in the 2016 Physical Master Plan Study and 2019 EIR for UCR's North District Development Plan (NDD Plan), which is separate and distinct from the proposed 2021 LRDP. Specifically, the NDD Plan EIR determined that the existing sewer capacities at West Linden Street and Canyon Crest Drive would be sufficient to convey flows associated with the initial phase of the NDD Plan but that full buildout of the NDD Plan may require upgrades to the existing 8-inch-diameter sewer lines in West Linden Street and Canyon Crest Drive (both north and south of West Linden Street). Such upgrades could include upsizing (replacing the existing pipe with a wider-diameter pipe) or paralleling (installing a new pipe in parallel position to the existing pipe) (UCR 2019b).

Improvements to on-campus sewer lines and lateral connections would occur concurrently with future project implementation and primarily in the disturbance footprints of such projects and existing roadways/disturbed areas. As with water infrastructure and facilities, any sewer line extensions necessary to serve future facilities associated with the proposed 2021 LRDP would generally be installed in already-disturbed rights-of-way, such as existing roads, or in the disturbance footprint of proposed buildings. Furthermore, the construction of these infrastructure

improvements would not substantially increase the proposed 2021 LRDP disturbance area, associated emissions and would not otherwise cause additional significant environmental effects. Potential impacts associated with wastewater infrastructure expansion and relocation for projects developed under the proposed 2021 LRDP would be **less than significant**.

Stormwater Drainage Facilities

Stormwater conveyance through the UCR campus, as discussed in Section 4.17.1 under "Stormwater Drainage", includes drainage facilities managed by UCR, the City, and the County of Riverside. As discussed in Section 4.17.2 under "Phase II Stormwater Discharge Permit", stormwater discharges from the UCR campus are covered under WQ Order No. 2013-0001-DWQ, which provides NPDES coverage for non-traditional Small MS4s. Compliance with this permit requires the implementation of a SWPPP for construction projects larger than 1 acre and BMPs associated with stormwater management, including, but not limited to, measures to prevent water quality degradation, increased flooding on- or off-site, and increased erosion and sedimentation on- or off-site. The existing stormwater drainage system across the UCR campus includes a mixture overland flow, underground storm drains, and natural arroyos that partially infiltrate stormwater into the basin and ultimately discharge the remaining stormwater to open channel arroyos and large-diameter County drainage facilities, and detention basins which are used to infiltrate stormwater into the groundwater basin (see Figure 4.10-4).

All campus projects would occur pursuant to the provisions of the Statewide General Construction Activity Stormwater Permit that specifies the implementation of BMPs. As described in Section 4.10, *Hydrology and Water Quality*, all construction projects under the proposed 2021 LRDP would comply with WQ Order No. 2013-0001-DWQ through the implementation of BMPs to manage stormwater runoff. Such BMPs may include, but are not limited to, the use of straw wattles, silt fencing, and site-specific temporary detention basins to prevent stormwater runoff from leaving active construction sites, the application of cover materials over stockpiles to prevent material from washing off-site and contributing total dissolved solids to stormwater runoff, establishment of designated areas for re-fueling and handling potentially hazardous materials, and providing worker training on emergency response procedures, should a potentially hazardous material such as vehicle fuel be accidentally spilled or leaked during project construction activities. These construction BMPs would not result in significant physical environmental impacts, construction-related stormwater impacts would be **less than significant**.

Compliance with the NPDES program would also include implementation of post-construction stormwater runoff controls for new development and redevelopment activities. Development under the proposed 2021 LRDP could increase stormwater runoff by introducing new impervious areas for previously undeveloped parcels. However, stormwater runoff from LRDP implementation would include localized stormwater capture and treatment facilities at the location of individual projects, and the expansion and development of additional on-campus aboveground and belowground stormwater drainage improvements in compliance with existing regulations discussed in Section 4.17.2.

More specifically, the Phase II MS4 permit requires all regulated projects – defined as projects creating and/or replacing 5,000 square feet or more of impervious area – to implement a SWMP that incorporates LID measures, including stormwater retention and treatment features. Such stormwater retention features must capture runoff from the 85th percentile, 24-hour storm event, 80 percent of the annual runoff, or flow from either 0.20 inch per hour rainfall intensity or twice the 85th percentile hourly rainfall intensity as determined by local rainfall records. Potential retention

features that may be incorporated into individual project designs include detention basins, biofiltration/catchment basins, or constructed wetland features. Given the size of proposed facilities, most individual projects constructed under the proposed 2021 LRDP would constitute regulated projects under the Phase II MS4 Permit and, therefore, would be required to demonstrate compliance with the stormwater capture requirements described in the permit. This would include development and implementation of a SWMP to account for potential runoff from the projected new development and to comply with the requirements of the Phase II Small MS4 permit.

The proposed 2021 LRDP is informed by the planning principles in the 2016 Physical Master Plan Study, which guides future decision-making regarding campus development, in support of the Strategic Plan's academic vision and proposed 2021 LRDP. Under the proposed 2021 LRDP, the existing arroyos and detention basins that currently convey stormwater flows through the UCR campus would be maintained and protected. The proposed 2021 LRDP includes a policy to integrate stormwater infrastructure in the open space framework of campus and to develop a SWMP that emphasizes strategies to restore, enhance, and maintain hydrological function on campus and the regional hydrological system. Existing features that convey stormwater flows and would be maintained and protected under the proposed 2021 LRDP include the Great Glen Basin and the Glade Basin, which are discussed further below.

The Great Glen Basin at the northeast intersection of East Campus Road and Big Springs Road currently receives flows from a natural arroyo which serves a portion of the campus as well as an off-site residential area to the northeast (UCR 2016). The 85th percentile treatment storm from development in the East Campus around East Campus Drive would be collected and conveyed by various drainage systems, including underground storm drains and surface conveyance through the proposed Science Walk Extension pedestrian mall. Stormwater runoff which exceeds the capacity of the treatment detention basins would overflow to existing and future storm drain conveyance systems which serve the existing sites and maintain existing drainage patterns (UCR 2016).

The Glade Basin at the northeastern corner of North Campus Drive and Aberdeen Drive currently receives flows from a 40-acre portion of the campus to its north and manages the 85th percentile treatment storm from development near Aberdeen Drive and north of North Campus Drive (UCR 2016). The Glade Basin would continue to manage the 85th percentile storm under the proposed 2021 LRDP, by conveying runoff in existing underground storm drains via a vegetated swale along Aberdeen Drive to the existing detention basin. Under existing conditions, stormwater runoff which exceeds the capacity of the vegetated swale or detention basin overflows to existing stormwater conveyance systems.

Stormwater flows occur in direct response to precipitation events and dissipate after such events, as flows remaining in the existing stormwater conveyance system infiltrate to the subsurface through gravel at the bottom of the basins. The proposed 2021 LRDP would maintain existing drainage patterns, including the existing capacity of the Great Glen Basin and the Glade Basin. As such, stormwater flows exceeding the capacity of existing drainage and detention features would overflow to the stormwater conveyance system. Additionally, as projects under the proposed 2021 LRDP are implemented, future project-specific stormwater drainage, conveyance, and detention improvements would be developed to manage project-specific alterations. However, as discussed above, the existing drainage patterns would be maintained under the proposed 2021 LRDP.

As currently envisioned, most of the future campus development that would occur under the proposed 2021 LRDP would be located on previously disturbed lands, such as parking lots and previously developed sites which are characterized by impervious surfaces. Future projects under the proposed 2021 LRDP would be sited to minimize potential alterations to existing drainage

patterns, such as on previously developed sites that are already characterized as impervious and have stormwater conveyance features in place in and/or surrounding the site, to guide stormwater flows into the existing conveyance system. It is also anticipated that not all future proposed 2021 LRDP projects may be sited as such, and that implementation of the proposed 2021 LRDP may introduce some new areas of impervious surfaces on the UCR campus, including land use designations for Agricultural/Campus Research, Student Neighborhood, Campus Support, and University Avenue Gateway, and the UCR Botanic Gardens interpretative center. Increasing impervious surfaces may subsequently increase stormwater runoff, if drainage features are not implemented to guide such flows to existing detention basins and conveyance systems on campus. However, future projects under the proposed 2021 LRDP would be implemented with project-specific SWPPPs for construction and SWMPs for operation and maintenance. The project-specific SWPPPs and SWMPs would include BMPs selected specifically for the subject site and proposed activities, and may include, but would not be limited to, the implementation of site-specific drainage features to reduce or avoid potential impacts. The purpose of such features would be to maintain existing drainage patterns and minimize alterations associated with individual projects, including potential increases in impervious surfaces. Potential impacts associated with site-specific drainage improvements would be limited to the footprint areas of future development projects and already-existing rights-of-way associated with roadways and drainage facilities. Potential operational impacts would be **less than significant**.

Electric Power and Natural Gas Facilities

Please note, Impact U-1 is specific to impacts associated with infrastructure and facilities; electric power and natural gas use is addressed in Section 4.6, *Energy*, under Impact E-1, *Result in Wasteful, Inefficient, and Unnecessary Use of Energy*.

No major electric power or natural gas facility improvements are proposed as part of the proposed 2021 LRDP. Individual projects occurring under the proposed 2021 LRDP may require minor electric power or natural gas facility improvements, such as rewiring buildings during renovation, and installing new electric wiring or natural gas connections for new construction projects. The installation of project-specific electric power and natural gas facilities would generally occur in the respective project's footprint, and would be temporary, limited to the respective project's construction period. Potential impacts associated with electric power and natural gas improvements would not have a significant impact during construction or operation and maintenance. Additionally, pursuant to UC Policy A.3, new buildings or renovations must, if feasible, not use natural gas for space and water heating unless connected to an existing campus central thermal infrastructure. Due to the potential for temporary construction-related impacts during installation of electric power or natural gas facilities, potential impacts would be **less than significant**.

Telecommunications Facilities

No major telecommunications improvements are proposed as part of the proposed 2021 LRDP. Individual projects occurring under the proposed 2021 LRDP may require minor telecommunications improvements, such as undergrounding telephone lines or rewiring buildings during renovation. The installation of project-specific telecommunications infrastructure would be temporary, and generally localized to each respective project's footprint. Potential impacts associated with telecommunications improvements would not have a significant impact during operation and maintenance. Therefore, due to the potential for temporary construction-related impacts during installation of telecommunications facilities, potential impacts would be **less than significant**.

Mitigation Measures

No mitigation measures are required.

Significance After Mitigation

Impacts would be less than significant without mitigation.

Impact U-2 SUFFICIENT WATER SUPPLIES.

IMPLEMENTATION OF THE PROPOSED 2021 LRDP WOULD RESULT IN A NET INCREASE IN WATER DEMAND ON THE UCR CAMPUS OF APPROXIMATELY 579 AFY THROUGH YEAR 2035/2036. THIS INCREASE IS ACCOUNTED FOR IN THE RPU'S 2015 UWMP, AND THERE IS SUFFICIENT WATER SUPPLY AVAILABLE UNDER ALL DROUGHT SCENARIOS. IMPACTS WOULD BE LESS THAN SIGNIFICANT. NO MITIGATION MEASURES ARE REQUIRED.

As discussed in Section 4.17.1 under "Water Supply", UCR receives its entire water supply from the RPU, which delivers water throughout the City in accordance with an UWMP that accounts for the UCR campus water demands and cumulative demands. Water delivered by the RPU is primarily sourced from locally produced groundwater resources. Notably, the local groundwater basins are adjudicated and managed in accordance with an Adjudication Judgement that is administered by a Court-appointed Watermaster. As discussed in the Environmental Setting, in addition to locally produced groundwater which is distributed in accordance with the Adjudication Judgement, the RPU also delivers recycled water and when needed, such as during dry years and heavy demand periods, the RPU also delivers imported surface water supplies purchased from Metropolitan via the WMWD.

The UCR campus water demand rates are accounted for in the RPU's UWMP, which also accounts for projected growth that would occur with the proposed 2021 LRDP. UCR has consulted with RPU, which has provided a future water demand letter dated April 16, 2021, noting that it anticipates RPU will have adequate water supplies to meet UCR's proposed 2021 LRDP increased demand, which will be reflected in the City's 2020 UWMP. The RPU's current UWMP[2] details water demand by sector, including retail customers and wholesale potable and raw water deliveries to other water districts, as shown in Table 4.17-4 (RPU 2016).

Table 4.17-4 RPU's 2015 UWMP's Projected Cumulative Demands for Potable and Raw Water

Use Type	2020	2025	2030	2035	2040
Potable					
Single Family Residential	29,931	31,064	32,241	33,462	34,730
Multi-Family Residential	5,365	5,568	5,779	5,998	6,225
Commercial/Institutional	9,959	10,337	10,728	11,135	11,556
Industrial	9,845	10,218	10,605	11,006	11,423
Landscape	1,050	100	150	200	250

[2] At the time of preparation of this Draft EIR, the RPU is currently updating its UWMP for 2020 but has not yet released the 2020 UWMP; this analysis therefore relies upon information provided in the 2015 UWMP.

Use Type	2020	2025	2030	2035	2040
Agricultural Irrigation	1,707	1,772	1,839	1,908	1,981
Other	371	385	399	414	430
Deliveries to WMWD	4,300	4,300	4,300	4,300	4,300
Additional UCR Demand	3,300	3,300	3,300	3,300	3,300
California Baptist University Added Demand	150	150	150	150	150
Gage Canal Company (Upper)	6,000	6,000	6,000	6,000	6,000
Potable Water Loss	5,278	5,375	5,559	5,750	5,948
Potable Water Total	**77,256**	**78,569**	**81,050**	**83,623**	**86,293**
Raw Water					
Gage Canal Company (Lower)	7,000	7,000	7,000	7,000	7,000
Overlying Uses	1,200	1,200	1,200	1,200	1,200
WMWD	2,500	2,500	2,500	2,500	2,500
Irrigation Water Loss	835	835	835	835	835
Raw Water Total	**11,535**	**11,535**	**11,535**	**11,535**	**11,535**
Recycled Water Demand	6,430	6,430	6,430	6,430	6,430
Demand (Potable and Raw Water) Total	95,221	96,534	99,015	101,588	104,258

WMWD = Western Municipal Water District
Units in acre feet per year
Source: RPU 2016

The RPU estimates that population in its service territory will increase to about 66,000 individuals by the year 2040, which equates to approximately 20 percent above the 2015 population. As shown in Table 4.17-4 above, the RPU's actual 2015 total water demand (potable and raw water) was 95,221 AFY and is estimated to increase to 104,258 AFY in 2040.

Construction Water Demands

Water would be required for temporary construction activities associated with implementation of the proposed 2021 LRDP. Temporary construction water uses would primarily be for dust suppression associated with grading, grubbing, and compaction, as well as for stormwater control BMPs including construction equipment wheel washing. However, during times of drought, the SCAQMD's *Drought Management and Water Conservation Plan* limits potable water dust suppression by increasing reliance on non-toxic chemical dust suppressants to stabilize soils, paving unpaved roadways and using vacuum sweepers instead of water to remove dust from paved areas, and increasing use of physical/mechanical barriers to contain or limit transport of fugitive dust (SCAQMD 2014); please see Section 4.10.2 for further discussion of SCAQMD requirements. Water would also be required for concrete mixing and casting; however, it is assumed that concrete mixing and casting would be conducted by contractors implementing specific LRDP projects. Of these

temporary construction-related water uses, dust suppression would demand the most water during construction. Pursuant to the requirements of SCAQMD Rule 403 as described in Section 4.2, *Air Quality*, all disturbed unpaved roads and disturbed areas on campus would be watered to reduce fugitive dust generation from construction activities. Demolition, site preparation, and grading are the activities anticipated to result in the greatest dust generation and, therefore, the greatest construction-related water demand. Water demand for dust suppression is highly dependent on site-specific variables such as soil properties, antecedent moisture conditions, and other climatic factors and can be performed with non-potable reclaimed water. A 2017 analysis prepared by SCAQMD estimated water demand associated with Rule 403 dust suppression requirements for construction sites in SCAQMD jurisdiction at approximately 1,000 gallons per acre per day (SCAQMD 2017). Additionally, where redevelopment of campus facilities would replace existing structures, construction water use would be significantly less than operational demand, which would generally halt during construction activities (e.g. landscaping water demands for these areas would halt). Furthermore, UCR Campus water demand would be less than the amount assumed in the UWMP, even with additional construction related water demand (see subsequent operational analysis for additional information).

Therefore, construction water demands would not result in a long-term strain on water supplies. Potential impacts related to construction water consumption would be **less than significant**.

Operational Water Demands

This analysis was informed by the water usage analysis included in the 2016 Physical Master Plan Study. As reported therein, operational water demands would be approximately 1,125 AFY with the 2014 campus space inventory at 7,360,521 gsf. Complete buildout of the proposed 2021 LRDP would provide a campus space inventory of approximately 12,750,000 gsf, representing an increase of approximately 73 percent. Applying the same increase factor of 73 percent to the estimated annual water usage, the approximate water usage with implementation of the proposed 2021 LRDP would be 1,950 AFY. This calculation is likely conservative, given the increasing effectiveness of water conservation measures discussed in Section 4.17.2 above which have not been considered in this calculation.

A comparison of the results of the calculations provided above is shown below, in Table 4.17-5.

Table 4.17-5 UCR Potable Water Consumption

Scenario Year	Campus Space (gsf)	Approximate Annual Potable Water Consumption (mg)	Approximate Annual Potable Water Consumption (afy)
2016 Physical Master Plan Study (based off 2014 data)	7,360,521	489	1,125
Buildout Year 2035/2036	12,750,000	846	1,950
Difference	**+5,389,479**	**+216.4357**	**+825**

gsf = gross square feet; mg = million gallons; afy = acre feet per year

Source: 2016 Physical Master Plan Study and input from UCR Planning, Design & Construction staff

As shown above, full buildout of the proposed 2021 LRDP would increase the baseline UCR population by 13,884 individuals, or approximately 48.44 percent. Total annual potable water consumption, based on a per capita use rate of 15,591 gallons per year, would increase by a commensurate 48.44 percent. As a result, total annual potable water demand for full buildout of the proposed 2021 LRDP would be approximately 1,950 AFY, which is approximately 579 AFY more than under baseline (year 2018/2019) conditions. As discussed above, the methodology used to estimate future water demands for buildout of the proposed 2021 LRDP is conservative in that it relies on a measured per capita water demand rate and does not account for increased per capita water use efficiencies which are expected to be achieved with implementation of the UC Policy on Sustainable Practices.

Realistically, these conservative estimations would be reduced through compliance with State-mandated water conservation measures. For example, the proposed 2021 LRDP would comply with all requirements of CalGreen pertaining to maximum flow rates for plumbing fixtures in both residential and non-residential buildings. CalGreen requirements are continuously updated and typically require more stringent conservation requirements with each iteration. The proposed 2021 LRDP also includes the redevelopment of existing uses pursuant to mandated water conservation measures and buildout would therefore replace or lessen existing water demand from redeveloped structures. Furthermore, pursuant to the UC Policy on Sustainable Practices, all UC campuses are to phase out un-used turf irrigated with potable water and reduce growth-adjusted potable water consumption (UCOP 2020).

Additionally, per capita water use would decrease during the lifetime of the proposed 2021 LRDP due to its policies to reduce potable water use, as listed below.

- Reduce potable water use in existing building in the Academic Center by 20 percent
- Reduce potable water use in student residential buildings by 30 percent
- Reduce potable water use in new facilities by exceeding applicable codes by a minimum of 20 percent
- Retrofit existing urinals, toilets, showerheads, and faucets for existing buildings with higher water efficiency rated equipment
- Design new building irrigation and efficient toilet flushing systems for use with future non-potable water sources.

Compliance with CalGreen and the UC Policy on Sustainable Practices, as well as the continued implementation of water conservation efforts already in place at UCR, and the additional water conservation efforts included in the proposed 2021 LRDP, would further decrease the indoor and outdoor water demand beyond the rates presented in Table 4.17-5.

Non-potable water demand for irrigation of agricultural teaching and research fields would not increase as a result of the proposed 2021 LRDP. As discussed in Section 4.2, *Agricultural Resources*, implementation of the proposed 2021 LRDP would halt agricultural cultivation on a portion of agricultural land. Thus, the area subject to irrigation by non-potable water would decrease.

Water Supply Availability

RPU's current UWMP indicates that UCR expansion will account for approximately 3,300 AFY of water, which would remain constant from 2020 through 2040 (RPU 2016, Tables 1-1 and 5-2). As shown in Table 4.17-5 above, buildout of the proposed 2021 LRDP is anticipated to require approximately 1,950 AFY of water. This is approximately 1,179 AFY less than the demand accounted

for on the UCR campus in the RPU UWMP. Therefore, the proposed 2021 LRDP's projected gross increase in water demand is fully accounted for in RPU's 2015 UWMP, for cumulative projections through year 2040. As previously mentioned, at the time of preparation of this Draft EIR, the RPU is currently updating its 2020 UWMP. The 2020 UWMP will project water supply and demand for the RPU service area, including UCR, through year 2045. The RPU has indicated that anticipated potable water supplies can accommodate UCR needs with anticipated supplies for normal, dry, and multiple dry years during the lifespan of the proposed 2021 LRDP (RPU 2021).

DRY YEAR WATER AVAILABILITY PROJECTIONS

As required by the Urban Water Management Act, the RPU's UWMP includes estimates of future groundwater availability under single-dry-year and multiple-dry-year scenarios, with locally produced groundwater constituting approximately 80 percent of the total water supply delivered by the RPU throughout its service area. Given the adjudication of the groundwater basins upon which it depends and the dependability of recycled water as a supply, RPU assumes 100 percent of its groundwater and recycled water supplies would remain available during both single- and multiple-dry-year scenarios. Table 4.17-6 summarizes RPU's normal, single, and multiple dry year supply through 2040.

Table 4.17-6 RPU's 2015 UWMP Water Supply in Single and Multiple Dry Years

Drought Condition	2020	2025	2030	2035	2040
Normal Year	116,903	121,903	124,703	124,703	124,703
Single Dry Year	96,288	101,288	104,088	104,088	104,088
Multiple Dry Year 1st, 2nd, and 3rd Year Supply[1]	102,364	107,364	110,164	110,164	110,164
RPU Projected Demand (afy)	**2020**	**2025**	**2030**	**2035**	**2040**
As presented in Table 4.17-4:	95,221	96,534	99,015	101,588	104,258[2]

RPU = Riverside Public Utilities; UWMP = Urban Water Management Plan

[1]Expected supplies for a period of multiple dry years are slightly higher than a single dry year due to higher average availability of SWP water.

[2]The projected demand in year 2040 of 104,258 acre-feet is greater than the projected supply under the single-dry-year drought condition by a projected 170 acre-feet.

Units in acre feet per year

Source: RPU 2016

As shown above, under nearly all considered drought conditions, the projected available water supply exceeds the projected demand as presented in Table 4.17-4, and shown above for comparison. One exception is the single-dry-year drought condition, wherein the projected supply is approximately 170 acre-feet less than the projected demand. This projected supply shortage would be managed through implementation of per capita water conservation measures and administration of the Adjudication Judgement for use of local groundwater resources, and through the UWMP Water Shortage Contingency Plan. The UWMP Contingency Plan, includes different stages depending upon the severity of the drought conditions, which include education programs, halting issuance of water meters, rebate programs for landscaping and fixture replacements, limits on potable water use for dust suppression, prohibitions of certain uses identified under Riverside

Municipal Code Chapter 14.22, and penalties and charges to enforce compliance. As discussed previously, the RPU also purchases imported SWP water supply during peak demand and drought conditions.

In addition to implementing conservation measures, complying with the Adjudication Judgement, and purchasing imported SWP water, the RPU also plans to implement several water supply projects between 2020 and 2030 that are designed to increase available water supplies. Specifically, the RPU plans to expand the availability of recycled water supply, as well as groundwater recharge and storage operations. Specific projects include the Riverside North Aquifer Storage and Recovery (Rubber Dam) project, designed to redirect overland storm flows into nearby groundwater recharge basins; infiltration of entrained water will augment the underlying groundwater supply to bolster drought-year water supply availability. Additional recharge basins in Grand Terrace and North Riverside will also help to ensure water supply availability. Furthermore, recycled water which is currently only available in the immediate vicinity of the treatment plant, is planned to be expanded to several parks, schools, and other businesses through construction of the Jackson Street Pipeline Project. The RPU also plans to modernize the Gage Canal's well fields and delivery system to improve reliability and expand service to a broader population in the Gage Canal's territory (RPU 2017). Collectively, these projects are anticipated to increase water supply availability to the RPU by approximately 15,000 AFY. Over a single or multi-year dry period the quantity of supply from these projects will only be slightly reduced, because in those dry years, supplemental water can be pulled from storage (RPU 2016).

Although the supply availability calculations provided above indicate a supply shortage of approximately 170 acre-feet under single-dry-year drought conditions, this shortage would be compensated through the continued development of water supply projects and programs that are accounted for in the RPU's UWMP. Potential impacts to water supply associated with construction and operation of the proposed 2021 LRDP would be **less than significant**.

Mitigation Measures

No mitigation measures are required.

Significance After Mitigation

Impacts would be less than significant without mitigation.

Impact U-3 Adequate Capacity from a Wastewater Treatment Provider.

Wastewater generated by development under the proposed 2021 LRDP would be treated at the Riverside Water Quality Control Plant. The plant would have adequate capacity to serve the proposed 2021 LRDP's anticipated wastewater generation in addition to its existing wastewater treatment commitments. Impacts would be less than significant. No mitigation measures are required.

As discussed under Impact U-1 related to wastewater facilities and infrastructure, project-generated wastewater would be treated at the RWQCP facility. In addition, as discussed in Section 4.17.1 under "Wastewater", in 2020, the RWQCP treated approximately 9,629 MG of wastewater, for a daily average of 26.31 MGD (R. Eland 2021). Cumulative projections indicate a wastewater flow of 39 MGD by the year 2037 (City of Riverside 2020). In comparison, the RWQCP's design capacity is for treatment of up to 46 MGD average dry weather flow. Also as discussed under Impact U-1,

consistent with the 2016 Physical Master Plan Study, this analysis assumes a per-capita wastewater generation rate for the UCR campus of approximately 20 gallons per person per day. With the projected increase in campus population of up to 13,884 additional individuals, the increased wastewater generation would be an additional approximately 277,680 GPD, which is within the 19.69 MG available treatment capacity at the RWQCP facility under existing conditions and within the available capacity under cumulative conditions.

As buildout under the proposed 2021 LRDP is implemented, the proposed 2021 LRDP would not result in a determination by the wastewater treatment provider that it does not have adequate capacity to serve the proposed 2021 LRDP's anticipated demand in addition to the provider's existing commitments. Impacts would be **less than significant**.

Mitigation Measures

No mitigation measures are required.

Significance After Mitigation

Impacts would be less than significant without mitigation.

Impact U-4 IMPACTS TO SOLID WASTE FACILITIES AND COMPLIANCE WITH REGULATIONS RELATED TO SOLID WASTE.

THE PROPOSED 2021 LRDP WOULD NOT GENERATE SOLID WASTE IN EXCESS OF STATE OR LOCAL STANDARDS, OR IN EXCESS OF THE CAPACITY OF LOCAL INFRASTRUCTURE. THE PROPOSED 2021 LRDP WOULD NOT IMPAIR THE ATTAINMENT OF SOLID WASTE REDUCTION GOALS AND WOULD COMPLY WITH FEDERAL, STATE, AND APPLICABLE LOCAL STATUTES AND REGULATIONS RELATED TO SOLID WASTE. IMPACTS WOULD BE LESS THAN SIGNIFICANT. NO MITIGATION MEASURES ARE REQUIRED.

As described in Section 4.17.1 under "Solid Waste", recyclable materials are partially recovered out of the landfill waste stream and the remainder is used for energy and concrete production. The CR&R Perris Transfer Station and MRF is a large volume transfer/processing facility that has a maximum permitted daily capacity of approximately 3,287 tons per day (CalRecycle 2019). This equates to an annual maximum capacity of approximately 1,199,755 tons per year.

Construction

Demolition of existing facilities and export of soil generated during development of future LRDP projects would result in the generation of construction/demolition debris. CalEEMod, which was used to determine emissions from all project construction activities including demolition, employs a conversion factor of 0.046 ton per square foot for building demolition debris, based on an analysis of commercial brick, concrete, and steel building demolition (CAPCOA 2017). Under the proposed 2021 LRDP, approximately 885,279 square feet of existing building area would be demolished. Using the CalEEMod conversion factor of 0.046 ton per square foot of demolition debris, demolition conducted for the 2021 LRDP would generate approximately 40,722.8 tons of debris. It is important to note that this is a highly conservative estimate, as it does not account for any recovery of material for recycling or reuse; as stated above, recyclable materials are partially recovered from the landfill waste stream prior to off-site disposal. For the purposes of this analysis, however, it is conservatively assumed that buildout of the proposed 2021 LRDP would generate approximately

40,722.8 tons per year of debris for off-site landfill disposal; this equates to approximately 111.57 tons per day of debris for off-site landfill disposal.

Because the campus consists of a largely developed campus, grading for individual projects developed under the proposed 2021 LRDP is not anticipated to result in major export of soil. Nevertheless, grading activities may result in export of some soil from individual project construction sites. As described above, the CR&R Transfer and MRF accepts construction/demolition waste. Grading activities associated with the proposed 2021 LRDP would not occur all at once, but rather would be spread across multiple projects implemented over the life of the proposed 2021 LRDP. Furthermore, exported soil could be transported to other area landfills that accept soil and construction debris in Riverside County to further reduce impacts at any single solid waste disposal facility, and is typically reused beneficially as landfill cover or imported fill material at other construction sites. Therefore, disposal of soils from grading of the campus would not exceed the capacity of local solid waste disposal facilities.

The handling of all debris and waste generated during construction of the proposed 2021 LRDP would be subject to 2016 CalGreen requirements and the California Integrated Waste Management Act of 1989 (AB 939) requirements for salvaging, recycling, and reuse of materials from construction activity on the campus. Further reduction in solid waste generation would occur with implementation of the UC Policy on Sustainable Practices. UCR has been implementing its construction waste diversion program, as discussed in Section 4.17.2 and in 2019 had a total diversion rate of 73 percent (UCOP 2019). As mentioned above, the demolition debris calculations of 40,722.8 tons per year or 111.57 tons per day for the proposed 2021 LRDP does not account for any reuse or recycling efforts. If the same diversion rate of 73 percent from 2019 is applied to the proposed 2021 LRDP, the resulting amount of demolition debris to be hauled off-site for landfill disposal would be approximately 10,995.16 tons per year, or approximately 30.13 tons per day. As such, sufficient solid waste landfill disposal capacity is available to meet the needs of the proposed 2021 LRDP, and impacts related to solid waste generated during construction would be **less than significant**.

Operation

In 2018/2019, UCR generated approximately 0.85 ton of waste per capita. With implementation of the proposed 2021 LRDP, the campus population would increase by approximately 13,884 individuals by year 2035/2036, for a total population of approximately 42,545. Assuming the UCR 2018/2019 per capita waste generation rate of 0.85 ton remains constant through 2035/2036, buildout of the proposed 2021 LRDP would increase annual solid waste generation by approximately 11,801.4 tons, or approximately 32.33 tons per day. However, most of this solid waste would be diverted away from the landfill. As discussed below, in 2018/2019, UCR had a Municipal Solid Waste diversion rate of approximately 70 percent, as well as a total diversion rate (including construction and demolition) of approximately 73 percent (UCOP 2019).

In addition, the UC Sustainability Practices Policy directs UCR to reduce per capita total municipal solid waste generation by 25 percent per capita from fiscal year 2015/2016 levels by 2025 and by 50 percent per capita from fiscal year 2015/2016 levels by 2030. The UC Sustainability Practices Policy also directs UCR to divert 90 percent of municipal solid waste from the landfill. However, the analysis provided herein considers a reasonable worst-case scenario, under which UCR would not meet the policy goal of reducing waste per capita by 50 percent by 2030 or diverting 90 percent of municipal waste from the landfill; rather, under the reasonable worst-case scenario, this analysis assumes a continuation of business-as-usual for waste diversion and does not factor in waste

reduction associated with additional campus conservation and diversion programs. Therefore, the reasonable worst-case scenario assessed herein assumes that the year 2018/2019 diversion rate of 70 percent would remain constant through year 2035/2036. As such, UCR would divert approximately 22.63 tons of waste per day away from the landfill, resulting in approximately 9.7 tons of waste per day being processed through the CR&R Perris Transfer Station and MRF.

As discussed above, daily permitted capacity of the CR&R Perris Transfer Station and MRF is approximately 3,287 tons per day. As shown in Table 4.17-2, there are three viable landfills that receive waste from UCR, which collectively have a maximum permitted daily load of 25,554 tons per day, and a collective total remaining capacity of approximately 69.1 million tons. The estimated 9.7 tons per day of solid waste that would be generated under the proposed 2021 LRDP (under the worst-case scenario not accounting for diversion) would not result in a substantial increase in solid waste disposal at the viable landfills, and disposal of solid waste generated under the proposed 2021 LRDP could be accommodated by existing viable landfills without creating a need for additional solid waste disposal facilities. The amount of solid waste generated and disposed of in nearby landfills would not constitute an unplanned increase in waste not envisioned by the regional waste planning process and would therefore does exceed solid waste capacity.

The calculations of solid waste disposal rates for the proposed 2021 LRDP do not account for UCR's waste/source reduction and recycling program, which includes sorting and separating wastes to simplify the removal of recyclable materials and the expansion of composting procedures associated with landscaping and agriculture to reduce the solid waste flow. The campus has constructed a transfer station on the West Campus at Parking Lot 30, where UCR collects the recyclables and waste on campus and delivers these materials to the transfer station for hauling. A third-party vendor picks up the recyclable material for recycling. UCR delivers waste in UCR haul trucks to the Nelson Transfer Station from which Burrtec Waste Industries then transports 100 percent of the non-recyclable material to a waste-to-energy facility. UCR composts all green wastes on campus. In addition, UCR is carrying out a shift in its procurement practices toward recyclable, second generation, or reusable products to the extent feasible.

The proposed 2021 LRDP would comply with federal, State, and UC statutes and regulations related to solid waste, including implementation of the *UC Policy on Sustainable Practices*. Therefore, because the proposed 2021 LRDP would be served by landfills with sufficient capacity and would comply with applicable regulations related to solid waste, impacts would **be less than significant**.

Mitigation Measures

No mitigation measures are required.

Significance After Mitigation

Impacts would be less than significant without mitigation.

4.17.4 Cumulative Impacts

The geographic scope of the cumulative analysis for utilities varies depending on the topic addressed, as discussed below. Cumulative projects considered as part of this cumulative analysis include those assumed under buildout of the proposed 2021 LRDP, plus the cumulative projects listed in Table 4-1. Cumulative impacts could occur if impacts of the proposed 2021 LRDP would combine with similar impacts of other projects in the cumulative scenario, including with respect to temporal and geographic context.

The potential impacts to utilities and service systems to occur is partly informed by cumulative growth projections, which are indicative of the extent of additional utility and service system connections and associated facilities that will be required. Several of the analyses above are inherently cumulative in nature, including the assumptions and growth projections, for example Impact U-2 (Water Supply) and Impact U-3 (Wastewater). These analyses rely upon projections from the Urban Water Management Plan and the Update of the Integrated Master Plan for the Wastewater Collection and Treatment Facilities and related documents described below.

As shown in Table 4.12-2 in Section 4.12, *Population and Housing*, based on SCAG projections, the population of the Riverside-San Bernardino-Ontario metropolitan area is forecasted to increase by approximately 356,839 by 2035. Population growth of 356,839 people would represent an approximately 16 percent increase above the 2020 service area population. A correlating amount of utility and service system connections will be necessary to support the projected population increase, as discussed below.

Relocation or Construction of Utility Facilities

Development of projects under the proposed 2021 LRDP would be adjacent to existing campus development and would connect to existing utility facilities as feasible, including for water supply, wastewater treatment, stormwater drainage, electric power, natural gas, and telecommunications.

Water Supply Facilities

The geographic scope of cumulative analysis for water supply facilities is the UCR campus, as all potable water, fire water, and irrigation water supplies are distributed through the campus-wide system. Projects under the proposed 2021 LRDP would require the installation of additional water main lines, lateral connections, and hydrants on campus to serve planned facilities, which would occur during individual project construction and in project footprint areas. Impacts associated with water supply facility improvements for cumulative projects under the proposed 2021 LRDP would have limited potential to result in cumulative impacts due to the site-specific nature of such improvements, as well as the siting of such improvements in previously disturbed areas and project footprints. Therefore, potential cumulative impacts associated with water supply facilities (Impact U-1) would be **less than significant, and the project's contribution would not be cumulatively considerable**.

Wastewater Treatment Facilities

The geographic scope of cumulative analysis for wastewater treatment facilities is the UCR campus's wastewater conveyance pipeline system, as well as the RWQCP, which provides treatment of wastewater generated on the UCR campus. As with water supply facilities, discussed above, impacts associated with wastewater conveyance facilities for cumulative projects under the proposed 2021 LRDP would have limited potential to result in cumulative impacts due to the site-specific nature of such improvements, as well as the siting of such improvements in previously disturbed areas and project footprints. As discussed under Impact U-1, the RWQCP has sufficient capacity to treat the increased wastewater generated by cumulative projects constructed under the proposed 2021 LRDP, such that expansion of wastewater treatment facilities would not be necessary. Potential cumulative impacts associated with wastewater conveyance and treatment facilities (Impact U-1) would be **less than significant, and the project's contribution would not be cumulatively considerable**.

Stormwater Drainage Facilities

The geographic scope of cumulative analysis for stormwater drainage facilities includes the City of Riverside and the RCFCWCD service areas. This area is appropriate for analysis of cumulative impacts to stormwater drainage facilities due to the regional nature of such facilities. Individual cumulative projects in this scope of analysis would be subject to the stormwater capture and treatment requirements of the applicable MS4 permit; as such, project-specific stormwater drainage features and BMPs to control stormwater runoff would be managed through the implementation of project-specific SWPPPs during construction and project-specific SWMPs during operation and maintenance. Where cumulative projects redevelop existing impervious sites, such redevelopment may result in benefits in comparison to existing conditions due to increased on-site stormwater capture. The implementation of project-specific SWPPPs and SWMPs would occur in the disturbance footprint of the respective projects. Through compliance of future projects with the applicable stormwater laws and regulations, cumulative impacts associated with stormwater (Impact U-1) are **less than significant, and the project's contribution would not be cumulatively considerable**.

Electric Power and Natural Gas Facilities

The geographic scope of cumulative analysis for electric power and natural gas facilities is limited to the UCR campus. This is an appropriate area of cumulative analysis because electric power and natural gas connections would be project-specific and largely limited to the temporary disturbance footprint of respective projects under the 2021 LRDP. The sufficiency of electricity and natural gas supply is addressed in Section 4.6, *Energy*, under Impact E-1, *Result in Wasteful, Inefficient, and Unnecessary Use of Energy*. The analysis provided herein is specific to potential impacts associated with construction of the physical connections to existing electric power and natural gas supply. Because project-specific connections to electric power and natural gas would be site-specific and limited to future projects' construction footprint, the potential for cumulative impacts to occur is considered minimal, and potential impacts (Impact U-1) would be **less than significant, and the project's contribution would not be cumulatively considerable**.

Telecommunications Facilities

The geographic scope of cumulative analysis for telecommunications facilities is the City, which is an appropriate scope due to the service area of existing service providers. The proposed 2021 LRDP would include telecommunications connections to existing lines and systems, as service providers exist for the project site and vicinity. Telecommunication facilities associated with future projects in this geographic scope of analysis would be implemented in the disturbance area of the respective project footprints and would be designed to meet project-specific needs. As such, the telecommunication facilities associated with other projects in the scope of this analysis would have minimal potential to combine and result in cumulatively considerable impacts. Therefore, potential cumulative impacts related to the implementation of service connections to telecommunications infrastructure (Impact U-1) would be **less than significant, and the project's contribution would not be cumulatively considerable**.

Water Supply Availability

The geographic scope of analysis for cumulative water supply impacts is the RPU service boundary. This geographic scope is appropriate because RPU is responsible for providing the water supply for all residential, commercial, industrial, and fire protection uses on the UCR campus. Cumulative

development in the RPU service area would increase demands on water supplies. The RPU anticipates a total demand of 104,258 AFY by 2040, which would result in an increase of 9,037 AFY from the anticipated 2020 demands of 95,221 (RPU 2016). This anticipated increase in demand is based on planned and pending future development as identified on the existing and planned zoning and land use specifications in the City's General Plan Housing Element. Cumulative water demand associated with planned development in the RPU service area, including the proposed 2021 LRDP, would be accounted for in the water supply demand projections in the current UWMP and will be accounted for in the water supply demand projections in the City's 2020 UWMP.

As discussed under Impact U-2, water demands of the proposed 2021 LRDP are fully accounted for by the RPU's anticipated water supply availability, except for a 170-acre-foot deficit during the single-dry-year drought condition. However, as discussed under Impact U-2, with continued implementation of UCR water conservation efforts, anticipated completion of future RPU water supply augmentation projects, and the UWMP Water Contingency Planning, sufficient water supply would be available to the UCR campus under all considered drought conditions, including normal-year (no drought), single-dry-year, and multiple-dry-year scenarios through year 2040. Future projects in RPU's service territory would be required to obtain service commitments from RPU prior to construction.

Due to the management of groundwater resources by an Adjudication Judgement, as administered by a Court-appointed Watermaster, cumulative projects in the RPU's service territory that would require a water supply would only be allowed to use water determined by the Watermaster to be available for future development. Additionally, the RPU will consider the water demands of individual projects proposed in its service territory, with respect to the RPU's ability to provide their required supply through available means, including recycled water and imported SWP water. Due to the existing and project water supply availability in the RPU's service territory, and compliance with existing laws and regulations for water supply, including, but not limited to, the Adjudication Judgement, cumulative impacts related to water supply (Impact U-2) are **less than significant, and the project's contribution would not be cumulatively considerable.**

Wastewater Treatment Capacity

The geographic scope of analysis for cumulative impacts to wastewater facilities is the UCR campus and the service area for the RWQCP, which includes the City as well as the community services districts of Jurupa, Rubidoux, Edgemont, and the community of Highgrove (City of Riverside 2020). This geographic scope is appropriate because all wastewater flows from the UCR campus would be directed to the RWQCP plant, and no other wastewater treatment facilities would have potential to be affected by implementation of the proposed 2021 LRDP.

Individual projects occurring under the proposed 2021 LRDP would require wastewater connections, to provide conveyance of wastewater generated at individual project sites to the regional conveyance and treatment system. Such connections would be project-specific and would be implemented during construction of future projects under the proposed 2021 LRDP. The installation of project-specific wastewater connections would occur in the respective project's footprint and would be temporary, limited to the respective project's construction period. Potential impacts associated with the construction of wastewater connections would not have a significant impact during construction or operation and maintenance.

Impacts associated with wastewater treatment capacity would be cumulatively considerable if cumulative development in the service area would exceed the capacity of the RWQCP plant. Population projections for the 2020 Integrated Master Plan for the Wastewater Collection and

Treatment Facilities for the City Public Works Department (2020 Integrated Master Plan) were developed through the year 2037 based on Geographic Information System (GIS) data provided by the SCAG for the 2016-2040 RTP/SSC Report, clipped to the City's service area boundary and limited by buildout projections (City of Riverside 2020). SCAG's population projections are based on the data collected from individual municipalities' general plans and community plans. The GIS data predict a population increase to approximately 390,200 people by the year 2037, although land use classifications and wastewater flow projections indicate actual buildout will occur in 2032. This means population growth will be limited to approximately 379,300 people in the year 2032 and beyond. As mentioned in the introduction to this cumulative analysis, SCAG forecasts a population increase of approximately 356,839 people by the year 2035. Therefore, the GIS data used in the 2020 Integrated Master Plan uses a larger future service population than is forecast by SCAG. Nonetheless, based on the results of the flow monitoring study and the population and hydraulic models, it is estimated that the City's service area could generate a total flow of approximately 39 MGD by 2037. The 2020 Integrated Master Plan recommends a Capital Improvement Program to increase the capacity of the overall wastewater system to handle anticipated increases in volume (City of Riverside 2020).

As discussed under Impact U-3, the increase in wastewater generation expected to occur with implementation of the proposed 2021 LRDP is approximately 277,680 GPD, which is within the 19.69 MGD available treatment capacity at the RWQCP facility. Planned, pending, and reasonably foreseeable development would continue to increase demands on the existing wastewater treatment and conveyance facilities in the RWQCP service area. However, future projects in the City and communities in the RWQCP service area would be required to obtain commitments to provide wastewater treatment services prior to construction, which would be dependent on remaining treatment capacity at RWQCP. Development of the proposed 2021 LRDP in combination with regional growth would be within the remaining wastewater capacity. The proposed 2021 LRDP would not combine with other area sources to result in a substantial increase in cumulative wastewater treatment capacity beyond the RWQCP's available treatment capacity; cumulative impacts associated with wastewater (Impact U-3) are **less than significant, and the project's contribution would not be cumulatively considerable.**

Solid Waste Disposal Capacity and Compliance with Regulations

The geographic scope of analysis for cumulative solid waste impacts encompasses all areas in the region that contribute solid waste to the Perris Transfer Station and MRF. This geographic scope is appropriate because the Perris Transfer Station and MRF would receive all solid waste generated on the UCR campus under the proposed 2021 LRDP. As shown in Table 4.17-2, there are three viable landfills that receive waste from UCR, which collectively have a maximum permitted daily load of 25,554 tons per day, and a collective total remaining capacity of approximately 69.1 million tons. The estimated 9.7 tons per day of solid waste that would be generated under the proposed 2021 LRDP (under the worst-case scenario not accounting for diversion) represents approximately 0.04 percent of the permitted daily throughput of available landfills. As such, the proposed 2021 LRDP would not result in a substantial increase in solid waste disposal at the viable landfills, and disposal of solid waste generated under the proposed 2021 LRDP could be accommodated by existing viable landfills without creating a need for additional solid waste disposal facilities.

Furthermore, the landfills have sufficient capacity to accommodate the cumulative land uses envisioned by the Riverside General Plan. Pursuant to the Public Facilities and Infrastructure Element of the City's General Plan, the solid waste generated by development at City's General Plan

buildout is not anticipated to exceed capacity at the three local area landfills identified in Table 4.17-2 (City of Riverside 2012). Because the project would be developed with a less intense land use than what was envisioned by the City's General Plan, as mentioned in the introduction to this analysis of cumulative impacts, the amount of solid waste generated and disposed of in nearby landfills would not constitute an unplanned increase in waste not envisioned by the regional waste planning process under existing and cumulative conditions.

In addition to this small contribution to available waste processing capacity, UCR is committed to the UC Initiative of reducing solid waste disposal needs in the future, ultimately achieving a zero-waste goal. Students, faculty, and staff at UCR campus would continue to participate actively in the waste reduction and diversion efforts and programs established on campus. Waste diversion would be expected to increase both on campus and regionally as more LEED-certified structures are built and more waste reduction programs are introduced, while landfill disposal rates would correspondingly decrease during the planning horizon of the proposed 2021 LRDP. In addition, as disposal rates decrease, UCR would help facilitate extending the lifespan on the local landfill systems and not impair the region's solid waste reduction goals. In addition, cities in the geographic scope of this analysis are subject to solid waste diversion requirements and implementation of waste diversion programs and policies to meet State-mandated solid waste diversion rates. For example, AB 939 requires cities to divert 50 percent of solid waste from landfills. Each individual project would be required to comply with State and local waste diversion and/or reduction programs. Due to the proposed 2021 LRDP's small contribution to available waste processing capacity, as well as the continued implementation of waste diversion programs and requirements, cumulative impacts associated with solid waste (Impact U-4) are **less than significant, and the project's contribution would not be cumulatively considerable.**

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4.18 Wildfire

This section analyzes potential impacts related to wildfires and fire hazards from the implementation of the proposed 2021 LRDP. The analysis considers fire severity zones and nearby State Responsibility Areas (SRA) or lands classified as Very High Fire Hazard Severity Zones (FHSZ) and the potential for the 2021 LRDP to exacerbate impacts in these locations.

4.18.1 Environmental Setting

Wildfire Fundamentals

A wildfire is an uncontrolled fire in an area of extensive combustible fuel, including vegetation and structures. Wildfires differ from other fires in that they take place outdoors in areas of grassland, woodlands, brushland, scrubland, peatland, and other wooded areas that act as a source of fuel, or combustible material. Buildings may become involved if a wildfire spreads to adjacent communities. The primary factors that increase an area's susceptibility to wildfire include slope and topography, vegetation type and condition, and weather and atmospheric conditions. The California Climate Change Center reported a projected increase in wildfire frequency statewide between 11 percent under a lower-range warming scenario and 55 percent under a medium-range warming scenario. Please see Section 4.8, *Greenhouse Gas Emissions*, for impact analysis and information related to the 2021 LRDP's GHG emissions.

A significant part of Riverside County is undeveloped and consists of rugged topography with highly flammable vegetation. Hillside terrain has substantial risk, particularly in August, September, and October, when dry vegetation and hot dry Santa Ana winds coincide (Riverside County 2019). Widespread fires after an earthquake, coupled with Santa Ana winds, constitute the worst-case wildfire scenario in Riverside County, and there is a statistically high chance that the worst-case fire suppression need could occur (Riverside County 2019).

The indirect effects of wildland fires can be catastrophic. In addition to stripping the land of vegetation and destroying forest resources, large, intense fires can harm the soil, waterways, and the land itself. Soil exposed to intense heat may lose its capacity to absorb moisture and support life. Regions of dense dry vegetation, particularly in canyon areas and on hillsides, pose the greatest potential for wildfire risks. Urban/wildland interface fires occur when a fire burning in wildland vegetation gets close enough to threaten urban structures. The Office of Planning and Research (OPR) has recognized that although high-density structure-to-structure loss can occur, structures in areas with low- to intermediate- housing density were most likely to burn, potentially due to intermingling with wildland vegetation or difficulty of firefighter access. Fire frequency also tends to be highest at low to intermediate housing density, at least in regions where humans are the primary cause of ignitions (California Natural Resources Agency 2018).

The major urban/rural interface areas of fire risk in Riverside include Mount Rubidoux, the Santa Ana River Basin, Lake Hills, Mockingbird Canyon/Monroe Hills, Sycamore Canyon, Box Springs Mountains, and La Sierra/Norco Hills. The Box Springs Mountains area has Very High risk fire susceptibility and Mockingbird Canyon and the Southern Sphere Area each have Very High/High/ Moderate risk fire susceptibility (City of Riverside 2018a).

No part of Riverside County is immune from fire danger. Structural and automobile fires represent the most common types of fire in urbanized areas and can be caused by a variety of human, mechanical and natural factors. Urban fires have the potential to spread to other structures or

areas, particularly if not extinguished promptly. Proactive efforts, such as fire sprinkler systems, fire alarms, and fire-resistant roofing and construction methods, can collectively lessen the likelihood and reduce the severity of urban fires (City of Riverside 2018a).

Wildfire-Conducive Conditions

Because of substantial open space areas and associated vegetation and wildlife habitats throughout the State, California is subject to fire hazards. Grassland or other vegetation in California is easily ignited, particularly in dry seasons. Wildfire is a serious hazard in high dry fuel load areas, particularly near areas of natural vegetation and steep slopes, because fires tend to burn more rapidly on steeper terrain. Wildfire is also a serious hazard in areas of high wind, given that fires will travel faster and farther geographically when winds are higher. Furthermore, wildfire is more likely in areas where electric power lines are located above-ground and could ignite vegetation where it comes into contact.

Vegetation

Vegetation is fuel to a wildfire, and it changes over time with seasonal growth and die-back. The relationship between vegetation and wildfire is complex, but generally some vegetation is naturally fire-resistant, while other vegetation is extremely flammable. For example, cured grass is much more flammable than standing trees (California Department of Forestry and Fire Protection [CAL FIRE] 2018). Grass is considered an open fuel, in which oxygen has free access to promote the spread of fire. Additionally, weather and climate conditions, such as drought, can lead to increasingly dry vegetation with low-moisture content and, thus, higher flammability. It is worth noting that some plant types in California landscapes are fire-resistant, while others are fire-dependent for their seed germination cycles. Wildfire behavior depends on the type of fuel present, such as ladder, surface, and aerial fuels. Ladder fuels provide a path for a surface fire to climb upward, into the crowns of trees. Surface fuels include grasses, logs, and stumps low to the ground. Aerial fuels include limbs, foliage, and branches not in contact with the ground (CAL FIRE 2020a). Weather and climate conditions, including drought cycles and high winds, can lead to dry vegetation whose low moisture content increases its flammability.

Hillside Slope and Aspect

According to CAL FIRE, sloping land increases susceptibility to wildfire because fire typically burns faster up steep slopes, and steep slopes may hinder firefighting efforts (CAL FIRE 2007). Following severe wildfires, sloping land is more susceptible to landslide or flooding from increased runoff during substantial precipitation events. Landslides and surficial slope failure are most likely to occur in areas with more than 25 percent (14 degrees) slope (hillside areas) and along steep bluffs. Aspect is the direction that a slope faces, which determines how much radiated heat the slope will receive from the sun. Thus, slopes facing south to southwest will receive the most solar radiation; they tend to be warmer and the vegetation drier than on slopes facing a northerly to northeasterly direction, increasing the potential for wildfire ignition and spread (University of California 2018).

Weather and Atmosphere

Wind, temperature, and relative humidity are the most influential weather elements in fire behavior and susceptibility (National Park Service 2017). Fire moves faster under hot, dry, and windy conditions. Wind may also blow embers ahead of a fire, causing its spread. Drought conditions also

lead to extended periods of excessively dry vegetation, increasing the fuel load and ignition potential.

Power Lines

Above-ground power lines have the potential to contribute to wildfire risk, especially when they are near or traverse wilderness areas. In some instances, high winds can blow nearby trees and branches into powerlines, sparking fires. Wind can also snap wooden poles, causing live wires to fall onto nearby grass or other fuel, igniting it. While the California Public Utilities Commission (CPUC) estimates only about 10 percent of California's wildfires are triggered by power lines, the frequency and severity of these wildfires has spurred the agency to make new requirements for power line safety practices (Atkinson 2018).

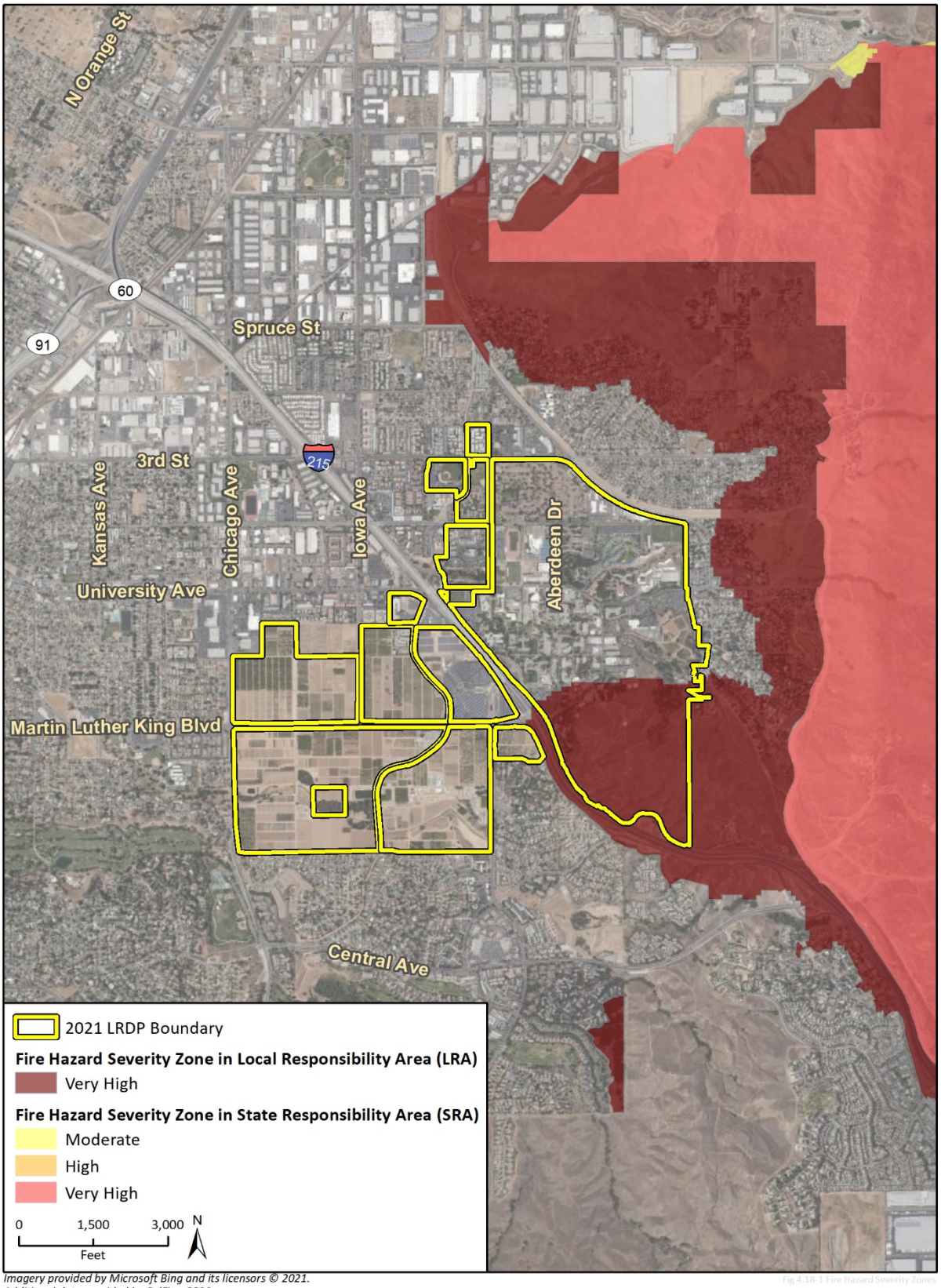
Wildfire Hazard Designations

In California, federal, State, and local agencies share responsibility for wildfire prevention and suppression. Federal agencies are responsible for federal lands in Federal Responsibility Areas (FRA). The State of California has determined that some non-federal lands in unincorporated areas with watershed value are of statewide interest and have classified those lands as SRA, which are managed by CAL FIRE. All incorporated areas and unincorporated lands not in FRAs or SRAs are classified as Local Responsibility Areas (LRA).

While nearly all of California is subject to some degree of wildfire hazard, there are specific features that make certain areas more hazardous. CAL FIRE is required by law to map areas of significant fire hazards based on fuels, terrain, weather, and other relevant factors (Public Resources Code 4201-4204, California Government Code 51175-89). As described above, the primary factors that increase an area's susceptibility to fire hazards include slope, vegetation type and condition, and atmospheric conditions. CAL FIRE maps fire hazards based on zones, referred to as FHSZ. There are three levels of severity: 1) Moderate FHSZs; 2) High FHSZs; and 3) Very High FHSZs. Only the Very High FHSZs are mapped for LRAs. Each of the zones influence how people construct buildings and protect property to reduce risk associated with wildland fires in a particular location. Under State regulations, areas in Very High FHSZs must comply with specific building and vegetation management requirements intended to reduce property damage and loss of life in those areas. Figure 4.18-1 shows areas near UCR that are designated as Very High FHSZ or an SRA.

The City of Riverside (City) General Plan Public Safety Element maps the areas in Box Springs Mountains, east of the UCR campus, as a Very High fire hazard area (City of Riverside 2018a, Figure PS-7). This extends to areas in the southern portion of East Campus, as illustrated in Figure 4.18-1.

Figure 4.18-1 Area Fire Hazard Severity Zones



Emergency and Evacuation Routes/Access

The City's General Plan Public Safety Element establishes multiple evacuation routes out of the City accessed from major arterial roadways, including but not limited to Martin Luther King Boulevard to the I-215/SR 60 freeway, University Avenue to the I-215/SR 60 freeway, and Iowa Avenue to the I-215/SR 60 freeway. The City's Emergency Operations Plan is updated every 5 years, during which these routes are confirmed as the most effective means of emergency response (City of Riverside 2018a).

The UCR Emergency Action Plan has provisions for evacuating campus buildings during emergency situations (UCR 2016). The Emergency Action Plan contains information including but not limited to emergency evacuation procedures, a map that shows the location of the building's emergency assembly areas, a building floor plan that shows emergency evacuation routes and the location of emergency equipment (e.g., fire extinguishers, fire alarm stations, emergency response kits), a list of pertinent safety personnel, including contact information, and department or building-specific emergency response procedure. UCR Transportation and Parking Services (TAPS) also assists in the event of an evacuation and coordinates with various campus locales including the City, as necessary.

The UCR Environmental Health & Safety (EH&S) Division offers training on helping persons who require assistance, including an online course library (UCR 2020). Emergency procedures are also posted on the EH&S website. Furthermore, a decision-making matrix is provided on the EH&S website that provides actions to take by levels of health concern pertaining to wildfire smoke events (UCR 2021).

Post-fire Slope Instability and Drainage Pattern Changes

Slope instability from wildfire scarring of the landscape can result in slope instability in the form of more intensive flooding and landslides. These post-fire slope soils and altered drainage patterns can result in soil creep on downslope sides of foundations and reduce lateral support.

In Riverside, most natural slopes are relatively flat, generally less than 15 percent, although some slopes are more than 30 percent in the southeastern hillsides (City of Riverside 2018a). Steep topography fractured and unconsolidated bedrock conditions, and expansive soils make hillside areas unstable, including those in the Box Springs Mountains area. Landsliding in these areas may result from heavy rain, erosion, removal of vegetation, seismic activity, wildfire, or combinations of these and other factors.

Campus Conditions

As shown on Figure 4.18-1, most developed areas of UCR are located in an urbanized area outside of a designated Very High FHSZ in a SRA. However, the southern area of East Campus, near South Campus Drive and East Campus Drive and including the southern portion of the UCR Botanic Gardens and the Open Space Reserve, are within a Very High FHSZ in a LRA that includes the Box Springs Mountains.

Hillside Slope and Aspect

As discussed in Section 4.7, *Geology and Soils*, campus topography is relatively flat, with some sloping on southeastern part of East Campus. These areas, particularly in the northern reaches, are largely developed. However, the UCR Botanic Gardens and open space lands are highly vegetated and in the Very High fire area. Over the last decades, wildfires have not occurred in the UCR Botanic Gardens (Tang 2021).

Vegetation

The northern portions of UCR East Campus include predominantly developed areas consisting of buildings, roads, parking lots and parking structures, and walkways commingled with a mature, extensive, and maintained campus landscape. The southern portions of East Campus where the UCR Botanic Gardens are situated include dense plantings and some native scrub species in open space areas near the Botanic Gardens Visitor Parking Lot. Adjacent neighborhoods are similarly developed and landscaped, although in residential patterns. These built environments and vegetation communities are susceptible to wildfire in extreme events under baseline conditions.

West Campus is largely comprised of agricultural fields, citrus groves, row crops, and research lands which are not prone to wildfire. These areas are managed and watered on a regular basis, and no fires have been documented in the area (Tang 2021).

Weather and Atmosphere

The Western Regional Climate Center maintains a weather monitoring station in Corona, approximately 17.9 miles west of UCR. According to data collected at this weather station, most precipitation is received from November through March, with an average annual rainfall of approximately 11 inches (U.S. Climate Data 2020). May through September is the driest part of the year and coincides with what was traditionally considered the fire season in California. However, increasingly persistent drought and climatic changes in the State have resulted in drier winters. Fires during the autumn, winter, and spring months are becoming more common. Prevailing winds are northwest, measured from March Air Reserve Base, approximately 11.6 miles southeast of the campus, and west/northwest, measured from the Riverside Municipal Airport, approximately 9.7 miles southwest of the campus (Western Regional Climate Center 2020). In 2020, average maximum wind speeds ranged from 5.8 mph to 10.6 mph, with wind gusts averaging between 5.7 mph to 7.3 mph (World Weather Online 2021).

Presence of Power Lines

Above-ground power lines are present along roadways that border the campus under existing conditions. This includes along Watkins Drive, near the Box Springs Mountains, and Blaine Street for its extent, including where it intersects Watkins Drive. They are also present on portions of West Linden Street, but electric power transmission lines are below ground on Canyon Crest Drive and within the campus grounds. As discussed in Section 3, *Environmental Setting,* one new transmission line segment will run south along Chicago Avenue to about a 0.25 mile south of Martin Luther King Boulevard, then east through West Campus. A second segment was being constructed at the time this EIR was being prepared approximately 600 feet north of where the first line ended. This line intercepts the north-south line on UCR's property and continues east across Canyon Crest Drive to the I-215/SR 60 freeway.

Campus Structures

Most buildings on the campus were built from the 1950s to the 1980s (see the Appendix E, Historic Resources Evaluation), and are primarily constructed of concrete, metal, and glass.

4.18.2 Regulatory Setting

Federal

The Disaster Mitigation Act of 2000

The Disaster Mitigation Act of 2000 requires a State mitigation plan as a condition of disaster assistance. There are two different levels of State disaster plans: "Standard" and "Enhanced." States that develop an approved Enhanced State Plan can increase the amount of funding available through the Hazard Mitigation Grant Program. The Act has also established new requirements for local mitigation plans.

National Fire Plan

The National Fire Plan was developed under Executive Order 11246 in August 2000, following an historic wildland fire season. Its intent was to establish plans for active response to severe wildland fires and their impacts to communities, while ensuring sufficient firefighting capacity. The plan addresses firefighting, rehabilitation, hazardous fuels reduction, community assistance, and accountability. The program promotes close coordination among local, State, tribal, and federal firefighting resources by conducting training, purchasing equipment, and providing prevention activities on a cost-share basis. To help protect people and their property from potential catastrophic wildfire, the National Fire Plan directs funding to be provided for projects designed to reduce the fire risks to communities. High-risk communities identified within the wildland-urban interface, the area where homes and wildlands intermix, were published in the Federal Register in 2001. At the request of Congress, the Federal Register notice only listed those communities neighboring federal lands (CAL FIRE 2018). CAL FIRE incorporates concepts from this plan into State fire planning efforts.

State

California Fire and Building Codes (2019)

The California Fire Code is Chapter 9 of California Code of Regulations (CCR) Title 24. It establishes the minimum requirements consistent with nationally recognized good practices to safeguard public health, safety, and general welfare from the hazards of fire, explosion, or dangerous conditions in new and existing buildings, structure, and premises, and to provide safety and assistance to firefighters and emergency responders during emergency operations. It is the primary means for authorizing and enforcing procedures and mechanisms to ensure the safe handling and storage of any substance that may pose a threat to public health and safety. The California Fire Code regulates the use, handling, and storage requirements for hazardous materials at fixed facilities. The California Fire Code and the California Building Code use a hazard classification system to determine what protective measures are required to ensure fire safety and protect lives.

These measures may include construction standards, separations from property lines and specialized equipment. To ensure that these safety measures are met, the California Fire Code employs a permit system based on hazard classification. The provisions of this Code apply to the construction, alteration, movement, enlargement, replacement, repair, equipment, use and occupancy, location, maintenance, removal, and demolition of every building or structure or any appurtenances connected or attached to such building structures throughout California.

More specifically, the Fire Code is included in Title 24 of the CCR. Title 24, part 9, Chapter 7 addresses fire-resistances-rated construction; California Building Code (Part 2); Chapter 7A addresses materials and construction methods for exterior wildfire exposure; Fire Code Chapter 8 addresses fire related Interior finishes; Fire Code Chapter 9 addresses fire protection systems; and Fire Code Chapter 10 addresses fire-related means of egress, including fire apparatus access road width requirements. Fire Code Section 4906 also contains existing regulations for vegetation and fuel management to maintain clearances around structures. These requirements establish minimum standards to protect buildings in FHSZs within SRAs and wildland-urban interface fire areas. This code includes provisions for ignition-resistant construction standards for new buildings.

Fire Code Chapter 33, *Fire Safety During Construction and Demolition*, also includes requirements for a construction pre-fire plan, training, fire protection devices, regulations for refueling, fire clearances, precautions against fire, including prohibitions on smoking, on-site firewatch, and regulations for welding and electrical wiring.

Executive Order N-05-19

On January 9, 2019, Governor Gavin Newsom issued Executive Order N-05-19 to address the recent damaging wildfires happening in California. Executive Order N-05-19 directs CAL FIRE, in consultation with other State agencies and departments, to recommend immediate, medium and long-term actions to help prevent destructive wildfires. In response, CAL FIRE (with the contribution of several other State agencies) created the Community Wildfire Prevention & Mitigation Report (February 22, 2019) which contains recommendations to reduce the damage from wildfires across the State. Specifically, they focus on reducing wildfire fuel (such as vegetation clearing), long-term community protection (creating defensible space in communities), wildfire prevention, and forest health (CAL FIRE 2019).

California Fire Plan

The Strategic Fire Plan for California (California Fire Plan) is the State's road map for reducing the risk of wildfire. The most recent version of the Plan was finalized in August 2018 and directs each CAL FIRE Unit to prepare a locally specific fire management plan (CAL FIRE 2018). Pursuant to the California Fire Plan, individual CAL FIRE units are required to develop fire management plans for their areas of responsibility. These documents assess the fire situation within each of the 21 CAL FIRE units and six contract counties. The plans include stakeholder contributions and priorities and identify strategic areas for pre-fire planning and fuel treatment as defined by the people who live and work with the local fire problem. The plans are required to be updated annually. The CAL FIRE/Riverside County Strategic Fire Plan seeks to reduce firefighting costs and property losses, increase firefighter safety, and educate the public on fire prevention throughout Riverside County, including areas adjacent to UCR such as Moreno Valley. With California's extensive wildland-urban interface situation, the list of high-risk communities extends beyond just those adjacent to federal lands, discussed above. The California State Forester (CAL FIRE Director) has the responsibility for managing the list of those high-risk communities. Areas near and adjacent to the UCR campus are included in high-risk evaluations and vegetation management plans have been developed for these areas (CAL FIRE 2020a).

California Disaster Mitigation Act

The California Office of Emergency Services (CalOES) prepares the State of California Multi-Hazard Mitigation Plan (SHMP). The SHMP identifies hazard risks and includes a vulnerability analysis and a

hazard mitigation strategy. The SHMP is federally required under the Disaster Mitigation Act of 2000 for the State to receive federal funding. The Disaster Mitigation Act of 2000 requires a State mitigation plan as a condition of disaster assistance.

California Emergency Response Plan

California has developed an emergency response plan to coordinate emergency services provided by federal, State, and local governments and private agencies. Responding to hazardous-materials incidents is one part of this plan. The plan is administered by the California Governor's Office of Emergency Services, which coordinates the responses of other agencies. When the City of Riverside experiences an emergency, an Emergency Operations Center may be opened. In the event an Emergency Operations Center is opened, emergency response team members coordinate efforts and work with local fire and police agencies, emergency medical providers, the California Highway Patrol, CAL FIRE, CDFW, and Caltrans.

State Emergency Plan

The foundation of California's emergency planning and response is a statewide mutual aid system designed to ensure adequate resources, facilities, and other support is provided to jurisdictions whenever their own resources prove to be inadequate to cope with a given situation.

The California Disaster and Civil Defense Master Mutual Aid Agreement (California Government Code Sections 8555–8561) requires signatories to prepare operational plans to use in their jurisdiction and outside their area. These plans include fire and non-fire emergencies related to natural, technological, and war contingencies. The State of California, all State agencies, all political subdivisions, and all fire districts signed this agreement in 1950.

Section 8568 of the California Government Code, the "California Emergency Services Act," states that "the State Emergency Plan shall be in effect in each political subdivision of the state, and the governing body of each political subdivision shall take such action as may be necessary to carry out the provisions thereof." The Act provides the basic authorities for conducting emergency operations following the proclamations of emergencies by the Governor or appropriate local authority, such as a City Manager. The provisions of the act are further reflected and expanded on by appropriate local emergency ordinances. The Act further describes the function and operations of government at all levels during extraordinary emergencies, including war.

All local emergency plans are extensions of the State of California Emergency Plan. The State Emergency Plan conforms to the requirements of California's Standardized Emergency Management System (SEMS), the system required by Government Code 8607(a) for managing emergencies that involve multiple jurisdictions and agencies. The SEMS incorporates the functions and principles of the Incident Command System, the Master Mutual Aid Agreement, existing mutual aid systems, the operational area concept, and multi-agency or inter-agency coordination. Local governments must use SEMS to be eligible for funding of their response-related personnel costs under State disaster assistance programs. The SEMS consists of five organizational levels that are activated as necessary, including field response, local government, operational area, regional, and State. The Governor's Office of Emergency Services divides the State into several mutual aid regions. Riverside is in Region IV, managed by Assistant Chief Pete Mercado (CalOES 2020).

California Building Code

WILDLAND-URBAN INTERFACE BUILDING STANDARDS

On July 2, 2019, the Building Standards Commission updated the Office of the State Fire Marshal's emergency regulations amending the CCR, Title 24, Part 2, known as the 2019 California Building Code. These codes include provisions for ignition-resistant construction standards in the wildland-urban interface.

Interface zones are dense housing adjacent to vegetation that can burn and must meet the following criteria:

1. Housing density class 2, 3, or 4
2. In moderate, high, or very high fire hazard severity zone
3. Not dominated by wildland vegetation (lifeform not herbaceous, hardwood, conifer, or shrub)
4. Spatially contiguous groups of 30-meter cells that are 10 acres and larger

Intermix zones are housing development interspersed in an area dominated by wildland vegetation and must meet the following criteria:

1. Not interface
2. Housing density class 2
3. Housing density class 3 or 4, dominated by wildland vegetation
4. In Moderate, High, or Very High FHSZ
5. Improved parcels only
6. Spatially contiguous groups of 30-meter cells 25 acres and larger

Influence zones have wildfire-susceptible vegetation up to 1.5 miles from an interface zone or intermix zone (CAL FIRE 2018).

California Public Resources Code

The California Public Resources Code (PRC) includes fire safety regulations that restrict the use of equipment that may produce a spark, flame, or fire; require the use of spark arrestors on construction equipment that use an internal combustion engine; specify requirements for the safe use of gasoline-powered tools in fire hazard areas; and specify fire suppression equipment that must be provided on-site for various types of work in fire-prone areas.

These regulations include the following:

- Earthmoving and portable equipment with internal combustion engines would be equipped with a spark arrestor to reduce the potential for igniting a wildland fire (PRC § 4442)
- Appropriate fire suppression equipment would be maintained during the highest fire danger period—from April 1 to December 1 (PRC § 4428)
- On days when a burning permit is required, flammable materials would be removed to a distance of 10 feet from any equipment that could produce a spark, fire, or flame, and the construction contractor would maintain the appropriate fire suppression equipment (PRC § 4427)
- On days when a burning permit is required, portable tools powered by gasoline-fueled internal combustion engines would not be used within 25 ft of any flammable materials (PRC § 4431)

Government Code Section 51182

A person who owns, leases, controls, operates, or maintains an occupied dwelling or occupied structure in, upon, or adjoining a mountainous area, forest-covered land, brush-covered land, grass-covered land, or land that is covered with flammable material, which area or land is in a Very High FHSZ shall at all times do all of the following:

1. Maintain defensible space of 100 ft from each side and from the front and rear of the structure
2. Remove that portion of a tree that extends within 10 ft of the outlet of a chimney or stovepipe
3. Maintain a tree, shrub, or other plant adjacent to or overhanging a building free of dead or dying wood
4. Maintain the roof of a structure free of leaves, needles, or other vegetative materials
5. Obtain a certification from the local building official that the dwelling or structure, as proposed to be built, complies with all applicable State and local building standards prior to constructing a new dwelling or structure that will be occupied or rebuilding an occupied dwelling or occupied structure damaged by a fire in that zone, the construction or rebuilding of which requires a building permit

California Public Utilities Commission General Orders

GENERAL ORDER 95

The CPUC General Order 95 applies to construction and reconstruction of overhead electric lines in California. The replacement of poles, towers, or other structures is considered reconstruction and requires adherence to all strength and clearance requirements of this order. The CPUC has promulgated various Rules to implement the fire safety requirements of General Order 95, including:

- Rule 18A requires utility companies take appropriate corrective action to remedy Safety Hazards.
- General Order 95 nonconformances requires that each utility company establish an auditable maintenance program.
- Rules 31.2 requires that lines be inspected frequently and thoroughly.
- Rule 35 requires that vegetation management activities be performed in order to establish necessary and reasonable clearances. These requirements apply to all overhead electrical supply and communication facilities that are covered by General Order 95, including facilities on lands owned and maintained by California State and local agencies.
- Rule 38 establishes minimum vertical, horizontal, and radial clearances of wires from other wires.
- Rule 43.2.A.2 requires that for lines located within Tier 2 or Tier 3 zones, the wind loads required in Rule 43.2.A.1 be multiplied by a wind load factor of 1.1. (CPUC 2018)

GENERAL ORDER 165

General Order 165 establishes requirements for the inspection of electric distribution and transmission facilities that are not contained within a substation. Utilities must perform “Patrol” inspections, defined as a simple visual inspection of utility equipment and structures that is designed to identify obvious structural problems and hazards, at least once per year for each piece of equipment and structure. “Detailed” inspections, where individual pieces of equipment and

structures are carefully examined, are required every 5 years for all overhead conductor and cables, transformers, switching/protective devices, and regulators/capacitors. By July 1st of each year, each utility subject to this General Order must submit an annual report of its inspections for the previous year under penalty of perjury (CPUC 2017a).

GENERAL ORDER 166

General Order 166 Standard 1.E requires that investor-owned utilities (IOUs) develop a fire prevention plan which describes measures that the electric utility will implement to mitigate the threat of power-line fires generally. Additionally, this standard requires that IOUs outline a plan to mitigate power line fires when wind conditions exceed the structural design standards of the line during a Red Flag Warning in a high fire threat area. Fire prevention plans created by IOUs are required to identify specific parts of the utility's service territory where the conditions described above may occur simultaneously. Standard 11 requires that utilities report annually to the CPUC regarding compliance with General Order 166 (CPUC 2017b). The City's Local Hazard Mitigation Plan notes that above-ground power lines are susceptible to high winds that pass through the city, including the area around UCR. Arcing lines can cause sparks to drop onto buildings or brush and the utility department continues to address this risk (City of Riverside 2018b).

California Public Utilities Commission Undergrounding Rule 20 Programs[1]

Tariff Rule 20 is the vehicle for the implementation of the underground conversion programs. Rule 20 provides three levels, A, B, and C, of progressively diminishing ratepayer funding for the projects, and a sub-program D which is specific to undergrounding in San Diego Gas & Electric's Fire Threat District. For the Rule 20 Program, Cities identify overhead lines that they wish to convert to underground and in consultation with their investor owned utility (IOU) determine if the conversion project qualifies for any of the Rule 20 A, B, C or D programs. If qualified utility ratepayer funds will cover between 0 and 100 percent of the costs of the conversion project as detailed below. Approximately 35 to 40 miles of overhead lines are converted each year to underground through Rule 20 Sections A, B, and C. There have not been any Rule 20D projects to date.

RULE 20A

Rule 20A projects are constructed in areas of a community that are used most often by the general public. Rule 20A projects are nominated by the city or county and are paid for by the electric utility ratepayers. Under Rule 20A, the CPUC requires the utility to allocate a certain amount of work credits each year to the cities and unincorporated counties for conversion projects. Because ratepayers contribute the bulk of the costs of Rule 20A programs through utility rates, the projects must be in the public interest by meeting one or more of the following public interest criteria:

- Eliminate an unusually heavy concentration of overhead lines;
- Involve a street or road with a high volume of public traffic;
- Benefit a civic or public recreation area or area of unusual scenic interest;
- Be listed as an arterial street or major collector as defined in the Governor's Office of Planning and Research (OPR) Guidelines.

The determination of "general public interest" under these criteria is made by the local government, after holding public hearings, in consultation with the utility.

[1] California Public Utilities Commission. 2021. https://www.cpuc.ca.gov/General.aspx?id=4403

In addition, the community must also have accumulated enough Rule 20A work credit allocations to fund a project. Such allocations are given out annually by the utility and communities can accumulate them over several years until they have sufficient funding to complete a project. Communities may borrow forward five years to obtain additional credits. Once enough work credits are available, the community forms a utility underground district by municipal resolution to initiate a project.

The program is voluntary, and the communities identify the overhead conversion projects in consultation with the utilities. Each year Rule 20A results in converting approximately 20 miles of overhead distribution lines to underground.

RULE 20B

Projects in larger developments or areas that do not meet any of the above criteria can be performed as Rule 20B projects. At a minimum, the proposed project must involve both sides of a street for a minimum of 600 feet. The applicant (residents, local government, or developer) is responsible for the installation of the conduit, substructures, and boxes as well as paying for the cost to complete the installation of the underground (electric, telephone, and cable) system. Unlike Rule 20A, there are no work credits involved with Rule 20B and the applicant expends funds and receives reimbursement. After the project is complete, the electric utility credits the applicant in the amount of an equivalent overhead system, plus the taxes, if applicable. This reimbursement typically ranges from 20 to 40 percent of the project cost.

RULE 20C

Projects that do not qualify under 20A or 20B are performed under Rule 20C. Rule 20C projects are less than 600 feet in length and typically involve one or more property owners. The applicant(s) bear the cost of the entire undergrounding project and receive a small credit for the salvage cost of the facilities, less depreciation, that do not go underground.

RULE 20D

Not Applicable – Rule 20D is currently only in San Diego Gas & Electric's service territory.

Senate Bill 1028

SB 1028 (2016) requires each electrical corporation to construct, maintain, and operate its electrical lines and equipment in a manner that will minimize the risk of catastrophic wildfire posed by those components, and makes a violation of these provisions by an electrical corporation a crime under State law. The bill also requires each electrical corporation to annually prepare a wildfire mitigation plan and submit to CPUC for review. The plan must include a statement of objectives, a description of preventive strategies and programs that are focused on minimizing risk associated with electric facilities, and a description of the metrics that the electric corporation uses to evaluate the overall wildfire mitigation plan performance and assumptions that underlie the use of the metrics.

University of California, Riverside

UCR Emergency Operations Plan/Emergency Action Plan

As required by CCR Title 8, UCR prepared and implemented an Emergency Action Plan in July 2012. The latest revision to the plan occurred in 2016. The document is intended to guide the emergency response actions of all campus personnel during an emergency event, as well as provide standard

actions in the case of a safety-threatening emergency. The UCR Emergency Operations Plan is a living document that is reviewed and modified on a 5-year cycle and is currently being updated. The Emergency Operations Plan establishes policies, procedures, and organizational structure for the preparedness, response, and recovery of emergency events impacting the campus. To prepare for emergencies and disasters, campus buildings are expected to have an Emergency Action Plan. The Emergency Action Plan contains information including but not limited to emergency evacuation procedures, a map that shows the location of the building's emergency assembly areas, a building floor plan that shows emergency evacuation routes and the location of emergency equipment (e.g., fire extinguishers, fire alarm stations, emergency response kits), a list of pertinent safety personnel, including contact information, and department or building-specific emergency response procedure. TAPS also assists in the event of an evacuation and coordinates with various campus locales including the City, as necessary. Emergency procedures are also posted on the EH&S website. Emergency assembly areas are identified on a campus map that also shows emergency call box locations.[2]

UCR Campus Construction and Design Standards

The UCR Campus Construction and Design Standards for building, safety, and security specify fire suppression requirements to which design professionals must adhere when developing civil, architectural, structural, electrical, and mechanical systems as they pertain to fire response. While the University is its own enforcement agency except where the codes of the State Fire Marshal are involved. For these requirements, campus projects are subject to plan approval and enforcement authority by the State agency in which the Campus Fire Marshal, who is designated by the California State Fire Marshal, serves the State as a deputy.

As noted in these standards, overhead lines are prohibited and required to be installed underground.

Pertaining to fire protection features, as development occurs, the following measures shall be incorporated:

- New structures would be designed with adequate fire protection features pursuant to State law and the requirements of the State Fire Marshal. Building designs would be reviewed by appropriate campus staff and as agreed upon by the University of California.
- Prior to implementation of individual projects, the adequacy of water supply and water pressure will be determined to ensure sufficient fire protection services, as established by the California Fire Code.
- Adequate access will be provided to within 50 feet of the main entrance of occupied buildings to accommodate emergency ambulance service.
- Adequate access for fire apparatus will be provided pursuant to the California Fire Code as it relates to standpipes and sprinkler outlets.
- Service roads, turnaround, plazas, and pedestrian walks that may be used for fire or emergency vehicles will be constructed to withstand loads of up to 80,000 pounds or per California Fire Code requirements.

[2] The Emergency Assembly Campus Map in its most updated format at https://campusmap.ucr.edu/emergency-assembly-areas

Regional and Local (Non-Binding)

As noted in Section 4, "University of California Autonomy," UCR, a constitutionally-created State entity, is not subject to municipal regulations of surrounding local governments for uses on property owned or controlled by UCR that are in furtherance of the university's educational purposes. However, UCR may consider, for coordination purposes, aspects of local plans and policies of the communities surrounding the campus when it is appropriate and feasible but not bound by those plans and policies in its planning efforts.

City of Riverside General Plan

The City's General Plan Public Safety Element contains objectives, policies, and tools that aim to reduce potential fire hazards and protect individuals from injuries caused by fires. Through implementation of the General Plan policies, the City will continue to reduce the potential for damage by dangerous fires by providing adequate firefighting services, by protecting hillsides and urban-wildland interface areas, by encouraging residents to plant and maintain drought-resistant, fire-retardant plant species on slopes to reduce the risk of brush fire and soil erosion and by working with the Riverside Fire Department to control hazardous vegetation.

In 2018, the City amended its Public Safety Element and it includes a discussion of fire prevention and response. Hills and canyon areas east, north/northeast, and south/southeast near the UCR campus are considered to present the greatest potential for wildfire that could threaten the urban/wildland interface, particularly during high wind or Santa Ana wind events. Figure PS-7 of the Public Safety Element indicates the area east, north/northeast, and south/southeast of the campus, in the Box Springs Mountains, as a Very High hazard rating. This extends to areas in the southern portion of East Campus (see Figure 4.18-1).

The Public Safety Element discusses a transition from total fire suppression in brush and vegetation areas to one that allows for a more holistic and ecologically sensitive management of these fuels in a way that reduces fire threats. Policies in the City's General Plan Public Safety Element that apply to wildfire impacts include the following:

- Policy PS-6.1: Ensure that sufficient fire stations, personnel, and equipment are provided to meet the needs of the community as it grows in size and population
- Policy PS-6.2: Endeavor to meet/maintain a response time of 5 minutes for Riverside's urbanized areas
- Policy PS-6.5: Mitigate existing fire hazards related to urban development or patterns of urban development as they are identified and as resources permit
- Policy PS-6.9: Provide outreach and education to the community regarding fire safety and prevention
- Policy PS-6.11: Promote the prevention, detection, investigation, and prosecution of accidental and arson fires through coordinated investigative and training partnerships with fire and law enforcement agencies and prosecuting authorities

City of Riverside Local Hazard Mitigation Plan

The City's Local Hazard Mitigation Plan (LHMP) was developed with input from many organizations and stakeholders, including State and local fire departments, including federal agencies, community groups, and land management agencies. The purpose of the LHMP is to help reduce the potential loss of human life and damage to property, natural, and cultural resources in Riverside due to

wildfire and other natural and human-made disasters. The plan describes the wildfire risk and potential throughout the City, designates wildland areas, discusses assets at risk throughout the City, provides mitigation actions, and discusses resources available (City of Riverside 2018b).

4.18.3 Environmental Impacts and Mitigation Measures

Significance Criteria

UCR utilizes the following 2020 CEQA Guidelines Appendix G significance criteria questions related to Wildfire.

If located in or near SRA or lands classified as Very High FHSZ, would the proposed 2021 LRDP:

a) Substantially impair an adopted emergency response plan or emergency evacuation plan?
b) Exacerbate wildfire risks due to slope, prevailing winds, and other factors and thereby expose project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?
c) Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines, or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?
d) Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?

Issues Not Evaluated Further

No criteria questions related to Wildfire were scoped out of the Draft EIR analysis; all concerns are addressed herein.

Analysis Methodology

Impacts related to wildfire hazards and risks were evaluated using FHSZ mapping for Riverside County, aerial imagery, and topographic mapping. Additionally, weather patterns related to prevailing winds and precipitation trends were considered as they relate to the spread and magnitude of wildfire.

To evaluate the proposed 2021 LRDP potential wildfire impacts, resource conditions that could pose a risk to development of the proposed 2021 LRDP were identified through review of documents pertaining to these topics. Sources consulted include the Riverside County General Plan, City of Riverside General Plan, the UCR Emergency Operations Plan, background reports prepared for nearby plans and projects, and published geologic literature. The information obtained from these sources was reviewed and summarized to establish the existing conditions (described above) and identify potential environmental hazards that may result from implementation of the proposed 2021 LRDP. In determining level of significance, the analysis assumes that the proposed 2021 LRDP would comply with relevant federal and State laws.

CEQA does not generally require an agency to consider the effects of existing environmental conditions on a proposed project's future users or residents. Consequently, impacts under the thresholds identified above would only be considered significant if the proposed 2021 LRDP risks exacerbating those existing environmental conditions.

2021 LRDP Objectives and Policies

There are no objectives or policies in the proposed 2021 LRDP related to wildfire.

Impact Analysis

Impact WF-1 Substantially Impair an Emergency Response Plan or Emergency Evacuation Plan.

Implementation of the proposed 2021 LRDP could result in temporary lane or roadway closures on the edges of campus and within the campus circulation system during construction activities. Construction impacts would be less than significant. Operation of new facilities would not substantially impair an adopted emergency response or evacuation plan. Impacts would be less than significant.

As shown in Figure 4.18-1, CAL FIRE has mapped areas proximate to the campus as Very High FHSZs and the City's General Plan Public Safety Element maps urban/wildland interface areas on the southern portion of East Campus and within proximity to East Campus on the east, north/northeast, and southeast as Very High fire hazard areas (CAL FIRE 2007, City of Riverside 2018a). UCR's Emergency Action Plan guides evacuation procedures in case of fire and other emergencies. TAPS personnel support evacuations and coordinate with other University departments and with the City, as necessary.

Construction

Buildout of the proposed 2021 LRDP would include the development of new structures and infrastructure within UCR. During construction phases, construction of campus facilities associated with the proposed 2021 LRDP could result in temporary lane or roadway closures on the edge of campus and within the campus circulation system. Construction management plans for each campus projects include information related to truck route details, potential road closures/detours, and emergency access, and are reviewed and approved prior to construction activity commencing. With these review and approval procedures in place, project developed under the proposed 2021 LRDP would not result in inadequate emergency access to construction sites or nearby structures. Construction management plans are prepared in accordance with the latest version of the California Manual on Uniform Traffic Control Devises and include measures such as the following:

- Identify proposed truck routes to be used
- Include a public information and signage plan to inform student, faculty and staff of the planned construction activities, roadway changes/closures, and parking changes
- Store construction materials only in designated areas that minimize impacts to nearby roadways
- Limit the number of lane closures during peak hours to the extent possible. Inform the Campus before any partial road closure.
- Use Caltrans certified flag persons for any temporary lane closures to minimize impacts to traffic flow, and to ensure safe access into and out of the project sites
- Install traffic control devices as specified in the California Department of Transportation Manual of Traffic Controls for Construction and Maintenance Work Zones
- To minimize disruption of emergency vehicle access, affected jurisdictions (Campus Police, City Police, and City Fire Department) [are] consulted to identify detours for emergency vehicles, which will then be posted by the construction contractor

- Coordinate with local transit agencies for temporary relocation of routes or bus stops in works zones, as necessary
- Coordinate with other projects under construction near the project site, so an integrated approach to construction-related traffic is developed and implemented

As detailed in Section 4.15, *Transportation*, with inclusion of a construction management plan as standard condition of approval, construction impacts related to transportation concerns would be **less than significant**. In support of these standard practices, UCR has proposed Continuing Best Practices (CBP) as conditions of individual project approval that would ensure, to the extent feasible, that at least one unobstructed lane in both directions on campus roadways are maintained specifically in the event of a wildfire emergency and that the Campus Fire Marshal discloses roadway closures to the City of Riverside Fire Department and identify alternative travel routes, if necessary. As such, evacuation routes, if present within the specific roadway segment that would require temporary closure as noted above, would be similarly rerouted.

Additionally, the Campus Fire Marshal would review plans during the plan review process to ensure adequate ingress/egress on the campus project site during construction activities is made available to emergency vehicles. Furthermore, evacuation routes would not be blocked during construction as staging areas are required to be situated in such a way that they avoid designated evacuation zones. Construction-related vehicular traffic would also use designated routes. Therefore, construction impacts related to emergency response/evacuation plan consistency would be **less than significant**.

Operation

Implementation of the proposed 2021 LRDP would result in higher-density residential, educational facilities, recreational facilities, and/or associated campus support services (e.g., neighborhood-serving commercial, retail, professional services) as part of infill development on campus in areas near the Very High fire hazard mapped areas (e.g., in areas along the southern portions of East Campus). These areas would be accessible from existing roadways (providing multiple access points for emergency vehicles) and would not impede the use of emergency evacuation routes either on campus or within the City during operation.

Roadways within the campus are not designated evacuation routes in the City's General Plan Public Safety Element (City of Riverside 2018a). Major arterial roadways that border the campus connect to other roadways that are used for evacuation routes, including University Avenue and Martin Luther King Boulevard. The ramp for the I-215/SR 60 freeway is accessible directly from the University Avenue and Martin Luther King Boulevard exits of the campus, which serve as evacuation routes for the campus (City of Riverside 2018a). Construction and operation of projects associated with the proposed 2021 LRDP would not substantially alter or otherwise interfere with public rights-of-way and would provide adequate and multiple internal ingress and egress for necessary emergency response vehicles. Implementation of the proposed 2021 LRDP would not obstruct traffic circulation on designated disaster routes during construction or operation. In addition, projects implemented under the proposed 2021 LRDP would comply with applicable California Fire Code (Title 24, CCR, Section 9) requirements, that include stringent building standards including fire suppression systems, materials, and design. Development constructed under the 2021 LRDP would also have to comply with Title 24, the CCR, including Fire Code Chapter 10 which addresses fire related Means of Egress, including Fire Apparatus Access Road width requirements. Fire Code Section 4906 also contains existing regulations for vegetation and fuel management to maintain

clearances around structures. As continuing best practice and required Fire Code requirements, the Campus Construction and Design Standards include fire protection features that would be adhered to for all new campus projects. The Campus Fire Marshal would review plans during the plan review process and inspect the project facility prior to occupancy of buildings to ensure all applicable Fire Codes are met, fire protection features are incorporated, and adequate ingress/egress on the campus project site is made available at all times to emergency vehicles.

Implementation of the 2021 LRDP would increase population in campus-associated housing in the northern portion of East Campus and increase population in campus facilities in the southern part of East Campus, where areas are near Very High FHSZs. Commensurate with this growth, the UCR Emergency Operations Plan would be revised to account for increased development in residential, neighborhood-serving commercial retail, and professional services, and academic development within the campus and would adequately cover the existing plus new 2021 LRDP population in the event of an emergency, including wildfire. As standard practice, the campus would implement the Emergency Operations Plan/Emergency Action Plan in the event of an emergency.

When implemented, infill development under the 2021 LRDP could alter emergency assembly areas throughout the campus, as indicated in the UCR Emergency Action Plan (UCR 2016). However, implementation of future development under the proposed 2021 LRDP would be guided by existing and future LRDP objectives and policies including those concerning public safety and transportation related to circulation and traffic management. Furthermore, the Office of Emergency Management will update its Emergency Action Plan to account for increased density and a greater student/faculty/staff population. Therefore, operational impacts related to emergency response/evacuation plan consistency would be **less than significant without mitigation**.

Mitigation Measures

No mitigation measures are required. Nevertheless, UCR has proposed the following Continuing Best Practices (CBP) as conditions of individual project approval.

CBP WF-1 Construction – Traffic Control

To the extent feasible, the campus shall maintain at least one unobstructed lane in both directions on campus roadways. At any time only a single lane is available, the campus shall provide a temporary traffic signal, signal carriers (i.e., flagpersons), or other appropriate traffic controls to allow travel in both directions. If construction activities require the complete closure of a roadway segment, the campus shall provide alternate routes and appropriate signage.

CBP WF-2 Construction – Alternative Travel Routes

Prior to campus construction activities and/or roadway closures, the Campus Fire Marshal, as delegated by the State Fire Marshal, and in cooperation with the City of Riverside Fire Department shall ensure that adequate access for emergency vehicles is provided or identify alternative travel routes.

Significance After Mitigation

Impacts would be less than significant.

Impact WF-2 EXACERBATE WILDFIRE RISKS THEREBY EXPOSING PROJECT OCCUPANTS TO POLLUTANT CONCENTRATIONS FROM A WILDFIRE.

IMPLEMENTATION OF THE PROPOSED 2021 LRDP WOULD INCREASE THE DENSITY OF DEVELOPMENT ON CAMPUS, WITH NEW BUILDINGS AND INFRASTRUCTURE CONSTRUCTED ACCORDING TO THE LATEST FIRE CODE AND SAFETY STANDARDS. NEW CONSTRUCTION WOULD BE LOCATED IN AREAS WITHIN 2 MILES OF VERY HIGH FHSZS. PEOPLE LIVING, WORKING, AND ATTENDING CLASS IN THESE AREAS COULD BE EXPOSED TO POLLUTANT CONCENTRATIONS FROM A WILDFIRE OR THE UNCONTROLLED SPREAD OF A WILDFIRE. IMPACT RISK WOULD BE LESS THAN SIGNIFICANT.

Construction

Construction activities under the proposed 2021 LRDP would involve the use of hazardous materials such as petroleum products (See Section 4.9, *Hazards and Hazardous Materials*). UCR EH&S is charged with implementing measures, directly and through campus departments, designed to ensure compliance with applicable federal and State laws and regulations related to the proper use, storage, and transport of hazardous materials. The Campus Fire Marshal is responsible for ensuring compliance with the proper storage, handling, and use of any hazardous materials during construction activities. Construction equipment would be subject to standard operating procedures that would limit sources of ignition that could generate a wildfire. All construction activities on campus require fire safety protocols, including, but not limited to, on-site fire extinguishing equipment, including Fire Code Chapter 33, as outlined in the Regulatory Setting above.

Compliance with applicable federal and State laws and regulations related to the proper use, storage, and transport of hazardous materials would reduce the risk of wildfire ignition from the use of hazardous materials. As such, impacts would be **less than significant**.

Operation

As shown on Figure 4.18-1, the southern areas of East Campus are in or adjacent to CAL FIRE Very High FHSZs and City-designated Very High fire hazard areas. Other east areas of East Campus are within 2 miles of these designated zones. Development facilitated by the proposed 2021 LRDP would increase the population associated with the campus by increasing residential development for student housing and campus facilities including laboratories, classrooms, and accessory structures. Development under the proposed 2021 LRDP would primarily be infill, in areas where campus student housing currently exists, mainly along Canyon Crest Drive and West Linden Street and where multi-family housing currently exists (e.g., Stonehaven Apartments on the northwest corner of Blaine Street and Canyon Crest Drive) and in the southern parts of East Campus where academic and supporting structures would be situated. UCR may also construct an interpretative center in the existing UCR Botanic Gardens.

Factors for assessing existing wildfire risk potential include drought, slope steepness, wind speeds, flammability of vegetation, and burn history and severity (length of time from last fire and location of last proximate fire). Since fires burn faster uphill, slope steepness is a crucial factor in fire spread. Vegetation provides fuel for fires, and low relative humidity and strong winds are critical weather conditions that could lead to rapid or dramatic increases in wildfire activity (CAL FIRE 2020b).

The UCR campus is subject to Santa Ana winds, which are strong dry offshore winds that affect southern California in autumn and winter. They can range from hot to cold, depending on the prevailing temperatures in the source regions, the Great Basin, and upper Mojave Desert (Tufts University 2018). The winds are known for the hot dry weather (often the hottest of the year) that

they bring in the fall and are infamous for fanning regional wildfires. Santa Ana winds are a type of downslope windstorm that occur over southern California from the coastal mountains westward and from Ventura County southward to the Mexican border (Rolinski et al. 2016).

Wildfire smoke produced from combustion of natural biomass contains thousands of individual compounds, including particulate matter, carbon dioxide, water vapor, carbon monoxide, hydrocarbons and other organic chemicals, nitrogen oxides, and trace minerals. Wildfires can move into the wildland urban interface, burning homes and structures and thereby consuming man-made materials in addition to natural fuels. Wildfire behavior will vary depending on natural fuel type; fires in open space fuels can range from mild to severe and can spread very slowly or extremely rapidly depending on weather and fuel conditions. Wildfires in open space areas can last for weeks and can have air quality impacts. Smoke levels in proximate and downwind populated areas can be difficult to predict (US EPA 2019).

The proposed 2021 LRDP would implement new development in areas previously disturbed and on relatively flat or slightly hilly topography, not in steep, vegetated slopes, and hillsides where fire risk is greatest. Development under the proposed 2021 LRDP would be concentrated on East Campus, which is within 2 miles of the Very High FHSZ and the Very High fire risk areas. The proposed 2021 LRDP would increase the density of development on the campus, including new residential; neighborhood-serving commercial, retail, professional services; interpretative center, and academic development that would be developed pursuant to the latest Fire Codes and safety standards. As discussed above, wildfire frequency tends to be highest at low to intermediate housing density. The 2021 LRDP would focus increased density within East Campus, with residential units occurring more toward Canyon Crest Drive and West Linden Street. Furthermore, development that could occur along South Campus Drive and East Campus Drive in East Campus, would occur in areas already developed and subject to wildfire prevention actions such as fuel clearance, thereby reducing the potential for wildfire risk. The proposed 2021 LRDP would not exacerbate wildfire risks over existing conditions.

Those portions of the UCR Campus currently designated as Very High FHSZ have generally been designated as Open Space Reserve and UCR Botanic Gardens. Furthermore, development under the proposed 2021 LRDP would maintain the same urban interface with wildland/vegetated areas in comparison to existing conditions. Development under the proposed 2021 LRDP would also include demolition and replacement of some existing structures with newer development that meets modern Fire Codes, thereby providing an increase in fire safety in comparison to existing conditions.

Implementation of fire protection features as outlined under UCR Campus Construction and Design Standards in the Regulatory Setting would further ensure that the projects implemented under the proposed 2021 LRDP would incorporate fire safety measures. The Campus Fire Marshal would review plans during the plan review process and inspect the project facility prior to occupancy of buildings to ensure all applicable Fire Codes are met, fire protection features are incorporated, and adequate ingress/egress on the campus project site is made available at all times to emergency vehicles.

Campus Construction and Design Standards and building codes, including the UCR Fire Prevention and Life Safety Policy, require all construction, alterations, renovations, and interior space dividers be subject to Fire Code review and inspection by UCR's Building and Safety Division, Fire Prevention, EH&S, Office of Emergency Management, and/or other applicable UCR departments and staff. This includes approval of plans and specifications to verify compliance with applicable codes, including the following:

- Title 24, CCR, Building Regulations
- Uniform Fire Code
- National Fire Codes of the National Fire Protection Association
- Title 19, CCR, Public Safety
- Title 8, CCR, Occupational Safety
- California Health and Safety Code

New development must be constructed to modern fire safety standards, which requires plan check review, during which the Campus Building Official and Campus Fire Marshal would review specific project plans to ensure that the design of the proposed structure complies with the required codes. Campus buildings, structures, and infrastructure would comply with the California Fire Code regarding emergency/fire access and use of building materials that would limit the spread of wildfire to the greatest extent possible. The California Fire Code includes safety measures that minimize the threat of fire, including ignition-resistant construction with exterior walls of noncombustible or ignition resistant material from the surface of the ground to the roof system and sealing any gaps around doors, windows, eaves and vents to prevent intrusion by flame or embers. Development would also be required to meet California Building Code requirements, including CCR Title 24, Part 2, which includes specific requirements related to exterior wildfire exposure. CCR Title 14 sets forth the minimum development standards for emergency access, fuel modification, setback, signage, and water supply, which help prevent loss of structures or life by reducing wildfire hazards risk.

Furthermore, new development is required to be constructed to modern fire safety standards, including Fire Code Title 24, Part 9, Chapter 7 Fire-Resistances - Rated Construction, California Building Code (Part 2), Chapter 7A Materials and Construction Methods for Exterior Wildfire Exposure, Fire Code Chapter 8 Interior Finishes. New development located in a Very High FHSZ would also be required to comply with standards in California Government Code 51182 to minimize fire risk. These standards include maintaining a firebreak of at least 30 feet, removing all flammable vegetation and combustible growth, and additional firebreaks within 100 feet by the removal of all brush, flammable vegetation, or combustible growth. In addition, prior to construction of a new dwelling that requires a building permit, California Government Code 51182 requires that the owner obtain certification from the local building official, in this case the Campus Building Official and the Campus Fire Marshal, that the building complies with all applicable State and local fire standards.

Operation under the 2021 LRDP would involve the use of hazardous materials including petroleum products, biohazards, radioactive materials, volatile, flammable, and explosive substances (see Section 4.9, *Hazards and Hazardous Materials*). UCR EH&S is charged with implementing measures, directly and through campus departments, designed to ensure compliance with applicable federal and State laws and regulations related to the proper use, storage, and transport of hazardous materials. Specifically, all individuals who handle hazardous materials are appropriately trained and are provided with Material Safety Data Sheets, which provide chemical safety information about precautions for protecting against known hazards associated with the material and identify protocols for proper storage and disposal of chemicals. In addition, the Campus Fire Marshal is responsible for ensuring compliance with the proper storage, handling, and use of explosive, flammable, combustible, toxic, corrosive, and other hazardous materials. Compliance with applicable federal and State laws and regulations related to the proper use, storage, and transport of hazardous materials would reduce the risk of wildfire ignition from the use of hazardous materials.

For all the reasons discussed above, the proposed 2021 LRDP would not exacerbate existing conditions related to exposing project occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire. Therefore, impacts would **less than significant.**

Mitigation Measures

Compliance with the most current Building and Fire codes would be required.

Significance After Mitigation

Impacts would be less than significant without mitigation.

Impact WF-3 Require Installation or Maintenance of Associated Infrastructure that may Exacerbate Fire Risk.

New or updated infrastructure would be concentrated in previously developed portions of campus, and utilities would be installed underground and would not contribute to increased fire risk. Impacts would be less than significant.

Construction

Impacts related to installation or maintenance of infrastructure (such as roads, fuel breaks, emergency water sources, or electrical power lines) that may exacerbate fire risk are limited to operational impacts. Construction impacts related to infrastructure that exacerbates fire risk would not occur. Impacts are considered to be **less than significant.**

Operation

The proposed 2021 LRDP would direct new development on the UCR campus, which may include the installation of new infrastructure (i.e. roadways or pedestrian pathways) and utilities. New infrastructure would be concentrated in already developed portions of campus, primarily on East Campus. All utilities would be installed according to current building codes and safety standards, as outlined in Section 4.18.2, Regulatory Setting. In addition, new electrical connections on-campus would be installed underground in accordance with UCR *Campus Construction and Design Standards*, and would not contribute to increased fire risk. The undergrounding of new electrical power connections would minimize potential ignition and related fire risk on the campus. Therefore, operational impacts related to infrastructure that exacerbates fire risk would be **less than significant**.

Mitigation Measures

No mitigation measures are required.

Significance After Mitigation

Impacts would be less than significant without mitigation.

Impact WF-4 EXPOSE PEOPLE OR STRUCTURES TO SIGNIFICANT RISKS, INCLUDING DOWNSLOPE OR DOWNSTREAM FLOODING OR LANDSLIDES.

DEVELOPMENT PROJECTS WOULD BE SITED ON PARTS OF CAMPUS THAT ARE AWAY FROM STEEP SLOPES (25 PERCENT OR GREATER) THAT MAY BECOME POST-FIRE HAZARD ZONES. IMPACTS WOULD BE LESS THAN SIGNIFICANT WITH MITIGATION.

According to the analysis in Section 4.7, *Geology and Soils*, the slope stability hazard in Riverside is considered negligible, because the topography is very flat to moderately flat, and no bedded sedimentary bedrock is exposed. Projects implemented under the proposed 2021 LRDP could develop in the southern area of East Campus, adjacent to natural hillsides, but the risk for deep-seated landslides is low, even on these natural slopes, because of the sturdy nature of the alluvial materials and bedrock underlying most of the campus. These have no weak planar structures developed that could trigger a large, deep-seated landslide. If a wildfire removed vegetation, there could be some runoff but there is little likelihood of a large, deep-seated landslide. This is discussed in more detail below.

Construction

Under the proposed 2021 LRDP, future development would result in short-term soil-disturbing activities that could lead to increased erosion including grading, trenching, boring, and removal of trees and other vegetation. Projects involving construction sites that are one acre or more are required to prepare and implement a SWPPP to comply with NPDES requirements for construction site stormwater discharges, as described in greater detail in Section 4.10, *Hydrology and Water Quality*. Plans include measures such as: design and construction of cut and fill slopes in a manner that minimizes erosion, protection of exposed slope areas, control of surface flows over exposed soils, use of wetting or sealing agents or sedimentation ponds, limiting soil excavation in high winds, construction of beams and runoff diversion ditches, and use of sediment traps, such as hay bales. Compliance with the NPDES requirements would ensure that implementation of the 2021 LRDP would not destabilize soils such that substantial risks related to post-fire landslides or debris flow would be created. As such, impacts are considered to be **less than significant**.

Operation

Severe wildfires damage the forest or shrub canopy, ground-level plants, and the soil itself. In general, this can result in increased runoff after intense rainfall, which can put homes and other structures below a burned area at risk of localized floods and landslides. West Campus is relatively flat and not subject to landslides or runoff. The southern portion of East Campus contains natural hillsides, in and near the UCR Botanic Gardens and Open Space Reserve. As noted above, the risk for deep-seated landslides is low, even on natural slopes in the East Campus area, because of the sturdy nature of the alluvial materials and bedrock underlying most of the campus, and these have no weak planar structures developed that could trigger a large, deep-seated landslide. The proposed 2021 LRDP would focus redevelopment projects in previously disturbed areas that are away or setback from steep, vegetated slopes and hillsides where fire-related slope instability and increased runoff risk is greatest. The most at-risk areas are designated for the least amount of development, particularly in the area around the UCR Botanic Gardens and Open Space Reserve.

In general, steep, hilly areas are especially vulnerable after a wildfire and areas burned at moderate to high severity are of greatest concern due to lack of cover and the development of water repellent layers. If a severe wildfire were to occur in the southern portion of East Campus (i.e., UCR Botanic

Gardens, Open Space Reserve), there is a chance that slope stability could be compromised and slope stabilization measures would become necessary. A provision to implement Mitigation Measure **MM WF-1** in the event of a catastrophic wildfire on the project site would be needed to minimize the potential for landslide and excessive erosion. Therefore, impacts related to flooding and landslide hazards due to post-fire slope instability or drainage changes would be **less than significant with mitigation**.

Mitigation Measures

MM WF-1 Implement Post-Fire Erosion Control Plan and Application

UCR shall incorporate into its Emergency Operations and Response Plan erosion control measures to be deployed in the event of a catastrophic wildfire. Erosion control measures shall be implemented as soon as possible after the event and shall include one or more of the following, as applicable:

1. Install mulch to cover the soil and reduce rain drop impact, overland flow, and soil particle movement. This can be certified weed-free straw, slash, and geotextile fabrics and should be installed as quickly as possible after the fire event.
2. Apply hydro-mulch mixture of water, fiber mulch, and tackifier on burned slopes to prevent soil erosion and foster revegetation. Seed, fertilizer, or soil stabilizing polymers can also be applied with the hydro-mulch.
3. Implement aerial seeing of grasses or legumes with a layer of straw mulch over seeded grasses. Ensure the mix of seed includes native grasses and plants with value for local wildlife.

Significance After Mitigation

Impacts would be less than significant with mitigation.

4.18.4 Cumulative Impacts

A project's environmental impacts are "cumulatively considerable" if the "incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects" (*CEQA Guidelines* Section 15065[a][3]). To analyze cumulative wildfire impacts, this Draft EIR considered anticipated development in the City of Riverside and Riverside County, and potential population increases of 55,945 in the City and 113,401 in the county by 2035. This geographic scope is appropriate for analyzing cumulative wildfire impacts because wildfires can affect large areas. This cumulative wildfire impact analysis particularly considered development on and proximate to the UCR campus, including the buildout of the cities of Riverside and Moreno Valley, anticipated in their general plans. It also considers projects in unincorporated Riverside County, which include warehouses and health care facilities, and mixed-use, single-family residential, and a mobile home park within 5 miles of campus, as described in Table 4-1.

Wildfire-Related Emergency/Evacuation Response (Impact WF-1)

Cumulative development in Riverside, Moreno Valley, and unincorporated Riverside County, including development under the proposed 2021 LRDP, would comply with local emergency response plans, which coordinate efforts among agencies and local entities in the event of a wildfire. This includes coordinating evacuation procedures for residents and businesses in the region. However, there is a chance that construction or operation of new cumulative development

would interfere with emergency response and evacuation plans. Therefore, cumulative impacts are considered significant. As outlined above under Impact WF-1, UCR has proposed conditions of individual project approval that would ensure, to the extent feasible, that at least one unobstructed lane in both directions on campus roadways are maintained specifically in the event of a wildfire emergency and that the Campus Fire Marshal discloses roadway closures to the City of Riverside Fire Department and identify alternative travel routes, if necessary. As such, evacuation routes, if present within the specific roadway segment that would require temporary closure as noted above, would be similarly rerouted. Therefore, the project's contribution would be reduced to **less than cumulatively considerable (less than significant)**.

Wildfire Hazards (Impact WF-2, WF-3, and WF-4)

Most land surrounding the UCR campus is suburban development, with only open space areas adjacent or within proximity of the east, northeast, south, and southeast of the campus and surrounding neighborhoods classified as Very High FHSZ (see Figure 4.18-1). Cumulative wildfire-related impacts could be significant if cumulative development would occur in rural or high fire hazard areas that could exacerbate risks due to location on steep slopes, in high-wind areas, or areas of historical wildfire burn areas. However, cumulative development in the City and throughout Riverside County would increase the density of development that would help reduce wildfire risk. All cumulative development would be required to assess potential for interfering with regional evacuation plans, increasing wildfire risk, and increasing exposure to potential post-fire landslides. Cumulative development and infrastructure would be subject to statewide standards for fire safety in the California Fire Code. However, existing codes and regulations cannot fully prevent wildfires from damaging structures or populations, and or prevent wildfires from igniting and occurring. If wildfires occurs, there would be the need for fire roads, fire breaks and other measures to fight and contain the fire. Following the fire, affected slopes in the cumulative assessment area could be subject to erosion and landslides, and cumulative wildfire impacts would be significant.

The proposed 2021 LRDP could result in a net increase in development of approximately 3.7 million asf (approximately 5.5 million gsf) of additional student housing, academic buildings, and support facilities. As such, implementation of the proposed 2021 LRDP would result in cumulatively considerable and significant contributions associated with Impact WF-4. However, implementation of Mitigation Measure **MM WF-1** would reduce impacts related to development under the proposed 2021 LRDP to less than significant levels. Therefore, the **cumulative contribution from the proposed 2021 LRDP would be less than significant**.

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5 Other CEQA Required Discussions

This section discusses growth-inducing impacts and significant irreversible environmental changes resulting from the proposed 2021 LRDP. As part of this analysis, the EIR must also identify the following: 1) significant environmental effects that cannot be avoided if the project is implemented, 2) significant irreversible environmental changes that would result from implementation of the project, and 3) growth-inducing impacts of the project.

5.1 Significant and Unavoidable Adverse Impacts

Public Resources Code Section 21100(b)(2) and the CEQA Guidelines Section 15126.2(c) requires EIRs to include a discussion of the significant environmental effects that cannot be avoided if the proposed 2021 LRDP is implemented. As documented in Section 4, *Environmental Impact Analysis*, after implementation of the recommended mitigation measures, most of the impacts associated with the proposed 2021 LRDP would be reduced to a less-than-significant level. The following impacts are considered significant and unavoidable; that is, no feasible mitigation is available to reduce these impacts to a less-than-significant level:

- **Aesthetics**
  - **Impact AES-1:** Development under the proposed 2021 LRDP could block or impede views of scenic vistas.
- **Agricultural Resources**
  - **Impact AG-1:** Implementation of the proposed 2021 LRDP would result in the conversion of Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland) to non-agricultural use. The establishment of the Coachella Valley Agricultural Research Station (CVARS) as mitigation (from MM 4.1-1 in the 1990 LRDP EIR) for impacts to Farmland does not fully offset the net reduction in farmland in the region as no new farmlands were being created in the vicinity of the campus.
- **Air Quality**
  - **Impact AQ-2:** Construction under the proposed 2021 LRDP would generate ROG and NO_X in quantities that exceed SCAQMD significance thresholds. Operation would exceed SCAQMD thresholds for ROG, NOX, and PM_{10}.
- **Cultural Resources**
  - **Impact CUL-1:** The proposed 2021 LRDP would adversely affect historical resources through the full and partial demolition of historical resources, renovation/rehabilitation of historical resources, and new construction adjacent to historical resources.
- **Noise**
  - **Impact N-1:** Construction under the proposed 2021 LRDP would exceed applicable noise thresholds.
- **Transportation**
  - **Impact T-3:** Development under the proposed 2021 LRDP would be constructed in such a way that changes would remain consistent to surrounding geometric design features and any redesign or construction of on-campus circulation paths would be designed and constructed to meet the Campus Construction and Design Standards. However, the increase

in campus population under Cumulative plus Project conditions would result in an impact related to AM Peak Hour queueing at the I-215/SR 60 Freeway Southbound Ramps at Martin Luther King Boulevard.

Cumulative impacts in these areas, in turn, would also be significant and unavoidable (cumulatively considerable) as a result of the implementation of the proposed 2021 LRDP.

5.2 Significant and Irreversible Environmental Changes

The CEQA Guidelines requires a discussion of any significant irreversible environmental changes that would be caused by a project. Specifically, the CEQA Guidelines Section 15126.2(d) states:

> Uses of nonrenewable resources during the initial and continued phases of the project may be irreversible, since a large commitment of such resources makes removal or nonuse thereafter unlikely. Primary impacts and, particularly, secondary impacts (such as highway improvement which provides access to a previously inaccessible area) generally commit future generations to similar uses. Also, irreversible damage can result from environmental accidents associated with the project. Irretrievable commitments of resources should be evaluated to assure that such current consumption is justified.

Generally, a project would result in significant irreversible environmental changes if one of the following would occur:

- The primary and secondary impacts would generally commit future generations to similar uses
- A project would involve uses in which irreversible damage could result from any potential environmental accidents associated with the project
- A project would involve a large commitment of nonrenewable resources
- Proposed consumption of resources is not justified (e.g., a project involves the wasteful use of energy)

UCR's ownership of the campus represents a long term-commitment of the campus and education uses; implementation of the proposed 2021 LRDP would continue and expand these uses. Restoration of the campus to pre-developed conditions would not be feasible given the degree of disturbance, the urbanization of the area, and the level of capital investment. Irreversible commitments to future use include those related to new housing or academic/administrative space development.

Most future development and redevelopment under the proposed 2021 LRDP would be infill in existing urban areas, but some development of existing agricultural lands may occur (although these too are infill areas-surrounded on three sides by development). Development of lands currently used for agricultural uses would constitute an irreversible change of use on these lands because once buildings or pavement are constructed, underlying soils would no longer be available for agricultural production. As described in Section 4.2, *Agricultural Resources*, the 1990 LRDP identified and recognized the need to convert Prime Farmland to non-agricultural land uses to accommodate future campus growth. To combat future loss of the Prime Farmland, UCR acquired 540 acres in Coachella Valley and established the CVARS. The 2005 LRDP proposed development on West Campus of approximately 125 acres of academic, support, housing, parking, and recreational uses north of Martin Luther King Boulevard. The 2005 LRDP EIR concluded that while the acquisition of agricultural land in the Coachella Valley in the 1990s reduced the programmatic loss of the

approximate 125 acres of agricultural land at the main campus, it did not offset the net reduction in farmland in the region as no new farmlands were being created in the vicinity of the campus and therefore, impacts to Prime Farmland were found to be significant and unavoidable. Notably, since analysis and approval of the 2005 LRDP, UCR has only converted approximately 43 acres of Farmland in the West Campus (which is less than the 125 acres assumed to be converted). Agricultural and land-based research is expected to continue to be a major component of UCR's research portfolio over the lifetime of the proposed 2021 LRDP. The proposed 2021 LRDP would impact fewer acres of Farmland than previous UCR LRDPs. However, implementation of the proposed 2021 LRDP would still reduce land available for agricultural research on Farmland in comparison to existing conditions. Consistent with past LRDP EIRs, the establishment of the CVARS as mitigation for impacts to Farmland does not fully offset the net reduction in farmland in the region as no new farmlands were being created in the vicinity of the campus.

As described in Section 4.5 *Cultural Resources,* at the program level, development under the proposed 2021 LRDP could affect identified historical resources, or presently unknown historical resources through demolition, construction, and reconstruction activities associated with buildout. Thus, mitigation measures that reduce impacts to less than significant cannot be assured in all cases and demolition or removal of a historically significant built-environment resource typically cannot be mitigated to below a level of significance under CEQA. Implementation of Mitigation Measure MM CUL-1 would reduce, mitigate, or avoid significant impacts to historic resources to the maximum extent feasible, but irreversible loss of historical resources would occur, nonetheless.

Resources that would be permanently and continually consumed by the proposed 2021 LRDP implementation include water, electricity, natural gas, and fossil fuels. However, all new buildings would be constructed in accordance with the most recent California Building Code at the time of construction, which require measures to reduce energy use and GHG emissions. Additionally, the UC Policy on Sustainable Practices and existing and proposed UCR policies and initiatives to use renewable energy, environmentally conscious design and materials, and measures to enhance pedestrian and bicycle use, would further reduce environmental impacts. Despite these conservation measures, construction and operational activities would still result in the irretrievable commitment of nonrenewable energy resources, primarily in the form of fossil fuels, natural gas, and gasoline for automobiles and construction equipment.

In respect to operational activities, compliance with and exceedance of applicable building codes, along with mitigation measures, would ensure that natural resources are conserved or recycled to the maximum extent feasible. Additionally, over time, new technologies or systems will likely emerge, or become more cost-effective or user-friendly, which would further reduce UCR reliance on nonrenewable natural resources. Please see Section 4.6, *Energy,* and Section 4.8, *Greenhouse Gas Emissions,* for additional information.

5.3 Growth Inducing Impacts

Section 15126.2(e) of the CEQA Guidelines requires a discussion of a proposed project's potential for growth inducing impacts. More specifically, provides for discussion of the ways in which the proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment. Included in this are projects which would remove obstacles to population growth (a major expansion of a wastewater treatment plant might, for example, allow for more construction in service areas). Increases in the population may tax existing community service facilities, requiring construction of new facilities that could

cause significant environmental effects. Further, the characteristics of some projects may encourage or facilitate other activities that could significantly affect the environment, either individually or cumulatively. It must not be assumed that growth in any area is necessarily beneficial, detrimental, or of little significance to the environment.

5.3.1 Population and Housing Growth

As discussed in Section 4.12, *Population and Housing,* the region surrounding UCR, including Riverside, has a population of 2,213,761, which is anticipated to increase by approximately 357,000 residents between 2020 and 2035. In the 2018/2019 academic year UCR had a student population of 23,922 students and 4,789 faculty and staff, resulting in a total campus population of 28,861.

UCR projects student enrollment will grow to 35,000 students by the 2035/2036 academic year (42,545 total campus population). The proposed 2021 LRDP would incrementally accommodate an additional 7,419 undergraduate students and 3,659 graduate students plus 2,806 faculty and staff, resulting in a net increase to the campus population of approximately 13,884 people by the 2035 horizon year.

Approximately 68 percent of the increase in student population could be housed in new UCR-affiliated housing. More specifically 7,489 new beds for 11,078 new student population (7,419 undergraduate and 3,659 graduate). Much of the student housing capacity accommodated under the proposed 2021 LRDP would occur through strategic infill and selective replacement of existing housing facilities in the northern half of East Campus. As outlined below, faculty, staff, and students would be accommodated by housing in Riverside and surrounding communities.

As discussed in Section 4.12, *Population and Housing,* the net increase of approximately 6,395 new students and faculty/staff would require non-UCR affiliated, off-campus housing (13,884 net increase to the campus population minus 7,489 new on-campus beds) by academic year 2035/2036. Using the conservative assumption that each new person would require one housing unit[1], the net increase of 6,395 housing units by academic year 2035/2036 represents approximately 5.6 percent of the net increase of total regional housing unit projections for 2035 (6,395 net increase in off-campus housing units/113,401 net increase in regional housing units).

Using an estimate of even population growth each year, approximately 380 new residents could move to the region each year and need housing between the baseline (2018/2019) and buildout (2035/2036) years. The estimate of average increased off-campus housing needs each year is highly conservative and does not factor in the existing population that may already reside in the area and subsequently attend UCR or get a job at UCR in the future. In recent years, a large portion of the new undergraduate student population (approximately 48 percent of freshmen and 53 percent of transfer students) resided in the region prior to attending UCR. It is reasonable to assume that a portion of the new undergraduate and graduate student population would continue to reside in the same household during their studies and not occupy a new residence, or would relocate from within the region. It is also unlikely that every student would occupy a single housing unit; the region has on average 3.28 persons per household (City of Riverside 2021). It can also be assumed that some new faculty and staff would already reside in the region prior to working at UCR. As discussed Section 4.12, *Population and Housing*, approximately 85 percent of the entire campus population currently lists an address within a “reasonable” commute radius (approximately one hour each way).

[1] In California, the average number of people per household is 2.93 (DOF 2020). Applying the statewide average to UCR off-campus housing needs would result in the need for 2,183 housing units.

It is reasonable to assume that these trends will continue through academic year 2035/2036. Therefore, much of the off-campus housing needs projected in the proposed 2021 LRDP would be from in the Inland Empire region and not constitute new residents.

Furthermore, if the vacancy rate for the region remains in line with 2020 at 4.8 percent, then approximately 37,080 available housing units would be available (4.8 percent of 772,500 regional housing units) in the region in 2035. Considering recent housing vacancy rates, the region is anticipated to absorb the incremental population increase over the 15-year life of the proposed 2021 LRDP and no new housing or infrastructure would be needed as a direct result of the proposed 2021 LRDP.

The net increase of 13,884 people by academic year 2035/2036 would be accommodated by the 356,839 net increase in regional population. According to data from UC, approximately 82 percent of UCR students are in-state residents, meaning that they resided in California prior to attending UCR. More precisely, approximately 60 percent of the undergraduate student population lived within a 50-mile radius of the UCR campus prior to enrolling at the University (UC 2019). Furthermore, according to available zip code information for UCR students, faculty, and staff, approximately 85 percent of the campus population currently resides within a "reasonable" commute radius (approximately 1 hour each way). It is reasonable to assume that these trends will continue, and that much of the campus population projected in the proposed 2021 LRDP will have already been accounted for in existing and/or projected population growth in the Inland Empire region.

Given all these considerations, the proposed 2021 LRDP would induce planned population growth but would not generate a need for construction of new off-campus housing beyond what is already anticipated in the SCAG regional forecasts.

UCR and the surrounding area is already heavily urbanized and contains existing infrastructure and services. The 2021 LRDP would not involve the extension of roads and utility infrastructure into undeveloped areas. Development on campus would be focused within the existing campus footprint and infill areas. Thus, population growth resulting from the 2021 LRDP would not result in significant physical impacts associated with a potential increase in need for public systems or services infrastructure beyond what has already been analyzed.

5.3.2 Economic Growth

Implementation of the proposed 2021 LRDP would generate temporary employment opportunities during construction of individual buildings and projects. Because construction workers would likely be drawn from the existing regional work force, construction of projects under the proposed 2021 LRDP are not considered growth-inducing. The proposed 2021 LDRP would add approximately 2,806 permanent employment opportunities in the region associated with operation of the campus.

Under CEQA, a social or economic change generally is not considered a significant effect on the environment unless the changes can be directly linked to a physical change. (CEQA Guidelines section 15131.) As further discussed under CEQA Guidelines Section 15126.2(e), "[I]t must not be assumed that growth in any area is necessarily beneficial, detrimental, or of little significance to the environment." The purpose behind looking at growth is to determine whether increases in the population may tax existing community service facilities, requiring construction of new facilities that could cause significant environmental effects. The proposed 2021 LRDP could indirectly foster economic growth consistent with regional growth projections in the surrounding region that may indirectly prompt development of community-service facilities. Such commercial development in

the region, however, would be subject to local planning and discretionary actions by local jurisdictions, including the City. The potential environmental impacts associated with indirect development would be identified consistent with local planning requirements and evaluated through local jurisdictions' General Plans and project-level evaluations of commercial development proposals.

5.3.3 Removal of Obstacles to Growth

Growth in an area may result from the removal of physical impediments or restrictions to growth, as well as the removal of planning impediments resulting from land use plans and policies. In this context, physical growth impediments may include nonexistent or inadequate access to an area or the lack of essential public services, while planning impediments may include restrictive zoning and/or land use designations. The 2021 LRDP would be implemented within the existing campus boundaries and focused within infill areas, in which established land uses and supporting infrastructure exist (roads, water distribution, wastewater and drainage collection, and energy distribution). The proposed 2021 LRDP includes redevelopment of campus buildings and facilities and may intensify existing land uses. To account for this possible intensification, the proposed 2021 LRDP proposes circulation infrastructure improvements, to provide for the safe and efficient movement of pedestrians, bicycles, and vehicles around campus, while also encouraging transitions to active transportation. Utilities infrastructure improvements are proposed, such as minor improvements to water, wastewater, and storm drainage infrastructure, to accommodate growth under the proposed 2021 LRDP. No new roads outside of the existing campus boundaries would be required. Because the proposed 2021 LRDP constitutes redevelopment within an urbanized area and does not require the extension of new infrastructure through undeveloped areas, implementation of the proposed 2021 LRDP would not remove an obstacle to growth.

5.4 References

California Department of Finance (DOF). 2020. Table 2: E-5 City/County Population and Housing Estimates, 1/1/2020. http://dof.ca.gov/Forecasting/Demographics/Estimates/E-5/.

Riverside, City of. 2021. Riverside Housing and Public Safety Element Updates and Environmental Justice Policies Project. https://riversideca.gov/cedd/sites/riversideca.gov.cedd/files/pdf/planning/2021/Housing_Element/2021-04-05%20Final%20IS%20for%20Publication.pdf.

University of California (UC). 2019. Accountability Report: Chapter 1.4 Geographic Origins and Non-Residents. https://accountability.universityofcalifornia.edu/2019/chapters/chapter-1.html#1.4.1.

6 Alternatives

6.1 Introduction

In accordance with California Environmental Quality Act (CEQA) Guidelines Section 15126.6, this EIR section contains a comparative impact assessment of alternatives to the proposed 2021 LRDP. The primary purpose of an alternatives analysis under CEQA is to provide decision-makers and the public with a reasonable range of potentially feasible alternatives to a proposed project that could attain most of the basic project objectives, while avoiding or reducing any of the project's significant adverse environmental effects.

Specifically, CEQA requires an EIR to describe a reasonable range of alternatives to a project or to the location of a project that feasibly attains most of the project's basic objectives but avoids or substantially lessens any of the project's significant environmental impacts. CEQA also requires an EIR to evaluate the comparative merits of the alternatives. Section 15126.6(a), of the CEQA Guidelines requires EIRs to describe:

> a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project and evaluate the comparative merits of the alternatives. An EIR need not consider every conceivable alternative to a project. Rather, it must consider a range of potentially feasible alternatives that will foster informed decision making and public participation. An EIR is not required to consider alternatives that are infeasible. The lead agency is responsible for selecting a range of project alternatives for examination and must publicly disclose its reasoning for selecting those alternatives. There is no ironclad rule governing the nature or scope of the alternatives to be discussed other than the rule of reason.

This section of the CEQA Guidelines also provides guidance regarding what the alternatives analysis should consider. CEQA Guidelines Section 15126.6(b) further states the purpose of the alternatives analysis is as follows:

> Because an EIR must identify ways to mitigate or avoid the significant effects that a project may have on the environment (Public Resources Code Section 21002.1), the discussion of alternatives shall focus on alternatives to the project or its location which are capable of avoiding or substantially lessening any significant effects of the project, even if these alternatives would impede to some degree the attainment of the project objectives, or would be more costly.

The CEQA Guidelines require that the EIR include sufficient information about each alternative to allow meaningful evaluation, analysis, and comparison with the proposed project. If an alternative would cause one or more significant effects in addition to those that would be caused by the project as proposed, the significant effects of the alternative must be discussed, but in less detail than the significant effects of the project as proposed (CEQA Guidelines Section 15126.6(d)). The CEQA Guidelines further require that the "no project" alternative be considered (CEQA Guidelines Section 15126.6(e)). The purpose of describing and analyzing a no project alternative is to allow decision makers to compare the impacts of approving a proposed project with the impacts of not approving the proposed project. If the no project alternative is the environmentally superior

alternative, CEQA requires that the EIR "shall also identify an environmentally superior alternative among the other alternatives" (CEQA Guidelines Section 15126.6(e)(2)).

In defining "feasibility" (e.g., feasibly attain most of the basic objectives of the project), CEQA Guidelines Section 15126.6(f)(1) states, in part: Among the factors that may be taken into account when addressing the feasibility of alternatives are site suitability, economic viability, availability of infrastructure, general plan consistency, other plans or regulatory limitations, jurisdictional boundaries (projects with a regionally significant impact should consider the regional context), and whether the proponent can reasonably acquire, control or otherwise have access to the alternative site (or the site is already owned by the proponent). No one of these factors establishes a fixed limit on the scope of reasonable alternatives. In determining what alternatives should be considered in the EIR, it is important to consider the objectives of the project, the project's significant effects, and unique project considerations. These factors are crucial to the development of alternatives that meet the criteria specified in CEQA Guidelines Section 15126.6(a).

Analysis of four alternatives to the proposed 2021 LRDP is provided to allow decision-makers to consider the proposed 2021 LRDP in light of hypothetical alternative development scenarios, thereby promoting CEQA's purpose as an information disclosure statute. This analysis is guided by the following overarching considerations set forth under CEQA Guidelines:

- An EIR need not consider every conceivable alternative to a project;
- An EIR should identify alternatives that were considered by the lead agency, but rejected as infeasible during the scoping process;
- Reasons for rejecting an alternative include:
  - Failure to meet most of the basic project objectives;
  - Infeasibility; or
  - Inability to avoid significant environmental effects.

6.2 Summary of Significant and Unavoidable Impacts

As required under CEQA, the intent of this alternatives analysis is to consider options that could reduce the proposed 2021 LRDP's significant impacts. Please see the Executive Summary for a summary of the impact determination for all the environmental resource areas. As stated therein, implementation of the proposed 2021 LRDP was determined to result in the following significant and unavoidable impacts.

- **Aesthetics**
  - **Impact AES-1:** Development under the proposed 2021 LRDP could block or impede views of scenic vistas.
- **Agricultural Resources**
  - **Impact AG-1:** Implementation of the proposed 2021 LRDP would result in the conversion of Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland) to non-agricultural use. The establishment of the Coachella Valley Agricultural Research Station (CVARS) as mitigation (from MM 4.1-1 in the 1990 LRDP EIR) for impacts to Farmland does not fully offset the net reduction in farmland in the region as no new farmlands were being created in the vicinity of the campus.

- **Air Quality**
  - **Impact AQ-2:** Construction under the proposed 2021 LRDP would generate ROG and NO_X in quantities that exceed SCAQMD significance thresholds. Operation would exceed SCAQMD thresholds for ROG, NOX, and PM_{10}.
- **Cultural Resources**
  - **Impact CUL-1:** The proposed 2021 LRDP would adversely affect historical resources through the full and partial demolition of historical resources, renovation/rehabilitation of historical resources, and new construction adjacent to historical resources.
- **Noise**
  - **Impact N-1:** Construction under the proposed 2021 LRDP would exceed applicable noise thresholds.
- **Transportation**
  - **Impact T-3:** Development under the proposed 2021 LRDP would be constructed in such a way that changes would remain consistent to surrounding geometric design features and any redesign or construction of on-campus circulation paths would be designed and constructed to meet the Campus Construction and Design Standards. However, the increase in campus population under Cumulative plus Project conditions would result in an impact related to AM Peak Hour queueing at the I-215/SR 60 Freeway Southbound Ramps at Martin Luther King Boulevard.

All other impacts addressed in the Draft EIR would either be less than significant or reduced to a less than significant level with mitigation, with the exception of land use and planning and mineral resources, which were found to have less than significant impacts or no impacts in the Initial Study (Appendix A).

6.3 Attainment of Project Objectives

In determining what alternatives should be considered in the EIR, the objectives of a project must be considered, as attainment of most of the basic objectives forms one of the tests of whether an alternative is feasible (see discussion above). UCR identified the following objectives, as previously described (see Section 2, *Project Description*):

1. Serve as good stewards of limited campus lands and natural resources as UCR continues to grow and accommodate enrollment projections of approximately 35,000 students.
2. Develop approximately 5.5 million gross square feet (gsf) of net new building space needed to accommodate student housing as well as academic and research facilities.
3. Maintain existing land-based research operations on West Campus, while supporting facility modernization, research support facilities growth, and strategic partnerships and initiatives.
4. Activate and enliven the East Campus through strategic mixed-use development, improved public spaces, expanded campus services, and additional on-campus housing to facilitate a living-learning campus environment.
5. Accommodate approximately 40 percent of eligible students with on-campus housing and replace aging low-density student housing units while considering demand, affordability, financial feasibility, and physical site constraints.

6. Locate future growth generally adjacent to and outside of the campus loop road, thereby maintaining the character of the Mid-Century Modern Core.
7. Incorporate efficient planning and design practices in support of minimizing the effects of climate change.

6.4 Alternatives Considered but Rejected

As described above, CEQA Guidelines Section 15126.6(c) provides that the range of potential alternatives for the project shall include those that could feasibly accomplish most of the basic objectives of the project and could avoid or substantially lessen one or more of the significant effects. Alternatives that fail to meet the fundamental project purpose need not be addressed in detail in an EIR.

An EIR is also required to identify any alternatives that were considered by the lead agency but were rejected during the planning or scoping process, and briefly explain the reasons underlying the lead agency's determination. The following alternatives were considered by UCR but are not evaluated further in this EIR, for the reasons discussed:

- **Remote/Distance Learning:** Under this potential alternative, UCR would serve all future enrollment through expanded online course curricula. This would reduce the need for on-campus facilities, although, certain academic programs (e.g., those that involve scientific laboratory coursework) and tenure track faculty would still require on-campus building space. Because on-campus students would not increase under this alternative, additional student housing would not be constructed. This alternative is not consistent with the university's current instruction model wherein remote learning is complementary to in-person learning. Further, this alternative would not fulfill most of the basic project objectives, including the objective of increasing on-campus housing opportunity for students, activating and enlivening East Campus through strategic mixed-use development to facilitate a living-learning campus environment, consolidating and densifying the center of campus, and incorporating efficient planning and design practices in support of minimizing the effects of climate change. Thus, because this alternative would not meet most of the basic project objectives, relative to the proposed plan, this alternative is not feasible and is not considered in further detail.
- **Alternative Location:** Under this potential alternative, UCR would develop its Coachella Valley satellite campus located in Palm Desert, California to accommodate anticipated student population growth. This alternative would still allow for renovations and redevelopment of existing campus facilities but would eliminate the need to expand the Riverside campus. However, this alternative would require acquisition of adjacent properties to the Palm Desert campus. Additionally, this alternative would require substantial new development of primarily undeveloped properties in Palm Desert. It is reasonable to assume that this alternative would simply relocate the impacts of the proposed project to another location, result in its own significant impacts, particularly related to air quality, biological resources, cultural resources, public services, transportation, tribal cultural resources (TCR), and utilities and service systems. This alternative is not consistent with the university's current instruction model wherein remote learning is complementary to in-person learning. Further, this alternative would not fulfill most of the basic project objectives, including the objective of increasing on-campus housing opportunity for students on the UCR main campus, activating and enlivening East Campus through strategic mixed-use development to facilitate a living-learning campus environment, consolidating and densifying the center of campus, and incorporating efficient planning and

design practices in support of minimizing the effects of climate change. Thus, because this alternative would not meet most of the basic project objectives, relative to the proposed plan, this alternative is not feasible and is not considered in further detail.

6.5 Alternatives Selected for Analysis

CEQA Guidelines Section 15126.6, as amended, mandates that all EIRs include a comparative evaluation of the proposed plan with alternatives to the plan that can attain most of the plan's basic objectives but would avoid or substantially lessen any of the significant and unavoidable effects of the proposed 2021 LRDP. CEQA requires an evaluation of a "range of reasonable" alternatives, including the "no project" alternative. Alternatives have been developed to provide a reasonable range of options to consider that would help decision makers and the public understand the general implications of revising or eliminating certain components of the proposed 2021 LRDP. The following provides descriptions of the four alternatives evaluated in this EIR.

- Alternative 1: No Project
- Alternative 2: Reduced Development Program
- Alternative 3: Increased Student Housing
- Alternative 4: No Agricultural Land Development

The environmental impacts of each alternative are analyzed in Sections 6.5.1 through 6.5.4 below. As explained above, the CEQA Guidelines allow for analysis of alternatives at a lesser level of detail. Consequently, the alternatives analyses below should be read in conjunction with the individual resource chapters in Sections 4, which provide a greater level of detail.

Alternative 1 - No Project. The CEQA-required No Project alternative would continue implementation of the 2005 LRDP per the CEQA Guidelines Section 15126.6(e)(3)(A). Planned development as expressed in the 2005 LRDP, primarily new academic/administrative space, would continue up to its planned capacity. This alternative would assume the same student enrollment growth (e.g., 10,000 new students) as projected in the proposed 2021 LRDP. Therefore, like with the proposed project, the 2035/2036 student body would still grow to approximately 35,000 students. This alternative would assume the same net new faculty and staff projections of approximately 2,800 new employees as projected in the proposed 2021 LRDP. Therefore, the 2035/2036 faculty and staff count would be approximately 7,545 employees. Under Alternative 1, the campus population in academic year 2035/2036 would be approximately 42,545. This alternative assumes a bed count of up to 12,500 beds.

Additionally, the assumed maximum development would remain at approximately 14.9 million gsf, as permitted under the 2005 LRDP. In academic year 2018/2019, UCR had approximately 6.8 million gsf of development. Therefore, Alternative 1 would allow for an increase of approximately 8 million gsf of additional academic buildings, student housing, and support space development by the year 2035/2036.

Alternative 2 - Reduced Development Program. The Reduced Development Program Alternative would reduce net new campus population and net new development by 50 percent. The net increase in development would be approximately 1.85 million asf (approximately 2.75 million gsf) of additional academic buildings and support facilities rather than 3.7 million asf and 5.5 million gsf, respectively. Therefore, under Alternative 2, there would be a maximum of approximately 6.65 million asf (approximately 9.75 million gsf) of total academic, research, student housing,

recreational facilities, and support space development by the year 2035/2036. It is reasonable to assume that less recreational facilities would be developed under this alternative since UCR would be limited in its development potential compared to the proposed 2021 LRDP.

Net new student enrollment for academic year 2035/2036 would be planned for 5,000 new students rather than 10,000. Therefore, the 2035/2036 student body would be approximately 30,000 students. Net new faculty and staff projections for academic year 2035/2036 would be planned for approximately 1,400 new employees rather than 2,800. Therefore, the 2035/2036 faculty and staff count would be approximately 6,200 employees. Under Alternative 2, the campus population in academic year 2035/2036 would be approximately 36,200 rather than 42,545. However, reducing the UCR student population under Alternative 2 would not reduce overall demand for higher education, and would simply relocate students to other campuses.

Alternative 3 - Increased Student Housing. This alternative would not alter the components of the proposed 2021 LRDP, but rather would increase the student bed capacity to provide housing for 60 percent of the eligible student body capacity rather than 40 percent under the proposed 2021 LRDP. This would result in a doubling of the proposed new campus beds, which would represent a net increase of approximately 14,978 new campus beds, rather than 7,489 under the proposed 2021 LRDP. Under Alternative 3, the total campus bed count in academic year 2035/2036 would be approximately 21,500 rather than 14,000 under the proposed 2021 LRDP.

Under Alternative 3, net new development would still total up to 3.7 million asf (5.5 million gsf), with a maximum buildout of approximately 8.5 million asf (approximately 12.7 million gsf). It is reasonable to assume that more of the developable square footage would be used for student housing under this alternative rather than student support, academic, or recreation space. The net new student enrollment for academic year 2035/2036 would be planned for 10,000 new students (35,000 total students). Net new faculty and staff projections for academic year 2035/2036 would be approximately 2,800 new employees (7,545 total employees). Under Alternative 3, the campus population in academic year 2035/2036 would be approximately 42,545.

Alternative 4 - No Agricultural Land Development. This alternative would maintain prime agricultural lands for land-based research. Under the proposed 2021 LRDP, there are nearly 394 acres of prime agricultural lands (i.e., State-designated Prime Farmland, Unique Farmland, or Farmland of Statewide Importance) located on West Campus in areas designated as Agricultural/Campus Research or Land-based Research. There are approximately 12.2 acres of prime agricultural land on East Campus concentrated near the eastern campus boundary at the USDA Salinity Laboratory. Under Alternative 4, all prime agricultural lands on West Campus and East Campus would be designated for land-based research opportunities with no secondary uses allowed or remain as open space. More specifically, the 2021 LRDP designations for Agricultural/Campus Research, Student Neighborhood, and the agricultural portions of the “Campus Support” would be designated with “Land-based Research” designations.

Under Alternative 4, net new development would still total up to 3.7 million asf (5.5 million gsf), with a maximum buildout of approximately 8.5 million asf (approximately 12.7 million gsf), and the net new student enrollment for academic year 2035/2036 would be planned for 10,000 new students (35,000 total students). Net new faculty and staff projections for academic year 2035/2036 would be approximately 2,800 new employees (7,545 total employees). Under Alternative 3, the campus population in academic year 2035/2036 would be approximately 42,545.

6.5.1 Alternative 1: No Project Alternative

CEQA Guidelines Section 15126.6(e)(1) requires that the "no project" alternative be described and analyzed "to allow decision makers to compare the impacts of approving the project with the impacts of not approving the project." The no project analysis is required to discuss "the existing conditions at the time the notice of preparation is published…as well as what would be reasonably expected to occur in the foreseeable future if the project were not approved, based on current plans and consistent with available infrastructure and community services" (CEQA Guidelines Section 15126.6(e)(2)). "If the project is…a development project on identifiable property, the no project alternative is the circumstance under which the project does not proceed. Here, the discussion would compare the environmental effects of the property remaining in its existing state against environmental effects which would occur if the project is approved. If disapproval of the project under consideration would result in predictable actions by others, such as the proposal of some other project, this 'no project' consequence should be discussed. In certain instances, the no project alternative means 'no build' wherein the existing environmental setting is maintained. However, where failure to proceed with the project will not result in preservation of existing environmental conditions, the analysis should identify the practical result of the project's non-approval and not create and analyze a set of artificial assumptions that would be required to preserve the existing physical environment" (CEQA Guidelines Section 15126(e)(3)(B)).

The No Project alternative would continue implementation of the 2005 LRDP per CEQA Guidelines Section 15126.6(e)(3)(A). Planned development as expressed in the 2005 LRDP, primarily new academic/administrative space, would continue up to its planned capacity. This alternative would assume the same student enrollment growth (e.g., 10,000 new students) as projected in the proposed 2021 LRDP. Therefore, like with the proposed project, the 2035/2036 student body would still grow to approximately 35,000 students. This alternative would assume the same net new faculty and staff projections of approximately 2,800 new employees as projected in the proposed 2021 LRDP. Therefore, the 2035/2036 faculty and staff count would be approximately 7,545 employees. Under Alternative 1, the campus population in academic year 2035/2036 would be approximately 42,545.The total campus bed count would be 12,500.

Additionally, the assumed maximum development would remain at approximately 14.9 million gsf, as permitted under the 2005 LRDP. In academic year 2018/2019, UCR had approximately 6.8 million gsf of development. Therefore, Alternative 1 would allow for an increase of approximately 8 million gsf of additional academic buildings, student housing, and support space development by the year 2035/2036.

The following analysis summarize the impact findings of the 2005 LRDP EIR and provides a comparison of those impacts in relation to the proposed 2021 LRDP impacts.

Aesthetics

The 2005 LRDP EIR found that implementation of the 2005 LRDP would not have a substantial adverse effect on a scenic vista and would not substantially degrade the visual character or quality of the campus and immediate surrounding area, and while the implementation of the 2005 LRDP could create new sources of light or glare, adherence to relevant 2005 LRDP Planning Strategies and Campus Programs and Practices would ensure impacts related to aesthetics remain less than significant without the need for mitigation. These findings would remain as such under the No Project Alternative.

The 2005 LRDP has not reached its buildout potential and could still develop up to approximately 8 million gsf of new building space. The No Project Alternative could result in more new academic space, student housing and support space, and athletic and recreational facilities than that proposed under the 2021 LRDP, which could develop up to 5.5 million gsf. In addition, the 2005 LRDP would allow for new buildings to be spread out around East and West Campus thereby impacting KVP 1 and KVP 2 on West Campus to a greater extent than the proposed 2021 LRDP, whereas development under the 2021 LRDP would be more centralized and densified in East Campus, but also taller as a result. The proposed 2021 LRDP would impact KVP 9 by allowing development of multi-story academic buildings where the parking and athletic and soccer fields are along Canyon Crest Drive where the 2005 LRDP has this area designated as parking, athletics and recreation. Thus, the proposed 2021 LRDP would impact the scenic views of the distant Box Springs Mountains compared to that of the No Project Alternative. The proposed 2021 LRDP found impacts to scenic vistas, specifically the Box Springs Mountains, to be significant with no sufficient mitigation to reduce impacts to less than significant.

All campus projects under the No Project Alternative and the proposed 2021 LRDP would be subject to the design review and approval processes described under the Physical Design Framework to ensure that the visual character and quality of the campus would be maintained or improved.

All campus projects under the No Project Alternative would incorporate design features to reduce light and glare based on the Campus Design Guidelines, Physical Design Framework, 2005 LRDP Planning Strategies and Campus Programs and Practices, and/or mitigation measures under the 2005 LRDP EIR for the No Project Alternative and based on the Campus Construction and Design Standards, Physical Design Framework, and/or mitigation measures under the proposed 2021 LRDP. Additionally, under both the No Project Alternative and the proposed 2021 LRDP, lighting plans would be reviewed and approved by UCR staff to ensure no light spillover onto adjacent properties.

Although the No Project Alternative could result in more development, it would be done in line with the 2005 LRDP and 2005 LRDP EIR, which found all impacts related to aesthetics to be less than significant, less than significant with adherence to relevant 2005 LRDP Planning Strategies and Campus Programs and Practices, or incorporation of mitigation. As such, overall aesthetic impacts under the No Project Alternative would be **similar to** the proposed 2021 LRDP. *(Similar impact)*

Agricultural Resources

The 2005 LRDP EIR found that implementation of the 2005 LRDP would not conflict with existing zoning for agricultural land or a Williamson Act contract nor would development under the 2005 LRDP involve other changes that could convert Farmland to nonagricultural uses with adherence to relevant 2005 LRDP Planning Strategies. However, the 2005 LRDP EIR found that implementation of the 2005 LRDP would result in the conversion of approximately 125 acres of Prime Farmland to nonagricultural uses and the impact would be significant and unavoidable. These findings would remain as such under the No Project Alternative.

The proposed 2021 LRDP reinforces the commitment to the densification of the existing Academic Center and existing urban environment on East Campus, limiting sprawl into existing open space and agricultural and land-based research areas on West Campus. Agricultural and land-based research is expected to continue to be a major component of UCR's research portfolio over the lifetime of the proposed 2021 LRDP. The proposed 2021 LRDP would impact fewer acres of Farmland than previous UCR LRDPs. However, implementation of the proposed 2021 LRDP would still reduce land available for agricultural research on Farmland in comparison to existing conditions. Consistent with past LRDP EIRs, the establishment of the CVARS as mitigation for impacts to Farmland does not fully

offset the net reduction in farmland in the region as no new farmlands were being created in the vicinity of the campus.

Since analysis and approval of the 2005 LRDP, UCR has only converted approximately 43 acres[1] of Farmland in the West Campus (which is less than the 125 acres assumed to be converted). However, the 2005 LRDP has not reached its buildout potential and could still develop up to approximately 8 million gsf of new building space, including new academic space, student housing and support space, and athletic and recreational facilities, including allowing for more intense development than that proposed by the 2021 LRDP on the remaining 82 acres on West Campus. Overall impacts to agricultural resources under the No Project Alternative would be **greater than** the proposed 2021 LRDP, though in both cases impacts remain significant and unavoidable. *(Greater impact)*

Air Quality

The 2005 LRDP EIR found that implementation of the 2005 LRDP would not conflict with or obstruct implementation of the AQMP for SCAB and the adherence to relevant 2005 LRDP Planning Strategies and Campus Programs and Practices would ensure impacts be less than significant (Impact AQ-1). The 2005 LRDP EIR found that construction and operational activities, both project-specific and cumulatively, would result in the generation of criteria pollutants (namely ROG, NO_x, and PM_{10}) which could contribute to an air quality violation, and therefore, impacts would be significant and unavoidable, even with the implementation of mitigation measures (Impact AQ-2). Exposures of sensitive receptors to substantial pollutant concentrations, campus-generated toxic air emissions, or odors were found to be less than significant (Impact AQ-3). These findings would remain as such under the No Project Alternative.

The proposed 2021 LRDP would also not conflict with or obstruct implementation of the AQMP for SCAB since the 2021 LRDP would not generate population, housing, or employment growth exceeding forecasts in the 2016 AQMP nor would the proposed 2021 LRDP expose sensitive receptors to odors or substantial pollutant concentrations from CO hotspots or toxic air contaminants. Similar to the No Project Alternative, the proposed 2021 LRDP would generate ROG and NO_X (during construction) and ROG, NO_X, and PM_{10} (during operation) that exceed SCAQMD thresholds, the exceedance of thresholds (in effect today) under the proposed 2021 LRDP would be greater than the exceedance of thresholds (in effect in 2005) under the 2005 LRDP. Impacts would remain significant even after the implementation of feasible mitigation measures.

The 2005 LRDP would result in more development that the proposed 2021 LRDP and, therefore, would result in greater air quality impacts related to the generation of criteria pollutants (namely ROG, NO_x, and PM_{10}). In both cases impacts related to criteria pollutants would be significant and unavoidable. Overall, impacts related to air quality under the No Project Alternative would be **greater than** the proposed 2021 LRDP. *(Greater impact)*

Biological Resources

The 2005 LRDP EIR found that implementation of the 2005 LRDP could result in significant, adverse impacts to plant and wildlife species. Implementation of the 2005 LRDP could result in development within the designated critical habitat area of the California gnatcatcher or could result in the loss or modification of drainage channels that protect riparian habitat, which could result in substantial adverse effects to gnatcatchers and riparian habitats. In addition, there could be a substantial

[1] The approximate 43-acre total development and conversion of Farmland on West Campus since the 2005 LRDP efforts include the Solar Farm, the hammer throw area, and the CARB facility.

adverse effect on federally protected wetlands, and development could interfere with the movement of native resident or migratory wildlife species or corridors. However, implementation of the relevant 2005 LRDP Planning Strategies and Campus Programs and Practices, and mitigation measures, would reduce impacts to less than significant. Furthermore, the 2005 LRDP would be in conformance with local applicable policies protecting biological resources with the implementation of relevant 2005 LRDP Planning Strategies and no additional mitigation measures. Finally, implementation of the 2005 LRDP would not conflict with an adopted habitat conservation plan or natural community conservation plan. These findings would remain as such under the No Project Alternative.

Similar to the 2005 LRDP, the proposed 2021 LRDP would also result in the disturbance or loss of special status species, result in the degradation or loss of riparian habitats and other sensitive natural communities, and result in the degradation or loss of State or federally-protected wetlands. Adherence to 2021 LRDP objectives and policies and the implementation of mitigation measures would reduce impacts to less than significant. Under the proposed 2021 LRDP, development would not be located near MSHCP conservation areas with potential for wildlife movement or native nursery sites, and impacts would be less than significant with no additional mitigation measures. The proposed 2021 LRDP would also result in less that significant impacts to local polices and ordinances protecting biological resources and would not conflict with an adopted habitat conservation plan, in line with the 2005 LRDP EIR findings.

Impact under the No Project Alternative would be slightly greater than those for the proposed 2021 LRDP since the proposed 2021 LRDP would consolidate new development at the campus core and would increase open space areas in relation to the 2005 LRDP. In addition, there are currently no planned or foreseeable development within the Open Space Reserve areas. Thus, impacts under the No Project Alternative would be increased as compared to the proposed 2021 LRDP, even with continued adherence to relevant 2005 LRDP Planning Strategies and implementation of mitigation measures. Overall impacts to biological resources under the No Project Alternative would be **slightly greater than** the proposed 2021 LRDP. (*Slightly greater impact)*

Cultural Resources

The 2005 LRDP EIR found that implementation of the 2005 LRDP could result in the modification of structures that have been designated as eligible or potentially eligible to the NRHP or CRHR which would require mitigation measures to reduce impacts to less than significant. Furthermore, the 2005 LRDP could result in the demolition of historic or potentially historic structures, which would be significant, even with the implementation of feasible mitigation measures. Impacts to known or unknown archeological resources and human remains would be less than significant with implementation of relevant 2005 LRDP Planning Strategies and Campus Programs and Practices; no additional mitigation measures were necessary. These findings would remain as such under the No Project Alternative.

Similar to the 2005 LRDP, the proposed 2021 LRDP would also adversely affect historical resources through full or partial demolition, renovation or rehabilitation of eligible structures, and new construction adjacent to recognized resources. Impacts would be significant, even with the implementation of mitigation measures. Impacts to known or unknown archeological resources and cultural resources of potential Native American origin would be less than significant with implementation of mitigation measures, as appropriate. Impacts to human remains would be less than significant with adherence to existing regulations. Overall impacts to cultural resources under the No Project Alternative would be **similar to** the proposed 2021 LRDP. *(Similar impact)*

Energy

The 2005 LRDP EIR found that construction activities related to the 2005 LRDP would result in the irretrievable commitment of nonrenewable energy resources, primarily in the form of fossil fuels (including gasoline, fuel oil, and natural gas for automobiles and construction equipment). With respect to operational activities on campus, compliance with existing campus planning regulations would ensure that all natural resources are conserved to the maximum extent possible. Overall, the consumption of natural resources would increase at a lesser rate than the projected population increase due to the variety of energy conservation measures that the campus has and will continue to provide.

With the potential for greater square footage of development under the No Project Alternative compared to the proposed 2021 LRDP, construction-related non-renewable energy (i.e., fuel) consumption would increase compared to under the proposed 2021 LRDP. Furthermore, the 2005 LRDP assumes a total of 12,500 beds whereas the 2021 LRDP would assume a total of 14,000 beds. With an increase in students but not a planned corresponding or accommodating increase in on-campus housing, the No Project Alternative would result in more students needing to commute to campus compared to the proposed 2021 LRDP. As such the No Project Alternative would result in increased VMT and associated transportation-related non-renewable energy (i.e., fuel) consumption compared to the proposed 2021 LRDP. Furthermore, the 2005 LRDP does not include energy conservation mitigation measures, and development under the No Project Alternative would only rely on State legislation and the *UC Policy for Sustainable Practices* in future reduction of energy consumption, whereas the proposed 2021 LRDP includes mitigation to ensure that energy consumption is not wasteful. Therefore, construction and operational energy impacts associated with the No Project Alternative would be greater than under the proposed 2021 LRDP.

As described in Section 4.6, *Energy*, while planned new and renovated facilities would be designed with the goal of improved energy efficiency, the proposed 2021 LRDP would result in an increase in operational energy, including non-renewable energy, consumption due to provision of additional land uses, additional VMT, and accommodation of additional student enrollment and, thus, result in a less than significant with mitigation impact. While operation of the proposed 2021 LRDP would consume energy, the No Project Alternative would not eliminate or reduce energy consumption related to VMT. Because facilities already approved under the 2005 LRDP and not yet constructed would be developed under the No Project Alternative, which is a greater net increase than development under the proposed 2021 LRDP, and because facilities operation constitutes the largest consumption of energy on the UCR campus, the No Project Alternative would result in comparatively increased overall operational energy, including non-renewable energy, consumption compared to the proposed 2021 LRDP. Because the No Project Alternative would generate more overall energy consumption, energy impacts would be **greater than** under the proposed 2021 LRDP. *(Greater impact)*

Geology and Soils

The 2005 LRDP EIR found that implementation of relevant 2005 LRDP Planning Strategies and Campus Programs and Practices would ensure impacts related to geology and soils remain less than significant and no additional mitigation measures were required. The 2005 LRDP EIR also found that impacts to paleontological resources would be less than significant with the adherence to relevant 2005 LRDP Planning Strategies and Campus Programs and Practices, including a policy related to what steps are to be taken if a paleontological resource is uncovered during construction activities. These findings would remain as such under the No Project Alternative.

Similar to the 2005 LRDP, the proposed 2021 LRDP would be required to comply with CBC building requirements, as well as the UC Seismic Safety Policy and UC Facilities Manual Seismic Program Guidelines, which would reduce impacts related to geology and soils to less than significant levels. Section 4.7, *Geology and Soils*, also found impacts to paleontological resources to be less than significant with the implementation of mitigation measures related to paleontological resources monitoring and steps to be taken if a paleontological resource is uncovered during construction activities. Overall impacts related to geology and soils under the No Project Alternative would be **similar to** the proposed 2021 LRDP. *(Similar impact)*

Greenhouse Gas Emissions

With a greater net increase in the square footage of development under the No Project Alternative compared to the proposed 2021 LRDP, construction-related emissions would increase compared to those of the proposed 2021 LRDP. With the potential for greater square footage of development under the No Project Alternative compared to the proposed 2021 LRDP, construction-related emissions would increase compared to under the proposed 2021 LRDP. Furthermore, the 2005 LRDP assumes a total of 12,500 beds whereas the 2021 LRDP would assume a total of 14,000 beds. With an increase in students but not a planned corresponding or accommodating increase in on-campus housing, the No Project Alternative would result in more students needing to commute to campus compared to the proposed 2021 LRDP. As such, the No Project Alternative would result in increased VMT and associated transportation-related emissions compared to the proposed 2021 LRDP. Furthermore, the 2005 LRDP does not include GHG emissions reduction mitigation measures, and development under the No Project Alternative would only rely on State legislation and the *UC Policy for Sustainable Practices* in future reduction of emissions, whereas the proposed 2021 LRDP includes mitigation to ensure GHG emissions impacts are less than significant. Therefore, construction and operational GHG emissions impacts associated with the No Project Alternative would be **greater than** under the proposed 2021 LRDP. *(Greater impact)*

Hazards and Hazardous Materials

The 2005 LRDP EIR found that implementation of relevant LRDP Campus Programs and Practices and mitigation measures would reduce impacts of exposure of workers or campus occupants to contaminated soil or groundwater to less than significant levels. Implementation of relevant 2005 LRDP Campus Programs and Practices would ensure impacts remain less than significant, and no additional mitigation measures were required, for impacts related to exposure of campus occupants or the nearby public to routine transport, use, disposal or storage of hazards and hazardous materials; the exposure of construction workers and campus occupants to significant health or safety risks through the renovation or demolition of buildings, or relocation of underground utilities, that contain hazardous materials; exposure of people to potential health risks in the event of an accident or accidental release of hazardous materials; and handling of hazardous materials within one-quarter mile of a school. Although there is an approximately 3.25-acre site on the UCR campus at 1060 Martin Luther King Boulevard listed as a DTSC Certified Operations and Maintenance Land Use Restrictions site as of December 15, 2010, cleanup activities were conducted and 18 years of groundwater monitoring were performed where DTSC concluded that the monitoring can be terminated and that the soils is safe for current and future use and is not adversely affecting groundwater quality. A Covenant to Restrict Use of Property between The Regents and DTSC was recorded with Riverside County in May 2006 which prohibits the site from being used for residential, hospital for humans, indoor classroom for persons under 18 years of age, or as a daycare center for children. The covenant will remain in place unless additional evaluations are conducted to make

sure the site is suitable for such uses. Any projects under the No Project Alternative and the proposed 2021 LRDP would be required to comply with the covenant. Thus, impacts would be less than significant, and no additional mitigations would be required.

Similar to the 2005 LRDP, the proposed 2021 LRDP would be required to comply with federal and State regulations, as well as existing UCR policies, related to the routine transport, use, or disposal of hazardous materials and impacts would therefore be less than significant without mitigation requirements. Mandatory compliance with existing regulations pertaining to the identification, handling, and disposing of hazardous materials, along with the implementation of mitigation measures would ensure impacts from the accidental release of hazardous materials on or nearby campus, including within one-quarter mile of a school, would be less than significant.

Section 4.9.3, Impact HAZ-4, of this EIR found that the UCR campus includes several closed, but listed UST release sites, and is located adjacent to a site with a restricted land use covenant. As a result, soil, soil vapor, and/or groundwater disturbance during construction could create a significant hazard to the public or the environment. Given the opportunity for contaminated soils to occur on the project site, project construction would potentially create a significant hazard to the public or the environment. Mitigation measures would be required to reduce the impact to less than significant.

It is important to note that the identified listed UST release sites and the site with a restricted land use covenant, exist under current conditions, despite the 2005 LRDP EIR not identifying these sites as potential impacts under the 2005 LRDP. The potential impact from unknowingly disturbing these sites with continued implementation of the 2005 LRDP could be significant. Therefore, overall, impacts related to hazards and hazardous materials under the No Project Alternative would be **greater than** the proposed 2021 LRDP. *(Greater impact)*

Hydrology and Water Quality

The 2005 LRDP would result in a greater amount of development, including grading and excavation work, and would result in an increase in the amount of impermeable surfaces in comparison to the 2021 LRDP. The 2005 LRDP EIR found that implementation of relevant 2005 LRDP Planning Strategies and Campus Programs and Practices would ensure impacts related to hydrology and water quality remain less than significant and no additional mitigation measures were required. Further, the 2005 LRDP EIR found that impacts related to the construction of new or expanded stormwater drainage systems would be less than significant and that the 2005 LRDP would not otherwise substantially degrade water quality. With implementation of relevant 2005 LRDP Planning Strategies and Campus Programs and Practices and mitigation measures, the 2005 LRDP would not place structures within a 100-year flood hazard area and development would not impede or redirect flood flows. These findings would remain as such under the No Project Alternative.

The CEQA Guidelines Hydrology and Water Quality significance criteria have been updated since the 2005 LRDP EIR. Flood hazard areas are no longer analyzed, and the criteria require analysis of impacts to surface and groundwater quality as well as the impediment of sustainable groundwater management plans. Surface runoff and stormwater drainage systems are still assessed, as is the potential risk of pollutant release in flood hazard, tsunami, or seiche zones.

In line with the No Project Alternative, construction and operation of the proposed 2021 LRDP would occur in compliance with applicable water quality standards and waste discharge requirements. In accordance with regulations and policies, a SWPPP would be implemented during construction activities and a SWMP would be implemented during operations, to provide on-site

construction and post-construction prevention, capture, and treatment of stormwater runoff, such that potential water quality impacts would be less than significant. Potential impacts to groundwater supplies and recharge would be less than significant. Construction and operation of the proposed 2021 LRDP would not alter the course of a stream or river and would not alter regional stormwater drainage patterns. Compliance with applicable regulations and policies, including implementation of a SWPPP during construction and a SWMP during operation, would provide sufficient on-site construction and post-construction prevention, capture, and treatment of stormwater runoff, and would minimize or avoid potentially adverse impacts such that they would be less than significant. The proposed 2021 LRDP would implement water quality BMPs in accordance with applicable requirements, reducing potential downstream water quality impacts to ensure that the proposed 2021 LRDP would not conflict with or obstruct implementation of the Water Quality Control Plan or a sustainable groundwater management plan. This impact would be less than significant.

Overall impacts related to hydrology and water quality under the No Project Alternative would be **similar to** the proposed 2021 LRDP. *(Similar impact)*

Noise

The 2005 LRDP EIR found that implementation of relevant 2005 LRDP Planning Strategies and Campus Programs and Practices would ensure impacts related to exposure of new student residential uses to noise levels in excess of the State's 45 dBA CNEL interior noise standard remain less than significant and no additional mitigation measures were required. Construction-related vibration impacts would be reduced to less than significant levels with the implementation of relevant 2005 LRDP Planning Strategies and Campus Programs and Practices and mitigation related to the notification of area occupants and researchers. Construction and operation vibration impacts, for on- and off-campus receivers, would be less than significant. The 2005 LRDP EIR also found that traffic volumes would not increase to the extent that there would be a substantial, permanent increase in on- or off-campus roadway noise. Implementation of relevant 2005 LRDP Planning Strategies and Campus Programs and Practices would also ensure impacts from new stationary source noise would be less than significant with no additional mitigation measures. Noise from special events was also found to be less than significant. Construction noise would result in substantial temporary or periodic increases in ambient noise levels on- and off-campus and it was determined even with the implementation of relevant 2005 LRDP Planning Strategies and Campus Programs and Practices, impacts would remain significant and unavoidable as no feasible mitigation measures were identified. These findings would remain as such under the No Project Alternative.

Similar to the 2005 LRDP, construction equipment used during construction and mechanical equipment used during operation of the proposed 2021 LRDP would result in noise level increases that would exceed applicable noise thresholds, resulting in a significant impact. Mitigation measures would reduce construction noise levels to the extent feasible but impacts to sensitive receiver on- and off-campus would remain significant. Comparable to the implementation of relevant 2005 LRDP Planning Strategies and Campus Programs and Practices under the 2005 LRDP, mitigation measures for the 2021 LRDP would reduce operational noise levels to less than significant. Vibration from the proposed 2021 LRDP construction may also exceed applicable standards, but implementation of mitigation measures during construction would reduce impacts to less than significant.

Overall impacts related to Noise under the No Project Alternative would be **slightly greater than** the proposed 2021 LRDP. *(Slightly greater impact)*

Population and Housing

The 2005 LRDP EIR found that implementation of relevant 2005 LRDP Planning Strategies would ensure impacts related to population and housing would remain less than significant and no additional mitigation measures were required. While the 2005 LRDP would directly induce substantial population growth, it would not result in population or housing effects that would lead to a significant impact on the environment. Further, the increased demand for housing would be reduced to less than significant by increasing student housing options on-campus. The 2005 LRDP would not displace existing residents, nor would it necessitate the construction of replacement housing elsewhere. These findings would remain as such under the No Project Alternative.

The 2005 LRDP has not reached its buildout potential and planned development as expressed in the 2005 LRDP, primarily new academic/administrative space, would continue up to its planned capacity. However, this alternative would assume the same student enrollment growth as projected in the proposed 2021 LRDP and the relevant 2005 LRDP Planning Strategies would continue to apply and be implemented as they relate to student housing, which may result in the No Project Alternative developing additional student housing and support space in place of academic/administrative space, though it would not be guaranteed. The 2005 LRDP assumes a total of 12,500 beds whereas the 2021 LRDP would assume a total of 14,000 beds. With an increase in students but not a planned corresponding or accommodating increase in on-campus housing, the No Project Alternative would result in more students needing housing accommodations off-campus. As such, the No Project Alternative would result in greater impacts related to population growth than the proposed 2021 LRDP.

The proposed 2021 LRDP would accommodate the anticipated regional population forecasts. Furthermore, the proposed 2021 LRDP does not include installation or extension of significant roads or infrastructure that would result in further population growth or housing needs. Direct and indirect impacts related to unplanned population growth would be less than significant. The proposed 2021 LRDP would not displace substantial numbers of existing people or housing, necessitating the construction of replacement housing and impacts would be less than significant.

Neither the No Project Alternative nor the proposed 2021 LRDP would result in population or housing effects that would lead to a significant impact on the environment. The increased demand for housing would be reduced by increasing student housing options on-campus under both scenarios, but the No Project Alternative would provide 1,500 fewer beds than the proposed 2021 LRDP. Overall impacts related to Population and Housing under the No Project Alternative would be **greater than** the proposed 2021 LRDP. *(Greater impact)*

Public Services

The 2005 LRDP EIR found that implementation of relevant 2005 LRDP Planning Strategies and Campus Programs and Practices would ensure impacts related to public services, specifically fire, police, schools, and libraries, would remain less than significant and no additional mitigation measures were required. No new or altered fire or police protection facilities would be required to maintain acceptable response times, fire flows, or applicable service levels. The increase in the number of school-age children would not result in the need for new or altered school facilities. The increase in campus population would not result in the need for new or altered library facilities. These findings would remain as such under the No Project Alternative.

Similar to the 2005 LRDP, the proposed 2021 LRDP would not result in significant environmental impacts associated with the need for new or altered fire, police, school, or library facilities. The No

Project Alternative would assume the same campus population growth as projected in the proposed 2021 LRDP but under the No Project Alternative, an additional 2.2 million gsf of buildout development would occur compared to the proposed 2021 LRDP. Therefore, it is reasonable to assume that the impacts from the No Project Alternative would be **greater than** the proposed 2021 LRDP, although under both projects, impacts to Public Services would remain less than significant. *(Greater impact)*

Recreation

The 2005 LRDP EIR found that implementation of relevant 2005 LRDP Planning Strategies would ensure impacts related to the additional demand for recreational space and the conversion of recreational space to nonrecreational uses would remain less than significant and no additional mitigation measures were required. In addition, construction of new recreational facilities under the 2005 LRDP would result in less than significant impacts. The 2005 LRDP would provide for neighborhood parks and tot lots in family housing areas, thereby reducing the need for the campus population to utilize area parks. These findings would remain as such under the No Project Alternative.

Similar to the 2005 LRDP, the proposed 2021 LRDP would include most existing recreational facilities and parkland on the UCR campus and incrementally develop new recreational facilities and open spaces that would adequately serve the campus population. The proposed 2021 LRDP would not increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of those facilities would occur or be accelerated. Impacts related to increased use of parks and recreational facilities would be less than significant. The proposed 2021 LRDP would incrementally develop new on-campus recreational facilities and open spaces, the construction of which may have an adverse physical effect on the environment. The impact from construction and operation of these new recreational facilities have been analyzed as part of the proposed 2021 LRDP buildout through the Draft EIR, and there would be no additional impacts.

Overall impacts related to Recreation under the No Project Alternative would be **similar to** the proposed 2021 LRDP. *(Similar Impact)*

Transportation

The 2005 LRDP EIR found that implementation of the 2005 LRDP would result in additional construction and operational vehicular trips, which would increase traffic volumes and degrade intersection levels of service, as well impact conditions along roadway segments. Even with implementation of the relevant 2005 LRDP Planning Strategies and Campus Programs and Practices, and mitigation measures, impacts were determined to be significant and unavoidable. However, vehicular congestion is statutorily no longer considered a significant environmental impact under Senate Bill 743.

Furthermore, it was found that implementation of the 2005 LRDP would not result in hazards due to design features or land use incompatibilities. While construction may result in short-term vehicular hazards due to closure of traffic lanes or roadway segments, it would not substantially increase pedestrian hazards due to closure of sidewalks or paths. Implementation of the 2005 LRDP would not impair emergency access nor result in inadequate parking capacity. Implementation of the 2005 LRDP would not conflict with applicable policies, plans or programs supporting alternative transportation. With implementation of the relevant 2005 LRDP Planning Strategies and Campus

Programs and Practices, and mitigation measures, these impacts would be less than significant. These findings would remain as such under the No Project Alternative.

The CEQA Guidelines Transportation significance criteria have been updated since the 2005 LRDP EIR. Level of service impacts are no longer analyzed; rather, the criteria require analysis of impacts to vehicle miles traveled. Impacts to circulation system programs, plans, ordinances, and policies are still reviewed, as are potential hazardous design features and inadequate emergency access.

Implementation of the proposed 2021 LRDP would increase bicycle and pedestrian travel, but it would not physically disrupt an existing pedestrian or bicycle facility or interfere with implementation of a planned pedestrian or bicycle facility. Implementation of the proposed 2021 LRDP would not conflict with any existing programs, plans, ordinances, or policies that address the circulation systems. Furthermore, the proposed 2021 LRDP would result in additional vehicular travel associated with increased population on the campus, but VMT would continue to be below regional thresholds, even under cumulative conditions. Development under the proposed 2021 LRDP would not include major changes to existing access points or on-campus circulation paths that would result in inadequate emergency access. All projects under the proposed 2021 LRDP would adhere to the Campus Construction and Design Standards. They would undergo review and approval by the State Fire Marshal prior to implementation and use. Impacts related to these criteria would be less than significant and no mitigation measures are required.

Development under the proposed 2021 LRDP would be constructed in such a way that changes would remain consistent to surrounding geometric design features and any redesign or construction of on-campus circulation paths would be designed and constructed to meet the Campus Construction and Design Standards. However, the increase in campus population under Cumulative Plus Project conditions would result in an impact related to AM Peak Hour queueing at the I-215/SR 60 Freeway Southbound Ramps at Martin Luther King Boulevard. Even though a mitigation measure has been proposed to reduce impacts, implementation of the mitigation measure is uncertain at this time due to UCR having no jurisdictional control (under jurisdiction of Caltrans) over the identified intersection, impacts would be significant and unavoidable.

The No Project Alternative would result in the same projected campus population as under the proposed 2021 LRDP. However, the 2005 LRDP assumes a total of 12,500 beds for on-campus student housing whereas the 2021 LRDP would assume a total of 14,000 beds. With an increase in students but not a planned corresponding or accommodating increase in on-campus housing, the No Project Alternative would result in more students needing to commute to campus compared to the proposed 2021 LRDP. As such, the No Project Alternative would result in increased VMT compared to the proposed 2021 LRDP and, impacts related to VMT would be greater under this alternative. In addition, while the impacts related to the AM Peak Hour queueing at the I-215/SR 60 Freeway Southbound Ramps at Martin Luther King Boulevard were not analyzed under the 2005 LRDP EIR, the impact could still result from continued development under the No Project Alternative and impacts would be significant.

Therefore, impacts related to Transportation under the No Project Alternative would be **greater than** the proposed 2021 LRDP. *(Greater Impact)*

Tribal Cultural Resources

The 2005 LRDP EIR found that implementation of the 2005 LRDP could result in impacts to known or unknown archeological resources and human remains. Implementation of relevant 2005 LRDP Planning Strategies and Campus Programs and Practices would reduce impacts to less than

significant and no additional mitigation measures were necessary. These findings would remain as such under the No Project Alternative. However, the 2005 LRDP EIR was silent to the potential impacts to TCR since AB 52 had not yet been adopted.

Nonetheless, development under the 2005 LRDP and the proposed 2021 LRDP has the potential to impact cultural resources of potential Native American origin. Development under the 2021 LRDP would primarily be infill development or expansion of already developed areas on the north portions of East Campus. A new interpretive center is programmatically assumed in the UCR Botanic Gardens designation on East Campus, but no foreseeable facilities development is anticipated in the Open Space Reserve in East Campus (southeastern portion of campus). If development occurs in the southeastern quadrant of campus and in areas containing Val Verde Pluton geologic features considered highly sensitive to prehistoric archaeological resources, mitigation would be required for a qualified archaeologist and a Native American monitor to reduce impacts to potential archaeological and/or TCR to less than significant levels.

Given that the 2005 LRDP would result in a greater amount of development, including grading and excavation work, impacts to TCR under the No Project Alternative would be **slightly greater than** the proposed 2021 LRDP. *(Slightly greater impact)*

Utilities and Service Systems

Development under the 2005 LRDP would not require the construction of new or expanded water treatment facilities; would generate an additional demand for water, but would not require new or expanded water supply entitlements or result in the need for new or expanded entitlements; would not exceed wastewater treatment requirements of the SARWQCB; would not increase wastewater generation such that treatment facilities would be inadequate to serve the project and the provider's existing commitments; could increase the demand for electricity and natural gas, but would not require or result in the construction of new energy or gas production or transmission facilities, the construction of which would cause a significant environmental impact; and would generate solid waste, but not enough to require the expansion of the permitted capacity of a regional landfill; comply with all applicable federal, State, and local statues and regulations related to solid waste. With implementation of the relevant 2005 LRDP Planning Strategies and Campus Programs and Practices, these impacts would be less than significant. Development under the 2005 LRDP could require the construction of new or expanded wastewater conveyance and treatment systems. With implementation of the relevant 2005 LRDP Planning Strategies and mitigation measures, this impact would be less than significant. These findings would remain as such under the No Project Alternative.

Similar to the 2005 LRDP, the proposed 2021 LRDP may require the relocation or construction of new or expanded water, wastewater treatment or stormwater drainage, or telecommunications facilities localized on the UCR campus, but such relocation and construction would not result in significant environmental effects. The proposed 2021 LRDP would result in a net increase in water demand on the UCR campus and this increase is accounted for in the RPU's 2015 UWMP. There is sufficient water supply available under all drought scenarios. Wastewater generated by development under the proposed 2021 LRDP would be treated at the Riverside Water Quality Control Plant. The plant would have adequate capacity to serve the proposed 2021 LRDP's anticipated wastewater generation in addition to its existing wastewater treatment commitments. The proposed 2021 LRDP would not generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure. The proposed 2021 LRDP would not impair the attainment of solid waste reduction goals and would comply with federal, State, and applicable local

statutes and regulations related to solid waste. Under the proposed 2021 LRDP, all impacts related to Utilities and Service Systems would be less than significant and no mitigation measures are required.

The 2005 LRDP has not reached its buildout potential and could still develop up to approximately 8 million gsf of new building space. The No Project Alternative could result in more new academic space, student housing and support space, and athletic and recreational facilities than that proposed under the 2021 LRDP, which could develop up to 5.5 million gsf. While impacts to Utilities and Service Systems under the 2005 LRDP would be greater than the proposed 2021 LRDP, impacts would still be less than significant with the implementation of relevant 2005 LRDP Planning Strategies and Campus Programs and Practices, and mitigation measures as appropriate. Impacts related to Utilities and Service Systems under the No Project Alternative would be **similar to** the proposed 2021 LRDP. *(Similar impact)*

Wildfire

Development of facilities in the southeastern portion of the campus (adjacent to the southeastern hills), under the 2005 LRDP, could expose people or structures to a risk of loss, injury, or death involving wildland fires. Implementation of relevant 2005 LRDP Planning Strategies and mitigation measures would reduce this impact to less than significant. Further, the 2005 LRDP could impair implementation of, or physically interfere with, an adopted emergency response or emergency evacuation plan. Implementation of relevant 2005 LRDP Planning Strategies and mitigation measures would reduce this impact to less than significant. These findings would remain as such under the No Project Alternative.

Development under the 2021 LRDP would primarily be infill development or expansion of already developed areas on the north portions of East Campus. A new interpretive center is programmatically assumed in the UCR Botanic Gardens designation on East Campus, but no foreseeable facilities development is anticipated in the Open Space Reserve in East Campus (southeastern portion of campus).

Similar to the 2005 LRDP, implementation of the proposed 2021 LRDP could result in temporary lane or roadway closures on the edges of campus and within the campus circulation system during construction activities. With inclusion of a construction management plan as a standard condition of approval, construction impacts related to transportation concerns would be less than significant. In support of these standard practices, UCR has proposed Continuing Best Practices as conditions of individual project approval that would ensure, to the extent feasible, that at least one unobstructed lane in both directions on campus roadways are maintained specifically in the event of a wildfire emergency and that the Campus Fire Marshal discloses roadway closures to the City of Riverside Fire Department and identify alternative travel routes, if necessary. As such, evacuation routes, if present within the specific roadway segment that would require temporary closure as noted above, would be similarly rerouted.

Operation of new facilities would not substantially impair an adopted emergency response or evacuation plan. Implementation of the proposed 2021 LRDP would increase the density of development on campus, with new buildings and infrastructure constructed according to the latest fire code and safety standards. New construction would be in areas within 2 miles of Very High FHSZs. People living, working, and attending class in these areas could be exposed to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire. New or updated infrastructure would be concentrated in previously developed portions of campus, and any new

utilities would be installed in compliance with existing regulations and would not contribute to increased fire risk.

Impacts related to Wildfire under the No Project Alternative would be **similar to** the proposed 2021 LRDP. *(Similar impact)*

Summary of Alternative 1 (No Project)

This alternative would result in similar impacts to aesthetics, cultural resources, geology and soils, hydrology and water quality, recreation, utilities and service systems, and wildfire compared to the proposed 2021 LRDP. However, this alternative would result in slightly greater/greater impacts to multiple environmental areas of concern, including agricultural resources, air quality, biological resources, energy consumption, GHG emissions, hazards and hazardous materials, noise, population and housing, public services, transportation, and TCR compared to the proposed 2021 LRDP.

This alternative would not consolidate or densify new development generally adjacent to and outside of the campus loop road, nor would it definitively incorporate efficient planning and design practices in support of minimizing the effects of climate change.

6.5.2 Alternative 2: Reduced Development Program

The Reduced Development Program Alternative would reduce net new campus population and net new development by 50 percent. The net increase in development would be approximately 1.85 million asf (approximately 2.75 million gsf) of additional academic buildings and support facilities rather than 3.7 million asf and 5.5 million gsf, respectively. Therefore, under Alternative 2, there would be a maximum of approximately 6.65 million asf (approximately 9.75 million gsf) of total academic, research, student housing, recreational facilities, and support space development by the year 2035/2036.

Net new student enrollment for academic year 2035/2036 would be planned for 5,000 new students rather than 10,000. Therefore, the 2035/2036 student body would be approximately 30,000 students. Net new faculty and staff projections for academic year 2035/2036 would be planned for approximately 1,400 new employees rather than 2,800. Therefore, the 2035/2036 faculty and staff count would be approximately 6,200 employees. Under Alternative 2, the campus population in academic year 2035/2036 would be approximately 36,200 rather than 42,545. However, reducing the UCR student population under Alternative 2 would not reduce overall demand for higher education, and would simply relocate students to other campuses.

Aesthetics

The Reduced Development Program Alternative would reduce net new campus population and net new development by 50 percent compared to the proposed 2021 LRDP. As discussed in Section 4.1, *Aesthetics*, the proposed 2021 LRDP would have a significant and unavoidable impact to scenic vistas, specifically related to the Box Springs Mountains. All other impacts related to aesthetics would be less than significant or less than significant with mitigation incorporated. Implementation of the Reduced Development Program Alternative would result in half as much net new building square footage. However, since the potential locations, height, and massing of new buildings under the Reduced Development Program Alternative would be **similar to** those permitted under the proposed 2021 LRDP, impacts to scenic vistas would remain significant and avoidable. *(Similar impact)*

Agricultural Resources

The Reduced Development Program Alternative would reduce net new development by 50 percent compared to the proposed 2021 LRDP. As discussed in Section 4.2, *Agricultural Resources*, the proposed 2021 LRDP would have a significant and unavoidable impact to Prime Farmland. Conceivably, implementation of the Reduced Development Program Alternative could result in a reduced impact to agricultural resources as development in West Campus and parts of East Campus may not be developed as much as under the proposed 2021 RLDP. However, this is not guaranteed and, consistent with past LRDP EIRs, the establishment of the CVARS as mitigation for impacts to Farmland does not fully offset the net reduction in farmland in the region as no new farmlands were being created in the vicinity of the campus. Therefore, impacts to agricultural resources under the Reduced Development Program Alternative would be **similar to** those under the proposed 2021 LRDP, and impacts to agricultural resources would remain significant and avoidable. *(Similar impact)*

Air Quality

The reduction of net new campus population and building square footage under the Reduced Development Program Alternative would result in fewer emissions of the criteria pollutants associated with short-term construction and long-term operation compared to the proposed 2021 LRDP, but impacts would still be significant and unavoidable. Because this alternative would result in less campus population growth as compared to the proposed 2021 LRDP, overall traffic and localized VMT would be reduced and would be less than significant. However, as noted above, reduced UCR student population would simply relocate the demand for higher education to alternative campuses thereby relocating construction and operational emissions to another location. Therefore, impacts related to air quality under the Reduced Development Program Alternative would be **similar to** those under the proposed 2021 LRDP, although impacts related to criteria pollutants would remain significant and avoidable. *(Similar impact)*

Biological Resources

Impact under the Reduced Development Program Alternative would be less than those for the proposed 2021 LRDP since this alternative would reduce net new building space by 50 percent. Under this alternative, UCR could have more flexibility in where new buildings would be located, thus potentially allowing for avoidance of biological resources to a greater extent than under the proposed 2021 LRDP. In addition, there are currently no planned or foreseeable development within the Open Space Reserve areas and that would still be the case under the Reduced Development Program Alternative. Thus, overall impacts to biological resources under the Reduced Development Program Alternative would be **slightly less than** the proposed 2021 LRDP. *(Slightly less impact)*

Cultural Resources

As discussed in Section 4.5, *Cultural Resources*, there are 38 qualifying historical resources on UCR's campus. Among these 38 resources is one eligible historic district (the Mid-Century Modern Core Historic District, with 15 contributing buildings and associated site plan features, circulation corridors, and landscapes), and one cultural landscape (the Citrus Variety Collection Cultural Landscape, with 11 contributing buildings and ancillary structures and associated agricultural fields). Appendix E includes the complete evaluations of each eligible historical resource. Impacts to historic resources would be comparable under the Reduced Development Program Alternative, as the reduction in square footage would not reduce the potential for alterations to historic buildings

compared to the proposed 2021 LRDP, and impacts would therefore remain significant and unavoidable.

With respect to archaeological resources, the reduced intensity and scale of development anticipated under the Reduced Development Program Alternative would reduce the degree of ground disturbance, but the potential to encounter previously unknown resources would still exist. Impacts would be less than significant with mitigation, which would be **similar to** the proposed 2021 LRDP. *(Similar impact)*

Energy

With the reduction in the square footage of development under the Reduced Development Program Alternative compared to the proposed 2021 LRDP, construction-related non-renewable energy (i.e., fuel) localized consumption would decrease compared to under the proposed 2021 LRDP. Because this alternative would result in less campus population growth as compared to the proposed 2021 LRDP, localized VMT would be reduced as well, resulting in less localized transportation-related non-renewable energy (i.e., fuel) consumption compared to the proposed 2021 LRDP. However, as noted above, reduced UCR student population would simply relocate the demand for higher education to alternative campuses thereby relocating vehicle trips to other locations. Therefore, construction and operational energy impacts associated with the Reduced Development Program Alternative would be **less than** under the proposed 2021 LRDP for localized impacts but would be **similar to** the proposed 2021 LRDP when accounting for displaced students. *(Less impact (locally)/Similar impact (regionally))*

Geology and Soils

The Reduced Development Program Alternative would result in a reduction of proposed net new building square footage compared to the proposed 2021 LRDP. Both the Reduced Development Program Alternative and the proposed 2021 LRDP would be required to comply with CBC building requirements, as well as the UC Seismic Safety Policy and UC Facilities Manual Seismic Program Guidelines, which would reduce impacts related to geology and soils to less than significant levels. Section 4.7, *Geology and Soils*, also found impacts to paleontological resources to be less than significant with the implementation of mitigation measures related to paleontological resources monitoring and steps to be taken if a paleontological resource is uncovered during construction activities. These measures would apply to development under the Reduced Development Program Alternative as well. Overall impacts related to geology and soils under the Reduced Development Program Alternative would be **similar to** the proposed 2021 LRDP. *(Similar impact)*

Greenhouse Gas Emissions

With the reduction in the square footage of development under the Reduced Development Program Alternative compared to the proposed 2021 LRDP, construction-related emissions would decrease compared to those of the proposed 2021 LRDP. In addition, with a comparatively decreased student enrollment, the Reduced Development Program Alternative would result in less students needing to commute to the UCR campus compared to the proposed 2021 LRDP. However, as noted above, reduced UCR student population would simply relocate the demand for higher education to alternative campuses thereby relocating construction activities, operational activities, and vehicle trips to other locations. As such, the Reduced Development Program Alternative would result in decreased localized GHG emissions, including VMT and associated transportation-related (i.e., Scope 3) GHG emissions compared to the proposed 2021 LRDP. Therefore, construction and

operational localized GHG emissions impacts associated with the Reduced Development Program Alternative would be **less than** under the proposed 2021 LRDP, but would be **similar to** the proposed 2021 LRDP when accounting for displaced students. *(Less impact (locally)/Similar impact (regionally))*

Hazards and Hazardous Materials

The Reduced Development Program Alternative would result in 50 percent less net new building space compared to the proposed 2021 LRDP. This alternative, similar to the proposed 2021 LRDP, would be required to comply with federal and State regulations, as well as existing UCR policies, related to the routine transport, use, or disposal of hazardous materials and impacts would therefore be less than significant without mitigation requirements. Mandatory compliance with existing regulations pertaining to the identification, handling, and disposing of hazardous materials, along with the implementation of mitigation measures would ensure impacts from the accidental release of hazardous materials on or nearby campus, including within one-quarter mile of a school, would be less than significant. Section 4.9.3, Impact HAZ-4, of this EIR found that the UCR campus includes several closed, but listed UST release sites, and is located adjacent to a site with a restricted land use covenant. As a result, soil, soil vapor, and/or groundwater disturbance during construction could create a significant hazard to the public or the environment. Given the opportunity for contaminated soils to occur on the project site, project construction would potentially create a significant hazard to the public or the environment. Mitigation measures would be required to reduce the impact to less than significant for both the Reduced Development Program Alternative and the proposed 2021 LRDP. Therefore, overall, impacts related to hazards and hazardous materials under the Reduced Development Program Alternative would be **similar to** the proposed 2021 LRDP. *(Similar impact)*

Hydrology and Water Quality

Under the Reduced Development Program Alternative there would be a reduced amount of development, including grading and excavation work, and would likely result in a reduction of impermeable surfaces in comparison to the 2021 LRDP. Under the Reduced Development Program Alternative, construction and operation would occur in compliance with applicable water quality standards and waste discharge requirements. In accordance with regulations and policies, a SWPPP would be implemented during construction activities and a SWMP would be implemented during operations, to provide on-site construction and post-construction prevention, capture, and treatment of stormwater runoff, such that potential water quality impacts would be less than significant. Potential impacts to groundwater supplies and recharge would be less than significant. Development under this alternative would not alter the course of a stream or river and would not alter regional stormwater drainage patterns. Compliance with applicable regulations and policies, including implementation of a SWPPP during construction and a SWMP during operation, would provide sufficient on-site construction and post-construction prevention, capture, and treatment of stormwater runoff, and would minimize or avoid potentially adverse impacts such that they would be less than significant. Development under the Reduced Development Program Alternative would implement water quality BMPs in accordance with applicable requirements, reducing potential downstream water quality impacts to ensure no conflict with or obstruction of the implementation of the Water Quality Control Plan or a sustainable groundwater management plan. While there would be 50 percent less development as compared to the proposed 2021 LRDP, the same standard regulations would apply. Overall impacts related to hydrology and water quality under the Reduced Development Program Alternative would be **similar to** the proposed 2021 LRDP. *(Similar impact)*

Noise

The reduction in building square footage and reduced campus population and associated VMT under the Reduced Development Program Alternative, would decrease construction and operational (mechanical and vehicular) noise generation compared to the proposed 2021 LRDP. However, construction noise would still occur in proximity to sensitive receptors but the frequency of noise over time would be reduced compared to the proposed 2021 LRDP but would still be significant and unavoidable. Overall impacts related to Noise under the Reduced Development Program Alternative would be **less than** the proposed 2021 LRDP. *(Less impact)*

Population and Housing

The Reduced Development Program Alternative would result in a net increase in campus population that is 50 percent less than that proposed under the 2021 LRDP. The proposed 2021 LRDP would accommodate the anticipated regional population forecasts. Furthermore, the proposed 2021 LRDP does not include installation or extension of significant roads or infrastructure that would result in further population growth or housing needs. Direct and indirect impacts related to unplanned population growth would be less than significant. The proposed 2021 LRDP would not displace substantial numbers of existing people or housing, necessitating the construction of replacement housing and impacts would be less than significant. No mitigation measures are required. The Reduced Development Program Alternative would result in less localized development and fewer new people on the UCR campus compared to the proposed 2021 LRDP, but at an even ratio (50 percent less building square footage and 50 percent fewer net new campus population). Therefore, overall impacts related to Population and Housing under the Reduced Development Program Alternative would be **similar to** the proposed 2021 LRDP. *(Similar impact)*

Public Services

The proposed 2021 LRDP was determined not to result in significant environmental impacts associated with the need for the new or altered fire, police, school, or library facilities. As the Reduced Development Program Alternative represents a reduction in campus population by 50 percent, it is reasonable to assume that the localized demand for public services would be reduced under the Reduced Development Program Alternative. However, neither the proposed 2021 LRDP nor the Reduced Development Program Alternative would induce construction of new facilities which would result in significant environmental impacts and would therefore be **similar to** the proposed 2021 LRDP. Under both projects, impacts to Public Services would remain less than significant and no mitigation would be required. *(Similar impact)*

Recreation

Similar to the proposed 2021 LRDP, the Reduced Development Program Alternative would include most existing recreational facilities and parkland on the UCR campus and incrementally develop new recreational facilities and open spaces that would adequately serve the campus population. However, it is reasonable to assume that less recreational facilities would be developed under this alternative since UCR would be limited in its development potential compared to the proposed 2021 LRDP.

The Reduced Development Program Alternative would not likely increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of those facilities would occur or be accelerated, but increased use of area parks and

recreational facilities off-campus may be necessary if the development under this alternative is allocated to other UCR needs (i.e., academic space or student housing). Impacts related to increased use of parks and recreational facilities would still be less than significant, but possibly still present a greater impact than under the proposed 2021 LRDP. Under this alternative, less incremental new on-campus recreational facilities and open spaces would be developed, but the construction of new facilities may have an adverse physical effect on the environment similar to the proposed 2021 LRDP. Overall impacts related to Recreation under the Reduced Development Program Alternative would be **similar to or greater than** the proposed 2021 LRDP. *(Similar impact (locally)/Greater impact (regionally))*

Transportation

The Reduced Development Program Alternative would result in a net increase in campus population that is 50 percent less than that proposed under the 2021 LRDP. This would result in reduced localized VMT compared to the proposed 2021 LRDP, due to the reduction in localized commuter trips. However, as noted above, reduced UCR student population would simply relocate the demand for higher education to alternative campuses thereby relocating vehicle trips to other locations. Therefore, while localized transportation and traffic impacts would be less than significant for both this alternative and the 2021 LRDP, it would be similar to the proposed 2021 LRDP when accounting for displaced students.

Buildout of the campus under this alternative, including the designs of internal circulation, would comply with ADA and National Association of City Transportation Officials standards, as well as the Campus Construction and Design Standards, including those applicable to roads, parking facilities, and walkways or bicycle facilities and would not result in hazards due to geometric design features. Further, emergency access would not be adversely affected under this alternative. The Reduced Development Program Alternative would reduce the AM Peak Hour queueing at the I-215/SR 60 Freeway Southbound Ramps under Cumulative Plus Project conditions to less than significant levels. Overall, impacts related to transportation under the Reduced Development Program Alternative would be **less than** for localized transportation and traffic impacts but **similar to** the proposed 2021 LRDP when accounting for displaced students. (*Less impact (locally)/Similar impact (regionally)*)

Tribal Cultural Resources

As discussed in Section 4.16, *Tribal Cultural Resources*, the proposed 2021 LRDP has the potential to impact cultural resources of potential Native American origin. Where development occurs in the southeastern quadrant of campus and in areas containing Val Verde Pluton geologic features considered highly sensitive to prehistoric archaeological resources, mitigation would be required for a qualified archaeologist and a Native American monitor to reduce impacts to potential archaeological and/or TCR to less than significant levels. No significant amount of facilities development is currently proposed in the TCR sensitive regions in the southeastern portions of the UCR campus under the proposed 2021 LRDP or the Reduced Development Program Alternative. Nevertheless, the potential to encounter previously unknown resources would still exist. Impacts to TCR would be less than significant with mitigation, which would be **similar to** the proposed 2021 LRDP. *(Similar impact)*

Utilities and Service Systems

The proposed 2021 LRDP was determined not to result in significant environmental impacts associated with utilities and service systems with adherence to existing regulations, UCR policies,

and BMPs; no mitigation measures would be required. As the Reduced Development Program Alternative represents a reduction in campus population by 50 percent, it is reasonable to assume that the impacts from the Reduced Development Program Alternative would be **less than** the proposed 2021 LRDP, although under both projects, impacts to Utilities and Service Systems would remain less than significant and no mitigation would be required. *(Less Impact)*

Wildfire

Similar to the proposed 2021 LRDP, implementation of the Reduced Development Program Alternative could result in temporary lane or roadway closures on the edges of campus and within the campus circulation system during construction activities. With inclusion of a construction management plan as a standard condition of approval, construction impacts related to transportation concerns would be less than significant. In support of these standard practices, UCR has proposed Continuing Best Practices as conditions of individual project approval that would ensure, to the extent feasible, that at least one unobstructed lane in both directions on campus roadways are maintained specifically in the event of a wildfire emergency and that the Campus Fire Marshal discloses roadway closures to the City of Riverside Fire Department and identify alternative travel routes, if necessary. As such, evacuation routes, if present within the specific roadway segment that would require temporary closure as noted above, would be similarly rerouted.

Operation of new facilities would not substantially impair an adopted emergency response or evacuation plan. This alternative would still increase the density of development on campus, albeit to a lesser extent, and new buildings and infrastructure would be constructed according to the latest fire code and safety standards. New construction could be in areas within 2 miles of Very High FHSZs under this alternative, similar to the proposed 2021 LRDP. Although the campus population would increase by fewer people compared to the proposed 2021 LRDP, people living, working, and attending class in these areas could be exposed to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire. New or updated infrastructure would be concentrated in previously developed portions of campus, and any new utilities would be installed in compliance with existing regulations and would not contribute to increased fire risk. Impacts related to Wildfire under the Reduced Development Program Alternative would be **similar to** the proposed 2021 LRDP. *(Similar impact)*

Summary of Alternative 2 (Reduced Development Program)

The Reduced Development Program Alternative would limit future enrollment growth on the campus as well as developed academic square footage, compared to the proposed 2021 LRDP. For this reason, it would only partially achieve the underlying purpose of the proposed 2021 LRDP to support a projected enrollment growth based on current student enrollment, regional growth trends, and agreements between the UC and the State regarding resident student and transfer student enrollment objectives.

This alternative would result in slightly less/less impacts to multiple environmental areas of concern, including biological resources, energy consumption, GHG emissions, noise, transportation, and utilities and service systems compared to the proposed 2021 LRDP. Impacts to aesthetics, agricultural resources, air quality, cultural resources, energy consumption, geology and soils, GHG emissions, hazards and hazardous materials, hydrology and water quality, population and housing, public services, recreation, transportation, TCR, and wildfire would be similar compared to the proposed LRDP. Impacts to recreation could be slightly greater than compared to the proposed 2021 LRDP.

This alternative would not develop the net new building space needed to accommodate projected student housing or academic and research facilities needs projections based on current student enrollment, regional growth trends, and agreements between the UC and the State of California regarding resident student and transfer student enrollment objectives. Furthermore, it is logical to assume the restriction of student and facility growth at UCR would result in required growth at other UC and university/college campuses throughout California, which could result in regional or localized impacts at those campuses.

6.5.3 Alternative 3: Increased Student Housing

This alternative would not alter the components of the proposed 2021 LRDP, but rather would increase the student bed capacity to provide housing for 60 percent of the eligible student body capacity rather than 40 percent under the proposed 2021 LRDP. This would result in a doubling of the proposed new campus beds, which would represent a net increase of approximately 14,978 new campus beds, rather than 7,489 under the proposed 2021 LRDP. Under Alternative 3, the total campus bed count in academic year 2035/2036 would be approximately 21,500 rather than 14,000.

Under Alternative 3, net new development would still total up to 3.7 million asf (5.5 million gsf), with a maximum buildout of approximately 8.5 million asf (approximately 12.7 million gsf). It is reasonable to assume that more of the developable square footage would be used for student housing under this alternative rather than student support, academic, or recreation space. The net new student enrollment for academic year 2035/2036 would be planned for 10,000 new students (35,000 total students). Net new faculty and staff projections for academic year 2035/2036 would be approximately 2,800 new employees (7,545 total employees). Under Alternative 3, the campus population in academic year 2035/2036 would be approximately 42,545.

Aesthetics

The Increased Student Housing Alternative would increase the student bed capacity to provide housing for 60 percent of the eligible student body capacity rather than 40 percent compared to the proposed 2021 LRDP. Net new square footage under this alternative would still total up to 5.5 million gsf, as it does under the proposed 2021 LRDP. As discussed in Section 4.1, *Aesthetics*, the proposed 2021 LRDP would have a significant and unavoidable impact to scenic vistas, specifically related to the Box Springs Mountains. All other impacts related to aesthetics would be less than significant or less than significant with mitigation incorporated. Therefore, the Increased Student Housing Alternative would be **similar to** the proposed 2021 LRDP and impacts to scenic vistas would remain significant and avoidable. *(Similar impact)*

Agricultural Resources

The Increased Student Housing Alternative would increase the allocation of total projected building square footage to student housing facilities rather than other land uses compared to the proposed 2021 LRDP. As discussed in Section 4.2, *Agricultural Resources*, the proposed 2021 LRDP would have a significant and unavoidable impact to Prime Farmland. Implementation of the Increased Student Housing Alternative could result in a reduced impact to agricultural resources as West Campus would be primarily reserved for land-based research and student housing would be focused on the northern portions of East Campus, similar to that under the proposed 2021 LRDP. However, consistent with past LRDP EIRs, the establishment of the CVARS as mitigation for impacts to Farmland does not fully offset the net reduction in farmland in the region as no new farmlands were being created in the vicinity of the campus. Therefore, impacts to agricultural resources under the

Increased Student Housing Alternative would be **similar to** those under the proposed 2021 LRDP, and impacts to agricultural resources would remain significant and avoidable. *(Similar impact)*

Air Quality

Net new campus population and total building square footage under the Increased Student Housing Alternative would result in similar emissions of the criteria pollutants associated with short-term construction and long-term operation compared to proposed 2021 LRDP, and impacts would still be significant and unavoidable. Because this alternative would result in more on-campus housing opportunities as compared to the proposed 2021 LRDP, overall traffic and VMT would be reduced. Therefore, impacts related to air quality under the Increased Student Housing Alternative would be generally **less than** those under the proposed 2021 LRDP, although impacts related to criteria pollutants would remain significant and avoidable. *(Less impact)*

Biological Resources

Impact under the Increased Student Housing Alternative would be similar to those for the proposed 2021 LRDP since this alternative would maintain the same net new building space. Under this alternative, the land use designations would remain, including clustering of student housing, and impacts would be similar to that under the proposed 2021 LRDP. In addition, there would be no planned or foreseeable development within the Open Space Reserve areas under the Increased Student Housing Alternative. Thus, impacts under the Increased Student Housing Alternative would be **similar to** the proposed 2021 LRDP. *(Similar impact)*

Cultural Resources

As discussed in Section 4.5, *Cultural Resources*, there are 38 qualifying historical resources on UCR's campus. Among these 38 resources is one eligible historic district (the Mid-Century Modern Core Historic District, with 15 contributing buildings and associated site plan features, circulation corridors, and landscapes), and one cultural landscape (the Citrus Variety Collection Cultural Landscape, with 11 contributing buildings and ancillary structures and associated agricultural fields). Appendix E includes the complete evaluations of each eligible historical resource. Impacts to historic resources would be comparable under the Increased Student Housing Alternative, as the net new square footage would not reduce the potential for impacts to historic buildings compared to the proposed 2021 LRDP, and impacts would therefore remain significant and unavoidable.

With respect to archaeological resources, development anticipated under the Increased Student Housing Alternative would be similar to the proposed 2021 LRDP and the potential to encounter previously unknown resources would still exist. Impacts would be less than significant with mitigation, which would be **similar to** the proposed 2021 LRDP. *(Similar impact)*

Energy

With no change in the square footage of development under the Increased Student Housing Alternative compared to the proposed 2021 LRDP, construction-related non-renewable energy consumption (i.e., fuel) would be similar compared to those of the proposed 2021 LRDP. However, with an increase in student housing to accommodate a greater percentage of students in on-campus housing, the Increased Student Housing Alternative would result in less students needing to commute to campus compared to the proposed 2021 LRDP. As such, the Increased Student Housing Alternative would result in decreased VMT and associated transportation-related energy (i.e., fuel) consumption compared to the proposed 2021 LRDP. Therefore, construction energy impacts

associated with the Increased Student Housing Alternative would be **similar to** the proposed 2021 LRDP, and operational energy impacts (reduced VMT) associated with the Increased Student Housing Alternative would be **less than** under the proposed 2021 LRDP.

As described in Section 4.6, Energy, the proposed 2021 LRDP would result in an increase in operational energy, including non-renewable energy consumption due to provision of additional land uses, additional VMT, and accommodation of additional student enrollment. The Increased Student Housing alternative would include similar facilities as that of the proposed 2021 LRDP and because facilities operation constitutes the largest consumption of energy, including non-renewable energy, at the UCR campus, the Increased Student Housing Alternative would result in similar overall operational energy consumption compared to the proposed 2021 LRDP. Impacts would be **similar to** the proposed 2021 LRDP. *(Less impact (fuel consumption)/Similar impact (other energy consumption))*

Geology and Soils

The Increased Student Housing Alternative would result in the same net new building square footage compared to the proposed 2021 LRDP. Both the Increased Student Housing Alternative and the proposed 2021 LRDP would be required to comply with CBC building requirements, as well as the UC Seismic Safety Policy and UC Facilities Manual Seismic Program Guidelines, which would reduce impacts related to geology and soils to less than significant levels. Section 4.7, *Geology and Soils*, also found impacts to paleontological resources to be less than significant with the implementation of mitigation measures related to paleontological resources monitoring and steps to be taken if a paleontological resource is uncovered during construction activities. These measures would apply to development under the Increased Student Housing Alternative as well. Overall impacts related to geology and soils under the Increased Student Housing Alternative would be **similar to** the proposed 2021 LRDP. *(Similar impact)*

Greenhouse Gas Emissions

With no change in the square footage of development under the Increased Student Housing Alternative compared to the proposed 2021 LRDP, construction-related emissions would be similar compared to those of the proposed 2021 LRDP. However, with an increase in student housing to accommodate a greater percentage of students in on-campus housing, the Increased Student Housing Alternative would result in less students needing to commute to campus compared to the proposed 2021 LRDP. As such the Increased Student Housing Alternative would result in decreased VMT and associated transportation-related (i.e., Scope 3) GHG emissions compared to the proposed 2021 LRDP. Therefore, construction GHG emissions impacts associated with the Increased Student Housing Alternative would be **similar to** the proposed 2021 LRDP, and operational GHG emissions impacts (reduced VMT) associated with the Increased Student Housing Alternative would be **less than** under the proposed 2021 LRDP.

As described in Section 4.8, *Greenhouse Gas Emissions*, the proposed 2021 LRDP would result in an increase in operational GHG emissions due to provision of additional land uses, VMT, and accommodation of additional student enrollment. The Increased Student Housing Alternative would not eliminate GHG emissions and a similar amount of facilities would be developed under the Increased Student Housing Alternative. Since facilities energy-related (i.e., Scope 2) GHG emission are the largest contributor of UCR GHG Emissions, the Increased Student Housing Alternative would result in similar overall operational GHG emissions compared to the proposed 2021 LRDP. Because the Increased Student Housing Alternative would generate similar overall operational GHG

emissions, impacts would be **similar to** the proposed 2021 LRDP. *(Less impact (Scope 3)/Similar impact (Scopes 1 and 2))*

Hazards and Hazardous Materials

The Increased Student Housing Alternative would result in the same net new building space and campus population compared to the proposed 2021 LRDP. This alternative, similar to the proposed 2021 LRDP, would be required to comply with federal and State regulations, as well as existing UCR policies, related to the routine transport, use, or disposal of hazardous materials and impacts would therefore be less than significant without mitigation requirements. Mandatory compliance with existing regulations pertaining to the identification, handling, and disposing of hazardous materials, along with the implementation of mitigation measures would ensure impacts from the accidental release of hazardous materials on or nearby campus, including within one-quarter mile of a school, would be less than significant. Section 4.9.3, Impact HAZ-4, of this EIR found that the UCR campus includes several closed, but listed UST release sites, and is located adjacent to a site with a restricted land use covenant. As a result, soil, soil vapor, and/or groundwater disturbance during construction could create a significant hazard to the public or the environment. Given the opportunity for contaminated soils to occur on the project site, project construction would potentially create a significant hazard to the public or the environment. Mitigation measures would be required to reduce the impact to less than significant for both the Increased Student Housing Alternative and the proposed 2021 LRDP. Therefore, overall, impacts related to hazards and hazardous materials under the Increased Student Housing Alternative would be **similar to** the proposed 2021 LRDP. *(Similar impact)*

Hydrology and Water Quality

Under the Increased Student Housing Alternative, construction and operation would occur in compliance with applicable water quality standards and waste discharge requirements. In accordance with regulations and policies, a SWPPP would be implemented during construction activities and a SWMP would be implemented during operations, to provide on-site construction and post-construction prevention, capture, and treatment of stormwater runoff, such that potential water quality impacts would be less than significant. Potential impacts to groundwater supplies and recharge would be less than significant. Similar to the proposed 2021 LRDP, development under this alternative would not alter the course of a stream or river and would not alter regional stormwater drainage patterns. Compliance with applicable regulations and policies, including implementation of a SWPPP during construction and a SWMP during operation, would provide sufficient on-site construction and post-construction prevention, capture, and treatment of stormwater runoff, and would minimize or avoid potentially adverse impacts such that they would be less than significant. Development under the Increased Student Housing Alternative would implement water quality BMPs in accordance with applicable requirements, reducing potential downstream water quality impacts to ensure no conflict with or obstruction of the implementation of the Water Quality Control Plan or a sustainable groundwater management plan. The same standard regulations would apply to this alternative compared to the proposed 2021 LRDP. Overall impacts related to hydrology and water quality under the Increased Student Housing Alternative would be **similar to** the proposed 2021 LRDP. *(Similar impact)*

Noise

The net new building square footage and campus population would be the same compared to the proposed 2021 LRDP. However, the Increased Student Housing Alternative would result in a reduction in traffic noise levels due to the reduction in trips generated by the reduced number of student commuters as compared to the proposed 2021 LRDP, and an increase in noise from on-campus residents would be minor. However, with the increase in students living on-campus over time, there would be incremental increases in potential impacts to sensitive receivers. Overall impacts related to Noise under the Increased Student Housing Alternative would be slightly **greater than** the proposed 2021 LRDP. *(Greater impact)*

Population and Housing

The proposed 2021 LRDP would accommodate the anticipated regional population forecasts. Furthermore, the proposed 2021 LRDP does not include installation or extension of significant roads or infrastructure that would result in further population growth or housing needs. Direct and indirect impacts related to unplanned population growth would be less than significant. The proposed 2021 LRDP would not displace substantial numbers of existing people or housing, necessitating the construction of replacement housing and impacts would be less than significant. The Increased Student Housing Alternative would be the same net new campus population as compared to the proposed 2021 LRDP, but would accommodate more students on-campus, thereby reducing off-campus housing demands and population growth in surrounding communities. Therefore, overall impacts related to Population and Housing would remain less than significant under either scenario; impacts under the Increased Student Housing Alternative would be **less than** the proposed 2021 LRDP. *(Less Impact)*

Public Services

The proposed 2021 LRDP was determined not to result in significant environmental impacts associated with the need for the new or altered fire, police, school, or library facilities. The Increased Student Housing Alternative would double the number of student beds, accommodating up to 60 percent of eligible students. Under this alternative, there would be an increased, localized demand on public services. However, since the total net increase in campus population and total net new development square footage would remain the same compared to the propose 2021 LRDP, it is reasonable to assume that the impacts from the Increased Student Housing Alternative would be **similar to** the proposed 2021 LRDP. *(Similar Impact)*

Recreation

Similar to proposed 2021 LRDP, the Increased Student Housing Alternative would incrementally develop new recreational facilities and open spaces that would adequately serve the campus population. As discussed in Section 4.14, *Recreation*, while campus population growth assumed under the proposed 2021 LRDP would likely increase the use of existing campus parks or other recreational facilities, regular maintenance of such facilities under established parks and recreation programs, increased funding, and increased recreational space would avoid the potential for substantial physical deterioration. Pursuant to the UCOP Facilities Manual, the UCR construction and maintenance policy outlines procedures for preventative maintenance, general replacement and repair, electrical repairs, ventilation, plumbing, painting, and furniture/cabinetry work.

In addition, UCR tuition fees would include a recreation center fee and recreation center expansion fee, which would provide increased funding for maintenance and operational expenses associated with increased student enrollment and the use of recreation center. Therefore, since regular maintenance of existing recreational facilities would continue to occur, substantial physical deterioration of on-campus recreational facilities is not anticipated, and impacts would be less than significant. Further, it was determined the proposed 2021 LRDP would not result in substantial physical deterioration or accelerate the physical deterioration of existing off-campus parkland, community centers, or bicycle or trail networks, and impacts would be less than significant**.** Since the total net increase in campus population would remain the same compared to the propose 2021 LRDP, it is reasonable to assume that the impacts to recreational facilities from the Increased Student Housing Alternative would be **similar to** the proposed 2021 LRDP. *(Similar Impact)*

Transportation

The addition of 7,489 more beds (for a total of approximately 21,500 beds) on campus under this alternative would result in reduced VMT compared to the proposed 2021 LRDP, due to the reduction in student commuter trips. Therefore, while VMT impacts would be less than significant for both this alternative and the 2021 LRDP, buildout under the Increased Student Housing Alternative would result in fewer vehicle miles traveled and transportation/traffic impacts would be **less than** the proposed 2021 LRDP.

Buildout of the campus under this alternative, including the designs of internal circulation, would comply with ADA and National Association of City Transportation Officials standards, as well as the Campus Construction and Design Standards, including those applicable to roads, parking facilities, and walkways or bicycle facilities and would not result in hazards due to geometric design features. Further, emergency access would not be adversely affected under the Increased Student Beds Alternative. Finally, the Increased Student Housing Alternative would reduce the number of students commuting to campus thereby reducing AM Peak Hour queueing impacts at the I-215/SR 60 Freeway Southbound Ramps under Cumulative Plus Project conditions. Overall, impacts related to transportation under the Increased Student Housing Alternative would be **less than** the proposed 2021 LRDP. (*Less impact*)

Tribal Cultural Resources

As discussed in Section 4.16, *Tribal Cultural Resources*, the proposed 2021 LRDP has the potential to impact cultural resources of potential Native American origin. Where development occurs in the southeastern quadrant of campus and in areas containing Val Verde Pluton geologic features considered highly sensitive to prehistoric archaeological resources, mitigation would be required for a qualified archaeologist and a Native American monitor to reduce impacts to potential archaeological and/or TCR to less than significant levels. The Increased Student Housing Alternative would result in the same net new square footage compared to the proposed 2021 LRDP and the potential to encounter previously unknown resources would still exist. Impacts to TCR would be less than significant with mitigation, which would be **similar to** the proposed 2021 LRDP. *(Similar impact)*

Utilities and Service Systems

The increase in student residential square footage under the Increased Student Housing Alternative would incrementally increase demand for public utilities, including water supply and conveyance, wastewater conveyance and treatment, and solid waste disposal services, compared to the proposed 2021 LRDP. Impacts related to Utilities and Service Systems under the Increased Student

Housing Alternative would be **greater than** the proposed 2021 LRDP although they would remain less than significant, as was concluded for proposed 2021 LRDP. (*Greater impact*)

Wildfire

Similar to the proposed 2021 LRDP, implementation of the Increased Student Housing Alternative could result in temporary lane or roadway closures on the edges of campus and within the campus circulation system during construction activities. Operation of new facilities would not substantially impair an adopted emergency response or evacuation plan. This alternative would still increase the density of development on campus, albeit to a lesser extent, and new buildings and infrastructure would be constructed according to the latest fire code and safety standards. New construction could be in areas within 2 miles of Very High FHSZs under this alternative, similar to the proposed 2021 LRDP. Net new campus population would be the same compared to the proposed 2021 LRDP, and people living, working, and attending class in these areas could be exposed to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire. New or updated infrastructure would be concentrated in previously developed portions of campus, and any new utilities would be installed in compliance with existing regulations and would not contribute to increased fire risk. Impacts related to wildfire under the Increased Student Housing Alternative would be **similar to** the proposed 2021 LRDP. *(Similar impact)*

Summary of Alternative 3 (Increased Student Housing)

The Increased Student Housing Alternative would increase the student bed capacity to provide housing for 60 percent of the eligible student body capacity rather than 40 percent compared to the proposed 2021 LRDP. Net new campus population and square footage under this alternative would be the same as the proposed 2021 LRDP.

This alternative would result in less impacts to air quality, fuel consumption, GHG emissions from Scope 3 sources, population and housing, and transportation compared to the proposed 2021 LRDP. Impacts to aesthetics, agricultural resources, biological resources, cultural resources, energy consumption, geology and soils, GHG emissions from Scope 1 and Scope 2 sources, hazards and hazardous materials, hydrology and water quality, public services, recreation, TCR, and wildfire would be similar compared to the proposed LRDP. Impacts to noise and utilities and service systems could be greater than compared to the proposed 2021 LRDP.

6.5.4 Alternative 4: No Agricultural Land Development

This alternative would maintain prime agricultural lands for land-based research. Under the proposed 2021 LRDP, there are nearly 394 acres of prime agricultural lands (i.e., State-designated Prime Farmland, Unique Farmland, or Farmland of Statewide Importance) located on West Campus in areas designated as Agricultural/Campus Research or Land-based Research. There are approximately 12.2 acres of prime agricultural land on East Campus concentrated near the eastern campus boundary at the USDA Salinity Laboratory. Under Alternative 4, all prime agricultural lands on West Campus and East Campus would be designated for land-based research opportunities or remain as open space. More specifically, the 2021 LRDP designations for Agricultural/Campus Research, Student Neighborhood, and the agricultural portions of the “Campus Support” would be designated with “Land-based Research” designations.

Under Alternative 4, net new development would still total up to 3.7 million asf (5.5 million gsf), with a maximum buildout of approximately 8.5 million asf (approximately 12.7 million gsf), and the net new student enrollment for academic year 2035/2036 would be planned for 10,000 new

students (35,000 total students). Net new faculty and staff projections for academic year 2035/2036 would be approximately 2,800 new employees (7,545 total employees). Under Alternative 4, the campus population in academic year 2035/2036 would be approximately 42,545.

Aesthetics

The No Agricultural Land Development Alternative would maintain approximately 406 acres of prime agricultural land for land-based research only, compared to the proposed 2021 LRDP. As discussed in Section 4.1, *Aesthetics*, the proposed 2021 LRDP would have a significant and unavoidable impact to scenic vistas, specifically related to the Box Springs Mountains. All other impacts related to aesthetics would be less than significant or less than significant with mitigation incorporated. Implementation of the No Agricultural Land Development Alternative would result in no net new building square footage on West Campus and it is reasonable to assume impacts to aesthetic resources would be reduced compared to the proposed 2021 LRDP. However, total net new square footage under this alternative would still be up to 5.5. million gsf. Since the potential locations, height, and massing of new buildings under the No Agricultural Land Development Program Alternative would be similar in nature to those permitted under the proposed 2021 LRDP, impacts to scenic vistas would remain significant and avoidable. In addition, the loss of land to development in West Campus would result in more condensed development in the campus core on East Campus. Overall impacts related to aesthetics under the No Agricultural Land Development Alternative would be **similar to** the proposed 2021 LRDP. *(Similar impact)*

Agricultural Resources

This alternative would maintain prime agricultural lands for land-based research. Under the proposed 2021 LRDP, there are nearly 394 acres of prime agricultural lands (i.e., State-designated Prime Farmland, Unique Farmland, or Farmland of Statewide Importance) located on West Campus in areas designated as Agricultural/Campus Research or Land-based Research. There are approximately 12.2 acres of prime agricultural land on East Campus concentrated near the eastern campus boundary at the USDA Salinity Laboratory. Under the No Agricultural Land Development Alternative, all prime agricultural lands on West Campus and East Campus would be designated for land-based research opportunities or remain as open space. Again, similar to the proposed 2021 LRDP, this alternative would impact fewer acres of Farmland than previous UCR LRDPs. However, while the No Agricultural Land Development Alternative would reduce the amount of agricultural acreage taken out of production, it would also interfere with agricultural research. Development on West Campus on agricultural land is proposed under the 2021 LRDP to include land use designations for Agricultural/Campus Research and Land-based Research. These designations and secondary uses are designed to provide support facilities for agricultural research.

Nevertheless, implementation of this alternative would reduce land taken out of agricultural production, and therefore impacts would be **less than** compared to the proposed 2021 LRDP. (*Less impact*)

Air Quality

Under the No Agricultural Land Development Alternative, net new development would still total up to 3.7 million asf (5.5 million gsf), with a maximum buildout of approximately 8.5 million asf (approximately 12.7 million gsf), and the net new student enrollment for academic year 2035/2036 would be planned for 10,000 new students (35,000 total students). Net new faculty and staff projections for academic year 2035/2036 would be approximately 2,800 new employees (7,545

total employees). Under this alternative, the campus population in academic year 2035/2036 would still be approximately 42,545. Air quality impacts would be **similar to** the proposed 2021 LRDP as campus population and facility growth would remain the same. *(Similar impact)*

Biological Resources

Impact under the No Agricultural Land Development Alternative would be similar to those for the proposed 2021 LRDP since this alternative would maintain the same net new building space, simply concentrated on East Campus. In addition, there are currently no planned or foreseeable development within the Open Space Reserve areas and that would still be the case under this alternative. Thus, impacts under the No Agricultural Land Development Alternative would be **similar to** the proposed 2021 LRDP. *(Similar impact)*

Cultural Resources

As discussed in Section 4.5, *Cultural Resources*, there are 38 qualifying historical resources on UCR's campus. Among these 38 resources is one eligible historic district (the Mid-Century Modern Core Historic District, with 15 contributing buildings and associated site plan features, circulation corridors, and landscapes), and one cultural landscape (the Citrus Variety Collection Cultural Landscape, with 11 contributing buildings and ancillary structures and associated agricultural fields). Appendix E includes the complete evaluations of each eligible historical resource. Impacts to historic resources would be comparable under the No Agricultural Land Development Alternative, as the net new square footage would not reduce the potential for impacts to historic buildings compared to the proposed 2021 LRDP, and impacts would therefore remain significant and unavoidable.

With respect to archaeological resources, development anticipated under the No Agricultural Land Development Alternative would be similar to the proposed 2021 LRDP and the potential to encounter previously unknown resources would still exist. Impacts would be less than significant with mitigation, which would be **similar to** the proposed 2021 LRDP. *(Similar impact)*

Energy

With no change in the square footage of development under the No Agricultural Land Development Alternative compared to the proposed 2021 LRDP, construction-related energy (i.e., fuel) consumption would be similar compared to those of the proposed 2021 LRDP. In addition, the No Agricultural Land Development Alternative would result in a similar amount of students needing to commute to campus compared to the proposed 2021 LRDP. As such, the No Agricultural Land Development Alternative would result in similar VMT and associated transportation-related energy (i.e., fuel) consumption compared to the proposed 2021 LRDP. Therefore, construction and operational GHG emissions impacts associated with the No Agricultural Land Development Alternative would be **similar to** the proposed 2021 LRDP.

As described in Section 4.6, Energy, the proposed 2021 LRDP would result in an increase in operational energy, including non-renewable energy, consumption due to provision of additional land uses, additional VMT, and accommodation of additional student enrollment. The No Agricultural Land Development alternative would include similar facilities as that of the proposed 2021 LRDP and because facilities operation constitutes the largest consumption of energy, including non-renewable energy, the No Agricultural Land Development Alternative would result in similar overall operational energy, including non-renewable energy, consumption compared to the proposed 2021 LRDP. Impacts would be **similar to** the proposed 2021 LRDP. *(Similar impact)*

Geology and Soils

The No Agricultural Land Development Alternative would result in the same net new building square footage compared to the proposed 2021 LRDP. Both the No Agricultural Land Development Alternative and the proposed 2021 LRDP would be required to comply with CBC building requirements, as well as the UC Seismic Safety Policy and UC Facilities Manual Seismic Program Guidelines, which would reduce impacts related to geology and soils to less than significant levels. Section 4.7, *Geology and Soils*, also found impacts to paleontological resources to be less than significant with the implementation of mitigation measures related to paleontological resources monitoring and steps to be taken if a paleontological resource is uncovered during construction activities. These measures would apply to development under the No Agricultural Land Development Alternative as well. Overall impacts related to geology and soils under the I No Agricultural Land Development Alternative would be **similar to** the proposed 2021 LRDP. *(Similar impact)*

Greenhouse Gas Emissions

With no change in the square footage of development under the No Agricultural Land Development Alternative compared to the proposed 2021 LRDP, construction-related emissions would be similar compared to those of the proposed 2021 LRDP. In addition, the No Agricultural Land Development Alternative would result in a similar amount of students needing to commute to campus compared to the proposed 2021 LRDP. As such, the No Agricultural Land Development Alternative would result in similar VMT and associated transportation-related (i.e., Scope 3) GHG emissions compared to the proposed 2021 LRDP. Therefore, construction and operational GHG emissions impacts associated with the No Agricultural Land Development Alternative would be **similar to** the proposed 2021 LRDP.

As described in Section 4.8, *Greenhouse Gas Emissions*, the proposed 2021 LRDP would result in an increase in operational GHG emissions due to provision of additional land uses, VMT, and accommodation of additional student enrollment. The No Agricultural Land Development Alternative would not eliminate GHG emissions and a similar amount of facilities would be developed under the No Agricultural Land Development Alternative. Since facilities energy-related (i.e., Scope 2) GHG emission are the largest contributor of UCR GHG Emissions, the No Agricultural Land Development Alternative would result in similar overall operational GHG emissions compared to the proposed 2021 LRDP. Because the No Agricultural Land Development Alternative would generate similar overall operational GHG emissions, impacts would be **similar to** the proposed 2021 LRDP. *(Similar impact)*

Hazards and Hazardous Materials

The No Agricultural Land Development Alternative would result in the same net new building space and campus population compared to the proposed 2021 LRDP. This alternative, similar to the proposed 2021 LRDP, would be required to comply with federal and State regulations, as well as existing UCR policies, related to the routine transport, use, or disposal of hazardous materials and impacts would therefore be less than significant without mitigation requirements. Mandatory compliance with existing regulations pertaining to the identification, handling, and disposing of hazardous materials, along with the implementation of mitigation measures would ensure impacts from the accidental release of hazardous materials on or nearby campus, including within one-quarter mile of a school, would be less than significant.

Section 4.9.3, Impact HAZ-4, of this EIR found that the UCR West Campus includes a site with a restricted land use covenant. Implementation of this alternative would reduce potential impacts related to hazardous materials at this restricted site. Mitigation measures generally would be required to reduce the impact to less than significant for both the No Agricultural Land Development Alternative and the proposed 2021 LRDP. Therefore, overall, impacts related to hazards and hazardous materials under the No Agricultural Land Development Alternative would be **similar to** the proposed 2021 LRDP. *(Similar impact)*

Hydrology and Water Quality

Under the No Agricultural Land Development Alternative, construction and operation would occur in compliance with applicable water quality standards and waste discharge requirements. In accordance with regulations and policies, a SWPPP would be implemented during construction activities and a SWMP would be implemented during operations, to provide on-site construction and post-construction prevention, capture, and treatment of stormwater runoff, such that potential water quality impacts would be less than significant. Potential impacts to groundwater supplies and recharge would be less than significant. Similar to the proposed 2021 LRDP, development under this alternative would not alter the course of a stream or river and would not alter regional stormwater drainage patterns. Compliance with applicable regulations and policies, including implementation of a SWPPP during construction and a SWMP during operation, would provide sufficient on-site construction and post-construction prevention, capture, and treatment of stormwater runoff, and would minimize or avoid potentially adverse impacts such that they would be less than significant. Development under the No Agricultural Land Development Alternative would implement water quality BMPs in accordance with applicable requirements, reducing potential downstream water quality impacts to ensure no conflict with or obstruction of the implementation of the Water Quality Control Plan or a sustainable groundwater management plan. The same standard regulations would apply to this alternative compared to the proposed 2021 LRDP. Overall impacts related to hydrology and water quality under the No Agricultural Land Development Alternative would be **similar to** the proposed 2021 LRDP. *(Similar impact)*

Noise

The net new building square footage and campus population would be the same compared to the proposed 2021 LRDP. However, the No Agricultural Land Development Alternative would result in a greater concentration of net new campus facilities located on East Campus and an increase in operational noise associated with stationary (building mechanical) operation. With the increase in campus population growth over time and the concentration of that growth on East Campus, there would be incremental increases in potential impacts to sensitive receivers. Overall impacts related to Noise under the No Agricultural Land Development Alternative would be **slightly greater than** the proposed 2021 LRDP. *(Slightly greater impact)*

Population and Housing

Under the No Agricultural Land Development Alternative, net new development would still total up to 3.7 million asf (5.5 million gsf), with a maximum buildout of approximately 8.5 million asf (approximately 12.7 million gsf), and the net new student enrollment for academic year 2035/2036 would be planned for 10,000 new students (35,000 total students). Net new faculty and staff projections for academic year 2035/2036 would be approximately 2,800 new employees (7,545 total employees). Under this alternative, the campus population in academic year 2035/2036 would

still be approximately 42,545. Population and housing impacts would be **similar to** the proposed 2021 LRDP as campus population and facility growth would remain the same. *(Similar impact)*

Public Services

Under the No Agricultural Land Development Alternative, net new development would still total up to 3.7 million asf (5.5 million gsf), with a maximum buildout of approximately 8.5 million asf (approximately 12.7 million gsf), and the net new student enrollment for academic year 2035/2036 would be planned for 10,000 new students (35,000 total students). Net new faculty and staff projections for academic year 2035/2036 would be approximately 2,800 new employees (7,545 total employees). Under this alternative, the campus population in academic year 2035/2036 would still be approximately 42,545. Public services impacts would be **similar to** the proposed 2021 LRDP as campus population and facility growth would remain the same. *(Similar impact)*

Recreation

Under the No Agricultural Land Development Alternative, net new development would still total up to 3.7 million asf (5.5 million gsf), with a maximum buildout of approximately 8.5 million asf (approximately 12.7 million gsf), and the net new student enrollment for academic year 2035/2036 would be planned for 10,000 new students (35,000 total students). Net new faculty and staff projections for academic year 2035/2036 would be approximately 2,800 new employees (7,545 total employees). Under this alternative, the campus population in academic year 2035/2036 would still be approximately 42,545. Recreation impacts would be **similar to** the proposed 2021 LRDP as campus population and facility growth would remain the same. *(Similar impact)*

Transportation

Under the No Agricultural Land Development Alternative, net new development would still total up to 5.5 million gsf, with a maximum buildout of approximately 8.5 million asf (approximately 12.7 million gsf), and the campus population in academic year 2035/2036 would still be approximately 42,545. Transportation and traffic impacts would be less than significant for both this alternative and the 2021 LRDP. Buildout of the campus under this alternative, including the designs of internal circulation, would comply with ADA and National Association of City Transportation Officials standards, as well as the Campus Construction and Design Standards, including those applicable to roads, parking facilities, and walkways or bicycle facilities and would not result in hazards due to geometric design features. Further, emergency access would not be adversely affected under this alternative. Overall, impacts related to transportation under the No Agricultural Land Development Alternative would be **similar to** the proposed 2021 LRDP. (*Similar impact*)

Tribal Cultural Resources

As discussed in Section 4.16, *Tribal Cultural Resources*, the proposed 2021 LRDP has the potential to impact cultural resources of potential Native American origin. Where development occurs in the southeastern quadrant of campus and in areas containing Val Verde Pluton geologic features considered highly sensitive to prehistoric archaeological resources, mitigation would be required for a qualified archaeologist and a Native American monitor to reduce impacts to potential archaeological and/or TCR to less than significant levels. The No Agricultural Land Development Alternative would result in the same net new square footage compared to the proposed 2021 LRDP and the potential to encounter previously unknown resources would still exist. Impacts to TCR

would be less than significant with mitigation, which would be **similar to** the proposed 2021 LRDP. *(Similar impact)*

Utilities and Service Systems

Under the No Agricultural Land Development Alternative, net new development would still total up to 3.7 million asf (5.5 million gsf), with a maximum buildout of approximately 8.5 million asf (approximately 12.7 million gsf), and the net new student enrollment for academic year 2035/2036 would be planned for 10,000 new students (35,000 total students). Net new faculty and staff projections for academic year 2035/2036 would be approximately 2,800 new employees (7,545 total employees). Under this alternative, the campus population in academic year 2035/2036 would still be approximately 42,545. Impacts to utilities and service systems would be **similar to** the proposed 2021 LRDP as campus population and facility growth would remain the same. *(Similar impact)*

Wildfire

Similar to the proposed 2021 LRDP, implementation of the No Agricultural Land Development Alternative could result in temporary lane or roadway closures on the edges of campus and within the campus circulation system during construction activities. Operation of new facilities would not substantially impair an adopted emergency response or evacuation plan. This alternative would still increase the density of development on campus, albeit to a lesser extent, and new buildings and infrastructure would be constructed according to the latest fire code and safety standards. New construction could be in areas within 2 miles of Very High FHSZs under this alternative, similar to the proposed 2021 LRDP. Net new campus population would be the same compared to the proposed 2021 LRDP, and people living, working, and attending class in these areas could be exposed to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire. New or updated infrastructure would be concentrated in previously developed portions of campus, and any new utilities would be installed in compliance with existing regulations and would not contribute to increased fire risk. Impacts related to wildfire under the No Agricultural Land Development Alternative would be **similar to** the proposed 2021 LRDP. *(Similar impact)*

Summary of Alternative 4 (No Agricultural Land Development)

The No Agricultural Land Development Alternative would result in the same net new campus population and square footage as the proposed 2021 LRDP. This alternative would maintain approximately 406 acres of prime agricultural lands for land-based research or open space.

This alternative would result in less impacts to agricultural resources compared to the proposed 2021 LRDP. Impacts to aesthetics, air quality, biological resources, cultural resources, energy consumption, geology and soils, GHG emissions, hazards and hazardous materials, hydrology and water quality, population and housing, public services, recreation, transportation, TCR, utilities and service systems and wildfire would be similar compared to the proposed LRDP. Impacts related to noise could be slightly greater than compared to the proposed 2021 LRDP.

6.6 Comparison of Alternatives

Table 6-1 indicates whether each alternative's environmental impact is less than, similar to, or greater than that of the proposed 2021 LRDP for each of the issue areas studied.

Table 6-1 Impact Comparison of Alternatives

Issue	2021 LRDP Maximum Impact Classification	Alternative 1: No Project – Continue 2005 LRDP	Alternative 2: Reduced Development Program	Alternative 3: Increased Student Housing	Alternative 4: No Agricultural Land Development
Aesthetics	SU	Similar	Similar	Similar	Similar
Agricultural Resources	SU	Greater	Similar	Similar	Less
Air Quality	SU	Greater	Similar	Less	Similar
Biological Resources	LTSM	Slightly Greater	Slightly Less	Similar	Similar
Cultural Resources	SU	Similar	Similar	Similar	Similar
Energy	LTSM	Greater	Less (locally) Similar (regionally)	Less (fuel) Similar (other energy)	Similar
Geology and Soils	LTSM	Similar	Similar	Similar	Similar
GHG	LTSM	Greater	Less (locally) Similar (regionally)	Less (Scope 3) Similar (Scopes 1 and 2)	Similar
Hazards and Hazardous Materials	LTSM	Greater	Similar	Similar	Similar
Hydrology and Water Quality	LTS	Similar	Similar	Similar	Similar
Noise	SU	Slightly Greater	Less	Greater	Slightly Greater
Population/Housing	LTS	Greater	Similar	Less	Similar
Public Services	LTS	Greater	Similar	Similar	Similar
Recreation	LTSM	Similar	Similar (locally) Greater (regionally)	Similar	Similar
Transportation	SU	Greater	Less (locally) Similar (regionally)	Less	Similar
Tribal Cultural Resources	LTSM	Slightly Greater	Similar	Similar	Similar

Issue	2021 LRDP Maximum Impact Classification	Alternative 1: No Project – Continue 2005 LRDP	Alternative 2: Reduced Development Program	Alternative 3: Increased Student Housing	Alternative 4: No Agricultural Land Development
Utilities and Service Systems	LTS	Similar	Less	Greater	Similar
Wildfire	LTSM	Similar	Similar	Similar	Similar

LTS – Less than Significant; LTSM – Less than Significant with Mitigation Incorporated; SU – Significant and Unavoidable

6.7 Environmentally Superior Alternative

The CEQA Guidelines Section 15126.6 states that an EIR should identify the "environmentally superior" alternative. "If the environmentally superior alternative is the 'no project' alternative, the EIR shall also identify an environmentally superior alternative among the other alternatives." As shown in the Executive Summary section of this EIR, there would be significant and unavoidable impacts associated with the proposed 2021 LRDP. These impacts are related to aesthetics, agricultural resources, air quality, cultural resources, noise, and transportation. Each of the evaluated action alternatives would result in lesser environmental impacts on some environmental resources and greater impacts on others compared to the proposed 2021 LRDP. None of the action alternatives presented would reduce all the impacts associated with the proposed 2021 LRDP.

Alternative 1 (No Project Alternative), would not be considered the environmentally superior alternative as described above in Section 6.5.1. Alternative 1 would not reduce any of the significant adverse impacts, and it would result in greater impacts related agricultural resources, air quality, biological resources, energy, GHG emissions, hazards and hazardous materials, noise, population and housing, public services, transportation, and TCR. All other impacts areas would be similar to those under the proposed 2021 LRDP.

Alternative 2 (Reduced Development Program Alternative) would result in fewer impacts to biological resources, local energy consumption, local GHG emissions, noise, local transportation, and utilities and service systems compared to the proposed 2021 LRDP. Impacts to aesthetics, agricultural resources, air quality, cultural resources, regional energy consumption, geology and soils, regional GHG emissions, hazards and hazardous materials, hydrology and water quality, population and housing, public services, local recreation, regional transportation, TCR, and wildfire would be similar compared to the proposed LRDP. Impacts to regional recreation would be greater compared to the proposed 2021 LRDP.

Alternative 3 (Increased Student Housing Alternative) would result in fewer impacts related to air quality, fuel consumption, GHG emissions for Scope 3 sources, population and housing, and transportation. Impacts to aesthetics, agricultural resources, biological resources, cultural resources, energy consumption, geology and soils, GHG emissions for Scope 1 and Scope 2 emissions, hazards and hazardous materials, hydrology and water quality, public services, recreation, TCR, and wildfire would be similar compared to the proposed LRDP. Impacts related to noise and utilities and service systems would be greater under Alternative 3 compared to the proposed 2021 LRDP.

Alternative 4 (No Agricultural Land Development Alternative) results in the fewest reductions in impacts in comparison to the proposed 2021 LRDP, resulting in fewer impacts to agricultural resources. All other areas of environmental concern would have similar impacts as the proposed 2021 LRDP under Alternative 4 with the exception for noise which would have a slightly greater impact compared to the proposed 2021 LRDP.

As demonstrated, there are different tradeoffs for each alternative (e.g. local versus regional impacts), which are dependent upon the specific resource areas. Individuals and the decision-makers may weigh these resource areas differently. Alternative 3 would result in fewer impacts to areas found to be significant and unavoidable under the proposed 2021 LRDP – air quality and transportation, and while impacts related to noise would be greater under this alternative due to the increase in students living on-campus (i.e. increase number of sensitive receptors), the decrease in the other areas of concern (fuel consumption, GHG emissions for Scope 3 sources, and population and housing) are found to be of greater local and regional value. Furthermore, although impacts

related to utilities and service systems under this alternative would be greater than the proposed 2021 LRDP, they would remain less than significant, as was concluded for proposed 2021 LRDP. Therefore, the Increase Student Housing Alternative, is considered the environmentally superior alternative.

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7 References

7.1 Bibliography

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