UNIVERSITY OF CALIFORNIA, RIVERSIDE

PARKING STRUCTURE 1

PROJECT NO. 956553

Initial Study/Mitigated Negative Declaration

Lead Agency

University of California, Riverside
Planning, Design & Construction
1223 University Avenue, Suite 240
Riverside, California 92507
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December 2019

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Acronyms and Abbreviations

AB	Assembly Bill
ACUPCC	American College and University Presidents' Climate Commitment
AQMP	Air Quality Management Plan
AVR	average vehicle ridership
BACT	best available control technology
BAU	business as usual
BMPs	best management practices
CalEEMod	California Emissions Estimator Model
CAL FIRE	California Department of Forestry and Fire Protection
CalGreen	California Green Building Standards Code
Caltrans	California Department of Transportation
CARB	California Air Resources Board
CBC	California Building Code
CCR	California Code of Regulations
CDFW	California Department of Fish and Wildlife
CDMG	California Division of Mines and Geology
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CFGC	California Fish and Game Code
CGS	California Geological Survey
CHRIS	California Historical Resource Information System
CNDDB	California Natural Diversity Data Base
CO	carbon monoxide
CRHR	California Register of Historic Resources
CSS	coastal sage scrub
cy	cubic yards
dBA	A-weighted decibels
DCFM	Designated Campus Fire Marshal
DOC	Department of Conservation
DWR	Department of Water Resources
EH&S	Environmental Health & Safety
EIC	Eastern Information Center

EIR	Environmental Impact Report
EOP	Emergency Operations Plan
EV	electric vehicle
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FTE	Full-Time Equivalent
GBCI	Green Business Certification, Inc.
GHG	greenhouse gas
gsf	gross square feet
HCP	Habitat Conservation Plan
HHRA	human health risk assessment
h:v	horizontal:vertical
I-215	Interstate 215
IS	Initial Study
IS/MND	Initial Study/Mitigated Negative Declaration
kv	kilovolts
kWh/year	kilowatt hours per year
Lbs/day	pounds per day
LED	light emitting diode
Leq	equivalent noise level
LID	low impact development
LRDP	Long Range Development Plan
LST	Localized Significance Thresholds
MMRP	Mitigation Monitoring and Reporting Program
MM	Mitigation Measures
MND	Mitigated Negative Declaration
MOU	Memorandum of Understanding
MS4	Municipal Separate Storm Sewer System Permits
MSHCP	Multiple Species Habitat Conservation Plan
$MTCO_2e$	metric tons carbon dioxide equivalent
MVA	mega volt amps
ND	Negative Declaration
NHPA	National Historic Preservation Act
No.	number

NO_2	nitrogen dioxide
NOI	Notice of Intent
NO_x	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
O_3	ozone
$PM_{2.5}$	particulate matter less than 2.5 micrometers in diameter
PM_{10}	particulate matter less than 10 micrometers in diameter
PP	Campus Programs and Practices
Ppb	parts per billion
PS	Planning Strategies
RCNM	Roadway Construction Noise Model
RFD	City of Riverside Fire Department
ROG	reactive organic gases
RPU	Riverside Public Utilities
RTP/SCS	Regional Transportation Plan/Sustainable Communities Strategy
RUSD	Riverside Unified School District
RWQCB	Regional Water Quality Control Boards
RWQCP	Riverside Water Quality Control Plant
SB	Senate Bill
SCAB	South Coast Air Basin
SCAG	Southern California Association of Governments
SCAQMD	South Coast Air Quality Management District
SCH	State Clearinghouse
SCS	Sustainable Communities Strategy
SIP	State Implementation Plan
SO_2	sulfur dioxide
SO_x	sulfur oxides
SOM	School of Medicine
SR-60	State Route 60
SRA	source receptor area
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board

TACs	toxic air contaminants
The Regents	Board of Regents
TDM	Travel Demand Management
TOS	Traffic Operations Study
UC	University of California
ug/m3	micrograms per cubic meter
UCPD	UC Police Department
UCR	University of California, Riverside
UNET	University Neighborhood Enhancement Team
USDA	U.S Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
UST	underground storage tanks
VHFHSZ	Very High Fire Hazard Severity Zone
VHLRA	Very High Local Responsibility Area
VOC	volatile organic chemical
VMT	vehicle miles traveled
WDR	waste discharge requirements

PARKING STRUCTURE 1
UNIVERSITY OF CALIFORNIA, RIVERSIDE

Project No. 956553

Initial Study and Environmental Checklist Form

I. PROJECT INFORMATION

1. Project Title

Parking Structure 1

2. Lead Agency Name and Address

The Regents of the University of California
1111 Franklin Street, 12th Floor
Oakland, California 94607

3. Contact Person and Phone Number

Jaime Engbrecht, Planner
University of California, Riverside
Planning, Design & Construction
1223 University Avenue, Suite 240
Riverside, California 92507
(951) 827-2421

4. Project Location

University of California, Riverside
Riverside, California 92521
(Refer to Figure 1 – Regional and Location Vicinity Map and Figure 2 – UCR Campus Map)

5. Project Sponsor's Name and Address

University of California, Riverside
Transportation & Parking Services
683 W. Linden Street Riverside, CA 92507

6. Custodian of the Administrative Record for this Project

Same as listed under No. 3 above.

7. Identification and Location of the Environmental Impact Report(s) Being Relied on for Tiering

University of California, Riverside 2005 Long Range Development Plan Environmental Impact Report (referred to hereinafter as the 2005 LRDP EIR) and the *University of California, Riverside 2005 Long Range Development Plan Amendment 2 Environmental Impact Report* (referred to hereinafter as the 2005 LRDP Amendment 2 EIR) (collectively referred to as the "LRDP EIR"). The documents are available for review at the University of California, Riverside (UCR) Planning, Design & Construction office, at the address listed above in Section I and online at http://lrdp.ucr.edu/.

Introduction

The environmental analysis for the proposed Parking Structure 1 project (project or proposed project) tiers from the 2005 LRDP EIR (State Clearinghouse [SCH] No. 2005041164), certified by the University of California (UC) Board of Regents (The Regents) in November 2005, as augmented, revised, and supplemented by the 2005 LRDP Amendment 2 EIR (SCH No. 2010111034) certified by The Regents on November 28, 2011. The 2005 LRDP Amendment 2 EIR is a supplement to the 2005 LRDP EIR and provides an analysis of only those environmental effects identified in the 2005 LRDP EIR that changed as a result of the 2005 LRDP Amendment 2, which includes a revision to the land use map to allow for the location of a new School of Medicine (SOM) as well other land use map changes; additional building space to accommodate the increased square footage requirements for the SOM; and the extension of the LRDP horizon year (described further below). The 2005 LRDP Amendment 2 EIR also includes an analysis of greenhouse gas (GHG) emissions resulting from development under the 2005 LRDP, as amended. The 2005 LRDP EIR and 2005 LRDP Amendment 2 EIR are Program EIRs and were prepared in accordance with the California Environmental Quality Act (CEQA) (Public Resources Code, Sections 21000, et seq., specifically, Section 21094), the State CEQA Guidelines (Title 14, California Code of Regulations [CCR], Sections 15000 et seq.), and the University of California Procedures for the Implementation of CEQA.

Section 15152(a) of the State CEQA Guidelines states, "Tiering refers to using the analysis of general matters contained in a broader EIR (such as one prepared for a general plan or policy statement) with later EIRs and negative declarations on narrower projects; incorporating by reference the general discussions from the broader EIR; and concentrating the later EIR or negative declaration solely on the issues specific to the later project." CEQA and the State CEQA Guidelines encourage the use of tiered environmental documents to eliminate repetitive discussions of the same issues. As stated in the 2005 LRDP Amendment 2 EIR, "As authorized by Section 15168(c) of the State CEQA Guidelines, projects implementing the 2005 LRDP as revised by Amendment 2 will be examined in light of the 2005 LRDP EIR and this supplemental EIR to determine whether the potential environmental effects of the individual project were adequately addressed in these EIRs, and whether any additional mitigation measures are required." Therefore, this Initial Study/Mitigated Negative Declaration (IS/MND) is hereby tiered from the 2005 LRDP EIR as supplemented and updated by the 2005 LRDP Amendment 2 EIR. The documents are available for review at the UCR Planning, Design & Construction office, at the address listed above in Section I, and online at http://lrdp.ucr.edu/.

The 2005 LRDP EIR analyzes the direct, indirect, and cumulative impacts resulting from the projected need for development of approximately 7.1 million gross square feet (gsf) of new academic, housing, and support space to accommodate a total enrollment of 25,000 students[1] by the academic year 2015/2016, for a total of 11.8 million gsf on the UCR campus with 2005 LRDP buildout. The 2005 LRDP Amendment 2 EIR analyzes the direct, indirect, and cumulative impacts resulting from revisions to the 2005 LRDP land use map and an increase in the maximum building space on the campus from 11.8 million gsf to 14.9 million gsf to accommodate the SOM. The 2005

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[1] Derived from 1 Full-Time Equivalent (FTE) = 1 Headcount. UCR uses a conversion rate of 1 FTE (0.95 rounded up) = 1 Headcount, and for the purposes of the 2005 LRDP and for the proposed Amendment 2, 1 FTE = 1 Headcount with the "student" taking full course loads every quarter with graduation in four years.

LRDP Amendment 2 does not change the projected enrollment level of 25,000 students but projects that this enrollment level will be attained in 2020/2021, five years later than projected in the 2005 LRDP. The 2005 LRDP Amendment 2 EIR addresses a total projected on-campus faculty, staff, and visitor population of 16,393 persons (an increase of 5,852 persons associated with the SOM) within the same modified planning horizon. Measures to mitigate the significant direct, indirect, and/or cumulative impacts identified for UCR's projected development are identified in both the 2005 LRDP EIR and 2005 LRDP Amendment 2 EIR.

Section 15152(f) of the State CEQA Guidelines instructs that when tiering, a later EIR or Negative Declaration (ND) shall be prepared only when, on the basis of an Initial Study (IS), the later project may cause significant effects on the environment that were not adequately addressed in the prior EIR(s) or ND(s). Significant environmental effects are considered to have been "adequately addressed" if the lead agency determines that:

(A) they have been mitigated or avoided as a result of the prior environmental impact report and findings adopted in connection with that prior environmental report; or

(B) they have been examined at a sufficient level of detail in the prior environmental impact report to enable those effects to be mitigated or avoided by site-specific revisions, the imposition of conditions, or by other means in connection with the approval of the later project.

Following review of the proposed project and the analysis presented in the 2005 LRDP EIR as supplemented and updated by the 2005 LRDP Amendment 2 EIR, it has been determined that the proposed project is a "project" under CEQA that was not fully addressed in the Program EIRs; therefore, additional environmental review is required. Accordingly, this tiered IS has been prepared on the basis that UCR has proposed to adopt an MND.

In conjunction with certification of the 2005 LRDP Amendment 2 EIR and approval of the 2005 LRDP Amendment 2, The Regents also adopted a Mitigation Monitoring and Reporting Program (MMRP). The MMRP ensures that 2005 LRDP Planning Strategies (PSs), Campus Programs and Practices (PPs), and Mitigation Measures (MMs), as revised by the 2005 LRDP Amendment 2 EIR, that are the responsibility of the UC, are implemented in a timely manner. The MMs are monitored by the appropriate campus entity and are reported on an annual basis. As individual projects, such as the proposed project, are designed and constructed, the projects include features necessary to implement relevant PSs, PPs, and MMs. Therefore, in accordance with The Regents' November 2011 approval of the 2005 LRDP Amendment 2 and certification of the associated Final EIR, all relevant PSs, PPs, and MMs have been incorporated into the proposed project description and would be implemented as a part of the proposed project and monitored through the approved MMRP. Relevant UCR PSs, PPs, and/or MMs are listed in the introduction to the analysis for each topical issue in Section V, Evaluation of Environmental Impacts, which are included in the project MMRP. In addition to PSs, PPs, and MMs from the MMRP relevant to the proposed project, this IS/MND includes new project-specific mitigation measures identified to reduce project-specific environmental impacts to a less than significant level (specifically related to archaeological resources).

In summary, this IS/MND provides a project-specific environmental analysis to determine if the proposed project would result in any new significant impacts not examined in the 2005 LRDP EIR as supplemented and updated by the 2005 LRDP Amendment 2 EIR, and/or if additional MMs beyond those adopted in the MMRP for the 2005 LRDP Amendment 2 would be required to reduce significant impacts. In accordance with the State CEQA Guidelines, an MND is the appropriate environmental document because, after incorporation of the identified MMRP and proposed project-specific MMs, the new significant effects that would be caused by the proposed project would be mitigated to a less than significant level.

This IS, along with a Notice of Intent (NOI) to Adopt an MND, has been circulated by the SCH Office of Planning and Research for review by State agencies and to any responsible agencies, trustee agencies, and interested parties, as required by CEQA, for a 30-day public review. Following receipt and evaluation of comments from agencies, organizations, and/or individuals, the UC will determine whether any substantial new environmental issues have been raised. It is anticipated that the proposed project will subsequently be submitted to the Chancellor for consideration in early 2020.

II. PROJECT DESCRIPTION

The project site is currently developed with a surface parking lot (Parking Lot 13) (see Figure 3 – Project Site Aerial Map). The proposed project would involve the removal of the existing asphalt and landscape, and parking spaces on the eastern portion of Parking Lot 13. Subsequent to demolition activities, the proposed project would include the construction of a four-level parking structure with approximately 1,079 parking spaces, reconfiguration of a portion of the existing surface parking area, landscape, pedestrian and bicycle pathways, and associated on-site improvements (see Figure 4 – Conceptual Site Plan and Landscape Plan).

More detailed information regarding the Project Description is provided below under “Proposed Project Components.”

1. Project Location

The UCR main campus is located within the City of Riverside, approximately 2 miles east of downtown Riverside and just west of Box Springs Mountains. The UCR campus is bisected by the Interstate 215 (I-215)/State Route 60 (SR-60) freeways. The approximately 7.5-acre project site encompasses the current Parking Lot 13 located at the eastern edge of the UCR campus, south of Big Springs Road and west of Valencia Hill Drive.

As a matter of information, for purposes of this IS/MND, the “project site” includes the areas that would be subject to physical modifications to implement the proposed project, including, but not limited to, demolition of asphalt pavement, removal of ornamental landscape, grading and construction, vehicular and non-vehicular circulation, hardscape and landscape, and infrastructure relocation/improvements, as described in this section.

Figure 1 shows the regional location and local vicinity for the proposed project; Figure 2 provides a map of the UCR campus, including the location of the proposed project; and Figure 3 – Project Site Aerial Map shows an aerial photograph of the project site.

2. Environmental Setting

The 2005 LRDP EIR and 2005 LRDP Amendment 2 EIR include descriptions of the regulatory and environmental setting for the region, the County and City, and the UCR campus, though the 2005 LRDP Amendment 2 EIR largely focuses on the West Campus. The regulatory and environmental settings for many of the topics addressed in this IS/MND have not substantively changed since preparation of the 2005 LRDP EIR or the 2005 LRDP Amendment 2 EIR. Therefore, they are not wholly repeated in this document. Particularly relevant and site-specific details of the regulatory and environmental settings are summarized in this IS/MND. Additionally, updated regulations related to Air Quality, GHGs, and Tribal Cultural Resources are incorporated in the environmental settings of that particular environmental topic. Following is a description of the environmental setting for the proposed project and surrounding areas.

As shown on Figure 3 – Project Site Aerial Map, the project site is currently developed with a surface parking lot with sidewalks, bicycle lanes, Big Springs Road, vegetated median, and a vegetated bioswale (street-side stormwater infiltration basin) containing shrubs and young trees on the northern portion of the site, and ornamental landscape throughout the site. See Figure 5 for photographs of the project site.

The eastern portion of Parking Lot 13 (the parking lot area east of the road to the U.S. Department of Agriculture (USDA) Salinity Laboratory) currently contains 487 existing parking spaces. The western portion of Parking Lot 13 (the parking lot area west of the road to the USDA Salinity Laboratory) currently contains 196 parking spaces.

Vehicular access to the project site is currently provided from Big Springs Drive and the UCR Botanic Gardens Road. At the southern boundary of Parking Lot 13, approximately halfway between the eastern and western sides of the surface parking lot, there is a driveway to the USDA Salinity Laboratory and associated parking lot. Pedestrian pathways are located along the northern and southern side of Big Springs Drive, in front of the project site, and pedestrian pathways are located along the Chemical Sciences Building when entering from the UCR Botanic Gardens Road, to the southwest of the project site. Bicycle lanes are located along Big Springs Road.

Surrounding land uses include the Glen Mor Housing Complex (student housing, market/food hall), Lothian Residence Hall, Big Springs Parking Structure, and Big Springs Road to the north; the USDA Salinity Laboratory, open space, and surface parking area to the south; the Chemical Sciences Building to the west; and surface parking area followed by multi-family residential homes, and open space followed by single-family residential homes to the east.

Regionally, as with all of Southern California, the UCR campus lies within a seismically active area. There are no known active or potentially active faults within the project site or the immediately vicinity. The nearest active fault is the San Jacinto Fault Zone, located approximately 4.9 miles to the northeast.

3. Consistency with the 2005 LRDP Amendment 2 EIR

This project is consistent with the 2005 LRDP Amendment 2 EIR, which MM Land Use 7: “Over time, relocate parking from central campus locations to the periphery of the academic core and replace surface parking with structures, where appropriate” (UCR 2011b). Parking Structure 1 would replace a portion of Parking Lot 13, a surface parking lot on the periphery of the UCR campus.

Additionally, the 2005 LRDP Amendment 2 envisions key changes to the pedestrian and bicycle systems at UCR, to provide more connectivity within the campus as it grows and to promote walking and bicycling as attractive alternatives to driving. It requires that “as existing pedestrian / bicycle pathways are enhanced or extended, and new pathways, some shared use, some exclusively for pedestrians or bicyclists, are developed, the pathway network must be designed to minimize the potential for pedestrian / bicycle conflicts” (UCR 2011a). Plans for this project include new pedestrian and bicycle pathways to enhance pedestrian and bicycle safety and increase connections between vehicle parking areas and the main UCR campus.

Figure 1 – Regional and Location Vicinity Map

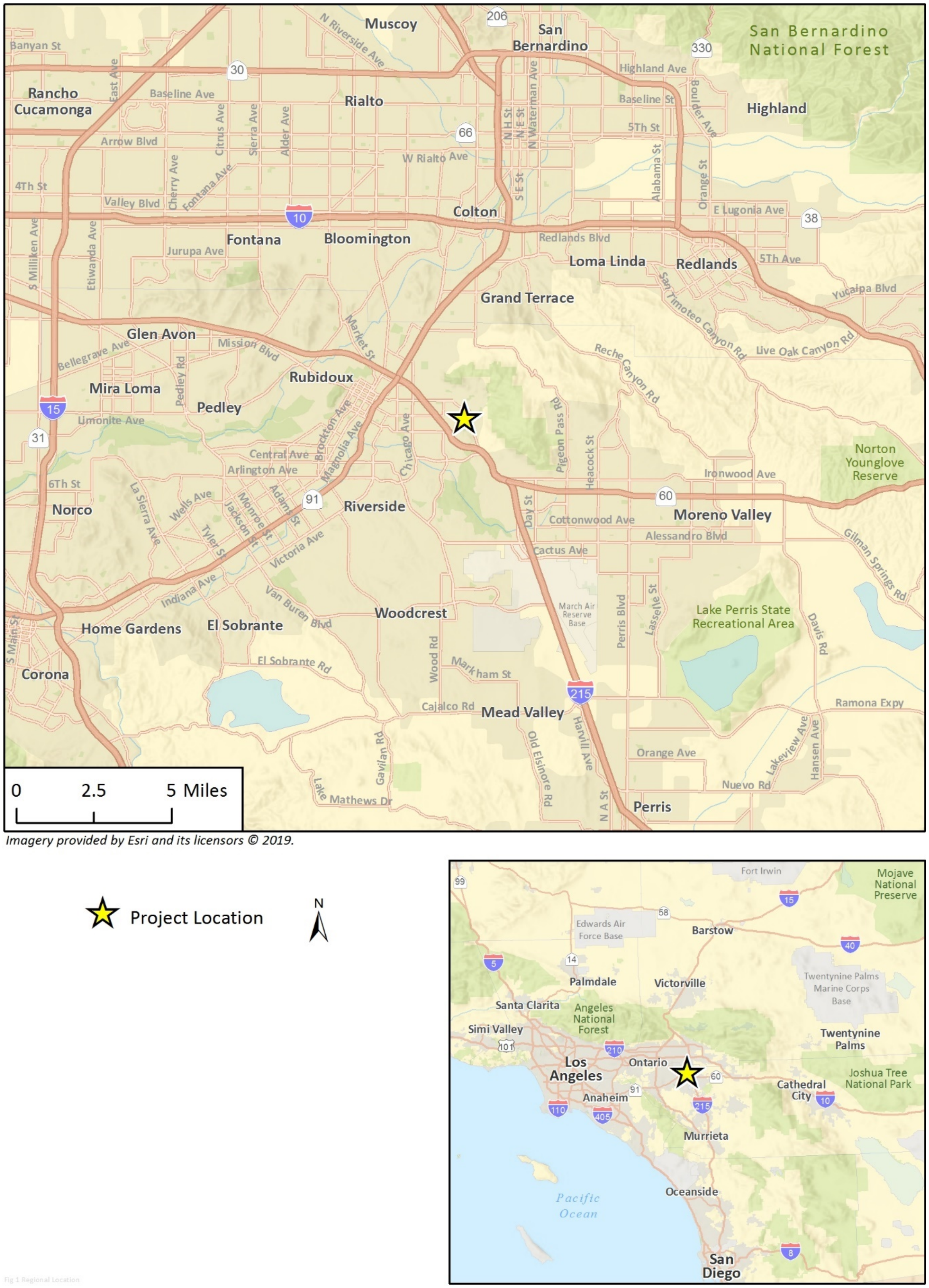

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Figure 2 – UCR Campus Map

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Figure 3 – Project Site Aerial Map

Imagery provided by Microsoft Bing and its licensors © 2019.

Fig 2 Project Site

Figure 4 – Conceptual Site Plan and Landscape Plan

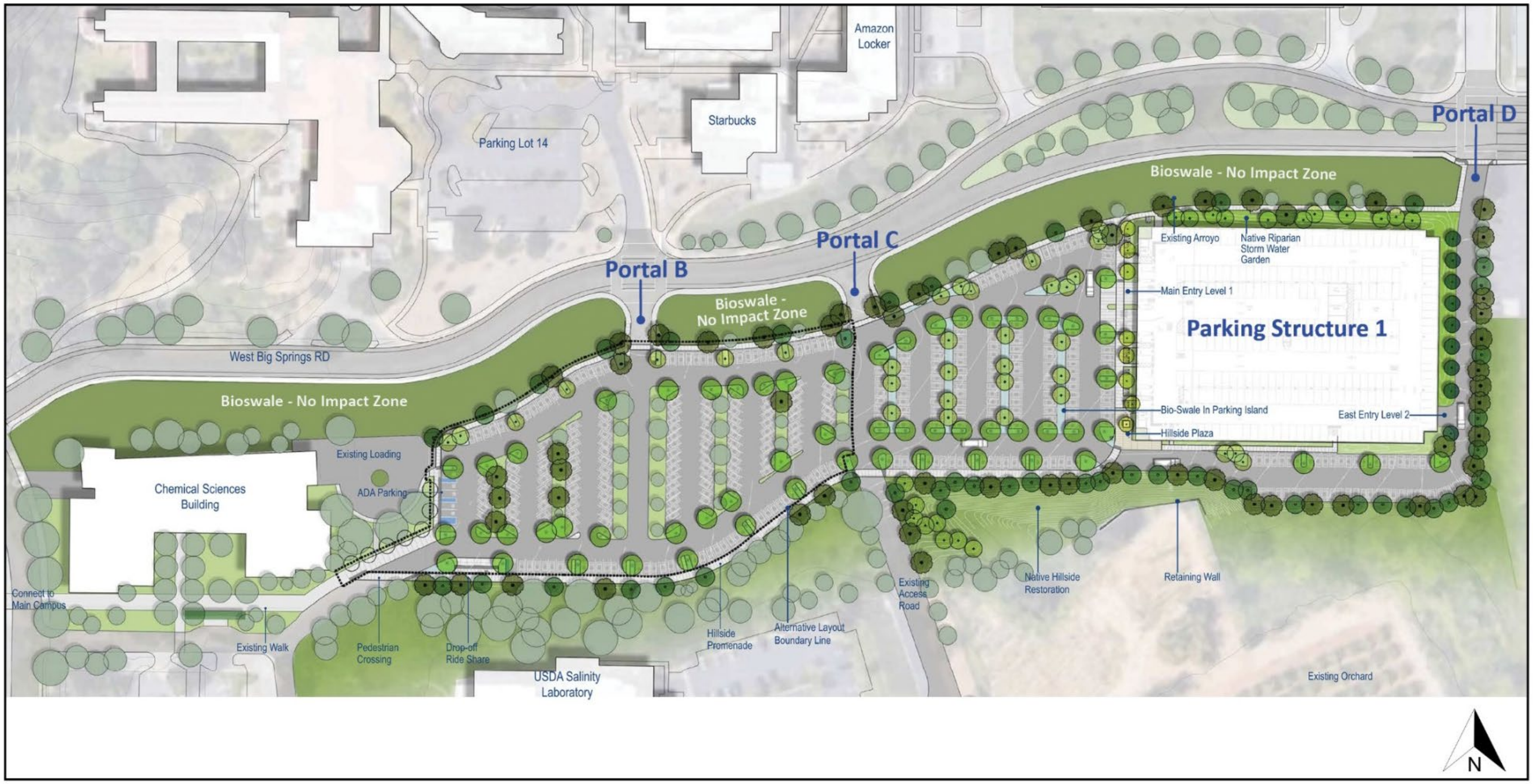


Figure 5 – Site Photographs

Photograph 1. View east from site

Photograph 2. View north from site

Photograph 3. View from the northeast from site

Photograph 4. View northeast from site

Photograph 5. View north from site

Photograph 6. View north from site

4. Code Compliance and Regulation

The University is the authority having jurisdiction for matters of code regulations on University projects. The University complies with the Title 24 of the California Building Code (CBC), Parts 1-12 and all amendments. Each facility acts as a "local jurisdiction" complete with its own Building Official and local administered code compliance program (similar to building officials in city or county jurisdictions).

All facilities owned, leased, designed, constructed, altered, or renovated with intent, or future intent, to support the mission of the University are under the jurisdiction and responsibility of the University and local Facility administration. Each Facility has a code compliance program to design, approve, construct, alter, renovate, inspect, and maintain its facilities in accordance with all applicable codes and regulations, and University policies. Codes and regulations include the CBC as adopted by the University, as well as any applicable federal, state, and local agency regulations and legislation. The code compliance program applies to all activities at the facilities that are subject to building codes and other related regulatory compliance, regardless of funding source, party overseeing construction, or the ownership status of the improvements (UC 2018).

5. Proposed Project Components

Proposed Development

UCR proposes construction of a four-level parking structure, approximately 27 feet high to the top of guard rail, and 350,728-square-feet with approximately 1,079 spaces (Parking Structure 1). The project also includes the reconfiguration of the existing surface parking area, landscape and hardscape improvements, new pedestrian and bicycle pathways, and other site amenities (e.g., bicycle racks, benches) on the existing campus parking lot (Parking Lot 13). Parking Structure 1 would house maintenance equipment and a storage room, communication rooms, an electrical room, and hydraulic elevator machine rooms.

The purpose of the proposed project is to accommodate parking needs of the existing campus population and the anticipated growth of student, faculty, and staff populations as analyzed in the LRDP EIR, as well as compensate for the loss of existing surface parking lots due to new major capital projects. Parking Lot 13 currently provides approximately 683 parking spaces that would be removed to construct the new parking structure and reconfigure the remaining surface parking area—487 on the eastern portion and 196 on the western portion. The eastern portion of Parking Lot 13 is the proposed site of the parking structure. Approximately 212 surface parking spaces would be added around the perimeter of the parking structure, resulting in approximately 804 new parking spaces on the eastern portion of Parking Lot 13. The western portion of Parking Lot 13 would be reconfigured to provide approximately 21 additional parking spaces. The proposed project would result in a net increase of approximately 825 parking spaces within the project site. Accessible parking will be provided in accordance with applicable code requirements. Table 1 shows the change in number of parking spaces on the project site. For purposes of this CEQA analysis and to accommodate for any potential minor project design revisions, a net increase of approximately 825 to 850 parking spaces is assumed.

Table 1 Parking Space Allocation

Vehicle Parking	Number of Existing Spaces	Number of Spaces to be Constructed	Net Change
Parking Lot 13 East			
Parking Structure 1	–	1,079	1,079
Surface parking	487	212	-275
Subtotal	487	1,291	804
Parking Lot 13 West			
Surface parking	196	217	+21
Total	**683**	**1,508**	**+825**

The two existing driveways (western driveway, referred to as Portal B and central driveway referred to as Portal C) into Parking Lot 13 from Big Springs Road would remain, as well as the existing campus roads to the USDA Salinity Laboratory and Parking Lot 10/UCR Botanic Gardens. A left-turn lane from Big Springs Road into Portal C would be provided. A new driveway at the eastern corner of Parking Lot 13 and the intersection of Big Springs Road/Valencia Hill Drive (eastern driveway, referred to as Portal D) is also being considered to support additional ingress and egress as a right-in/right-out only.

A 20-foot wide emergency/fire access lane would extend around the eastern portion of Parking Lot 13 (and Parking Structure 1) and the southern perimeter of Parking Lot 13 and Parking Structure 1.

Existing pedestrian and bicycle circulation to Parking Lot 13 would remain. New pedestrian and bicycle pathways are proposed to connect pedestrians and bicyclists from Parking Structure 1 to Big Springs Road, to the Chemical Sciences Building, and to East Campus Drive. Figure 4 shows the conceptual site plan for the project.

An eight-foot tall fence of galvanized picket style may be installed on the eastern perimeter of Parking Lot 13 along with landscaping. A retaining wall ranging from 8 to 12 feet high is proposed south of the project site for erosion control and slope stabilization purposes.

Natural ventilation would be used without mechanical ventilation/exhaust, heating, and cooling. Natural cross ventilation throughout parking structure openings along are a suitable passive design strategy to reduce overheating during daytime and to increase cooling of a parking structure during night-time. Ventilation for the maintenance storage room, elevator machine room and elevator hoist-way levels would be achieved via steel vents through walls, doors, and elevator shaft masonry walls.

The parking structure is being designed as part of a design-build process. The design goals for the proposed project include:

- Design a parking structure which is both functional and aesthetically pleasing and promotes a safe vehicular, pedestrian, and bicycle-friendly environment.
- Deliver the parking structure with a minimum ParkSmart rating of "Bronze" designation by the Green Business Certification, Inc. (GBCI).
- Create an open concept parking structure that will achieve energy conservation and incorporate enhanced parking space features by integrating modern technology.
- Strengthen campus identity at the east campus gateway on Big Springs Drive.

Vehicle Circulation and Access

Vehicle access to Parking Structure 1 would include two-way vehicular traffic from the existing central driveway (Portal C); see Figure 4 – Conceptual Site Plan and Landscape Plan. A secondary driveway (Portal D), at Big Springs Road and Valencia Hill Drive, at the northeast corner of Parking Lot 13, is also being considered to facilitate additional access and egress at the parking structure. The existing western driveway (Portal B) on Big Springs Road into the western portion of Parking Lot 13 would remain.

A car count system would be designed at each level of the parking structure. Parking Structure 1 would contain stall counters with exterior dynamic counter readers mounted on back-lit boards for wayfinding signage at each level at speed ramp intersections. Digital “space available” signs would be located at structure entrances and along driveways at Big Springs Road. This feature would assist vehicles in finding an empty parking space. The type of paving material to be used would minimize vehicle tire noise (e.g. quiet pavement) Headlight screening features will be installed to minimize light spillover into the immediate neighborhood.

All elements of vehicle access and roadway improvements, including size, configuration, vertical and horizontal alignment, lane widths, striping, signage, lighting and traffic control measures (i.e. stop signs and speed bumps) would be designed and constructed in accordance with all applicable codes and regulations.

Pedestrian, Bicycle, and Ride-share Circulation and Access

Primary interior pedestrian circulation within Parking Structure 1 would be located on the west end of the parking structure. Elevators would be installed at the northwest and southwest corners to direct parking patrons to the core of the UCR campus.

Stairs would be adjacent to the elevators at each level. Additional set of stairs would be provided on the southern side of the structure on the first four levels as an alternate means of exit from each level of Parking Structure 1. A fourth staircase will be available on level four and open to the top-level, providing a path of travel for those visitors wanting to access the elevators or main stairwells. The project site would be designed for clear access, circulation, and separation between vehicles, ride-share services, bicycles, fire and emergency access. External walkways would be partially or fully covered and designed to be comfortable and accessible.

The site would include a ride-share drop off area at the southwestern portion of the project site near the Chemical Sciences Building. Signage for wayfinding in and around Parking Structure 1 and for UCR destinations would be provided. Accessible parking spaces would be distributed on each level to accommodate van accessible, wheelchair, and accessible EV parking spaces.

Existing pedestrian/bicycle circulations to Parking Lot 13 would remain. New pedestrian/bicycle pathways would extend north from Parking Structure 1 and connect to an improved pedestrian/bicycle pathway along the northern boundary of the project site. Additionally, a new pedestrian/bicycle pathway would extend from Parking Structure 1 along the southern boundary of Parking Lot 13 and connect to the pathway at the Chemical Sciences Building.

Lighting and Security

The parking structure was designed using the principles of Crime Prevention Through Environmental Design. Security cameras would be installed at drive isles (including top deck), inside elevators, elevator lobbies, stairwell landings, and at pedestrian entrances at ground level.

Lighting installed on the project site would follow all campus standards. In addition to parking structure interior lighting, there would be landscape/hardscape lighting around Parking Structure 1. Exterior building lighting would be down lighting. Lighting where required for parking lots would be provided at a level no less than one foot candle throughout the lot and access areas, and such lighting would be reviewed by campus officials as to its coverage and intensity. Emergency Blue lights would be located at each stair landing of each level of Parking Structure 1. The lighting design for the site and within the parking structure would be carefully considered to prevent light spillage while providing a safe environment with minimal dark zones. High-cutoff light fixtures or similar measures would be considered on the rooftop level to reduce light spillage into nearby residences.

Utilities and Services

Connections to irrigation water, domestic water, sewer, fire water, and electrical services would be established. It is anticipated that major upgrades in existing utilities would not be required but there may be minor re-routing.

Water and Sewer Connections

A possible water main would be constructed to extend to the existing eight-inch water main in East Campus Drive. An existing 15-inch sanitary sewer line is located north of the project site. Drains internal to Parking Structure 1 would discharge to the existing sewer line. Sewer line laterals may be constructed to connect to the main sewer line. It is anticipated that new fire hydrants would be installed on the project site that would be served by the existing campus water system.

Stormwater Management

All storm water runoff would be managed for both quality and quantity as required by current regulations (as further discussed in Section V.10, Hydrology and Water Quality, of this IS/MND). All stormwater runoff from the site and roof of Parking Structure 1 would be treated and detained, infiltrated or reused as necessary to comply with UCR's Municipal Separate Storm Sewer System Permits (MS4) permit and the UCR Post Construction Stormwater Management Requirements. Additionally, conveyance facilities would be designed in compliance with Riverside County Flood and Water Conservation District requirements.

Stormwater quality would be managed using treatment-based low impact development (LID) best management practices (BMPs). The project would follow the Riverside County Flood Control and Water Conservation District BMPs. The storm drain infrastructure would include area drains, roof drain connections, and piped conveyance of stormwater to the water quality treatment basins/devices and connections to the existing storm drain system. Stormwater would be treated by a coalescing silt/sand oil/water separator (clarifier). Opportunities for water harvesting and storage would be investigated where feasible. Water quality treatment would consist of biofiltration basins, proprietary treatment devices, and/or underground storage vaults. Runoff from the project site would continue to discharge at the existing pervious areas on site and eventually to the storm drain system. There may be reconfiguration of storm drain inlets at entrances adjoining Big Springs Road.

In addition to appropriate plant selection, consideration would be given to reducing stormwater run-off through incorporation of bioswales, filter strips, or another LID method. Paving and landscape design would emphasize natural infiltration and evaporation where possible to reduce water run-off during storm events.

Electricity and Communications Systems

Electrical service would be supplied from the 12-kilovolt (kV) campus normal power distribution system until the installation of photovoltaic panels. Parking Structure 1 would be designed as a future net-zero parking structure, where future photovoltaic panels could be located on the top deck (open to the exterior) for optimal sunrays. A photovoltaic room would be provided for the installation of the Solar infrastructure (stub-ins), to be panel ready. Communication Rooms would act as a transition point for cabling and house active network equipment, call equipment, energy management panels and other low voltage, and signaling equipment. A Main Distribution Frame Room would connect to the campus underground infrastructure. Parking Structure 1 would include conduit pathways for future cell phone antennas.

Parking Structure 1 would use natural ventilation and not rely on mechanical ventilation/exhaust, heating, and cooling. The elevator cabs and some rooms will require heating, ventilation, and air conditioning systems. Ventilation for the maintenance storage room, elevator machine room and elevator hoist-way levels would be achieved via steel vents through walls, doors and elevator shaft masonry walls. Design will take advantage of prevailing wind to maximize the cross ventilation and passive cooling, thereby eliminating the need for mechanical ventilation.

Emergency Services and Infrastructure

Parking Structure 1 would be required to connect to the existing UCR fire protection system as well as be connected to the UCR Police dispatch. Emergency responders would have clear access to any mechanical or electrical systems. The structure would provide emergency blue light phones, fire alarm and standpipe systems, and motion sensor lighting. Type 1A fire resistance construction would be required in compliance with the 2019 CBC. All emergency power would be supplied from battery backup, with the ability to provide power from a portable generator as needed.

Landscape Design

The landscape design for the project would use drought tolerant and adapted plant material that are reflective of the region and would be consistent with UCR Landscape-Irrigation Guidelines and Campus Standards Landscape design would support and blend into the surrounding natural landscape character of the eastern side of campus. Existing planting areas would be protected and enhanced where appropriate to support UCR’s campus character.

Surface Parking Lot Landscaping

The project proposes to remove approximately 32 ornamental trees on the western side of Parking Lot 13 and approximately 81 ornamental trees on the eastern side of Parking Lot 13. Approximately 22 mature trees would be removed from the southern edge of the eastern portion of the project site for erosion control and slope stabilization purposes. Some mature trees on the southern edge of the western portion of the project site may be removed to construct the new pedestrian and bicycle pathways. New trees would be installed at a ratio of one tree per eight surface parking lot spaces and located to maximize exposure to winter sun and provide shade during the summer. Additional trees on the eastern and southern perimeters is proposed to provide landscape screening to the adjacent residents.

Sustainability Features

The proposed project would comply with the University of California Policy on Sustainable Practices (Sustainable Practices Policy) and adopt the principles of energy efficiency and sustainability to the extent practical, consistent with budgetary constraints and regulatory and programmatic requirements.

The proposed project would achieve a minimum ParkSmart rating of “Bronze” designation by the GBCI, with the possibility of achieving a “Silver” designation, which may include the following:

- Ride share and public drop-off and pick-up locations
- Future EV charging ready spaces
- Net zero solar ready
- Short and long-term bicycle parking
- Bicycle tire inflation station
- Campus directories at elevator lobbies and exterior southwest pedestrian walkway
- Water-efficient landscaping
- Energy efficient light sources such as natural lighting, light emitting diodes (LED), and daylight harvesting.

The design, construction, and operation of the project would include sustainable site development, water saving features, stormwater integration with project planting, energy efficient design, water saving landscape design, and solar panel readiness. Project design would implement strategies required by the 2019 California Green Building Standards Code (CalGreen) and the Sustainable Practices Policy to exceed CBC Title 24 energy efficiency requirements by 20 percent or greater (for new buildings).

Construction

For purposes of this CEQA analysis construction activities is anticipated to begin late 2019 and last for approximately 13 months. Construction activities would include:

- Demolition (approximately one month)
- Site Preparation (approximately five days)
- Grading (approximately one month)
- Building Construction (approximately 10 months)
- Architectural Coating (approximately 15 days)
- Paving (approximately one month)

Depending on the construction phase, implementation of the proposed project would require common equipment, such as a dozer, tractor/loader/backhoe, concrete/industrial saw, crane, forklift, paver, roller, compressor, cement and mortar mixers. As required by existing regulations, soil erosion from the project site during construction would be controlled with several BMPs, including the use of sandbags as barriers. The construction site would be encircled by sandbags, and stabilized driveways would be provided at construction entrance and exit areas. Appropriate BMPs to minimize sediment entering the storm drain system would be provided.

The project would demolish existing trees, landscaping, concrete sidewalks, lighting, islands, utilities and asphalt from the existing surface of Parking Lot 13. The construction staging/laydown area would be within the limits of work on the eastern side of Parking Lot 13, where construction workers would also park.

Approximately 213,000 square feet (4.89 acres) of asphalt and concrete curbs would be demolished during construction, resulting in approximately 5,259 cubic yards (cy), or 10,294 tons of demolition material. Approximately 8,000 cy of soil is anticipated to be excavated (cut) and 7,500 cy would be required for fill during grading activities. It is anticipated that approximately 120,000 square feet of the project site would be paved. The bioswale area to the south of Big Springs Road would not be impacted by construction.

Vehicular and Pedestrian Access During Construction

The proposed project would not require lane closures or other access restrictions for extended periods of time. The proposed construction route would occur from Linden Street to Aberdeen Drive to North Campus Drive to Big Springs Road or from Canyon Crest Drive to West Campus Drive to Big Springs Road. No construction vehicles are allowed on Watkins Drive and would be noted on the construction specifications.

During construction activities, access to the site would be limited to authorized Campus staff, construction workers, and emergency providers, and no public access would be allowed.

6. Relationship to the 2005 Long Range Development Plan Amendment 2

Figure 13 of the 2005 LRDP Amendment 2 provides the current Land Use Plan for the UCR campus. As shown, the project site is in an area designated as “Parking” which allows for the development of the proposed project. The Land Use Section of the 2005 LRDP Amendment 2 identifies that parking structures would begin to replace surface lots as more land is needed for academic, housing, recreation, and other uses. In addition, parking would be moved from central locations on campus to more peripheral sites (UCR 2011). The proposed project site is consistent with the 2005 LRDP Amendment 2 Land Use Plan for future commuter parking structures.

As shown in Table 3.0-3, Land Use Summary – 2005 LRDP and 2005 LRDP Amendment 2, of the 2005 LRDP Amendment 2 EIR, a total of 27.5 acres is assigned to structured parking on campus for the 2020/2021 horizon year. The project would help fulfil the goal set forth in the 2005 LRDP to convert surface lots to structured parking.

As shown in Table 3.0-6, Parking Supply – 2005 LRDP and 2005 LRDP Amendment 2, of the 2005 LRDP Amendment 2 EIR, it was estimated that the on-campus parking supply would increase from 9,338 parking spaces in Fall 2010 to 17,328 in 2020/2021, an increase of 7,990 spaces, to accommodate the projected campus population (including commuter and resident students, faculty, staff, visitors, and campus service vehicles/deliveries). The proposed project would provide a net increase of approximately 825 to 850 parking spaces, representing approximately 10% to 11% of the proposed increase in parking noted in the 2005 LRDP Amendment 2 EIR.

7. Discretionary Approvals

The Regents, or its delegate, will consider the proposed project, the tiered IS/MND, and UCR’s request for project approval. Delegates of The Regents include, but are not limited to, the UCR Chancellor. UCR and the responsible agencies identified below are expected to use the information contained in this tiered IS/MND for consideration of approvals related to and involved in the implementation of the proposed project. This tiered IS/MND has been prepared to inform all State, regional, and local government approvals needed for construction and/or operation of the proposed project, whether or not such actions are known or are explicitly listed. Anticipated approvals required from UCR and the responsible agencies to implement the proposed project include, but are not limited to, those listed below.

University of California Board of Regents, or its Designee

- Adoption of the Final Tiered IS/MND
- Approval of the Design of Parking Structure 1
- Approval of the project Budget
- Approval of Financing

Other Public Agencies Whose Approval May Be Required

Other project approvals may include:

- Division of the State Architect (accessibility compliance)
- State of California Fire Marshall (fire/life safety)
- City of Riverside Fire Department (access)
- City of Riverside (encroachment permit for road improvements/modifications)

8. Have California Native American Tribes Traditionally and Culturally Affiliated with the Project Area Requested Consultation Pursuant to Public Resources Code Section 21080.3.1?

To date, UCR has received two requests for project notification pursuant to Assembly Bill (AB) 52 (from the Agua Caliente Band of Cahuilla Indians and the Torres-Martinez Desert Cahuilla Indians). On August 7, 2019, UCR provided these tribes with notification of the proposed project. No response was received by the Torres-Martinez Desert Cahuilla Indians. On September 6, 2019, the Agua Caliente Band of Cahuilla Indians responded to this request stating that the project area is not within the boundaries of the Agua Caliente Band of Cahuilla Indians Reservation; however, the project area is within the tribes’ Traditional Use Area. The tribe requested formal government-to-government consultation and also requested copies of any cultural resource documentation generated in connection with the project. On September 6, 2019, UCR responded to the Agua Caliente Band of Cahuilla Indians requesting to schedule a consultation with the tribe and stated that no specific cultural assessments are to be conducted for the project, but tribal cultural resources will be discussed and analyzed in this IS/MND and the tribe will be added to the NOI distribution list. On October 17, 2019, UCR contacted the Agua Caliente Band of Cahuilla Indians representative via telephone to discuss the proposed project and a follow up email was sent to the tribe on October 22, 2019 concluding government-to-government consultation based on the phone conversation that took place. See Section V.18, Tribal Cultural Resources, of the IS/MND for additional discussion.

III. ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED

The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a "Potentially Significant Impact" as indicated by the checklist on the following pages.

☐ Aesthetics
☐ Agriculture and Forestry Resources
☐ Air Quality
☐ Biological Resources
☐ Cultural Resources
☐ Energy
☐ Geology and Soils
☐ Greenhouse Gas Emissions
☐ Hazards and Hazardous Materials
☐ Hydrology and Water Quality
☐ Land Use and Planning
☐ Mineral Resources
☐ Noise
☐ Population and Housing
☐ Public Services
☐ Recreation
☐ Transportation
☐ Tribal Cultural Resources
☐ Utilities and Service Systems
☐ Wildfire
☐ Mandatory Findings of Significance

IV. DETERMINATION

Based on this initial evaluation:

☐ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION be adopted.

☒ I find that although the proposed project could have a significant effect on the environment, the project impacts were adequately addressed in an earlier document or there will not be a significant effect in this case because revisions to the project have been made or project-specific mitigation measures have been proposed that will avoid or reduce any potential significant effects to a less than significant level and recommend that a MITIGATED NEGATIVE DECLARATION be adopted.

☐ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT be certified.

Signature

12/05/2019
Date

Jaime Engbrecht
Printed Name

Planner
Title

V. EVALUATION OF ENVIRONMENTAL IMPACTS

The University has defined the column headings in the IS checklist as follows:

A) “**Potentially Significant Impact**” is appropriate if there is substantial evidence that the project’s effect may be significant even with the incorporation of Planning Strategies (PSs), Programs and Practices (PPs), and Mitigation Measures (MMs) identified in the 2005 LRDP EIR as supplemented and updated by the 2005 LRDP Amendment 2 EIR. If there are one or more “Potentially Significant Impacts” a Project EIR will be prepared.

B) “**Project Impact Adequately Addressed in LRDP EIR**” applies where the potential impacts of the proposed project were adequately addressed in the 2005 LRDP EIR as supplemented and updated by the 2005 LRDP Amendment 2 EIR, and the PSs, PPs, and MMs identified in the 2005 LRDP EIR as supplemented and updated by the 2005 LRDP Amendment 2 EIR will mitigate any impacts of the proposed project to the extent feasible. All applicable MMs identified in the 2005 LRDP EIR as supplemented and updated by the 2005 LRDP Amendment 2 EIR are incorporated into the project as proposed. The impact analysis in this document summarizes and cross references the relevant analysis in the 2005 LRDP EIR as supplemented and updated by the 2005 LRDP Amendment 2 EIR.

C) “**Less Than Significant With Project-level Mitigation Incorporated**” applies where the incorporation of project-specific mitigation measures will reduce an effect from “Potentially Significant Impact” to a “Less Than Significant Impact”. All project-level mitigation measures must be described, including a brief explanation of how the measures reduce the effect to a less than significant level.

D) “**Less Than Significant Impact**” applies where the proposed project will not result in any significant effects. The effects may or may not have been discussed in the 2005 LRDP EIR as supplemented and updated by the 2005 LRDP Amendment 2 EIR. The project impact is less than significant without the incorporation of 2005 LRDP EIR as supplemented and updated by the 2005 LRDP Amendment 2 EIR or project-level mitigation.

E) “**No Impact**” applies where the proposed project would not result in any impact in the category or the category does not apply. “No Impact” answers need to be adequately supported by the information sources cited, which show that the impact does not apply to projects like the one involved (e.g., the project falls outside a fault rupture zone). A “No Impact” answer should be explained where it is based on project-specific factors as well as general standards (e.g., the project will not expose sensitive receptors to pollutants, based on a project-specific screening analysis).

Environmental Checklist

1. AESTHETICS

The analysis of Aesthetics is tiered from the 2005 LRDP EIR and was addressed in Section 4.1, Aesthetics, of that document. Relevant elements of the project related to aesthetics/visual change include the construction of a four-level parking structure with approximately 1,079 parking spaces, reconfiguration of a portion of the existing surface parking area, improvements to driveways from Big Springs Road, new pedestrian and bicycle pathways, landscaping, interior/exterior lighting fixtures, installation of associated utility and irrigation systems, and associated on-site improvements.

During construction activities, some walkways, bicycle paths, and the existing surface parking area would be closed to allow for construction access to the site, construction staging and equipment storage and construction of the project. Trees would be protected as much as possible; however, in order to construct the project, removal of trees will be required. New trees would be planted as part of the proposed project.

The following applicable PSs, PPs, and MM were adopted as part of the 2005 LRDP EIR as supplemented and updated by the 2005 LRDP Amendment 2 EIR and are incorporated as part of the proposed project and assumed in the analysis presented in this section.

PS Development Strategy 1	Establish a design review process to provide regular review of building and landscape development on campus.
PS Open Space 3	In Naturalistic Open Space areas, where arroyos and other natural features exist, preserve wherever feasible existing landforms, native plant materials, and trees. Where appropriate, restore habitat values.
PS Open Space 4	Provide landscaped buffers and setbacks along campus edges, such as Valencia Hills Drive and its extension south of Big Springs Road, Martin Luther King Boulevard, and the I-215/SR-60 freeway.
PS Conservation 1	Protect natural resources, including native habitat; remnant arroyos; and mature trees, identified as in good health as determined by a qualified arborist, to the extent feasible.
PS Conservation 2	Site buildings and plan site development to minimize site disturbance, reduce erosion and sedimentation, reduce stormwater runoff, and maintain existing landscapes, including healthy mature trees whenever possible.
PS Campus & Community 1	Provide sensitive land use transitions and landscaped buffers where residential off-campus neighborhoods might experience noise or light from UCR activities.

PP 4.1-1	The Campus shall provide design professionals with the 2007 Campus Design Guidelines and instructions to implement the guidelines, including those sections related to use of consistent scale and massing, compatible architectural style, complementary color palette, preservation of existing site features, and appropriate site and exterior lighting design. *(This is identical to Land Use PP 4.9-1[a].)*
PP 4.1-2(a)	The Campus shall continue to provide design professionals with the 2007 Campus Design Guidelines and instructions to develop project-specific landscape plans that are consistent with the Guidelines with respect to the selection of plants, retention of existing trees, and use of water conserving plants, where feasible. *(This is identical to Land Use PP 4.9-1[b].)*
PP 4.1-2(b)	The Campus shall continue to relocate, where feasible, mature “specimen” trees that would be removed as a result of construction activities on the campus. *(This is identical to Land Use PP 4.9-1[c].)*
MM 4.1-3(a)	Building materials shall be reviewed and approved as part of project-specific design and through approval of construction documents. Mirrored, reflective glass is prohibited on campus.
MM 4.1-3(b)	All outdoor lighting on campus resulting from new development shall be directed to the specific location intended for illumination (e.g., roads, walkways, or recreation fields) to prevent stray light spillover onto adjacent residential areas. In addition, all fixtures on elevated light standards in parking lots, parking structures, and athletic fields shall be shielded to reduce glare. Lighting plans shall be reviewed and approved prior to project-specific design and construction document approval.
MM 4.1-3(c)	Ingress and egress from new parking areas shall be designed and situated so as to minimize the impact of vehicular headlights on adjacent uses. Walls, landscaping or other light barriers will be provided. Site plans shall be reviewed and approved as part of project-specific design and construction document approval.

Project Impact Analysis

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Would the project have a substantial adverse effect on a scenic vista?	☐	☒	☐	☐	☐

Discussion

UCR is part of the UC, a constitutionally created entity of the State of California. As a constitutional entity, the UC is not subject to municipal regulations, such as Riverside County and City of Riverside General Plans. This analysis considers the project's consistency with the 2005 LRDP EIR.

As discussed in Section 4.1 of the 2005 LRDP EIR, scenic vistas may generally be described in two ways: panoramic views (visual access to a large geographic area, for which the field of view can be wide and extend into the distance) and focal views (visual access to a particular object, scene, setting, or feature of interest). Sweeping panoramic views of the Box Springs Mountains are considered a scenic vista. Since no specific focal views of the Box Springs Mountains from the East Campus were identified, the 2005 LRDP EIR concluded that scenic vistas for the campus are limited to panoramic views of the Box Springs Mountains from publicly accessible viewpoints. On-campus, publicly accessible, panoramic views of the Box Springs Mountains are limited to the southeast hills. Views of the Box Springs Mountains are otherwise largely obstructed by existing campus structures and mature vegetation, as is the case for the project site; see Photos 1 and 2 below.

The analysis of Impact 4.1-1 in Section 4.1, Aesthetics, of the 2005 LRDP EIR concluded that with implementation of PS Open Space 5 (retaining Carillon Mall as a major campus Landmark Open Space) and PP 4.1-1 (developed in compliance with the Campus Design Guidelines), development under the 2005 LRDP would result in a less than significant impact to scenic vistas.

Partial views of the Box Springs Mountains are currently available from the project site and along Big Springs Road. Development of Parking Structure 1 would fully or partially block views of the Box Springs Mountains from the project site, including the surface parking areas, from intermittent segments of Big Springs Road, and from the Chemical Sciences Building near the drop-off/loading dock area. The 2005 LRDP EIR does not consider parking lots a key vantage point given that they are not used as public gathering spaces. Views from Big Springs Road would only be intermittently affected. Views from the Chemical Sciences Building would only be partially affected, and impacts would be offset by the existing and planned trees in the intervening viewshed between the viewer and the parking structure. There are no scenic vistas looking west from the project site, and scenic views would not be affected from any key vantage points off-campus, traditional public gathering spaces on campus (e.g., the Highlander Union Building), or scenic areas such as the UC Riverside Botanic Gardens. Therefore, the proposed project would have a less than significant impact on a scenic vista, consistent with the findings of the LRDP EIR.

Photograph 1. View looking northeast from Parking Lot 13

Photograph 2. View looking east from Parking Lot 13

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would not impact scenic vistas. The proposed project impacts would be less than significant. The proposed project impacts were adequately addressed in the LRDP EIR.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
b) Would the project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☒	☐	☐	☐

Discussion

As identified in the IS for the 2005 LRDP EIR, the UCR campus is bisected by the I-215/SR-60 freeway and is generally bounded by University Avenue, Canyon Crest Drive, Blaine Street, Watkins Drive, Valencia Hill Drive, Le Conte Drive, and Chicago Avenue, none of which are officially designated or identified as eligible for designation as a State scenic highway (Caltrans 2011). Therefore, development under the 2005 LRDP was determined to have no impact related to State scenic highways.

While there are no scenic highways in the campus vicinity, the 2005 LRDP includes the provision to retain the southeast hills and associated rock outcroppings, considered a scenic resource, as an Open Space Reserve. The project is not located in or in proximity to the southeast hills. Additionally, the temporary construction staging/equipment laydown area will not be located in proximity to the southeast hills. Therefore, there would be no impact from implementation of the proposed project on scenic resources, including within a State scenic highway, consistent with the findings of the 2005 LRDP EIR.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would not substantially damage scenic resources within a scenic highway. The proposed project impacts were adequately addressed in the LRDP EIR.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
c) Would the project 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). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?	☐	☒	☐	☐	☐

Discussion

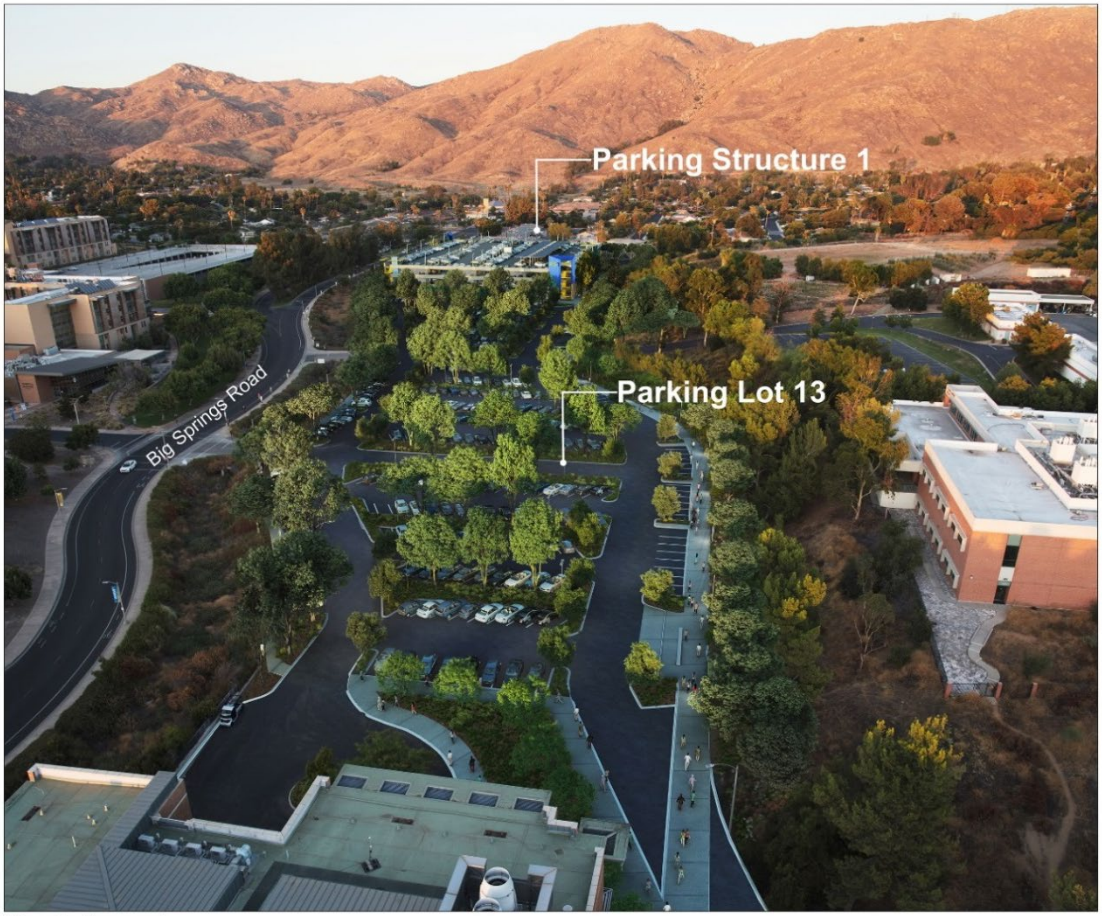
The analysis of Impact 4.1-2 in the 2005 LRDP EIR concluded that, with implementation of PS Land Use 1 through 3, PS Open Space 1 through 7, PS Conservation 1 through 4, PS Campus & Community 1, PS Development Strategy 1 through 3, and PP 4.1-2(a) through PP 4.1-2(d), development under the 2005 LRDP would result in a less than significant impact to the visual character or quality of the campus and the immediately surrounding area. As discussed above, relevant PSs and PPs have been incorporated into the proposed project.

The eastern portion of Parking Lot 13 is currently developed with a surface parking lot, with undeveloped open space to the south, bioswale followed by Big Springs Road to the north, multi-family residential to the east and northeast, open space followed by single-family residential uses to the east and southeast, and additional surface parking (western portion of Parking Lot 13) followed by Chemical Sciences Building to the west. Intermittent views of the parking lot are available from some locations of Big Springs Road and from the rear of several single-family homes located immediately east of the site. Current views from the private homes are partially screened by vegetation (in the backyards of the homes) and include views of the surface parking lot with campus buildings in the background.

Development of the proposed project would change views of the project site from that of a surface parking lot with landscape, hardscape areas, and parking lot lighting to that of a parking structure, surface parking lot with landscape, hardscape areas, and lighting from the parking structure and parking lot area. See Figure 6 and Figure 7 for visual renderings of the parking structure.

Design goals include the construction of a safe, well-planned, and intuitive parking structure that would enhance the east campus gateway, as well as provide focal architectural features and textures and an inviting and approachable entrance. Design would be developed in accordance with *UCR Physical Design Framework* and abide by the 2019 CBC, CSI's Master Format, and the UC Riverside Divisions 2-33 Technical Specifications. PS Development Strategy 1 (design review of building and landscape development), and implementation of PP 4.1-1, PP 4.1-2(a), and PP 4.1-2(b) would ensure that a parking structure is sited and designed consistent with the Campus Design Guidelines and the Campus Landscape Master Plan. PS Conservation 1 (protect native habitat, remnant arroyos, and mature trees) and PS Conservation 2 (site buildings and plan development to minimize site disturbance) require the project to include design features to reduce massing where appropriate, and to preserve or relocate mature trees, when feasible.

Figure 6 – Conceptual Parking Structure 1 Rendering



View to the east.

Figure 7 – Conceptual Parking Structure 1 Rendering

The proposed project incorporates PS Open Space 3, PS Open Space 4, and PS Campus and Community 1, which preserves natural features in naturalistic open space areas, requires the provision of a landscaped buffer east of Parking Lot 13, between the proposed parking structure and the adjacent off-campus single-family residential homes. Current views from the rear of the off-campus residential uses east of Parking Lot 13 (of a surface parking lot with campus buildings in the background) would be replaced by views of a landscaped screening followed by a parking structure and surface parking in the background.

Site improvements would include hardscape elements, site furnishings, and access control equipment that express a commitment to quality and are in character with the campus. Aesthetic design would be sensitive and consistent with the campus context through its colors, materials, textures, sensitivity to climate, building scale, outdoor public spaces, and surrounding landscape. The University's Representative would approve colors and patterns. Concrete, brick, masonry, metal panel, glass, and steel materials would be used. The color pallet would match materials currently used in campus architecture, with UCR Brick, exposed grey concrete, and grey tone painted metals. Integration of the landscape with existing topography and built form, and use of natural light and views, would be encouraged, and may include the use of vegetative screens.

Shade and shadow impacts are primarily a consideration for outdoor leisure areas such as parks, plazas, backyards, pools and play grounds. Shade and shadow simulations were prepared to evaluate potential evening shade impacts resulting from the proposed parking structure on off-site residential uses east of the project shadows (see Appendix A for the Shade and Shadow Analysis). The parking structure would cast shadows westward in the morning and eastward in the evening; thus, only the eastern shadows are a consideration. See Figure 8 for a simulation of evening shadow impacts during the summer and winter solstices.

During the summer months, a total of seven residences would be impacted by afternoon shade. Six residences would experience from 59 minutes to 2 hours, 8 minutes of shade beginning as early as 5:43 in the evening, including outdoor leisure areas, primarily backyards. One apartment building would experience shade for 2 hours, 45 minutes beginning at 5:06 pm; however, the outdoor leisure areas associated with this building would not be impacted by the parking structure shade.

During the winter months, a total of 11 residences would be impacted by afternoon shade from as early as 2:44 pm to 5:02 pm. Two of these residences would experience more than 1.5 hours of afternoon shade, 1 hour 33 minutes, and 2 hours 29 minutes respectively, including outdoor leisure areas. Overall shade impacts are not considered significant. Shade can also help reduce heat residents experience during the extreme heat of summer.

With implementation of PS Open Space 4, PS Campus and Community 1, PS Conservation 1, PS Conservation 2, PS Development Strategy 1, PP 4.1-1, PP 4.1-2(a), and PP 4.1-2(b), development of the proposed project would not substantially degrade the visual character or quality at this location.

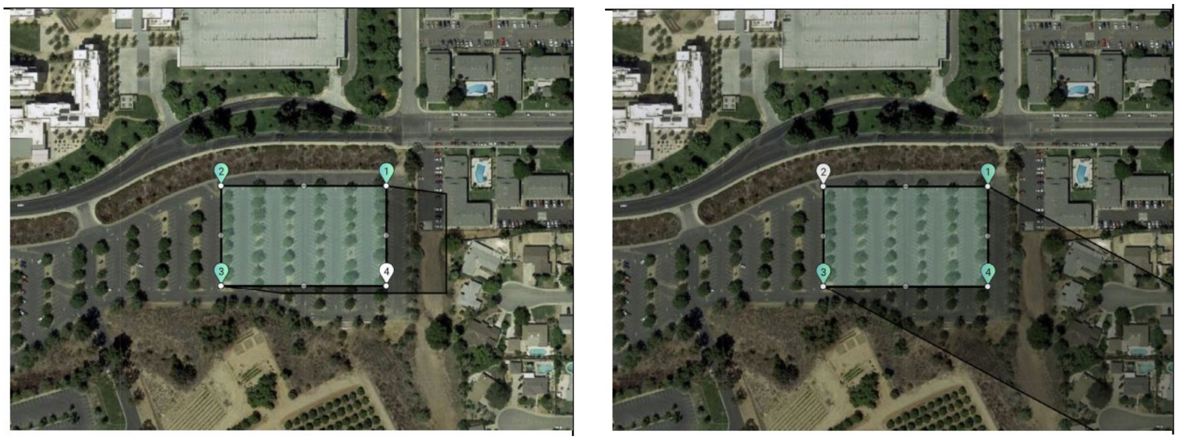
Additional Project-Level Mitigation Measures

None required.

Level of Significance

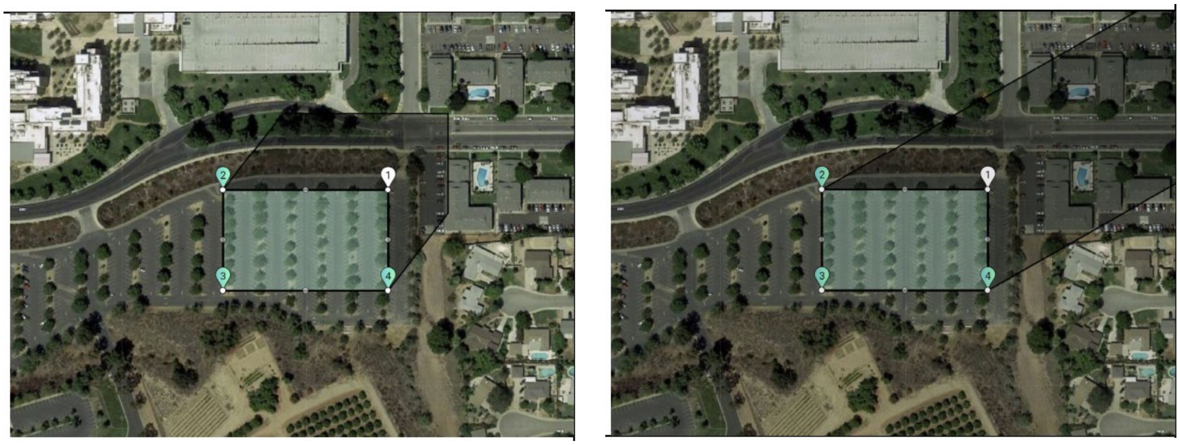
Impacts would be less than significant with the incorporation of the PSs and PPs noted above. The proposed project impacts were adequately addressed in the LRDP EIR.

Figure 8 – Shade and Shadow Simulations for Evening Summer and Winter Solstice



Simulation 1. June 21 at 5:11 pm

Simulation 2. June 21 at 7:56 pm; sunset is at 8:04 pm



Simulation 3. December 22 at 2:21 pm

Simulation 4. December 21 at 4: 34; sunset is at 4:43 pm

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
d) Would the project create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☐	☒	☐	☐	☐

Discussion

As previously discussed in Threshold V.1(a), the UC is not subject to municipal regulations. This analysis considers the project's consistency with the 2005 LRDP EIR. The 2005 LRDP EIR indicates that light and glare impacts could result from interior illumination of parking structures, exterior lighting of parking structures (e.g., associated with vehicular and pedestrian entrances) and exterior lighting of the parking area (e.g., either a surface lot, with standard street lamp fixtures, or the top parking deck of a parking structure). In addition, light and glare impacts could also result from the headlights of cars entering or exiting the parking structure (or parking lot), or from cars on ramps or the upper levels of parking structures. The analysis of Impact 4.1-3 in the 2005 LRDP EIR concluded that implementation of PS Land Use 3, PS Open Space 1 through 4, PS Conservation 1 and 2, PS Campus & Community 1, PS Development Strategy 1, PP 4.1-1, PP 4.1-2(a), PP 4.1-2(b), and MM 4.1-3(a) through MM 4.1-3(c) would ensure that light and glare impacts on adjacent land uses resulting from development under the 2005 LRDP would be reduced or avoided, resulting in a less than significant impact.

Building designs consistent with the Campus Design Guidelines and the Campus Landscape Master Plan, would include features to reduce light and glare effects, and preserve or relocate mature trees, whenever feasible. As a result, the 2005 LRDP EIR concluded that development of parking facilities would be compatible with the nighttime lighting and glare of existing on-campus residential structures and the off-campus multi-family residential structures located north of Blaine Street.

The 2005 LRDP EIR identified mitigation to reduce lighting and glare impacts. MM 4.1-3(a) would require incorporation of design features that would minimize glare. Features would include non-reflective surfaces on building exteriors and prohibition of mirrored glass. In addition, MM 4.1-3(b) would require that lighting be directed to the intended illumination site to reduce spill onto adjacent areas. MM 4.1-3(c) would require structural or other barriers on parking structures to reduce light and/or glare impacts from headlights on vehicles entering or exiting the parking structure. The 2005 LRDP EIR determined that with implementation of MM 4.1-3(a) through MM 4.1-3(c), the project would not create a new source of substantial light or glare that would adversely affect daytime or nighttime views in the area.

Parking Structure 1 would provide motion sensor, variable LED smart lighting systems to further reduce illumination during nighttime hours. The structure would be dominated by concrete and painted metals and minimize use of glare-inducing materials such as glass and non-painted metal. New trees with large canopies would provide shade cover in the surface parking lot, which would reduce glare from the asphalt surface. The amount of illumination used would be based on current industry standards, and Campus Design Guidelines, and any applicable code requirements. As the project would be developed in accordance with the *UCR Physical Design Framework*, any new pedestrian walkways associated with the project would use the "UCR Tan" integral color admixture to reduce surface glare (UCR 2009).

Implementation of PS Development Strategy 1 (design review), PP 4.1-1 (design in compliance with the Campus Design Guidelines), MM 4.1-3(a) (use of non-reflective building materials), MM 4.1-3(b) (prevent stray light spillover onto adjacent residential areas), and MM 4.1-3(c) (minimize vehicular headlights in parking areas) as part of the proposed project, would ensure that impacts are less than significant. The proposed project would not result in a substantial new source of light or glare, and there would be less than significant impacts related to new sources of daytime or nighttime light and glare, consistent with the findings of the LRDP EIR.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

There would be a less than significant impact associated with the creation of a new source of substantial light or glare affecting day or nighttime views in the area with the incorporation of the PS, PP, and MMs noted above. The proposed project impacts were adequately addressed in the LRDP EIR.

2. AGRICULTURE AND FORESTRY RESOURCES

The analysis of agricultural and forestry resources is tiered from the 2005 LRDP Amendment 2 EIR and was addressed in Section 4.2, Agricultural Resources, of that document. There are no relevant elements of the proposed project related to agricultural or forestry resources, and no PSs, PPs, or MMs are applicable. There are no agricultural or forestry resources on or adjacent to the project area.

Project Impact Analysis

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Would the project 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) Would the project conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☒	☐	☐	☐
c) Would the project 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) Would the project result in the loss of forest land or conversion of forest land to non-forest use?	☐	☒	☐	☐	☐
e) Would the project 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?	☐	☒	☐	☐	☐

Discussion

The analysis of Impact 4.2-1 in Section 4.2, Agricultural Resources, of the 2005 LRDP Amendment 2 EIR concluded that, even with implementation of PS Land Use 1, PS Land Use 2, and PS Land Use 3, development under the 2005 LRDP, as amended, would result in a significant and unavoidable impact due to conversion of Prime Farmland to non-agricultural uses associated with improvements on the West Campus. However, implementation of the 2005 LRDP would not result in the loss of Prime Farmland on the East Campus, where the proposed project is located.

The 2005 LRDP Amendment 2 EIR identified the distribution of Farmland, as designated by the California Department of Conservation (DOC) Farmland Mapping and Monitoring Program, on the UCR campus at that time. The UCR campus was mapped as having 481.7 acres of Prime Farmland and Farmland of Statewide Importance (collectively, “Farmland”) primarily located on the West Campus with an isolated area of Farmland of Statewide Importance located along the eastern boundary of the East Campus. Review of the 2016 Important Farmland Map indicates a similar distribution of Farmland, primarily on the West Campus with an isolated area near the eastern boundary of the East Campus (DOC 2017). The project area is designated as “Urban Built-Up Land” and, as such, implementation of the proposed project would not convert Farmland to non-agricultural resources (DOC 2017). Therefore, the project would have no impact on agricultural resources.

As discussed in the IS prepared for, and summarized in the 2005 LRDP Amendment 2 EIR, no portion of the UCR campus is zoned for forest land, timberland, or agricultural use. The campus does not contain any forest land or timberland and is not under a Williamson Act contract. The project site does not contain existing Farmland, forest land, timberland, agricultural land, or forest land uses. Therefore, implementation of the project would result in no impacts related to conflict with existing zoning for forest land, timberland, or agriculture; no conflict with a Williamson Act Contract; and no loss or conversion of forest lands, consistent with the findings of the 2005 LRDP Amendment 2 EIR.

Implementation of the proposed project would not involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural use. Therefore, the proposed project would result in no impacts related to indirect conversion of Farmland to non-agricultural use, consistent with the findings of the 2005 LRDP Amendment 2 EIR.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

There would be no impacts to Farmland, forest land, timberland, or Williamson Act Contracts. The proposed project impacts were adequately addressed in the LRDP EIR.

3. AIR QUALITY

The analysis of air quality is tiered from the 2005 LRDP Amendment 2 EIR and was addressed in Section 4.3, Air Quality, of that document. Relevant elements of the proposed project related to air quality include the demolition of existing landscaping and pavement; use of diesel-powered off-road construction equipment and on-road trucks used for material deliveries/debris hauling; construction of an approximately 350,728 square-foot, four-level, parking structure with approximately 1,079 parking spaces; reconfiguration of the existing surface parking area; improvements to driveways from Big Springs Road; new pedestrian and bicycle pathways; associated on-site improvements; and the operation of these facilities. It is anticipated that the proposed parking structure is not a use that would generate additional trips beyond what was analyzed in the 2005 LRDP Amendment 2 EIR. As such, the proposed parking structure would accommodate the parking needs of students, staff/faculty, and visitors who are already coming on to campus and accommodate future vehicular trips that was contemplated in the 2005 LRDP Amendment 2 EIR.

The following applicable PSs, PPs, and MMs were adopted as part of the 2005 LRDP EIR and 2005 LRDP Amendment 2 EIR; they are incorporated as part of the project and are assumed in the analysis presented in this section.

PS Campus and Community 4	Provide strong connections within the campus and its edges to promote walking, bicycling, and transit use, rather than vehicular traffic.
PS Transportation 3	Provide a continuous network of bicycle lanes and paths throughout the campus, connecting to off-campus bicycle routes.

PS Transportation 5 Provide bicycle parking at convenient locations.

PP 4.3-1 The Campus shall continue to implement a Transportation Demand Management (TDM) program that meets or exceeds all trip reduction and average vehicle ridership (AVR) requirements of the South Coast Air Quality Management District (SCAQMD). The TDM program may be subject to modification as new technologies are developed or alternate program elements are found to be more effective. *(This is identical to Transportation and Traffic PP 4.14-1.)*

PP 4.3-2(a) Construction contract specifications shall include the following:

i. Compliance with all SCAQMD rules and regulations.
ii. Maintenance programs to assure vehicles remain in good operating condition.
iii. Avoid unnecessary idling of construction vehicles and equipment.
iv. Use of alternative fuel construction vehicles.
v. Provision of electrical power to the site, to eliminate the need for on-site generators.

PP 4.3-2(b) The Campus shall continue to implement dust control measures consistent with SCAQMD Rule 403 – Fugitive Dust during the construction phases of new project development. The following actions are currently recommended to implement Rule 403 and have been quantified by the SCAQMD as being able to reduce dust generation between 30 and 85 percent depending on the source of the dust generation. The Campus shall implement these measures as necessary to reduce fugitive dust. Individual measures shall be specified in construction documents and require implementation by construction contractor:

i. Apply water and/or approved non-toxic chemical soil stabilizers according to manufacturer’s specification to all inactive construction areas (previously graded areas that have been inactive for 10 or more days).
ii. Replace ground cover in disturbed areas as quickly as possible.
iii. Enclose, cover, water twice daily, or apply approved chemical soil binders to exposed piles with 5 percent or greater silt content.
iv. Water active grading sites at least twice daily.
v. Suspend all excavating and grading operations when wind speeds (as instantaneous gusts) exceed 25 miles per hour over a 30-minute period.
vi. All trucks hauling dirt, sand, soil, or other loose materials shall be covered or maintain at least two feet of freeboard (i.e., minimum vertical distance between top of the load and the top of the trailer), in accordance with Section 23114 of the California Vehicle Code.
vii. Sweep streets at the end of the day if visible soil material is carried over to adjacent roads.
viii. Install wheel washers where vehicles enter and exit unpaved roads onto paved roads, or wash off trucks and any equipment leaving the site each trip.

ix. Apply water three times daily or chemical soil stabilizers according to manufacturers' specifications to all unpaved parking or staging areas or unpaved road surfaces.
x. Post and enforce traffic speed limits of 15 miles per hour or less on all unpaved roads.

(This is identical to Geology PP 4.6-2[a] and Hydrology PP 4.8-3[c].)

MM 4.3-1(a)

For each construction project on the campus, the project contractor will implement Programs and Practices 4.3-2(a) and 4.3-2(b). In addition, the following PM_{10} and $PM_{2.5}$ control measure shall be implemented for each construction project:

- Post a publicly visible sign with the telephone number and person to contact at the lead agency regarding dust complaints. This person shall respond and take corrective action within 48 hours. The phone number of the District shall also be visible to ensure compliance

MM 4.3-1(b)

For each construction project on the campus, the University shall require that the project include a construction emissions control plan that includes a comprehensive inventory of all off-road construction equipment, equal to or greater than 50 horsepower, that will be used for an aggregate of 40 or more hours during any portion of the construction project. During construction activity, the contractor shall utilize California Air Resources Board (CARB)-certified equipment or better for all on-site construction equipment according to the following schedule:

- Post January 1, 2015: All off-road diesel-powered construction equipment greater than 50 hp shall meet the Tier 4 emission standards, where available. In addition, all construction equipment shall be outfitted with BACT devices certified by California Air Resources Board (CARB). Any emissions control device used by the contractor shall achieve emissions reductions that are no less than what could be achieved by a Level 3 diesel emissions control strategy for a similarly sized engine as defined by CARB regulations.
- A copy of each unit's certified specification, BACT documentation and CARB or SCAQMD operating permit shall be provided at the time of mobilization of each applicable unit or equipment.
- Encourage construction contractors to apply for AQMD "SOON" funds. Incentives could be provided for those construction contractors who apply for AQMD "SOON" funds. The "SOON" program provides funds to accelerate clean-up of off-road diesel vehicles, such as heavy duty construction equipment. More information on this program can be found at the following website: http://www.aqmd.gov/home/programs/business/business-detail?title=off-road-diesel-engines&parent=vehicle-engine-upgrades.

The contractor shall also implement the following measures during construction:

- Prohibit vehicle and engine idling in excess of 5 minutes and ensure that all off-road equipment is compliant with CARB's in-use off-road diesel vehicle regulation and SCAQMD Rule 2449.

- Configure construction parking to minimize traffic interference.
- Provide temporary traffic controls such as a flag person, during all phases of construction to maintain smooth traffic flow.
- Provide dedicated turn lanes for movement of construction trucks and equipment on- and off site.
- Schedule construction activities that affect traffic flow on the arterial system to off-peak hour to the extent practicable.
- Improve traffic flow by signal synchronization, and ensure that all vehicles and equipment will be properly tuned and maintained according to manufacturers' specifications.
- Use diesel-powered construction vehicles and equipment that operate on low- oxides of nitrogen (NOx) fuel where possible.
- Reroute construction trucks away from congested street or sensitive receptor areas.
- Maintain and tune all vehicles and equipment according to manufacturers' specifications.

MM 4.3-1(c)

To minimize volatile organic chemical (VOC) emissions from the painting/finishing phase, for each construction project on the campus, the project contractor will implement the following VOC control measures:

- Construct or build with materials that do not require painting, or use pre-painted construction materials.
- If appropriate materials are not available or are cost-prohibitive, use low VOC-content materials more stringent than required under SCAQMD Rule 1113.

MM 4.3-2(b)

UCR shall continue to participate in greenhouse gas (GHG) reduction programs such as the American College and University Presidents' Climate Commitment (ACUPCC) and shall adhere to the UC Policy on Sustainable Practices. The measures adopted by UCR are presented in Tables 4.16-9 and 4.16-10 in Section 4.16, Greenhouse Gas Emissions, of the 2005 LRDP Amendment 2 EIR. While these measures are typically targeted at GHG emissions, many act to reduce energy consumption and vehicle use on campus and would consequently also reduce air pollutant emissions from both area and mobile sources. In accordance with the ACUPCC and the UC Policy on Sustainable Practices and through implementation of its Climate Action Plan, UCR shall commit to reducing GHG emissions to 1990 levels by 2020, which would require significant reductions (on the order of 70 percent) from these sources in terms of GHG and therefore reductions in other air pollutants as well.

Regulatory Framework

Section 4.3 of the 2005 LRDP Amendment 2 EIR includes a detailed discussion of the regulatory framework for the LRDP. In summary, both the Federal and State governments have established ambient air quality standards for outdoor concentrations of specific pollutants, referred to as "criteria pollutants," in order to protect public health. The national and State ambient air quality standards have been set at concentration levels to protect the most sensitive persons from illness or discomfort; these levels are given with a margin of safety. The criteria pollutants for which Federal standards have been promulgated and that are most relevant to this air quality impact analysis are ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), and particulate matter (PM_{10} and $PM_{2.5}$).[2] O_3 is a gas that is formed when volatile organic compounds (VOCs) and nitrogen oxides (NOx) – both byproducts of internal combustion engine exhaust – undergo slow photochemical reactions in the presence of sunlight. Thus, VOCs and NOx are O_3 precursors.

The UCR campus is located in the South Coast Air Basin (SCAB), which includes 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 South Coast Air Quality Management District (SCAQMD) is responsible for ensuring the SCAB meets the national and State ambient air quality standards.

Subsequent to the preparation of the air quality study for the 2005 LRDP Amendment 2 EIR, there have been changes to the attainment status in the SCAB. These changes include Federal designation of the SCAB as PM_{10} attainment area and Federal designation of Los Angeles County as a nonattainment area for lead. The current Federal and State attainment designations are shown in Table 2.

Table 2 Attainment Status of Criteria Pollutants

Pollutant	State	Federal
O_3 (one hour)	Nonattainment	No standard
O_3 (eight hour)		Extreme Nonattainment
PM_{10}	Nonattainment	Attainment
$PM_{2.5}$	Nonattainment	Nonattainment
CO	Attainment	Unclassified/Attainment
NO_2	Attainment	Unclassified/Attainment
SO_2	Attainment	Attainment
Lead	Attainment	Attainment (for portion of SCAB located outside Los Angeles County)

Source: CARB 2018.

Notes:

O_3 = ozone; PM_{10} = particulate matter 10 micrometers or less in diameter; $PM_{2.5}$ = particulate matter 2.5 micrometers or less in diameter; CO = carbon monoxide; NO_2 = nitrogen dioxide; SO_2 = sulfur dioxide.

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[2] Particulate matter less than 10 microns in size is referred to as PM_{10} and particulate matter less than 2.5 microns in size is referred to as $PM_{2.5}$.

Air Quality Management Plan

In December 2012, the SCAQMD adopted the 2012 Air Quality Management Plan (AQMP), which is a regional and multiagency effort (SCAQMD, California Air Resources Board [CARB], Southern California Association of Governments [SCAG], and the U.S. Environmental Protection Agency [USEPA]). The 2012 AQMP incorporated the latest scientific and technical information and planning assumptions, including SCAG's 2012–2035 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS), updated emission inventory methods for various source categories, and SCAG's latest growth forecasts. The primary purposes of the 2012 AQMP are to demonstrate attainment of the federal 24-hour $PM_{2.5}$ standard by 2014 and to update the USEPA-approved 8-hour Ozone Control Plan. On December 20, 2012, the 2012 AQMP was submitted to CARB and the USEPA for concurrent review and approval for inclusion in the State Implementation Plan (SIP) (SCAQMD 2013). CARB approved the 2012 AQMP on January 25, 2013.

The SCAQMD updated its AQMP for the SCAB in 2016, which included a new approach focusing on available, proven, and cost-effective alternatives to traditional strategies, while seeking to achieve multiple goals in partnership with other entities, promoting reductions in GHGs and toxic risk, as well as efficiencies in energy use, transportation, and goods movement. The most effective way to reduce air pollution impacts on the health of the nearly 17 million residents within the SCAB, including those in disproportionally impacted and environmental justice communities that are concentrated along transportation corridors and goods movement facilities, is to reduce emissions from mobile sources, the principal contributor to air quality challenges within the SCAB. For that reason, the SCAQMD has been and would continue to be closely engaged with CARB and the USEPA who have primary responsibility for these sources. The 2016 AQMP recognized the critical importance of working with other agencies to develop funding and other incentives that encourage the accelerated transition of vehicles, buildings, and industrial facilities to cleaner technologies in a manner that benefits not only air quality, but also local businesses and the regional economy. These "win-win" scenarios are key to implementation of the 2016 AQMP with broad support from a wide range of stakeholders. The 2016 AQMP includes strategies and measures to meet the following National Ambient Air Quality Standards (SCAQMD 2017):

- 8-hour O_3 (75 parts per billion [ppb]) by 2031[3]
- Annual $PM_{2.5}$ (12 micrograms per cubic meter [µg/m3]) by 2025
- 8-hour O_3 (80 ppb) by 2023
- 1-hour O_3 (120 ppb) by 2022
- 24-hour $PM_{2.5}$ (35 µg/m3) by 2019

The SCAG assists by preparing the transportation portion of the AQMP. This includes the preparation of a Sustainable Communities Strategy (SCS) that responds to planning requirements of Senate Bill (SB) 375 and demonstrates the region's ability to attain GHG reduction targets set forth in State law. The SCS identifies regional and local efforts to promote new housing and employment in high-quality transit areas that would support development patterns that complement the evolving transportation network. The SCS was incorporated in the 2016 Regional Transportation Plan, adopted by SCAG on April 7, 2016. The AQMP for the SCAB establishes a program of rules and

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[3] On October 1, 2015, the USEPA lowered the 8-hour O_3 standard to 0.070 parts per million (ppm) (70 ppb). The SIP (or AQMP) for the 70 ppb standard will be due four years after the attainment/nonattainment designations are issued by the USEPA, which is expected in 2017. Thus, meeting the 70 ppb standard will be addressed in the 2021 AQMP.

regulations directed at attainment of the State and national air quality standards. Ultimately, a project's operational cumulative impact is judged against its consistency with the applicable AQMP. Conformance with the AQMP for development projects is determined by demonstrating compliance with local land use plans.

Air Quality Sensitive Receptors

The SCAQMD defines typical sensitive receptors as residences, schools, playgrounds, childcare centers, athletic facilities, long-term health care facilities, rehabilitation centers, convalescent centers, and retirement homes. The project site is not located within a K-12 school. The nearest sensitive receptors to the project site are multi-family and single-family residences immediately east of the existing parking lot. Other sensitive receptors in the vicinity of the project site include the Glen Mor Student Housing building approximately 120 feet north of the project site. Potential impacts to sensitive receptors from construction emissions are assessed under the analysis of Threshold V.3(c) below.

Methodology and Criteria Pollutant Emissions Thresholds

Criteria pollutant emissions for project construction and operation were calculated using the California Emissions Estimator Model (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 emissions associated with both construction and operations from a variety of land use projects. The model was developed for the California Air Pollution Control Officers Association in collaboration with the California air districts. CalEEMod allows for the use of default 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 input data and subsequent construction and operation emission estimates for the proposed project are discussed below. CalEEMod output files for the project are included in Appendix B to this report.

The SCAQMD recommends that projects be evaluated in terms of their quantitative thresholds, which have been established to assess both the regional and localized impacts of project-related air pollutant emissions. The significance thresholds are updated, as needed, to appropriately represent current ambient air quality standards and attainment status. As identified in Section 4.3.4, Impacts and Mitigation Measures, of the 2005 LRDP Amendment 2 EIR, UCR utilizes the SCAQMD recommended thresholds that are in place at the time development projects are proposed in order to assess the significance of quantifiable emissions. The SCAQMD recommends quantitative regional significance thresholds for temporary construction activities and long-term project operation in the SCAB. The current SCAQMD thresholds are identified in Table 3 and are applied to the proposed project.

Table 3 SCAQMD Regional Significance Thresholds

	Mass Daily Thresholds	
Pollutant	Operation Thresholds (lbs/day)	Construction Thresholds (lbs/day)
NO_X	55	100
ROG[1]	55	75
PM_{10}	150	150
$PM_{2.5}$	55	55
SO_X	150	150
CO	550	550

Source: SCAQMD 2019.

Notes:

NO_x = nitrogen oxides; ROG = reactive organic gases; PM_{10} = particulate matter with a diameter of 10 micrometers or less; $PM_{2.5}$ = particular matter with a diameter of 2.5 micro meters or less; SO_x = sulfur oxides; CO = carbon monoxide

[1] ROG are formed during combustion and evaporation of organic solvents. ROG are also referred to as Volatile Organic Compounds (VOC).

lbs/day = pounds per day

Localized Significance Thresholds

In addition to the above regional thresholds, the SCAQMD has developed Localized Significance Thresholds (LSTs) in response to the Governing Board's Environmental Justice Enhancement Initiative (1-4), which was prepared to update the *CEQA Air Quality Handbook* (1993). 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 from construction areas up to five acres in size. However, LSTs only apply to emissions fixed stationary locations and are not applicable to mobile sources, such as cars on a roadway (SCAQMD 2008). As such, LSTs are typically applied only to construction emissions because the majority of operational emissions are associated with project-generated vehicle trips.

The SCAQMD provides LST lookup tables for project sites that measure one, two, or five acres. If a site is greater than five acres, SCAQMD recommends a dispersion analysis be performed. Project construction would disturb an area of approximately 4.89 acres; therefore, this analysis uses a regression calculator to determine an applicable LST based on the project site area and the LST lookup values for two- and five-acre construction sites. LSTs are provided for receptors at a distance of 82 to 1,640 feet from the project disturbance boundary to the sensitive receptors. Construction activity would occur adjacent to closest sensitive receptors, which are residences immediately east of the existing parking lot. 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 located in SRA-23 (Metropolitan Riverside County). LSTs for construction in SRA-23 on a 4.89-acre site with a receptor 82 feet away are shown in Table 4.

Table 4 SCAQMD LSTs for Construction (SRA-23)

Pollutant	Allowable Emissions for a 4.89-acre Site in SRA-23 for a Receptor 82 Feet Away (lbs/day)
Gradual conversion of NO_X to NO_2	266
CO	1,552
PM_{10}	13
$PM_{2.5}$	8

Source: SCAQMD 2009

Project Impact Analysis

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Would the project conflict with or obstruct implementation of the applicable air quality plan?	☐	☒	☐	☐	☐

Discussion

The analysis of Impact 4.3-6 in the 2005 LRDP Amendment 2 EIR concluded that, even with implementation of PS Land Use 4 and PS Land Use 5, PS Transportation 1 through 6, and MM 4.3-6 (which implements MM 4.3-1 and MM 4.3-2[b]), development under the 2005 LRDP would likely conflict with SCAQMD AQMPs for O_3 and particulate matter; and there would be a significant and unavoidable impact. This conclusion was based on the forecasted construction emissions that exceed SCAQMD CEQA significance mass daily thresholds for VOC, NOx, PM_{10}, and $PM_{2.5}$.

The two principal criteria for conformance to the AQMP are whether (1) the project would result in an increase in the frequency or severity of existing air quality violations or cause or contribute to new violations or delay timely attainment of air quality standards and (2) whether the project would exceed the assumptions in the AQMP (SCAQMD 1993).

With respect to the first criterion, with incorporation of the identified PSs, PPs, and MMs, the forecasted project construction and operational emissions, as detailed in Threshold b, would not exceed the SCAQMD CEQA significance mass daily thresholds, which demonstrates that the project would not result in a long-term increase in the frequency or severity of existing regional air quality violations; cause or contribute to new violations; or delay timely attainment of air quality standards. With respect to the second criterion, the increase in faculty and staff to accommodate a student population of 25,000 was anticipated in the 2005 LRDP. As stated in Section 4.9 of the 2005 LRDP Amendment 2 EIR, “The projected growth in campus population by 2020 is within the SCAG projections for the City of Riverside. Therefore, the 2005 LRDP population increase would be consistent with AQMP attainment forecasts.”

The current 2016 AQMP included the projected growth associated with the 2005 LRDP, including the increase in population resulting from associated projects. This project does not induce any employment opportunities or construct housing; therefore, it does not increase population and would not exceed the assumptions in the 2016 AQMP. Additionally, the project site is in an area designated as “Parking” in the LRDP which allows for development of the proposed project. Consequently, because the proposed project would have been accounted for in SCAG’s RTP/SCS, the proposed project would not exceed the assumptions in the 2016 AQMP. Based on these criteria, it is concluded that the proposed project would not conflict with or obstruct the SCAQMD AQMP; there would be no impact, consistent with the findings in the LRDP EIR.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would not conflict with or obstruct implementation of the applicable air quality plan; there would be no impact. The proposed project would have a less than significant impact related to violating the SCAQMD pollutant thresholds with incorporation of the PPs and MMs noted above. The proposed project impacts were adequately addressed in the LRDP EIR.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
b) Would the project result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard?	☐	☒	☐	☐	☐

Discussion

The analysis of Impact 4.3-7 in the 2005 LRDP Amendment 2 EIR concluded that, with implementation of MM 4.3-7 (implements MM 4.3-2[b]), which will reduce traffic associated with campus operations), development under the 2005 LRDP would result in a less than significant impact related to cumulatively considerable net increase of pollutants for which the project region is nonattainment.

Construction Emissions

Construction-related emissions are described as short-term (or temporary) in duration. Construction activities associated with the proposed project would result in emissions of criteria air pollutants (i.e., PM_{10}, $PM_{2.5}$, CO, and the O_3 precursors VOC and NOx) from (1) construction equipment that performs demolition, excavation, grading, paving, and building construction; (2) material handling and transport (i.e., removal of demolished materials and trucking of building materials to the project site); and (3) other miscellaneous activities, including worker commuting vehicles and application of architectural coatings.

Total project construction period is anticipated to extend from December 2019 to January 2021, for a period of approximately 13 months. The construction schedule utilized for the analysis represents a “worst-case” scenario since if actual construction occurs after the dates assumed, emission factors for equipment and on-road vehicles decrease as the construction start date get delayed.

Demolition would include removal of approximately 213,000 square feet of existing landscape and hardscape areas at the project site. Approximately 1,000 cy of soil would be exported during grading operations. Truck capacity is assumed to be 16 cubic yards, resulting in approximately 125 truckloads of export (including empty truck return trips) over a 20-day period, or approximately 6 truckloads per day. The CalEEMod default haul truck trip length of 20 miles was used. Additionally, demolition activities would result in the removal of approximately 5,259 cy of debris, or approximately 658 haul trips at a length of approximately 10 miles per trip. The architectural coatings would be applied using airless sprayers.

Construction emissions for the proposed project were calculated by using the CalEEMod Version 2016.3.2. Compliance with SCAQMD rules is required and included as part of the proposed project (PP 4.3-2[a]). Additionally, the proposed project includes PPs and MMs that serve to reduce construction-related emissions and have been assumed in the analysis. Specifically, construction would be performed in accordance with SCAQMD's Rule 403, Fugitive Dust (PP 4.3-2[b]) and Rule 1113, Architectural Coatings (MM 4.3-1[c]). Additionally, Tier 4 construction equipment would be used, consistent with MM 4.3-1(b). Table 5, Modeled Construction Equipment, shows the proposed construction equipment anticipated to be used for the project.

Table 5 Modeled Construction Equipment

Construction Phase	Construction Equipment	Unit Amount	Hours of Operation
Demolition	Excavators	1	8
	Rubber Tired Dozers	1	8
	Tractors/Loaders/Backhoes	3	8
Site Preparation	Rubber Tired Dozers	3	8
	Tractors/Loaders/Backhoes	4	8
Grading	Graders	1	8
	Rubber Tired Dozers	1	8
	Tractors/Loaders/Backhoes	3	8
Building Construction	Aerial Lifts	1	8
	Forklifts	2	8
	Off-Highway Trucks	8	8
	Plate Compactors	2	8
	Pumps	1	8
	Tractors/Loaders/Backhoes	2	8
	Cranes	1	7
Paving	Off-Highway Trucks	3	8
	Paving Equipment	1	8
	Rollers	2	8
Architectural Coating	Air Compressors	1	6

Source: CalEEMod (Appendix B).

Table 6 summarizes the estimated maximum daily regional emissions associated with construction of the proposed project. Construction-related regional air quality impacts were determined by comparing these modeling results with applicable SCAQMD significance thresholds, as shown.

Table 6 Maximum Daily Regional Construction Emissions for the Proposed Project

	Emissions in Pounds per Day					
Construction Year	ROG	NO_x	CO	SO_2	PM_{10}	$PM_{2.5}$
2019	4.4	45.6	22.9	<0.1	10.7	6.7
2020	13.0	78.2	57.1	0.2	10.5	6.5
2021	2.8	21.7	17.7	<0.1	1.1	0.9
Maximum Emissions	***13.0***	***78.2***	***57.1***	***0.2***	***10.7***	***6.7***
SCAQMD Regional Significance Thresholds	75	100	550	150	150	55
Threshold Exceeded?	**No**	**No**	**No**	**No**	**No**	**No**

Source: CalEEMod (Appendix B).

Notes:

Calculations assume compliance with SCAQMD Rules 403 and 1113. Emissions were presented based on the highest emissions occurring for both winter and summer sessions. Some totals may not add up precisely due to rounding.

ROG = Reactive Organic Gases; NOx = nitrogen oxides; CO = carbon monoxide; SO_2 = sulfur dioxide; PM_{10} = particulate matter with a diameter of 10 micrometers or less; $PM_{2.5}$ = particular matter with a diameter of 2.5 micro meters or less

Estimated regional construction emissions would be less than the SCAQMD CEQA significance thresholds. Nonetheless, the project contractor would incorporate PP 4.3-2(a), MM 4.3-1(a), and MM 4.3-1(b) in the LRDP EIR as standard construction practice to further reduce air quality impacts to the extent feasible. Therefore, construction emissions from the proposed project are considered to be less than significant with incorporation of PP 4.3-2(a), PP 4.3-2(b), MM 4.3-1(a), MM 4.3-1(b), and MM 4.3-1(c), consistent with the findings of the LRDP EIR.

Operational Emissions

Long-term operation emissions are evaluated at build-out of the project. The proposed project's first full operational year is assumed to be operational in 2022 following completion of project construction in January 2021. Operational emissions are composed of area source, energy source, and mobile source emissions. Area source emissions from the proposed project include stationary combustion emissions of landscape maintenance and an average building square footage to be repainted each year. Energy emissions are typically associated with combustion of natural gas on-site. The proposed project's operational emissions are entirely attributable to area sources, as the parking structure itself would not generate trips or involve on-site combustion of natural gas. It is anticipated that existing UCR staff would assist in the maintenance and operation of the parking structure facility, as needed. The proposed parking structure is not a use that would result in campus population growth; rather, the proposed parking structure would accommodate the parking needs of students, staff/faculty, and visitors who are already coming on to campus and accommodate future vehicular trips that was contemplated in the 2005 LRDP Amendment 2 EIR.

It should be noted that UCR implements PS Campus and Community 4 (promote campus-wide non-vehicular transportation), PS Transportation 3 (campus-wide bicycle network to connect to off-campus bicycle routes), PS Transportation 5 (provide bicycle parking), and PP 4.3-1 (campus-wide implementation of a transportation demand management [TDM] program), which all serve to reduce vehicular trips.

The peak daily operational emissions associated with operation of the proposed project were calculated using CalEEMod and area shown in Table 7. As shown in Table 7, the emissions generated by operation of the proposed project would not exceed SCAQMD CEQA significance thresholds. Furthermore, the proposed project would adhere to the UC Policy on Sustainable Practices (MM 4.3-2[b]) that would reduce air pollutant emissions from both area and mobile sources and comply with the campus' TDM Program (PP 4.3-1). Therefore, air quality impacts during project operations are considered to be less than significant with incorporation of PS Campus and Community 4, PS Transportation 3, PS Transportation 5, PP 4.3-1 and MM 4.3-2(b), consistent with the findings of the LRDP EIR.

Table 7 Peak Daily Operational Emissions for the Proposed Project

	Maximum Daily Emissions (lbs/day)					
Emission Source	**ROG**	**NO_X**	**CO**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**
Project Emissions	0.2	<0.1	0.2	<0.1	<0.1	<0.1
SCAQMD Regional Thresholds	55	55	550	150	150	55
Threshold Exceeded?	**No**	**No**	**No**	**No**	**No**	**No**

Source: Appendix B.

Note: Project operational emissions consist entirely of area source emissions, as electricity consumption in the parking structure would not generate air quality emissions and the project would not result in trip generation but, rather, would accommodate trips generated by development of academic facilities. Maximum of summer and winter operational emissions are identified.

Criteria pollutant emissions from construction and operation of this project would not exceed the SCAQMD regional daily thresholds for any criteria pollutant and would not be cumulatively considerable. The impact would be less than significant, consistent with the findings of the LRDP EIR.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

Construction and operation of the proposed project would result in a less than significant cumulatively considerable net increase of criteria pollutants for which the proposed project region is in nonattainment under an applicable Federal or State ambient air quality standard with the incorporation of the PSs, PPs, and MMs noted above. The proposed project impacts were adequately addressed in the LRDP EIR.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
c) Would the project expose sensitive receptors to substantial pollutant concentrations?	☐	☒	☐	☐	☐

Discussion

The analysis of Impacts 4.3-3 and 4.3-4 in the 2005 LRDP EIR concluded that development under the 2005 LRDP would result in a less than significant impact related to exposure of sensitive receptors to substantial pollutant concentrations of CO and toxic air contaminants (TACs). Exposure to substantial concentration of construction emissions is a project-specific and site-specific analysis and was not evaluated in the 2005 LRDP Amendment 2 EIR.

Carbon Monoxide

Exposure of sensitive receptors to CO is of concern if the project contributes substantial traffic to severely-congested, high-volume, signalized intersections with an associated potential increase in local CO concentrations (i.e., CO hotspots). UCR staff would assist in the maintenance and operation of the parking structure facility, as needed. The proposed parking structure is not a use that would result in campus population growth; rather, the proposed parking structure would accommodate the parking needs of students, staff/faculty, and visitors who are already coming on to campus and accommodate future vehicular trips that was contemplated in the 2005 LRDP Amendment 2 EIR. As such, it is not anticipated that the project will add any new traffic to the study area and no additional analysis is required. This is consistent with the conclusion of the 2005 LRDP Amendment 2 EIR that implementation of the proposed project would not result in exposure of sensitive receptors to substantial concentrations of CO, and there would be no impact.

Toxic Air Contaminants

TACs are airborne substances that are capable of causing chronic (i.e., of long duration) and acute (i.e., severe but of short duration) adverse effects on human health. A human health risk assessment (HHRA) was prepared as part of the 2005 LRDP Amendment 2 EIR to estimate the potential off-campus and on-campus health risks associated with TACs generated by current and projected campus-wide operations. The emissions sources analyzed in the HHRA included natural gas combustion sources, boilers and kitchen equipment, gasoline dispensing operations, emergency generators driven by internal combustion engines, painting operations, and laboratory fume hoods (chemical usage). The HHRA concluded that full development of the campus under the 2005 LRDP Amendment 2 would not generate toxic air emissions that would result in excess human cancer risk from stationary sources or that would result in a cumulative acute or chronic non-cancer Hazard Index that exceeds the established standards.

The proposed project would not add facilities or equipment that would emit TACs. Therefore, implementation of the proposed project would not result in exposure of the additional campus population to substantial concentrations of TACs. The impact would be less than significant, which is consistent with the findings of the 2005 LRDP Amendment 2 EIR.

Construction-Source Emissions LST Analysis

The SCAQMD has developed thresholds and methodologies for analyzing the localized air quality effects on a project-specific level. The LST methodology is a conservative, simple screening methodology for determining impacts to off-site receptors from on-site emissions (SCAQMD 2009). According to the LST methodology, only on-site emissions need to be analyzed. Emissions associated with vendor and worker trips are mobile source emissions that occur off site. The emissions analyzed under the LST methodology are NO_2, CO, PM_{10}, and $PM_{2.5}$. The LST methodology provides "lookup" tables of emissions limits based on the location of the project site, the size of the project area, and the distance to the off-site receptor. For the LST method, receptor locations include residential, commercial, and industrial land use areas and any other areas where persons can be situated for an hour at a time or longer.

The nearest sensitive receptors to the project site are multi-family and single-family residences immediately east of the existing parking lot. Other sensitive receptors in the vicinity of the project site include the Glen Mor Student Housing building approximately 120 feet north of the project site. The distance to the receptors used for analysis is 25 meters (82 feet),[4] which is the minimum distance prescribed for the LST methodology for all source-to-receptor distances of 25 meters (82 feet) or less. SCAQMD provides LST lookup tables for project sites that measure one, two, or five acres. The overall project site is approximately 7.5 acres; however, approximately 4.89 acres would be disturbed. Therefore, this analysis uses a regression calculator to determine an applicable LST based on the project site area and the LST lookup values for two- and five-acre construction sites. In addition, the project is located in SRA-23 (Metropolitan Riverside County). LSTs for construction in SRA-23 on a 4.89-acre site with a receptor 82 feet away are shown in Table 4 above.

Based on these parameters, LST emissions and thresholds for the proposed project are shown in Table 8. The emissions shown in Table 8 include only on-site emissions and are less than those in Table 7 which include both off-site and on-site emissions.

Table 8 LST Results for Daily Construction Emissions

Pollutant	Maximum Daily On-Site Emissions[a] (lbs/day)	LST[b] Thresholds (lbs/day)	Exceed Threshold?
NOx	67.5	**266**	**No**
CO	45.5	**1,552**	**No**
PM_{10}	10.5	**13**	**No**
$PM_{2.5}$	6.7	**8**	**No**

Notes:

lbs/day = pounds per day; LST = localized significance threshold; NOx = nitrogen oxides; CO = carbon monoxide; PM_{10} = particulate matter less than 10 micrometers in diameter; $PM_{2.5}$ = particulate matter less than 2.5 micrometers in diameter.

[a] CalEEMod model data sheets are included in Appendix B.

[b] The LST analysis uses a regression calculator to determine an applicable LST based on the 4.89-acre project site disturbance area and the LST lookup values for two- and five-acre construction sites.

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[4] The methodology for LST analysis uses the metric system for distance factors.

As shown in Table 8, the proposed project's estimated construction emissions would not exceed the SCAQMD LST thresholds, and the impact from exposure to construction emissions at the nearest sensitive uses would be less than significant, consistent with the findings of the LRDP EIR.

Localized Significance – Long-Term Operational Activities

According to the SCAQMD LST methodology, LSTs would apply to the operational phase of a project. As discussed previously, it is anticipated that existing UCR staff would assist in the maintenance and operation of the parking structure facility, as needed. The proposed parking structure is not a use that would result in campus population growth; rather, the proposed parking structure would accommodate the parking needs of students, staff/faculty, and visitors who are already coming on to campus and accommodate future vehicular trips that was contemplated in the 2005 LRDP Amendment 2 EIR. As such, it is not anticipated that the project will add any new traffic to the study area but rather a redistribution of trips from students, faculty/staff, and visitors from other parts of campus. LST analyses evaluate whether air pollutant emissions occurring at the project site would significantly impact the nearest sensitive receptors. The project site would not involve emission sources that result in substantial levels of emissions that would have the potential to adversely affect the nearest sensitive receptors. Therefore, implementation of the proposed project would not result in significant levels of localized air pollutants since no additional vehicular trips are anticipated. As discussed previously, CO hotspots are not anticipated to occur at local intersections. CO hotspots at parking areas are likewise not anticipated to occur due to the brevity of emissions within the parking area and the requirement of passenger cars to have pollutant control devices (catalytic converters). Therefore, no significant impacts associated with exceedance of the LST from the operational phase of the project would occur consistent with the findings of the LRDP EIR.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

Construction and operation of the proposed project would have a less than significant impact related to exposure of sensitive receptors to substantial pollutant concentrations. The proposed project impacts were adequately addressed in the LRDP EIR.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
d) Would the project result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?	☐	☒	☐	☐	☐

Discussion

The analysis of Impact 4.3-5 in the 2005 LRDP Amendment 2 EIR concluded that development under the 2005 LRDP would result in a less than significant impact related to objectionable odors.

Construction activities may result in other emissions (such as those leading to odors), such as diesel exhaust associated with operations of diesel-fueled construction vehicles/equipment, architectural coatings, and asphalt paving. These odors are typical of urbanized environments and would be subject to construction and air quality regulations, including proper maintenance of machinery to minimize engine emissions. These emissions would occur during daytime hours and would be isolated to the immediate vicinity of construction activities. The odors would be of a relatively small magnitude and short duration and would quickly disperse into the atmosphere. These odors are not pervasive enough to cause objectionable odors affecting a substantial number of people. The proposed project is also regulated from nuisance odors or other objectionable emissions by SCAQMD Rule 402. Rule 402 prohibits any the discharge from any source of air contaminants or other material which would cause injury, detriment, nuisance, or annoyance to people or the public. As such, the project would have a less than significant impact.

As identified in the 2005 LRDP Amendment 2 EIR, the campus does not contain any facilities that are considered by the SCAQMD to be odor-emitting, and no such facilities would be added. Additionally, the CARB has developed an Air Quality and Land Use Handbook that outlines major common sources of odor complains, including: sewage treatment plants, landfills, recycling facilities, and petroleum refineries (CARB 2005). However, the proposed project does not include any such uses. Therefore, long-term operation of the proposed project would not expose substantial numbers of persons to objectionable odors.

In summary, impacts from construction or operation of the proposed project related to odors would be less than significant, consistent with the findings of the 2005 LRDP Amendment 2 EIR.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would create a less than significant impact associated with other emissions affecting a substantial number of people. The proposed project impacts were adequately addressed in the LRDP EIR.

4. BIOLOGICAL RESOURCES

The analysis of biological resources is tiered from the 2005 LRDP EIR and was addressed in Section 4.4, Biological Resources, of that document. Relevant elements of the proposed project related to biological resources include the retention and/or removal of existing vegetation, including trees within the project site. New trees are also proposed as part of the project. The following applicable PSs, PPs, and MMs were adopted as part of the 2005 LRDP EIR and 2005 LRDP Amendment 2 EIR and are incorporated as part of the proposed project and assumed in the analysis presented in this section.

PS Conservation 1	Protect natural resources, including native habitat; remnant arroyos; and mature trees, identified as in good health as determined by a qualified arborist, to the extent feasible.

PS Conservation 2

Site buildings and plan site development to minimize site disturbance, reduce erosion and sedimentation, reduce stormwater runoff, and maintain existing landscapes, including healthy mature trees whenever possible.

PS Open Space 3

In Naturalistic Open Space areas, where arroyos and other natural features exist, preserve wherever feasible existing landforms, native plant materials, and trees. Where appropriate, restore habitat value.

PP 4.4-1(b)

To reduce disturbance of Natural and Naturalistic Open Space areas:

i. Unnecessary driving in sensitive or otherwise undisturbed areas shall be avoided. New roads or construction access roads would not be created where adequate access already exists.
ii. Removal of native shrub or brush shall be avoided, except where necessary.
iii. Drainages shall be avoided, except where required for construction. Limit activity to crossing drainages rather than using the lengths of drainage courses for access.
iv. Excess fill or construction waste shall not be dumped in washes.
v. Vehicles or other equipment shall not be parked in washes or other drainages.
vi. Overwatering shall be avoided in washes and other drainages.
vii. Wildlife including species such as fox, coyote, snakes, etc. shall not be harassed. Harassment includes shooting, throwing rocks, etc.

PP 4.4-2(b)

In compliance with National Pollutant Discharge Elimination System (NPDES), the campus would continue to implement Best Management Practices, as identified in the UCR Stormwater Management Plan (UCR 2003):

i. Public education and outreach on stormwater impacts
ii. Public involvement/participation
iii. Illicit discharge detection and elimination
iv. Pollution prevention/good housekeeping for facilities
v. Construction site stormwater runoff control
vi. Post-construction stormwater management in new development and redevelopment

(This is identical to Geology and Soils PP 4.6-2(b) and Hydrology PP 4.8-3(d).)

MM 4.4-4(a)

Prior to the onset of construction activities that would result in the removal of mature trees that would occur between March and mid-August, surveys for nesting special status avian species and raptors shall be conducted on the affected portion of the campus following USFWS and/or CDFW guidelines. If no active avian nests are identified on or within 250 feet of the construction site, no further mitigation is necessary.

MM 4.4-4(b)	If active nests for avian species of concern or raptor nests are found within the construction footprint or a 250-foot buffer zone, exterior construction activities shall be delayed within the construction footprint and buffer zone until the young have fledged or appropriate mitigation measures responding to the specific situation have been developed and implemented in consultation with USFWS and CDFW.

Additionally, PPs 4.1-2(a) and 4.1-2(b) (included under the Aesthetics analysis, which is Section V.1 of this IS/MND) are included in the proposed project. PP 4.1-2(a) requires development of landscape plans that are consistent with the Campus Design Guidelines (including tree retention). PP 4.1-2(b) requires that the campus continue to relocate, where feasible, mature “specimen” trees that would be removed as a result of construction activities on the campus.

Rincon biologist conducted a review of relevant databases of sensitive resource occurrences.[5] A reconnaissance visit of the project site indicates the site and surrounding areas are highly urbanized by institutional (education), on- and off-campus residential and off-campus commercial development integrated with heavily travelled roads.[6] The project site is comprised of disturbed/developed land (approximately 4.6 acres) and landscaped/ornamental vegetation (approximately 2.7 acres). The project site is primarily underlain by Hanford course sandy loam soils, a hydric soil, with terrace escarpments along the north and south borders of the site (NRCS 2019). Three large bioswales which support coastal sage scrub (CSS) and riparian scrub vegetation border the site along its northern edge and collect stormwater from the parking lot to the south and Big Springs Road to the north. A hillside of disturbed CSS borders the site to the south between additional campus buildings and orchards to the south.

Project Impact Analysis

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Would the project 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 Game or U.S. Fish and Wildlife Service?	☐	☒	☐	☐	☐

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[5] California Department of Fish and Wildlife (CDFW) California Natural Diversity Data Base (CNDDB) (CDFW 2019a); the CDFW California Sensitive Natural Communities list (CDFW); the U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory Wetlands Mapper (USFWS 2019); the United States Department of Agriculture, Natural Resource Conservation Service (NRCS) Web Soil Survey (NRCS 2019); and a Google Earth Pro aerial assessment.

[6] Rincon biologist Brooke Pickett conducted site observation on July 19, 2019 between 9:00 AM and 12:00 PM. Weather conditions during the survey consisted of cool temperatures, no wind, and moderate cloud cover. Wildlife activity was generally low during the survey.

Discussion

The analysis of Impact 4.4-1 in the 2005 LRDP EIR concluded that, with implementation of PS Open Space 1 through 4, PS Conservation 1 through 3, PP 4.4-1(a), PP 4.4-1(b), MM 4.4-1(a), and MM 4.4-1(b), development under the 2005 LRDP would result in less than significant impacts on candidate, sensitive, and special-status plant and wildlife species.

Based on the land use and open space designations defined in the 2005 LRDP, on-campus plant and wildlife resources can be generally described by four biological resource "associations" as follows:

- **Natural** areas are undeveloped open space and are composed of native and naturally occurring plant species. This association refer to the southeast hills on the East Campus, where the primary plant community is coastal sage scrub.
- **Naturalistic** areas are mostly undeveloped but have been subject to modification and/or the introduction of ornamental trees and shrubs. This association is limited to drainage channels or arroyos, Picnic Hill, and the Botanic Gardens.
- **Landscaped** areas are open spaces that have been developed with turf-covered lawn areas, mature trees, and shrubs or groundcover in planting beds, typically around the edges of these spaces. This association dominates the academic core and the residential areas of the East Campus.
- **Agricultural** areas are undeveloped land that is used for agricultural teaching and research and is dominated by row crops and orchards. This association is found on most of the West Campus.

As identified in the 2005 LRDP EIR, a literature search determined that special status plant and animal species have the potential to occur within Natural and Naturalistic areas of the campus; several sensitive wildlife species and one sensitive plant species were observed within the UCR Botanic Gardens (refer to Tables 4.4-1 and 4.4-2 of the 2005 LRDP EIR). Therefore, development within Natural and Naturalistic areas could result in substantial direct and indirect (e.g., removal of foraging habitat) adverse impacts on candidate, sensitive, and/or special status species. The distribution of the campus' Natural and Naturalistic areas is shown on Figure 4.4-1, Existing Campus Biological Resources, of the 2005 LRDP EIR. As shown, the project site consists of a large paved surface parking lot and Naturalistic open space areas is located north and south of the project site.

The Naturalistic open space along Big Springs Road includes bioswales dominated by common native CSS and riparian scrub plant species including California buckwheat (*Eriogonum fasciculatum*), elderberry (*Sambucus nigra*), arroyo willow (*Salix lasiolepis*), and California live oak (*Quercus agrifolia*). These bioswales would be avoided, and no impacts to the Naturalistic open space along Big Springs Road would occur; see no impact zones on Figure 4.

The Naturalistic open space south of the project site contains disturbed CSS habitat, dominated by California sage brush (Artemisia californica) and California buckwheat, features mature trees, and lacks drainages. Impacts to the Naturalistic open space would be minimized through project design consistent with PS Conservation 2 and PS Open Space 3; however, the project would partially encroach into this area to facilitate slope stabilization, including a retaining wall. The project would directly impact CSS vegetation and ornamental trees but would avoid impacts to drainages. The surface parking area contains planters with ornamental Chinese pistache (Pistacia chinensis) trees that would be removed. Migratory or other common bird species may nest in the ornamental trees in the riparian scrub and disturbed CSS. Two common bird species were observed within the vicinity of the project site: California towhee (Melozone crissalis) and mourning dove (Zenaida macroura). Therefore, construction of the proposed project has the potential to directly (by destroying a nest) or indirectly (through construction noise, dust, and other human disturbances that may cause a nest to fail) impact protected nesting birds.

The project would incorporate MM 4.4-4(a), which requires a pre-construction survey for nesting special status avian species and raptors, and MM 4.4-4(b), which requires that exterior construction activities be delayed within the construction footprint or a 250-foot buffer zone until the young have fledged or appropriate MMs responding to the specific situation have been developed and implemented in consultation with U.S. Fish and Wildlife Service (USFWS) and California Department of Fish and Wildlife (CDFW). Because the proposed project would incorporate all relevant PSs and MMs and would be required to comply with the Migratory Bird Treaty Act (MBTA), impacts on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulation by the CDFW or by the USFWS would be less than significant with incorporation of PS Conservation 2, PS Open Space 3, MM 4.4-4(a) and MM 4.4-4(b), consistent with the findings of the LRDP EIR.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would not 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 CDFW or USFWS. Impacts would be less significant with incorporation of the PSs and MMs noted above. The proposed project impacts were adequately addressed in the LRDP EIR.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
b) Would the project 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 Game or US Fish and Wildlife Service?	☐	☒	☐	☐	☐

Discussion

The analysis of Impact 4.4-2 in the 2005 LRDP EIR concluded that there would be less than significant impacts to the on-campus portion of the USFWS-designated critical habitat area for coastal California gnatcatcher (*Polioptila californica californica*) and on the riparian habitat within the existing arroyos on campus with implementation of PS Open Space 1 through 3, PS Conservation 1, PP 4.4-1(a), PP 4.4-1(b), PP 4.4-2(a), PP 4.4.2-(b), MM 4.4-1(a), and MM 4.4-1(b). The project site is currently developed with a paved surface parking lot with associated landscape and hardscape areas. The project site features bioswales along Big Springs Road that would be avoided by the project. Disturbed CSS habitat to the south, including ornamental trees, would be directly impacted to implement slope stabilization features, including a retaining wall, but would not impact drainages. As such, the project does not have the potential to result in direct adverse effects to riparian habitat, but there would be direct adverse effects to disturbed CSS, as anticipated in the 2005 LRDP EIR. Indirect adverse effects to riparian habitat are possible; however, the proposed project would comply with PP 4.4-2(b) to use BMPs as identified in the UCR Stormwater Management Plan, which would reduce stormwater runoff and control erosion in and around the project site and reduce impacts to the adjacent bioswales. Additionally, the proposed project would comply with PS Conservation 1, PS Open Space 3, and PP 4.4-1(b) for the Naturalistic open space areas north of Parking Lot 13 because they would not be disturbed or impacted.

Impacts to the Naturalist open space would be minimized through project design consistent with PS Conservation 2. In addition, the project would include a landscape plant and vegetate any disturbed areas consistent with PS Open Space 3 which encourages the restoration of habitat value.

The proposed project would have less than significant impacts with the incorporation of PS Conservation 1, PS Conservation 2, PS Open Space 3, PP 4.4-1(b), and PP 4.4-2(b), consistent with the findings of the LRDP EIR.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would not have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the CDFW or USFWS. Impacts would be less significant with the incorporation of the PSs, PPs, and MMs noted above. The proposed project impacts were adequately addressed in the LRDP EIR.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
c) Would the project have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☒	☐	☐	☐

Discussion

As identified in Section 4.4, Biological Resources, of the 2005 LRDP EIR, development under the 2005 LRDP could involve minor development, such as extension of utility lines or pedestrian or bicycle paths, within Naturalistic open space areas, which can include arroyos that may contain jurisdictional seasonal wetlands or “waters of the U.S.” The analysis of Impact 4.4-3 in the 2005 LRDP EIR concluded that, with implementation of PS Open Space 3, PS Conservation 1 and 2, PP 4.4-1(a), PP 4.4-1(b), PP 4.4-2(a), PP 4.4.2(b), MM 4.4-3(a), MM 4.4-3(b), and MM 4.4-3(c), there would be less than significant impacts to jurisdictional wetlands.

The project site is currently developed with a surface parking lot with associated landscape and hardscape areas. The project site does not contain any surface water bodies or potentially jurisdictional water features (USFWS 2019). The nearest water features are three bioswales located along the northern portion of the project site. These bioswales are designed to filter surface runoff water, consisting of sloped sides and abundant native vegetation and would be avoided and protected during project construction. Indirect impacts to these bioswales may occur through contaminated run-off from the construction activities, as well as operational use within the project area. However, the project would comply with PP 4.4-2(b) using applicable BMPs as identified in the UCR Stormwater Management Plan, which would reduce stormwater runoff and control erosion in and around the project site and reduce impacts to the adjacent bioswales. While the open space area south of the project site will be impacted, this area does not contain wetlands or any other water features.

The proposed project would have less than significant impacts on adjacent water bodies or wetland habitat through direct removal, filling, hydrological interruption, or other means with incorporation of PP 4.4-2(b) noted above. The proposed project impacts were adequately addressed in the LRDP EIR.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would not have a substantial adverse effect on state or federally protected wetlands. Impacts would be less significant with incorporation of the PP noted above. The proposed project impacts were adequately addressed in the LRDP EIR.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
d) Would the project 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?	☐	☒	☐	☐	☐

Discussion

As identified in Section 4.4, Biological Resources, of the 2005 LRDP EIR, the large undeveloped areas of the southeast hills, including the Botanical Gardens and nearby arroyos, provide opportunities for wildlife connections between the Box Springs Mountains and Sycamore Canyon Park. These undeveloped areas function as potential wildlife corridors as they connect two or more habitat patches that would otherwise be fragmented or isolated from one another. Additionally, the 2005 LRDP EIR identified that development on campus would result in the removal of mature trees, some of which could be used by migratory birds. Nesting birds and raptors are protected by the MBTA; raptors are also protected by the California Fish and Game Code. The loss of an occupied nest as a result of construction or demolition activities would constitute a substantial adverse effect (such as "take" or "destruction" under Section 3513 of the California Fish and Game Code) and, in the case of raptors, would constitute the "take" or "destruction" of the nest or egg (under Section 3503.5 of the California Fish and Game Code).

The analysis of Impact 4.4-4 in the 2005 LRDP EIR concluded there would be less than significant impacts related to wildlife movement with implementation of PS Open Space 1, 2, 3, and 5; PS Conservation 1 and 2; PP 4.4-1(a); PP 4.4-1(b); MM 4.4-4(a); and MM 4.4-4(b).The project site is in a currently developed portion of the East Campus (Parking Lot 13) and would not involve development in the southeast hills described for wildlife connections. Therefore, implementation of the project would not interfere with wildlife movement through identified corridors. Impacts to wildlife movement would be less than significant, which is consistent with the conclusions of the 2005 LRDP EIR.

The proposed project includes PP 4.1-2(a), which ensures that project-specific landscape plans are consistent with the Campus Design Guidelines and PP 4.1-2(b), which requires that the campus continue to relocate, where feasible, mature "specimen" trees that would be removed as a result of construction activities on the campus. Additionally, the proposed project would involve planting new trees within the project site. Ornamental trees in the surface parking area will be removed in order to develop the parking structure and reconfigure the existing surface parking area. Mature trees on the southern portion of the site will be retained to the extent feasible but some will be removed in order to construct erosion control features (e.g., slope stabilization and retaining wall) and new pedestrian/bicycle pathways.

As analyzed in the 2005 LRDP EIR, it is anticipated that any migratory birds or raptors using mature trees as perching sites would leave the site upon the initiation of construction activities. However, implementation of the 2005 LRDP, including the proposed project, could still result in the removal of trees and other vegetation that may serve as perching or nesting sites of migratory birds or raptors. This would constitute substantial interference (take or destruction) with a raptor or migratory species of special concern. Therefore, the proposed project incorporates MM 4.4-4(a), which requires a pre-construction survey for nesting special status avian species and raptors, and MM 4.4-4(b), which requires that exterior construction activities be delayed within the construction footprint or a 250-foot buffer zone until the young have fledged or appropriate MMs responding to the specific situation have been developed and implemented in consultation with USFWS and CDFW. Because the proposed project incorporates all relevant PPs and MMs, impacts on nesting birds and raptors would be less than significant with incorporation of PP 4.1-2(a), PP 4.1-2(b), MM 4.4-4(a), and MM 4.4-4(b), consistent with the findings of the LRDP EIR.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would not 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. Impacts would be less significant with incorporation of the PPs and MMs noted above. The proposed project impacts were adequately addressed in the LRDP EIR.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
e) Would the project conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☒	☐	☐	☐

Discussion

UCR is a part of the UC, a constitutionally created unit of the State of California. As a State entity, UC is not subject to municipal plans, policies, or regulations, such as the County and City General Plans or local ordinances. However, because UCR its relationship with the local communities, it voluntarily reviewed the policies in the *City of Riverside General Plan* for consistency. Relevant *City of Riverside General Plan* policies include preservation of sage scrub habitat, retention of natural ridgeline areas, and preservation of Rare and Endangered Species habitat. The *County of Riverside General Plan* does not apply to the UCR Campus as it includes only unincorporated areas of the County. The analysis of Impact 4.4-5 in the 2005 LRDP EIR concluded there would be less than significant impacts related to consistency with *City of Riverside General Plan* goals related to preservation of biological resources with implementation of PS Conservation 1 and PS Open Space 1 through 3.

As discussed under Thresholds V.4(a) through V.4(d) and Threshold V.4(f), the proposed project incorporates PS Conservation 2, PP 4.1-2(a), PP 4.1-2(b), MM 4.4-4(a), and MM 4.4-4(b) and would have less than significant impacts to sensitive biological resources.

Existing landscaping, primarily ornamental trees, is proposed to be removed in order to construct the parking structure and reconfigure a portion of the existing surface parking area. Some mature trees would be removed for the construction of erosion control features (e.g., slope stabilization and retaining wall) and potentially for the construction of new pedestrian and bicycle pathways. As previously mentioned, any removal of trees would comply with the MBTA, MM 4.4-4(a), and MM 4.4-4(b).

The University currently does not have a tree preservation policy or ordinance in place. However, the landscape plan includes new trees; see Figure 4 – Conceptual Site Plan and Landscape Plan. As such, impacts would be less than significant with incorporation of PS Conservation 2, PP 4.1-2(a), PP 4.1-2(b), MM 4.4-4(a), and MM 4.4-4(b), consistent with the findings of the LRDP EIR.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would have less than significant impacts related to conflict with LRDP policies protecting biological resources with incorporation of the PS, PPs, and MMs noted above. The proposed project impacts were adequately addressed in the LRDP EIR.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
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?	☐	☒	☐	☐	☐

Discussion

A Multiple Species Habitat Conservation Plan (MSHCP) was approved and adopted by Riverside County in 2003 as a comprehensive, multijurisdictional Habitat Conservation Plan (HCP) focusing on conservation of both species and associated habitats to address biological and ecological diversity conservation needs in Western Riverside County. In addition to being an HCP pursuant to Section 10(a)(1)(B) of the Federal Endangered Species Act of 1973, this MSHCP also serves as a Natural Communities Conservation Plan under the Natural Communities Conservation Planning Act of 1991. UCR is not a Permittee to the Western Riverside MSHCP and therefore is not subject to the Conservation efforts established in the MSHCP. Nonetheless, the following analysis discusses how the proposed project complies with the MSHCP.

Sections of Criteria Cells 634 and 719 of the MSHCP include portions of the UCR campus; however, the project site is not within these Criteria Cells and therefore is not subject to any Conservation efforts. The project site is not located within a drainage feature, riparian, or riverine areas and the bioswales north of the project site will be avoided; thus, the proposed project does not conflict with Section 6.1.2 of the MSHCP. The project site does not occur within a predetermined Survey Area for the MSHCP criteria area species, mammals, amphibians, or narrow endemic plant species. As such, the proposed project does not conflict with Sections 6.1.3 and 6.3.2 of the MSHCP. The project site is not located adjacent to an existing or proposed MSHCP Conservation Area. Thus, the project is not subject to the MSHCP Urban/Wildlands Interface guidelines and does not conflict with Section 6.1.4 of the MSHCP.

The 2005 LRDP EIR concluded that development under the 2005 LRDP, of which the proposed project is a part, would not conflict with the MSHCP, and there would be no impact. Therefore, the proposed project would have no impact related to conflict with the MSHCP, consistent with the findings of the LRDP EIR.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would have no impact related to conflict with the Western Riverside County MSHCP. The proposed project impacts were adequately addressed in the LRDP EIR.

5. CULTURAL RESOURCES

The analysis of cultural resources is tiered from the 2005 LRDP EIR and was addressed in Section 4.5, Cultural Resources, of that document. Relevant elements of the project related to cultural resources include earthmoving activities for the construction of Parking Structure 1, the reconfiguration of the existing surface parking area, improvements to driveways from Big Springs Road, new pedestrian and bicycle pathways, installation of associated utility and irrigation systems, and associated site improvements.

Analysis in this section is supplemented by information resulting from a historical resource literature and records search completed for the project at the Eastern Information Center (EIC) of the California Historical Resource Information System (CHRIS), housed at UCR, on July 24, 2019. The objective of the historical records search was to determine whether any of the buildings and structures in the immediate project vicinity had been previously documented as a historical resource. Sources consulted during the historic resource literature and records search include the DPR 523 recording forms and historic resource location maps, the National Register of Historic Places (NRHP), the California Register of Historic Resources (CRHR), the Office of Historic Preservation Directory of Properties in the Historic Property Data File, and the list of California Historical Landmarks and California Points of Historical Interest. Results are further discussed herein.

The following applicable PP are incorporated as part of the project and assumed in the analysis presented in this section.

PP 4.5-5 In the event of the discovery of a burial, human bone, or suspected human bone, all excavation or grading in the vicinity of the find shall halt immediately and the area of the find shall be protected and the University immediately shall notify the Riverside County Coroner of the find and comply with the provisions of P.R.C. Section 5097 with respect to Native American involvement, burial treatment, and re-burial, if necessary.

Project Impact Analysis

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Would the project cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5?	☐	☒	☐	☐	☐

Discussion

The analysis of Impact 4.5-1 in the 2005 LRDP EIR concluded that there would be less than significant impacts associated with modification of historic or potentially historic resources during construction activities with implementation of PS Conservation 4, MM 4.5-1(a), and MM 4.5-1(b). The analysis of Impact 4.5-2 concluded there would be significant and unavoidable impacts with demolition of historic or potentially historic resources even with implementation of PS Conservation 4, PS Land Use 3, PS Open Space 5, PP 4.5-2, MM 4.5-1(a), MM 4.5-1(b), and MM 4.5-2. A detailed discussion of the regulatory setting and existing cultural resources is provided in Section 4.4, Cultural Resources, of the 2005 LRDP EIR. As identified, relevant regulatory programs include the National Historic Preservation Act (NHPA) of 1966, California SB 297, and the CRHR. The 2005 LRDP EIR identified a total of eight campus structures located on both the East Campus and West Campus that were considered by CRM Tech (2002) to be potentially eligible for listing in the NRHP and/or the CRHR. It also identified structures exceeding 45 years of age that were evaluated and determined not to be eligible for listing as a historic resource. In addition, the 2005 LRDP EIR included a compilation of structures that would be of age for evaluation as potentially historic by the end of the 2005 LRDP planning horizon (2015-2016). The planning horizon was extended to 2020-2021 as part of the 2005 LRDP Amendment 2 and, as such, would result in additional campus buildings that are potentially historic. None of these structures are located on the project site.

The project site and temporary construction staging and laydown area are currently developed with a surface parking area, trees and ornamental landscape, and hardscape areas. There are no structures on the project site. Based on the review of aerial photographs, site visit, and given that no structures are on site, no impacts to historical resources are anticipated with development of the proposed project.

Although the LRDP planning area contains potentially significant resources, as discussed above, the project area does not contain any known historical resources. As such, no impacts to historical resource would occur, consistent with the findings of the LRDP EIR.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would have no impact related to the potential to cause a substantial adverse change to a significant historical resource as defined in Section 15064.5 of the State CEQA Guidelines. The proposed project impacts were adequately addressed in the LRDP EIR.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
b) Would the project cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5?	☐	☐	☒	☐	☐

Discussion

The analysis of Impact 4.5-3 in the 2005 LRDP EIR concluded there would be less than significant impacts related to archaeological resources during construction activities with implementation of PS Land Use 2, PS Land Use 3, PS Open Space 1 through 3 and 5, PS Conservation 1 through 3, and PP 4.5-3.

As discussed in the 2005 LRDP EIR, three archaeological sites have been recorded within the UCR campus: Site CA-RIV-495, a prehistoric site located on a slope in the southeast hills; the 2002 discovery of a previously undocumented prehistoric site located in the southeast hills in the vicinity of Site CA-RIV-495; and Site CA-RIV-4768H, which represents the historic Gage Canal that traverses the West Campus. Cultural resources investigation in support of the 2005 LRDP EIR concluded that the following areas of the UCR campus exhibit moderate sensitivity for unknown archaeological resources: the rolling hills in the southeastern or southwestern portion of the campus and the agricultural fields on the West Campus. The project site is not in these areas and is not considered sensitive for archaeological resources.

Regarding the East Campus, the majority of the area has been developed for academic purposes. Most of these areas have been previously graded and were replaced with undocumented, artificial fill (EIP 2005). The project site is an infill development on a previously disturbed and developed site not located in the sites of archeological discovery. Substantial ground disturbance has, therefore, occurred in this area, and surface evidence of archaeological resources is not likely to be encountered with the development of the project site.

Burials or cemeteries containing human remains can also be considered an archaeological resource, in addition to tribal cultural resources (as discussed in Section V.18 of this IS/MND). Although prehistoric occupation has been documented along the eastern side of the campus, there are no known burials or cemeteries within the area. Given the developed nature of the surrounding areas and past activities in the project area as described above, the potential to find intact buried deposits within the project area is considered low. Nevertheless, there is always a possibility of encountering unknown or undocumented burials containing human remains during earth moving activities. UCR's standard contract specifications address the protection and recovery of buried archaeological resources, including human remains, and the standard requirements are incorporated into the project as MM CUL-1, presented below. This mitigation measure identifies steps to be taken in the event archaeological resources, including human remains, are discovered during construction activities.

Additional Project-Level Mitigation Measures

MM-CUL 1 If an archaeological resource is discovered during construction, all soil-disturbing work within 100 feet of the find shall cease and the University Representative shall contact a qualified Archaeologist meeting the Secretary of the Interior standards within 24 hours of discovery to inspect the site. If a resource within the project area of potential effect is determined to qualify as a unique archaeological resource (as defined by the California Environmental Quality Act [CEQA]), the University shall devote adequate time and funding to determine if it is feasible, through project design measures, to preserve the find intact. If it cannot be preserved, the University shall retain a qualified non-University Archaeologist to 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.

a. If significant Native American cultural resources are discovered, as determined by the consulting Archaeologist for which a Treatment Plan must be prepared, the contractor or his Archaeologist shall immediately contact the University Representative. The University Representative shall contact the appropriate tribal representatives.

b. If requested by tribal representatives, the University, the contractor, or his project Archaeologist shall, in good faith, consult on the discovery and its disposition (e.g., avoidance, preservation, return of artifacts to tribe).

c. In the event of the discovery of a burial, human bone, or suspected human bone, all excavation or grading in the vicinity of the find shall halt immediately and the area of the find shall be protected. The University shall immediately notify the Riverside County Coroner of the find and comply with the provisions of *California Health and Safety Code* Section 7050.5.

Level of Significance

The proposed project would have a less than significant impact related to substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5 of the State CEQA Guidelines with incorporation of project-level mitigation measure MM CUL-1.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
c) Would the project disturb any human remains, including those interred outside of formal cemeteries?	☐	☒	☐	☐	☐

Discussion

The analysis of Impact 4.5-5 in the 2005 LRDP EIR concluded that there would be less than significant impacts related to the disturbance of human remains, including those interred outside of formal cemeteries, during construction activities with implementation of PS Land Use 3; PS Open Space 1, 2, and 5; PS Conservation 1 and 2; and PP 4.5-5. As discussed in the 2005 LRDP EIR, no formal cemeteries are known to have occupied the UCR campus, so any human remains encountered would likely come from archaeological or historical archaeological contexts. As such, given the presence of archaeological resources on the campus, ground-disturbing activities associated with development could affect unknown human remains, particularly in those areas of the campus that are in a relatively undisturbed condition.

The project site has been previously disturbed and is currently developed with a surface parking area with related landscape and hardscape. Despite previous development, there is always a possibility for encountering unknown human remains.

Human burials, in addition to being potential archaeological resources, have specific provisions for treatment in Section 5097 of the Public Resources Code. In accordance with these requirements, the project incorporates PP 4.5-5, which requires implementation of these provisions if human remains are discovered on campus. Accordingly, the project would result in a less than significant impact related to the disturbance of human remains with incorporation of PP 4.5-5, consistent with the findings of the LRDP EIR.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would have a less than significant impact related to the potential disturbance of human remains, including those interred outside of formal cemeteries with incorporation of the PP noted above. The proposed project impacts were adequately addressed in the LRDP EIR.

6. ENERGY

In January 2019, updates to the State CEQA Guidelines were adopted, which included the addition of an Energy section, as addressed in this section.

The following applicable PS, and MM were adopted as part of the 2005 LRDP Amendment 2 EIR and are incorporated as part of the proposed project and assumed in the analysis presented in this section.

PS Conservation 5 Continue to adhere to the conservation requirements of Title 24 of the California Code of Regulations and comply with any future conservation goals or programs enacted by the University of California.

MM 4.3-3 To reduce energy consumption and areawide emission of criteria pollutants, the campus shall annually inspect and enforce an emissions control strategy, which may include, where feasible, the following:

<u>Design</u>

- Use light-colored roof materials to reduce heat again
- Orient buildings to the north and include passive solar design features
- Increase building and attic insulation beyond Title 24 requirements
- Provide electric vehicle charging systems at convenient location in campus parking facilities
- Provide prominent website and/or kiosks displaying information about alternative transportation programs
- Install electrical outlets outside buildings for the use of electric landscape maintenance equipment

<u>Operation</u>

- Implement a subsidized vanpool program
- Implement staggered or compressed work schedules to reduce vehicular traffic
- Use alternative fuel shuttle buses to reduce intra-campus vehicle trips
- Provide shuttle service to major off-campus activity centers and Metrolink station(s)
- Aggressive expansion of the campus TDM program to achieve an AVR of 1.5

- Expand transit subsidies to encourage use of public transit
- Implement incentives for telecommuting
- Convert campus fleet to low emission, alternative fuel, and electric vehicles over time
- Implement solar or low-emission water heaters
- Implement an educational program for faculty and staff and distribute information to students and visitors about air pollution problems and solutions

In addition, the following PPs and MM are incorporated into the proposed project and would reduce energy impacts: PP 4.3-1 included under the Air Quality analysis (Section V.3 of this IS/MND) which addresses implementation of a TDM program; PP 4.3-2(a) included under the Air Quality analysis (Section V.3 of this IS/MND) which requires compliance with SCAQMD rules and regulations; and MM 4.3-1(b) included under the Air Quality analysis (Section V.3 of this IS/MND) which requires implementation of Construction Best Practices.

Energy consumption is regulated through Federal, State, and local guidelines. On a Federal level, the Energy Independence and Security Act of 2007 (*Public Law* 110–140) sets standards for Corporate Average Fuel Economy; Renewable Fuel; appliance energy efficiency; building energy efficiency; and accelerated research and development tasks on renewable energy sources (e.g., solar energy, geothermal energy, and marine and hydrokinetic renewable energy technologies), carbon capture, and sequestration. The State regulations primarily regulate utility companies and ensures the provision of safe, reliable utility service and infrastructure related to electric, natural gas, telecommunications, water, railroad, rail transit, and passenger transportation companies. Local regulations provide planning programs intended to incentivize efficient energy use for increased sustainability and affordability.

UCR has committed to sustainability throughout the campus through a number of programs designed to promote energy efficiency, alternative energy, smart procurement, and clean energy research.

Development of the proposed project would involve the consumption of gasoline and diesel fuel from off-road construction equipment and on-road vehicle sources such as vendor trucks, haul trucks, and worker trips. During operation, vehicles entering and exiting the project site would use transportation fuels. In addition, electricity would be used for parking structure and surface parking area lighting, and for conveyance of water (irrigation and sink in the storage room). As mandated by State and local laws, the proposed project is required to assess energy consumption during construction and operations.

Construction

Fuel use for both diesel and gasoline are provided for the construction phase for off-road equipment, worker commutes, haul trips, and vendor trips. Fuel consumption was estimated based on anticipated construction durations, as well as equipment quantities and types. Construction energy consumption was estimated using a combination of CalEEMod.

Operation

The operations phase of the project would result in energy consumption from vehicle trips associated with the proposed project as well as electrical consumption for security lighting, elevator, HVAC, and electricity to power electric vehicles. Operational phase energy consumption was estimated using CalEEMod for vehicle trips, trip lengths, and vehicle types. CalEEMod generates electricity consumption projections based on energy data specific to land uses.

Electricity

The Riverside Public Utilities (RPU) currently provides electricity to the UCR campus. The energy is received through a 69 kV line at a substation west of the I-215/SR-60. From this point, the power is reduced to a usable voltage and then distributed to individual buildings and transformers. The existing UCR distribution system has been expanded and renovated in the last decade. The substation has been enlarged to accommodate two new transformers and associated outdoor switchgear to provide distribution of power to the campus at 12 kV. Campus 4.16 kV distribution lines and building transformers have been gradually replaced on a selected basis. The City-owned substation is a dual transformer system, with each transformer powered from a different 69 kV utility station. Normally, half of the campus load is served by each transformer through a 12 kV loop distribution system. Should either transformer experience a power failure, the entire campus 12 kV load could be transferred to the transformer remaining in service. For this reason, the capacity of the substation is 25 mega volt amps (MVA) versus the 50 MVA-installed rating of the two transformers.

Natural Gas

UCR currently utilizes natural gas for heating and some cooling needs for research and instructional lab purposes. A high-pressure gas distribution system owned and maintained by SoCalGas provides natural gas to the Central Utility Plant, as well as many individual buildings on campus.

As of June 2019, no new UC buildings or major renovations, except in special circumstances, will use on-site fossil fuel combustion, such as natural gas, for space and water heating. The proposed project would not consume natural gas.

Project Impact Analysis

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Would the project result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?	☐	☐	☐	☒	☐

Discussion

Construction Energy Demand

Construction energy use could be considered wasteful, inefficient, or unnecessary if construction equipment is not well-maintained such that its energy efficiency is substantially lower than newer equipment; if equipment idles when not in use; if construction trips utilize longer routes than necessary; or if excess electricity and water[7] are used during construction activities. Pursuant to the CCR (specifically, Title 13, Section 2485), all diesel-fueled commercial motor vehicles must not idle for more than five consecutive minutes at any location. Mandatory compliance should reduce fuel use by construction vehicles. MM 4.3-1(b) requires construction equipment utilize equipment that complies with Tier 4 final engine standards. Tier 4 final engines are the newest, lowest emitting off-road engines. Fuel efficiency for these engines would not be considered inefficient. Fuel energy consumed during construction would also be temporary in nature, and there are no unusual project characteristics that would necessitate the use of construction equipment that would be less energy-efficient than at comparable construction sites in other parts of the region or state. Short-term energy usage for construction of the proposed project would result in long-term energy savings from renovated and newly constructed buildings that are compliant with the current Title 24 CBC and goals/strategies adopted by UCR pursuant to PS Conservation 5.

The construction of the project would require the use of construction equipment for demolition, site preparation, grading, paving, and building activities. All off-road construction equipment is assumed to use diesel fuel. Transportation energy use depends on the type and number of trips, vehicle miles traveled, fuel efficiency of vehicles, and travel mode. During construction, transportation energy would be used for the transport and use of construction equipment, from delivery vehicles and haul trucks, and from construction employee vehicles that would use diesel fuel and/or gasoline. The use of these energy resources fluctuates according to the phase of construction and would be temporary, as construction activities are anticipated to occur over an approximately 13-month period. Table 9 quantifies anticipated energy use during construction activities.

Table 9 Estimated Fuel Consumption during Construction

Fuel Type	Gallons of Fuel	MMBtu[4]
Diesel Fuel (Construction Equipment)[1]	157,817	20,115
Diesel Fuel (Hauling & Vendor Trips)[2]	18,382	2,343
Other Petroleum Fuel (Worker Trips)[3]	22,065	2,422
Total	**198,264**	**24,880**

Source: Appendix B

Notes: Totals may not add up precisely due to rounding.

[1] Fuel demand rate for construction equipment is derived from the total hours of operation, the equipment's horse power, the equipment's load factor, and the equipment's fuel usage per horse power per hour of operation, which are provided in CalEEMod outputs (see Appendix B), and from compression-ignition engine brake-specific fuel consumptions factors for engines between 0 to 100 horsepower and greater than 100 horsepower (U.S. EPA 2018). Fuel consumed for all construction equipment is assumed to be diesel.

[2] Fuel demand rate for hauling and vendor trips (cut material imports) is derived from hauling and vendor trip number, hauling and vendor trip length, and hauling and vendor vehicle class from "Trips and VMT" Table contained in Section 3.0, *Construction Detail*, of the CalEEMod results (see Appendix B). The fuel economy for hauling and vendor trip vehicles is derived from the United States Department of Transportation (U.S. DOT 2018a). Fuel consumed for all hauling trucks is assumed to be diesel.

[3] The fuel economy for worker trip vehicles is derived from the U.S. Department of Transportation National Transportation Statistics (24 mpg) (U.S. DOT 2018b). Fuel consumed for all worker trips is assumed to be gasoline.

[4] CaRFG CA-GREET 3.0 fuel specification of 109,772 Btu/gallon used to identify conversion rate for fuel energy consumption for worker trips specified above. Low-sulfur Diesel CA-GREET 3.0 fuel specification of 127,460 Btu/gallon used to identify conversion rate for fuel energy consumption for construction equipment specified above (CARB 2018b).

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[7] Indirect energy use for the extraction, treatment, and conveyance of water.

The construction energy estimates represent a conservative estimate because the construction equipment used in each phase of construction was assumed to be operating every day of construction. According to the California Annual Retail Fuel Outlet Report Results (CEC-A15), retail diesel sales in Riverside County totaled approximately 132 million gallons while retail gasoline sales totaled approximately 1.05 billion gallons in 2018 [California Energy Commission (CEC) 2019b]. Therefore, fuel consumption associated with project construction would account for approximately 0.1 percent of annual retail diesel sales and approximately 0.002 percent of annual retail gasoline sales in Riverside County.

Based on the above discussion, the proposed project would not involve the inefficient, wasteful, and unnecessary use of energy during construction, and the construction-phase impact related to energy consumption would be less than significant.

Operational Energy Demand

Long-term energy use would be considered inefficient if alternative energy sources are not used when they are feasible/available and if the new buildings are not compliant with building code requirements for energy efficiency. The regulations, plans, and policies adopted for the purpose of maximizing energy efficiency that are directly applicable to the proposed project include (1) California's Title 24 Energy Efficiency Standards for Residential and Nonresidential Buildings, and (2) the CALGreen Code. All UC projects shall outperform California's Title 24, Part 6, currently in effect, by 20 percent. The proposed project would be developed in compliance with these regulations, plans, and policies.

Electrical service would be supplied from the campus normal power distribution system (12 kV) until the installation of photovoltaic panels. Parking Structure 1 would be designed as a future net-zero parking structure, where future photovoltaic panels could be located on the top deck (open to the exterior) for optimal sun rays. Until Parking Structure 1 is operational as a net-zero structure, operation of the project would increase area energy demand from greater electricity consumption at a site currently used as a surface parking lot. Electricity would be used for the elevator system and lighting in and around Parking Structure 1, pole lighting in Parking Lot 13, and electricity to power electric vehicles that would park on site.

The Parking Structure 1 and site will provide EV-ready stalls equivalent to eight percent of the total space/stall count, which would equate to approximately 106 EV-ready locations. The EV-ready stations would use a 120-volt/20-amp power circuit, which provides 2.4 kilowatts maximum power per charge (ClipperCreek 2019).

As discussed previously, analysis by the CEC concludes that the 2019 energy efficiency standards are projected to result in a 30 percent improvement in energy efficiency over the 2016 standards and are planned to be effective January 1, 2020. Based on the CalEEMod included as Appendix B, the electricity usage from the proposed project would be approximately 767,050 kilowatt hours per year (million kWh/yr) until Parking Structure 1 becomes a net-zero structure. After the parking structure is operational as a net-zero structure, electricity would continue to be supplied from the service grid to the pole lighting in Parking Lot 13. For now, because the new campus structures in the proposed project would be constructed to exceed the latest energy efficiency standards by 20 percent, energy use associated with the proposed project would not be considered inefficient, wasteful, or unnecessary.

Transportation energy use would be associated with daily trips associated with the proposed project. The proposed project would not generate new vehicle miles traveled (VMTs). UCR staff would assist in the maintenance and operation of the parking structure facility, as needed. The proposed parking structure is not a use that would result in campus population growth; rather, the proposed parking structure would accommodate the parking needs of students, staff/faculty, and visitors who are already coming on to campus and accommodate future vehicular trips that was contemplated in the 2005 LRDP Amendment 2 EIR. Furthermore, as a parking land use, the project would not itself generate vehicle trips but rather accommodate trips generated by existing and planned academic facilities at UCR. As such, fuel consumption associated with project operation would be minimal. The project would have minimal daily operational energy demand associated with fossil fuels consumed for maintenance activities and safety inspections. Transportation fuels consumption would steadily decline with increases to the Corporate Average Fuel Efficiency Standards as well as the phase-out of older, more fuel consumptive vehicles.

Relative to Criterion 1— The UC Policy on Sustainable Practices seeks to go beyond the reduction by 20 percent over the 2016 Building Standards for new construction projects. Depending on when the building permit for this project is issued, the project would be subject to either the 2019 Building Standards or the reductions in energy usage within the UC Policy on Sustainable Practices. Regardless, the proposed project will be consistent with Criterion 1 and result in a decrease in the overall per capita energy consumption by implementing energy efficiency associated with the project.

In regards to Criterion 2 (decreasing reliance on fossil fuels such as coal, natural gas, and oil) and Criterion 3 (increasing reliance on renewable energy sources) development of the proposed project is guided by UC Policy on Sustainable Practices and goals to achieve carbon neutrality, which include UCR transportation emission reduction strategies (increase access to alternative modes of transportation, such as accommodations for electric vehicles, incentives for carpools, educational materials, and bicycle and pedestrian facilities), solar carports, thermal energy storage, solar farm, and other non-fossil fuel sources of energy. Increases in energy efficiency for buildings and water and solid waste conservation efforts would result in reductions in energy consumption. Implementation of these measures to reduce energy consumption for transportation, building energy usage, water consumption, and solid waste generation would directly reduce reliance on fossil fuel usage, which is used to generate electricity and meet heating needs. This reduction in fossil fuel reliance is consistent with Criterion 2.

In summary, the proposed project is consistent with the 2005 LRDP. The project will also develop an energy efficient building that exceeds the requirements of the State of California's Title 24 energy efficiency standards, pursuant to PS Conservation 5. In addition, the LRDP has PPs as well as MM which include PP 4.3-1 (TDM program), PP 4.3-2(a) (Construction Best Practices), MM 4.3-3 (Energy Consumption) which promote energy efficiency. As such, the project would not result in significant impacts related to inefficient, wasteful, or unnecessary consumption of energy.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would have less than significant impacts related to wasteful or unnecessary energy consumption with the incorporation of the PPs and MM noted above and would result in a less than significant impact with regards to energy consumption.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
b) Would the project conflict with or obstruct a state or local plan for renewable energy or energy efficiency?	☐	☐	☐	☒	☐

Discussion

Consistency with Statewide, Regional, and Local Policies

As discussed above, strategies and measures have been implemented at the State level with the California's Title 24 Energy Efficiency Standards for Residential and Nonresidential Buildings and the CALGreen Code.

All newly constructed buildings would be developed in compliance with (and exceed) Title 24 Energy Efficiency Standards and the CALGreen Code, and UCR would incorporate other green building strategies as part of their Sustainable Practices Policy in new development including energy consumption reduction targets and water use reduction, pursuant to PS Conservation 5. The proposed project would achieve a minimum ParkSmart rating of "Bronze" designation by the GBCI, with the possibility of achieving a "Silver" designation. The proposed project would not impede the policies described in CARB's Scoping Plan Update, or others, that will help achieve established goals.

Consistency with the UCR Sustainability Policies and Measures

As discussed previously, the project is part of the UCR campus which has established numerous sustainability programs. These programs include, but not limited to, the Green Lab, Green Campus Action Plan, Sustainable Practices Policy, green procurement, carbon neutrality, and Sustainable Integrated Grid Initiative. Energy consumption related to the project would occur in the context of these programs and the LRDP. The LRDP stated that future development of the campus under the amended 2005 LRDP would comply with the University policy on sustainability, as well as any future conservation goals or programs enacted by the UC. For all of these reasons, implementation of the 2005 LRDP as amended would not encourage the wasteful or inefficient use of energy, and this impact would be less than significant. The proposed project would likewise be consistent with the energy conservation goals and programs established by the UC. The LRDP has PPs as well as MM which include PP 4.3-1 (TDM program), PP 4.3-2(a) (Construction Best Practices), and MM 4.3-3 (Energy Consumption) which promote energy efficiency. Consequently, the project would not conflict with or obstruct a State or local plan for renewable energy or energy efficiency. The impact would be less than significant.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would not conflict with or obstruct a state or local plan for renewable energy or energy efficiency . Impacts would be less than significant.

7. GEOLOGY AND SOILS

The analysis of geology and soils is tiered from the 2005 LRDP EIR and was addressed in Section 4.6, Geology and Soils, of that document. Relevant elements of the proposed project related to geology and soils include earthmoving activities to accommodate the required removal and preparation of the underlying soils for the construction of Parking Structure 1, the reconfiguration of Parking Lot 13 surface parking, improvements to driveways from Big Springs Road, new pedestrian and bicycle pathways, and the installation of associated utility and irrigation systems.

Information in this section is primarily based on the Geology and Soils Report prepared for the proposed project by Inland Engineering Technologies (IET) and is provided in Appendix C (IET 2019).

The following applicable PPs are incorporated as part of the proposed project and are assumed in the analysis presented in this section.

PP 4.5-4 Construction specifications shall require that if a paleontological resource is uncovered during construction activities:

i. A qualified paleontologist shall determine the significance of the find.
ii. The Campus shall make an effort to preserve the find intact through feasible project design measures.
iii. If it cannot be preserved intact, then the University shall retain a qualified non-University paleontologist to design and implement a treatment plan to document and evaluate the data and/or preserve appropriate scientific samples.
iv. The paleontologist shall prepare a report of the results of the study, following accepted professional practice.
v. Copies of the report shall be submitted to the University and the Riverside County Museum.

PP 4.6-1(a) During project-specific building design, a site-specific geotechnical study shall be conducted under the direct supervision of a California Registered Engineering Geologist or licensed geotechnical engineer to assess seismic, geological, soil, and groundwater conditions at each construction site and develop recommendations to prevent or abate any identified hazards. The study shall follow applicable recommendations of CDMG Special Publication 117 and shall include, but not necessarily be limited to:

- Determination of the locations of any suspected fault traces and anticipated ground acceleration at the building site.
- Potential for displacement cause by seismically inducted shaking, fault/ground surface rupture, liquefaction, differential soil settlement, expansive and compressible soils, landsliding, or other earth movements or soil constraints.
- Evaluation of depth to groundwater.

The structure engineer shall incorporate the recommendations made by the geotechnical report when designing building foundations.

PP 4.6-1(c) The Campus will continue to fully comply with the University of California's Policy for Seismic Safety, as amended. The intent of this policy is to ensure that the design and construction of new buildings and other facilities shall, at a minimum, comply with seismic provisions of the California Code of Regulations, Title 24, California Administrative Code, the California State Building Code, or local seismic requirements, whichever requirements are most stringent.

PP 4.6-2(a) The Campus shall continue to implement dust control measures consistent with SCAQMD Rule 403 – Fugitive Dust during the construction phases of new project development. The following actions are currently recommended to implement Rule 403 and have been quantified by the SCAQMD as being able to reduce dust generation between 30 and 85 percent depending on the source of the dust generation. The Campus shall implement these measures as necessary to reduce fugitive dust. Individual measures shall be specific in construction documents and require implementation by construction contractor.

i. Apply water and/or approved nontoxic chemical soil stabilizers according to manufacturer's specification to all inactive construction areas (previously graded areas that have been inactive for 10 or more days).
ii. Replace ground cover in disturbed areas as quickly as possible.
iii. Enclose, cover, water twice daily, or apply approved chemical soil binders to exposed piles with 5 percent or greater silt content.
iv. Water active grading sites at least twice daily.
v. Suspend all excavating and grading operations when wind speeds (as instantaneous gusts) exceed 25 miles per hours over a 30-minute period.
vi. All trucks hauling dirt, sand, soil, or other loose materials are to be covered or should maintain at least two feet of freeboard (i.e., minimum vertical distance between top of the load and the top of the trailer), in accordance with Section 23114 of the California Vehicle Code.
vii. Sweep streets at the end of the day if visible soil material is carried over to adjacent roads.
viii. Install wheel washers where vehicles enter and exit unpaved roads onto paved roads, or wash off trucks and any equipment leaving the site each trip.
ix. Apply water three times daily or chemical soil stabilizers according to manufacturers' specifications to all unpaved parking or staging areas or unpaved road surfaces.
x. Post and enforce traffic speed limits of 15 miles per hour or less on all unpaved roads.

(This is identical to Air Quality PP 4.3-2[b] and Hydrology PP 4.8-3[c].)

PP 4.6-2(b) In compliance with NPDES, the campus would continue to implement Best Management Practices, as identified in the UCR Stormwater Management Plan (UCR 2003):

i. Public education and outreach on stormwater projects.
ii. Public involvement/participation.
iii. Illicit discharge detection and elimination.

iv. Pollution prevention/good housekeeping for facilities.
v. Post-construction stormwater management in new development and redevelopment.

(This is identical to Biological Resources PP 4.4-2[b] and Hydrology PP 4.8-3[d].)

Project Impact Analysis

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Would the project 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?	☐	☒	☐	☐	☐

Discussion

The analysis of Impact 4.6-1 in the 2005 LRDP EIR determined that, with implementation of PS Open Space 1 and 2, PS Conservation 2, and PPs 4.6-1(a) through 4.6-1(c), there would be less than significant impacts related to fault rupture, strong seismic shaking, or seismic-related hazards.

In accordance with PP 4.6-1(a), and as identified previously, a site-specific study has been prepared for the proposed project, and the associated geotechnical recommendations would be incorporated into the building design.

A subsurface investigation was conducted on the project site which included the excavation, sampling, and logging of five borings and additional exploratory borings for the proposed parking lot lights. The borings were excavated to evaluate the general characteristics of the subsurface conditions on the site including classification of site soils, determination of depth to groundwater, and to obtain representative soil samples. The report concluded that from a geotechnical perspective, the existing onsite soils appear to be suitable material for use as fill, provided they are relatively free from rocks (larger than 8 inches in maximum dimension), construction debris, and organic material (IET 2019).

The earth materials on the site are primarily comprised of topsoil and quaternary axial channel deposits. Topsoil was encountered in the upper one foot below the existing surface. This material generally consists of light to dark brown, moist, very dense, fine grained silty sand with gravel. Quaternary axial channel deposits were encountered below the topsoil to the maximum explored depth of approximately 38 feet below ground surface. This alluvial unit consists predominantly of light to dark brown, dry to moist, very dense fine-grained silty sand with gravel. No groundwater was encountered in the current subsurface investigation up to approximately 38 feet below ground surface. Based on a review of the data from nearby Department of Water Resources (DWR) well within two to four miles of the project site, it appeared that groundwater could be more than 50 feet below ground surface (IET 2019).

Fault Rupture

The project site is not located within an Earthquake Fault Zone, as delineated on the California Department of Conservation Alquist-Priolo Earthquake Fault Zoning Map (DOC 2019). The project is located approximately 5 miles southwest of the San Bernardino section of the San Jacinto Fault Zone. Based on geologic reconnaissance and given that the project site is not located on an active fault, it was determined that the probability of damage from surface fault rupture is considered to be low.

Although the project site is not located within an active fault, the project site is located in a seismically active area, as is the majority of southern California. As concluded for the UCR campus in the 2005 LRDP EIR, the project area is within a seismically active area and moderate to strong seismic shaking caused by an earthquake on any of the active or potentially active nearby local and regional faults (refer to Figure 4.6-2, Regional Fault Map, of the 2005 LRDP EIR) can be expected during the lifetime of the project. Proper engineering design and construction in conformance with the CBC standards and project-specific geotechnical recommendations would ensure that seismic ground shaking would be reduced to less than significant levels. The project would incorporate PP 4.6-1(c) to comply with the UC’s Policy for Seismic Safety, which requires compliance with CCR, Title 24, California Administrative Code, the CBC, or local seismic requirements. Design and construction of Parking Structure 1 would also comply with American Society of Civil Engineers 7-10, Minimum Design Loads for Buildings and Other Structures, and American Concrete Institute 318-11, Building Code Requirements for Structural Concrete.

Therefore, implementation of the project would not expose people and/or structures to potentially substantial adverse effects resulting from ruptures of a known earthquake fault with incorporation of PP 4.6-1(c), as addressed in the 2005 LRDP EIR.

Strong Seismic Shaking

As previously mentioned, the project area is within a seismically active area and moderate to strong seismic shaking caused an earthquake on any of the active or potentially active nearby local and regional faults (refer to Figure 4.6-2, Regional Fault Map, of the 2005 LRDP EIR) can be expected during the lifetime of the project.

According to the IET geotechnical report, the seismic soil parameters had a site class definition of D, stiff soil, based on the 2016 CBC classification system (IET 2019). A “D” classification corresponds to buildings and structures in areas expected to experience severe and destructive ground shaking but not located close to a major fault (ISAT 2014). The project would incorporate PP 4.6-1(c) to fully comply with the University of California’s Policy for Seismic Safety, which directs compliance with CCR, Title 24, California Administrative Code, the California State Building Code, or local seismic requirements. Proper engineering design and construction in conformance with the CBC standards and project-specific geotechnical recommendations would ensure that seismic ground shaking would be reduced to less than significant levels. Therefore, implementation of the project would not expose people and/or structures to potentially substantial adverse effects resulting from strong seismic ground shaking with incorporation of PP 4.6-1(c), as addressed in the 2005 LRDP EIR.

Seismic Related Shaking

As indicated in the 2005 LRDP EIR, liquefaction is a phenomenon where loose, saturated, non-cohesive soils such as silts, sands, and gravels undergo a sudden loss of strength during earthquake shaking. These soils may acquire a high degree of mobility and lead to structurally damaging deformations. Liquefaction begins below the water table, but after liquefaction has developed, the groundwater table will rise and cause the overlying soil to mobilize. Liquefaction typically occurs in areas where groundwater is less than 30 feet from the surface and where the soils are composed of poorly consolidated fine- to medium-grained sand. In addition to the necessary soil conditions, the ground acceleration and duration of the earthquake must also be of a sufficient level to initiate liquefaction.

The analysis of Impact 4.6-1 in the 2005 LRDP EIR determined that, with implementation of PS Open Space 1 and 2, PS Conservation 2, and PPs 4.6-1(a) through 4.6-1(c), there would be less than significant impacts related to fault rupture, strong seismic shaking, or seismic-related hazards.

According to the IET geotechnical report, the site is located in an area mapped as having very low susceptibility for liquefaction. No groundwater was encountered in the subsurface investigation up to approximately 38 feet below ground surface and is likely to be located a depth deeper than 50 feet below ground surface (IET 2019). Therefore, implementation of the project would not expose people and/or structures to potentially substantial adverse effects resulting from seismic-related ground failure, including liquefaction, as addressed in the 2005 LRDP EIR.

Landslides

California Geological Survey (CGS) has produced numerous maps that show landslide features and delineate potential slope-stability problem areas. Based on the CGS Information Warehouse, the project site lies in an area with no landslide reports or maps (DOC 2015).

According to the geotechnical report prepared by IET, the project site does not contain slopes more than 30 feet in height and steeper than 2:1 [horizontal:vertical (h:v)] in inclination, and none are anticipated by the project. Therefore, implementation of the project would not expose people and/or structures to potentially substantial adverse effects resulting from landslides, as addressed in the 2005 LRDP EIR.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would have a less than significant impact with related to the risk of loss, injury, or death involving fault rupture, strong seismic shaking, or seismic-related hazards. Impacts would be less than significant with compliance with the above mentioned PP and compliance with the CBC. The proposed project impacts were adequately addressed in the LRDP EIR.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
b) Would the project result in substantial soil erosion or the loss of topsoil?	☐	☒	☐	☐	☐

Discussion

The analysis of Impact 4.6-2 in the 2005 LRDP EIR concluded that there would be less than significant impacts related to soil erosion and loss of topsoil with implementation of PS Land Use 2 and 3, PS Open Space 1 through 5, PS Conservation 1 through 3, PP 4.6-2(a), and PP 4.6-2(b).

Soil erosion from water or wind can occur to exposed soils during site clearance, excavation/grading activities, and other earth-disturbing activities associated with construction, including vegetation and hardscape removal. Erosion hazards in most of the East Campus, including the project area, range from slight to moderate. Construction activities associated with the proposed project would comply with all provisions of the current CBC related to excavation activities, grading activities, erosion control, and construction of foundations to minimize or eliminate soil erosion or loss of topsoil.

The proposed project would also minimize or eliminate soil erosion during construction activities through implementation of dust-control measures consistent with SCAQMD Rule 403 (PP 4.6-2[a]) and implement BMPs, in compliance with the National Pollutant Discharge Elimination System (NPDES) permit (PP 4.6-2[b]) (refer to the discussion provided in Section V.10, Hydrology and Water Quality, of this IS/MND). When these dust-control measures and construction BMPs are applied, they significantly reduce the erosion potential of project construction to negligible amounts.

The project would also comply with PP 4.6-1(a) of the 2005 LRDP EIR, which states that a site-specific geotechnical study shall be conducted under the direct supervision of a California Registered Engineering Geologist or licensed geotechnical engineer to assess seismic, geological, soil, and groundwater conditions at each construction site and develop recommendations to prevent or abate any identified hazards. The geotechnical report prepared by IET provides the following recommendations to reduce soil erosion and loss of topsoil:

- The southern slopes on the parking lot should be maintained at a gradient of 2:1 (h:v) or flatter and be hydroseeded to minimize erosion. In-lieu of hydroseeding, erosion resistance vegetation or placement of jute matting/wattles may be considered. Proper slope irrigation practice is important to minimize erosion. V-ditches and swales should be constructed on the slope as necessary. Root balls of any dead trees (if any) should not be allowed and be removed completely and replaced with compacted fill.
- Vegetation and debris should be removed and properly disposed of offsite. All debris from the proposed demolition activities at the site should be removed and properly disposed of offsite. Areas to receive fill and/or other surface improvements should be scarified to a minimum depth of 6 inches, brought to a near-optimum moisture condition, and recompacted to at least 90 percent relative compaction.
- Compressible materials not removed by the planned grading should be excavated to competent material and replaced with compacted fill soils. In the parking structure footprint

at least the upper five feet below the existing grade or three feet below the proposed footings bottom, whichever is deeper, should be removed and replaced as compacted fill. The removal and recompaction should be extended to at least five feet outside the building footprint.

- All excavations for the proposed development should be performed in accordance with current Occupational Safety and Health Agency (OSHA) regulations and those of other regulatory agencies, as appropriate.
- Temporary excavations may be cut vertically up to four feet. Excavations over four feet should be slot-cut, shored, or cut to a 1H:1V slope gradient. Surface water should be diverted away from the exposed cut, and not be allowed to pond on top of the excavations.
- Temporary cuts should not be left open for an extended period of time.
- Areas prepared to receive structural fill and/or other surface improvements should be scarified to a minimum depth of six inches, brought to at least optimum-moisture content, and recompacted to at least 95 percent relative compaction.
- The onsite soils may generally be suitable as trench backfill provided, they are screened of rocks and other material over six inches in diameter and organic matter.
- Construction observation and testing should also be performed by the geotechnical consultant during future grading, excavations, backfill of utility trenches, preparation of pavement subgrade and placement of aggregate base, foundation or retaining wall construction or when an unusual soil condition is encountered at the site. Grading plans, foundation plans, and final project drawings should be reviewed prior to construction.

Based on the above discussion, the project would result in less than significant impacts related to soil erosion or loss of topsoil with incorporation of PP 4.6-1(a), PP 4.6-2(a) and PP 4.6-2(b), consistent with the findings of the 2005 LRDP EIR.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would have less than significant impacts related to soil erosion and loss of topsoil with incorporation of the PPs noted above. The proposed project impacts were adequately addressed in the LRDP EIR.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
c) Would the project 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) Would the project 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?	☐	☒	☐	☐	☐

Discussion

The analysis of Impacts 4.6-3 and 4.6-4 in the 2005 LRDP EIR determined that, with implementation of PS Open Space 1 and 2, PS Conservation 2, and PP 4.6-1(a), there would be less than significant impacts related to unstable geological materials, including expansive soils.

No groundwater was encountered in the subsurface investigation up to approximately 38 feet below ground surface and is likely to be located a depth deeper than 50 feet below ground surface (IET 2019). Due to the absence of groundwater in the upper 35 feet and the dense nature of onsite soils below approximately 35 feet, the potential for liquefaction or lateral spreading on site are considered low (IET 2019). Additionally, IET concluded that the project site does not contain slopes more than 30 feet in height and steeper than 2:1 h:v in inclination, and none are anticipated by the project.

As required by PP 4.6-1(a), the geotechnical recommendations outlined in the geotechnical investigation for the proposed project (i.e., general recommendations and recommendations related to expansive and corrosive soils, earthwork and site preparation, foundations, concrete slabs, subgrade preparation for concrete slabs, retaining walls, drainage control, flexible and rigid pavement design, and stormwater quality control measures) would be incorporated into the building design. Therefore, with the proposed project’s incorporation of PP 4.6-1(a), there would be less than significant impacts related to unstable and expansive soils, consistent with the findings of the LRDP EIR.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would have less than significant impacts associated with unstable and expansive soils with incorporation of the PP noted above. The proposed project impacts were adequately addressed in the LRDP EIR.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
e) Would the project have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?	☐	☒	☐	☐	☐

Discussion

Through the IS process for the 2005 LRDP EIR, implementation of the 2005 LRDP was determined to have no impact related to soils constraints for alternative wastewater disposal systems and was not carried forward for further discussion in the Draft EIR. As indicated in the 2005 LRDP EIR, the City provides sanitary sewer service to the campus and alternative systems or septic tanks are not needed. In addition, the proposed project would not include restrooms or generate wastewater. Therefore, there would be no impact related to the use of septic tanks or alternative wastewater disposal systems resulting from implementation of the project, consistent with the findings of the 2005 LRDP EIR.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would have no impact related to 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. The proposed project impacts were adequately addressed in the LRDP EIR.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
f) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☒	☐	☐	☐

Discussion

The analysis of Impact 4.5-4 in the 2005 LRDP EIR concluded that there would be less than significant impacts related to paleontological resources during construction activities with implementation of PS Land Use 3; PS Open Space 1, 2, and 5; and PP 4.5-4. As discussed in the 2005 LRDP EIR, the rock and sediment types that underlie the campus are unlikely to be fossil-bearing. However, while the likelihood of encountering paleontological resources is low, the potential for discovery of previously unknown paleontological resources cannot be eliminated. Therefore, there is a potential to encounter unknown paleontological resources because the proposed project involves excavation activities. The proposed project incorporates PP 4.5-4, which outlines the necessary steps to take in the event paleontological resources are uncovered during construction activities. Accordingly, the project would result in a less than significant impact to paleontological resources with incorporation of PP 4.5-4, consistent with the findings of the LRDP EIR.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would have less than significant impacts to paleontological resources or unique geologic features with implementation of the PP noted above. The proposed project impacts were adequately addressed in the LRDP EIR.

8. GREENHOUSE GAS EMISSIONS

The analysis of GHG emissions is tiered from the 2005 LRDP Amendment 2 EIR and was addressed in Section 4.16, Greenhouse Gas Emissions, of that document. Relevant elements of the project related GHG include the demolition of the existing landscape and hardscape areas, construction equipment and workers' vehicles during the construction phase of the project, construction and operation of Parking Structure 1, the reconfiguration of the existing surface parking area, improvements to driveways from Big Springs Road, new pedestrian and bicycle pathways, and associated on-site improvements. It is anticipated that existing UCR staff would assist in the maintenance and operation of the parking structure facility, as needed. The proposed project would achieve a minimum ParkSmart rating of "Bronze" designation by the GBCI, with the possibility of achieving a "Silver" designation.

Section 4.16 of the 2005 LRDP Amendment 2 EIR discusses the background of GHG emissions and climate change; the types of GHGs; the State, United States, and global GHG contributions; and the regulatory framework related to GHG emissions and their assessment under CEQA. This information remains current and applicable to the analysis of GHG emissions related to the proposed project in this IS/MND. In addition, subsequent regulations have been adopted to reduce GHG emissions statewide since the adoption of the LRDP Amendment 2 in 2011. SB 32 was enacted in 2016 and codified a 2030 GHG emissions reduction goal in Executive Order B-30-15 to reduce emissions 40 percent below 1990 levels. In December 2017, CARB approved California's 2017 Climate Change Scoping Plan, which identifies how the State can reach the 2030 climate target and substantially advance toward the 2050 climate goal to reduce GHG emissions by 80 percent below 1990 levels identified in Executive Order S-3-05 (CARB 2017). SB 350 was also enacted in 2015 increasing the Renewables Portfolio Standard to 50 percent by 2030 and will double the energy savings required in electricity and natural gas end uses.

University of California Policies for GHG Reduction

The following applicable PSs and MMs were adopted as part of the 2005 LRDP Amendment 2 EIR and are incorporated as part of the project and assumed in the analysis presented in this section.

PS Campus and Community 4	Provide strong connections within the campus and its edges to promote walking, bicycling and transit use, rather than vehicular traffic.

PS Transportation 3	Provide a continuous network of bicycle lanes and paths throughout the campus, connecting to off campus bicycle routes.
PS Transportation 5	Provide bicycle parking at convenient locations.
MM 4.14-1(b)	**Travel Demand Management.** To reduce on- and off-campus vehicle trips and resulting impacts, the University will enhance its Transportation Demand Management (TDM) program. TDM strategies will include measures to increase transit and Shuttle use, encourage alternative transportation modes including bicycle transportation, implement parking policies that reduce demand, and other mechanisms that reduce vehicle trips to and from the campus. The University shall monitor the performance of campus TDM strategies through annual surveys.
MM 4.14-1(d)	**Sustainability and Monitoring.** The University shall review individual projects proposed under the amended 2005 LRDP for consistency with UC sustainable transportation policy and UCR TDM strategies to ensure that bicycle and pedestrian improvements, alternative fuel infrastructure, transit stops, and other project features that promote alternative transportation are incorporated into each project to the extent feasible.
MM 4.16-1	All projects developed under the amended 2005 LRDP shall be evaluated for consistency with the GHG reduction policies of the UC Policy on Sustainable Practices, as may be updated from time to time by the University. GHG reduction measures, including, but not limited to, those found within the UC Policy identified in Tables 4.16-9 and 4.16-10 shall be incorporated in all campus projects so that at a minimum an 8 percent reduction in emissions from business as usual (BAU) is achieved. It is expected that the GHG reduction measures in the UCR CAP will be refined from time to time, especially in light of the evolving regulations and as more information becomes available regarding the effectiveness of specific GHG reduction measures. The Campus will also monitor its progress in reducing GHG emissions to ensure it will attain the established targets.

In addition, the following MMs are incorporated into the project and would reduce GHG emissions:

- MM 4.3-2(b) included under the Air Quality analysis (see Section V.3 of this IS/MND) which requires UCR to continue to participate in GHG reduction programs.
- PS Conservation 5 (see Section V.6 of this IS/MND) requiring adherence to Title 24 conservation goals and programs.

Project Impact Analysis

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Would the project generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☐	☒	☐	☐	☐

Discussion

The analysis of Impact 4.16-1 in the 2005 LRDP Amendment 2 EIR concluded that, although development under the 2005 LRDP Amendment 2 would generate substantial direct and indirect GHG emissions, impacts would be less than significant with implementation of MM 4.16-1. UCR has committed to reduce GHG emissions by over 70 percent by 2020 from business as usual (BAU) projections.

Construction

GHG emissions from the proposed project were calculated using CalEEMod Version 2016.3.2. Construction GHG emissions are generated by vehicle engine exhaust from construction equipment, on-road hauling trucks, vendor trips, and worker commuting trips. Construction assumptions are described in Section V.3, Air Quality, and in Appendix B of this IS/MND. The results are output in $MTCO_2e$ for each year of construction. The estimated construction GHG emissions for the proposed project are shown in Table 10.

Table 10 Estimated Construction GHG Emissions

Construction Year	Annual Emissions (MT CO_2e)
2019	40
2020	1,784
2021	25
Total	**1,849**
Amortized over 30 years	**62**

Notes: Emissions modeling was completed using CalEEMod. See Appendix B for modeling results. Some numbers may not add up due to rounding. Emission data is pulled from “mitigated” results that include compliance with regulations and project design features that will be included in the project.

$MTCO_2E$ = metric tons carbon dioxide equivalent.

As shown in Table 10, construction activity for the project would generate an estimated 1,849 MT CO2e. Since the draft SCAQMD GHG threshold Guidance document released in October 2008[8] recommends that construction emissions be amortized for a project lifetime of 30 years to

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[8] http://www.aqmd.gov/docs/default-source/ceqa/handbook/greenhouse-gases-(ghg)-ceqa-significance-thresholds/year-2008-2009/ghg-meeting-6/ghg-meeting-6-guidance-document-discussion.pdf?sfvrsn=2

ensure that GHG reduction measures address construction GHG emissions as part of the operational reduction strategies. Therefore, the total GHG emissions from project construction were amortized and are included in Table 11 below.

Operation

CalEEMod estimates the GHG emissions associated with the operation of the project:

- Building electricity: electricity used in Parking Structure 1 would be generated from RPU's energy sources until the building achieves net-zero energy status via installation of photovoltaic panels. This analysis is based on electricity use prior to the building achieving net-zero energy status since no timeframe has been specified.
- Lighting in the surface parking area of Parking Lot 13 would continue to use electricity from the campus grid. Electricity is also indirectly used in water supply, treatment, and distribution for irrigation. The default energy usage values used in CalEEMod are based on the CEC sponsored California Commercial End Use Survey and Residential Appliance Saturation Survey studies and reflect 2016 Title 24 improvements (CalEEMod User's Guide, Appendix B). The default energy usage values were used in this analysis.
- CalEEMod estimates the annual GHG emissions from project-related vehicle usage based on trip generation data contained in defaults or in a project-specific traffic analyses. Parking garages are assumed not to generate trips by virtue of their existence. It is assumed that trips are generated by other uses, such as academic uses.
- CalEEMod also calculates the GHG emissions associated with the disposal of solid waste into landfills based on default data contained within the model for waste disposal rates, composition, and the characteristics of landfills throughout the state. At least 50 percent of this waste would be diverted from landfills by a variety of means, such as reducing the amount of waste generated, recycling, and/or composting, with adherence to UCR goals and policies (a detailed discussion of solid waste disposal is provided in Section V.19, Utilities and Service Systems, of this IS/MND).

The proposed project would achieve a minimum ParkSmart rating of “Bronze” designation by the GBCI, with the possibility of achieving a “Silver” designation. The proposed project also incorporates PS Campus and Community 4, PS Conservation 5, PS Transportation 3 and 5, MM 4.3-2(b), MM 4.14-1(b), MM 4.14-1(d), and MM 4.16-1, which relate primarily to UCR implementation of GHG reduction policies and measures and travel demand management, and promoting alternative transportation.

Table 11 combines the construction and operational GHG emissions associated with development of the proposed project. As shown, annual emissions from the proposed project would be approximately 524 MT CO_2e.

Table 11 Combined Annual GHG Emissions

Emission Source	Annual Emissions (MT CO_2e)
Amortized Construction Emissions	62
Operational	
Area	<0.1
Energy	462
Mobile	0
Solid Waste	0
Water	0
Net Total	**524**

Notes: Emissions modeling was completed using CalEEMod. See Appendix B for modeling results. Some numbers may not add up due to rounding. Emission data is pulled from "mitigated" results that include compliance with regulations and project design features that will be included in the project. The project would not produce emissions from mobile sources because no new VMT are generated. Solid waste and water use would be minimal and resulting emissions would be negligible.

$MTCO_2e$ = metric tons of carbon dioxide equivalent per year.

As discussed in Section 4.16 of the 2005 LRDP Amendment 2 EIR, some air quality management and air pollution control districts in California, including CARB and the SCAQMD, have either proposed or adopted guidance documents for evaluating the significance of GHG emissions. Beginning in April 2008, the SCAQMD convened a Working Group to provide guidance to local lead agencies in determining significance for GHG emissions in their CEQA documents. In September 2010, the SCAQMD Working Group presented a revised tiered approach to determining GHG significance for residential and commercial projects (SCAQMD 2010). These proposals have not yet been considered by the SCAQMD Board. At Tier 1, GHG emissions impacts would be less than significant if the project qualifies under a categorical or statutory CEQA exemption. At Tier 2, for projects that do not meet the Tier 1 criteria, the GHG emissions impact would be less than significant if the project is consistent with a previously adopted GHG reduction plan that meets specific requirements.[9] At Tier 3, the Working Group proposes extending the 10,000 $MTCO_2e$/yr screening threshold currently applicable to industrial projects where the SCAQMD is the lead agency, described above, to other lead agency industrial projects. For residential and commercial projects, the Working Group proposes the following Tier 3 screening values: either (1) a single 3,000-$MTCO_2e$/yr threshold for all land use types or (2) separate thresholds of 3,500 $MTCO_2e$/yr for residential projects, 1,400 $MTCO_2e$/yr for commercial projects, and 3,000 $MTCO_2e$/yr for mixed-use projects. A project with emissions less than the applicable screening value would be considered to have less than significant GHG emissions.

As shown in Table 11, the estimated annual operational GHG emissions for the proposed project with GHG reduction features, including amortized construction emissions, is 524 $MTCO_2e$/yr. This value may be compared with the proposed SCAQMD Tier 3 screening threshold of 3,000 $MTCO_2e$/yr for all land use types. Therefore, the proposed project would generate a less than significant

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[9] The plan must (a) quantify GHG emissions, both existing and projected over a specified time period, resulting from activities within a defined geographic area; (b) establish a level, based on substantial evidence, below which the contribution GHG emissions from activities covered by the plan would not be cumulatively considerable; (c) identify and analyze the GHG emissions resulting from specific actions or categories of actions anticipated within the geographic area; (d) specify measures or a group of measures, including performance standards, that substantial evidence demonstrates, if implemented on a project-by-project basis, would collectively achieve the specified emissions level; (e) establish a mechanism to monitor the plan's progress toward achieving the level and to require an amendment if the plan is not achieving specified levels; and (f) be adopted in a public process following environmental review (State CEQA Guidelines, §15183.5).

emission rate of GHG emissions based on the SCAQMD threshold. It is therefore concluded that the direct and indirect GHG emissions of the proposed project would not be cumulatively considerable and would result in a less than significant impact with the incorporation of PS Campus and Community 4, PS Conservation 5, PS Transportation 3 and 5, MM 4.3-2(b), MM 4.14-1(b), MM 4.14-1(d), and MM 4.16-1, consistent with the findings in the LRDP EIR.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would have a less than significant impact related to GHG emissions with incorporation of the PSs and MMs noted above. The proposed project impacts were adequately addressed in the LRDP EIR.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
b) Would the project conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	☐	☒	☐	☐	☐

Discussion

The analysis of Impact 4.16-2 in the 2005 LRDP Amendment 2 EIR concluded that development under the 2005 LRDP, as amended, would result in a less than significant impact related to conflict with applicable plans, policies, or regulations concerning reductions in GHG emissions. The applicable plans, policies, or regulations pertinent to the project include the UC Policy on Sustainable Practices Policy (last issued in July 2019).

The Green Building Design section of the UC Policy on Sustainable Practices includes the following goals for new buildings that are applicable to the proposed project.

- 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. The University will strive to design, construct, and commission buildings that outperform CBC energy efficiency standards by 30 percent or more, whenever possible within the constraints of program needs and standard budget parameters.[10]

There are multiple policies and regulatory requirements applicable to development on the UCR campus, including the UC Policy on Sustainable Practices; AB 32; American College and University Presidents Climate Commitment, to which UCR is a signatory; CEQA; and USEPA reporting requirements. The UC Policy on Sustainable Practices establishes the goal for the campus to reduce GHG emissions to 1990 levels by 2020. The project incorporates MM 4.3-2(b), which requires UCR to implement the GHG reduction measures described in the 2005 LRDP Amendment 2 EIR (Tables 4.16-

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[10] The UC Policy also offers an alternative “energy performance target” method.

9 and 4.16-10 in Section 4.16); MM 4.14-1(b), which requires UCR's continued implementation and enhancement of its TDM program; MM 4.14-1(d), which requires UCR's review of individual projects for consistency with UC transportation policy and TDM strategies; and MM 4.16-1, which requires UCR's review of individual projects for consistency with the GHG reduction policies of the UC Policy on Sustainable Practices. Additionally, implementation of the proposed project would adhere to the conservation requirements of Title 24 of the CCR and comply with any future conservation goals or programs enacted by the UC (PS Conservation 5).

Specifically, the design, construction, and operation of the proposed project would include a series of green building strategies under development, along with mandatory strategies required by the CalGreen Code, and the UC Policy on Sustainable Practices to exceed CBC energy efficiency requirements by 20 percent or greater (for new buildings). Additionally, the proposed project would comply with applicable UC Policy on Sustainable Practices goals for climate protection, recycling and waste management, and sustainable operations). Based on the above analysis, the proposed project would not conflict with the UC Policy on Sustainable Practices. Impacts would be less than significant with incorporation of PS Conservation 5, MM 4.3-2(b), MM 4.14-1(b), MM 4.14-1(d), and MM 4.16-1, consistent with the findings of the LRDP EIR.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions. Impacts were considered less than significant with incorporation of PSs and MMs noted above. The proposed project impacts were adequately addressed in the LRDP EIR.

9. HAZARDS AND HAZARDOUS MATERIALS

The analysis of hazards and hazardous materials is tiered from the 2005 LRDP EIR and was addressed in Section 4.7, Hazards and Hazardous Materials, of that document. Relevant elements of the proposed project related to hazards and hazardous materials include the removal of existing landscape and hardscape areas, construction of Parking Structure 1, reconfiguration of the existing surface parking area, improvements to driveways from Big Springs Road, new pedestrian and bicycle pathways, installation of associated utility and irrigation systems, and associated on-site improvements. Landscape maintenance chemicals and cleaning products would continue to be used, consistent with existing campus operations. The design of the proposed project ensures that emergency access to and around the project area is maintained.

Section 4.7 of the 2005 LRDP EIR provides a detailed description of the hazardous materials and wastes handled and/or generated at UCR and the policies, programs, and practices implemented to manage these materials in compliance with local, State, and Federal regulations, as applicable. These include, but are not limited to, the following programs offered by UCR's Environmental Health & Safety (EH&S) Department: Biosafety; Emergency Management; Campus Emergency Response Plan; Environmental Health; Environmental Programs; Hazardous Materials Program; Spill Prevention, Control and Countermeasures Plan; Industrial Hygiene and Safety; Laboratory/Research Safety; and Radiation Safety.

The following applicable PPs were adopted as part of the 2005 LRDP EIR as supplemented and updated by the 2005 LRDP Amendment 2 EIR; they are incorporated as part of the proposed project and assumed in the analysis presented in this section.

PP 4.7-1 The Campus shall continue to implement the current (or equivalent) health and safety plans, programs, and practices related to the use, storage, disposal, or transportation of hazardous materials, including, but not necessarily limited to, the Business Plan, the Broadscope Radioactive Materials License, and the following programs: Biosafety, Emergency Management, Environmental Health, Hazardous Materials, Industrial Hygiene and Safety, Laboratory/Research Safety, Radiation Safety, and Integrated Waste Management. These programs may be subject to modification as more stringent standards are developed or if the programs are replaced by other programs that incorporate similar health and safety protection measures

PP 4.7-2 The Campus shall perform hazardous materials surveys on buildings and soils, if applicable, prior to demolition and construction. When remediation is deemed necessary, surveys shall identify all potential hazardous materials within the structure to be demolished, and identify hazardous materials within the structure to be demolished, and identify handling and disposal practices. The Campus shall follow the practices during building demolition to ensure construction worker and public safety.

PP 4.7-7(a) 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., flag persons), 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 appropriate signage indicating alternative routes. *(This is identical to Transportation and Traffic PP 4.14-5.)*

PP 4.7-7(b) To maintain adequate access for emergency vehicles when construction projects would result in roadway closures, Architects & Engineers (formerly the Office of Design and Construction) shall consult with the UCPD, EH&S, and the RFD to disclose roadway closures and identify alternative travel routes. *(This is identical to Transportation and Traffic PP 4.14-8.)*

PP 4.8-10 In the event of an emergency, including catastrophic failure of the California State Water Project pipeline, the campus would implement the Emergency Operations Plan.

Project Impact Analysis

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Would the project create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☒	☐	☐	☐
b) Would the project create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☐	☒	☐	☐	☐

Discussion

The analysis of Impacts 4.7-1 through 4.7-4 in the 2005 LRDP EIR concluded that, with implementation of PP 4.7-1 through PP 4.7-4 and MM 4.7-4, development under the 2005 LRDP would have a less than significant impact during construction and long-term operations related to public exposure to hazards from (1) the routine transport, use, or disposal of hazardous materials and (2) a reasonably foreseeable upset and accident condition involving the release of hazardous materials.

As defined in the 2005 LRDP EIR, for purposes of this analysis, hazardous materials include inorganic and organic chemicals and products (chemical reagents and reactions) containing such substances as defined by California laws and regulations, radioactive materials, and biohazardous materials.

Construction-Related Hazards

There have been localized areas of soil contamination on campus in connection with leaking underground storage tanks (USTs) in the past; all of the sites on campus have been remediated and properly closed. Additionally, although there is no known contamination associated with the historic use of agricultural teaching and research fields in the West Campus, due to the long-term use of common agricultural practices, including the application of pesticides, fertilizers, and other agricultural chemicals, the potential exists for residues of agricultural chemicals to be present in the soil in this area. Development of new facilities in the West Campus north of Martin Luther King Boulevard could result in exposure of these residues, if any, to construction workers during construction and campus occupants during operation of the buildings and other facilities. The proposed project is located in the East Campus and would not expose construction workers or building occupants to these potential hazards.

Additionally, construction activities could encounter abandoned pipes, discarded building materials, unknown USTs, or previously unidentified contaminated soil, which could result in the exposure of construction workers or campus occupants to hazardous materials.

The project incorporates PP 4.7-1, which requires compliance with Federal, State, and local regulations as well as current (or equivalent) campus plans, programs, and practices related to the use, storage, disposal, and transport of hazardous materials and wastes. Therefore, the project would not create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials or through reasonably foreseeable upset and accident conditions involving the release of hazardous materials during construction; there would be a less than significant impact, consistent with the findings of the LRDP EIR.

Operational Hazards

As discussed in Section 4.7 of the 2005 LRDP EIR, implementation of the 2005 LRDP would include development of facilities that use hazardous materials in teaching and research activities; development of such facilities is not included under the proposed project. However, with an increase in on-campus facilities, expansion of maintenance and cleaning services would be required, which would increase the use, handling, storage, and disposal of products routinely used in building maintenance, some of which may contain hazardous materials (Impact 4.7-1). This, in turn, would result in an increase in the amount of hazardous materials that are used, stored, transported, and disposed of and could increase the potential for an accident or accidental release of hazardous materials or wastes (Impact 4.7-3).

As discussed in the 2005 LRDP EIR, transportation of hazardous materials and wastes along any City or State roadway or rail lines within or near the campus is subject to all relevant Department of Transportation (Caltrans), California Highway Patrol, and California Department of Health Services hazardous materials and wastes transportation regulations, as applicable. Regular inspections of licensed waste transporters are conducted by agencies to ensure compliance with requirements that range from the design of vehicles used to transport wastes to the procedures to be followed in case of spills or leaks during transit.

To minimize risks associated with routine hazardous material use on campus, the project incorporates PP 4.7-1, which requires compliance with Federal, State, and local regulations as well as current (or equivalent) campus plans, programs, and practices related to the use, storage, disposal, and transport of hazardous materials and wastes. Modifications of these existing programs and services are made over time to make sure that they continue to keep the campus in compliance with the numerous hazardous materials laws and regulations at all levels of government. Additionally, the design of the project ensures that emergency access to and around the project area is maintained.

Other hazardous materials that may be used as part of the proposed project include commercial cleaning products and landscape maintenance chemicals. Cleaning products would be disposed of either through the wastewater system (i.e., sinks) or evaporation. Neither chlorine nor standard cleaning products (i.e., degreasers) are used in quantities that would result in adverse health effects either through direct exposure to the skin or inhalation. Pesticides and herbicides are directly applied to affected areas using methods that follow State and County laws and/or guidelines.

The potential for accidents involving hazardous materials during operation would not increase with the proposed project since the types of uses would be consistent with existing conditions at the project site and other locations on campus. Additionally, operation of the proposed project would comply with applicable Federal, State, and local laws and regulations and with the existing UCR programs, practices, and procedures required by PP 4.7-1, identified above. Therefore, the project would not create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials or through reasonably foreseeable upset and accident conditions involving the release of hazardous materials during construction and operation; there would be a less than significant impact with incorporation of PP 4.7-1, consistent with the findings of the LRDP EIR.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would have a less than significant impact related to the potential to create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials; or through reasonably foreseeable upset and accident conditions involving the release of hazardous materials in the environment with incorporation of the PP noted above. The proposed project impacts were adequately addressed in the LRDP EIR.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
c) Would the project emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☒	☐	☐	☐

Discussion

The analysis of Impact 4.7-5 in the 2005 LRDP EIR concluded that, with implementation of PP 4.7-1, development under the 2005 LRDP would have a less than significant impact related to hazardous emissions of handling hazardous materials within a one-quarter mile of a school. There are no K-12 schools located within 0.25 mile of the project site.

Project construction may require occasional transport of hazardous materials, including oils, lubricants, paints, or other construction equipment chemicals. Use of such materials would be typical of parking construction projects and any transport, use, and storage of hazardous materials would be conducted in accordance with all applicable state and federal laws. Project operation may involve occasional use of solvents, paints, oils/fuels, and pesticides/herbicides in small quantities associated with maintenance, cleaning, and upkeep of Parking Structure 1, pedestrian and bicycle pathways, lighting, and landscaping areas. Use of such materials would be typical of parking structures and would not result in substantial hazardous emissions. Compliance with Federal, State, and local regulations as well as current (or equivalent) campus plans, programs, and practices related to the use, storage, disposal, and transport of hazardous materials and wastes, as required by PP 4.7-1, would ensure that risks associated with hazardous emissions or materials would be eliminated or reduced through proper handling techniques, disposal practices, and/or cleanup procedures.

The project would have no impact related to handling hazardous materials within 0.25 mile of a school with incorporation of the PP 4.7-1, consistent with the findings of the LRDP EIR.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would have no impact related to handling hazardous materials within a one-quarter mile of a school with incorporation of the PP noted above. The proposed project impacts were adequately addressed in the LRDP EIR.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
d) Would the project be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☒	☐	☐	☐

Discussion

The analysis of Impact 4.7-6 in the 2005 LRDP EIR concluded that development under the 2005 LRDP would have a less than significant impact related to construction on a site included on the Cortese List, which is compiled pursuant to Section 65962.5 of the California Government Code.

In compliance with PP 4.7-2, multiple databases were checked to determine if the project site is recorded as a contaminated site. The project site is not included in any database of sites compiled pursuant to Section 65962.5 of the California Government Code, referred to as the Cortese List, and collected by the California Environmental Protection Agency (CalEPA 2019). Specifically, the project site is not identified on (1) the California Department of Toxic Substances Control's (DTSC's) Hazardous Waste and Substances Site List, also called EnviroStor; (2) the DTSC's list of hazardous waste facilities where the DTSC has taken or contracted for corrective action because a facility owner/operator has failed to comply with a date for taking corrective action or because DTSC determined that immediate corrective action was necessary to abate an imminent or substantial endangerment; (3) the State Water Resources Control Board's (SWRCB's) Leaking Underground Storage Tank sites, also called GeoTracker; (4) the SWRCB's list of Cease and Desist Orders and Cleanup and Abatement Orders; and (5) the SWRCB's list of solid waste disposal sites with waste constituents above hazardous waste levels outside the waste management unit (CalEPA 2019a, DTSC 2019).

Although the project site is not included in any database of sites compiled pursuant to Section 65962.5 of the California Government Code, an existing mainline may contain asbestos cement pipe. The proposed project would incorporate PP 4.7-1, which requires compliance with Federal, State, and local regulations as well as current (or equivalent) campus plans, programs, and practices related to the use, storage, disposal, and transport of hazardous materials and wastes, and PP 4.7-2, requiring remediation to remove any hazardous materials from the mainline in accordance with Federal, State, and local regulations and in coordination with EH&S. As such, impacts are considered less than significant, consistent with the findings of the LRDP EIR.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would be located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962 and would have less than significant impact with the incorporation of the PP noted above. The proposed project impacts were adequately addressed in the LRDP EIR.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?	☐	☒	☐	☐	☐

Discussion

Based on the IS prepared for the 2005 LRDP EIR, development under the 2005 LRDP was determined to have no impact related to public use airports or private airstrips and was not carried forward for further discussion in the Draft EIR. Specifically, the UCR campus including the project site is not located within two miles of a public airport or public use airport; it has not been included in an airport land use plan; and it is not located within the vicinity of a private airstrip. Therefore, the proposed project would not result in any impacts from safety hazards associated with airports or airstrips, consistent with the findings of the LRDP EIR.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would have no impacts related to public use airports or private airstrips. The proposed project impacts were adequately addressed in the LRDP EIR.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
f) Would the project impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☒	☐	☐	☐

Discussion

The analysis of Impact 4.7-7 in the 2005 LRDP EIR concluded that, with implementation of PS Land Use 3, PS Open Space 1, PS Open Space 4 through 7, PS Transportation 4, PP 4.7-7(a), PP 4.7-7(b), MM 4.7-7(a), and MM 4.7-7(b), development under the 2005 LRDP would have a less than significant impact related to impairing the implementation of or physically interfering with an adopted emergency response plan or emergency evacuation plan.

EH&S is responsible for the campus' Emergency Operations Plan (EOP), which is intended to safeguard people, property, research, and other resources from the consequences of natural and man-made hazards through mitigation, preparedness, response, and recovery. The EOP was last updated in December 2011. Although the City of Riverside does not have a Master Emergency Response Plan prepared specifically for the campus, the campus coordinates with the City during development and update of its EOP to ensure awareness and proper coordination when emergency situations occur on the campus. In the event of an emergency, the proposed project would incorporate PP 4.8-10 by implementing the campus' EOP.

Parking Structure 1 would contain emergency infrastructure, including emergency callboxes, fire alarm, and standpipe systems. The project would also adhere to the regulations provided by the Office of the State Fire Marshal and the Designated Campus Fire Marshal's (DCFM's) "Fire and Life Safety Inspection Checklist." Parking Structure 1 would be developed with Type 1A fire resistive construction in compliance with the 2019 CBC and would connect to the existing UCR Police dispatch and UCR fire protection with an addressable-point fire alarm system conforming to all State and local codes and remote reporting via auto dialer system. All new fire-related infrastructure, including lanes, hydrant spacing, hydrant types, and flow rates/pressures would be consistent with the provisions set forth by the DCFM.

Multiple emergency access or evacuation routes are provided on campus to ensure that, in the event one roadway or travel lane is temporarily blocked, another may be utilized. Construction of the proposed project could result in temporary lane or roadway closures to an on-campus road, Big Springs Road. However, construction and operation of the proposed project would be designed to ensure that the EOP is maintained and that emergency access on campus is not impeded, including existing fire lanes near the project area. Big Springs Road would continue to serve as the main emergency access road for the project site. Project design for the reconfigured Parking Lot 13 would include an emergency access lane of 20 feet via the ingress/egress from Big Springs Road and around Parking Structure 1.

Also, the proposed project would incorporate PP 4.7-7(a), which requires the maintenance of at least one unobstructed lane in both directions on campus roadways, to the extent feasible, and PP 4.7-7(b), which requires consultation between UCR and the UC Police Department (UCPD), Riverside

Fire Department, and EH&S to identify alternative travel routes for emergency vehicle access when construction projects result in roadway closures.

Therefore, the project would have a less than significant impact related to implementation of or physical interference with an adopted emergency response plan or emergency evacuation plan with incorporation of PP 4.7-7(a), PP 4.7-7(b) and PP 4.8-10, consistent with the findings of the 2005 LRDP EIR.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would have a less than significant impact related to implementation or physical interference with an adopted emergency response plan or emergency evacuation plant, with the implementation of relevant PPs noted above. The proposed project impacts were adequately addressed in the LRDP EIR.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
g) Would the project expose people or structures, either directly or indirectly, to a significant risk of loss, injury, or death involving wildland fires?	☐	☒	☐	☐	☐

Discussion

The analysis of Impact 4.7-8 in the 2005 LRDP EIR concluded that, with implementation of PS Open Space 1, MM 4.7-8(a), and MM 4.7-8(b), development under the 2005 LRDP would have a less than significant impact related to wildfires. The 2005 LRDP EIR identified the campus areas that may be subject to wildland fires, which include the following areas located adjacent to the southeast hills and the Botanic Gardens: the area south of South Campus Drive and areas currently occupied by Parking Lots 13 and 10, east of East Campus Drive. The proposed project is located on Parking Lot 13 and is approximately 625 feet west from a designated California Department of Forestry and Fire Protection (CAL FIRE) Very High Local Responsibility Area (VHLRA).

The proposed project would adhere to Fire Access requirements per 2010 CA Code Section 503, local, State, Federal regulations, and as required by City of Riverside Fire Authority, and DCFM. Parking Structure 1 would be developed with Type 1A fire resistive construction and the project would include adequate emergency and fire infrastructure, including fire water connections, as directed by CBC, California Fire Code, and State Fire Marshal regulations. The proposed project would also be consistent with the UCR Physical Design Framework, which recommends the use of native or climate adapted plants or low water requiring plants to prevent wildfires from spreading (UCR 2009).

State and UCR regulations, inspections, and enforcement procedures would reduce risk of loss, injury, or death involving wildland fires, and impacts would be less than significant. Project impacts were adequately addressed in the LRDP EIR. For more discussion of potential impacts related to wildfire, please refer to Section V.20, Wildfire, of this IS/MND.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would have a less than significant impact related to exposure of people or structures, either directly or indirectly, to a significant risk of loss, injury, or death involving wildland fires. The proposed project impacts were adequately addressed in the LRDP EIR.

10. HYDROLOGY AND WATER QUALITY

The analysis of hydrology and water quality is primarily tiered from the 2005 LRDP EIR; however, current regulatory information and selected portions of the impact analysis, as indicated, are tiered from the 2005 Amendment 2 EIR. Hydrology and water quality issues are addressed in Section 4.8 of both documents. The analysis of hydrology and water quality is applicable to the project which would involve the same types of uses, and a similar amount of pervious and impervious surface. Relevant elements of the project related to hydrology and water quality include the construction of Parking Structure 1, the reconfiguration of the existing surface parking area, improvements to driveways from Big Springs Road, new pedestrian and bicycle pathways, and the installation of associated utility and irrigation systems, and associated site improvements.

The following applicable PPs were adopted as part of the 2005 LRDP Amendment and/or 2005 LRDP Amendment 2 EIR; they are incorporated as part of the project and have been assumed in the analysis presented in this section.

PP 4.8-1 The Campus will continue to comply with all applicable water quality requirements established by the SARWQCB. *(This is identical to Utilities PP 4.15-5.)*

PP 4.8-2(a) To further reduce the campus’ impact on domestic water resources, to the extent feasible, UCR will:

- i. Install hot water recirculation devices (to reduce water waste).
- ii. Continue to require all new construction to comply with applicable State laws requiring water-efficient plumbing fixtures, including but not limited to the Health and Safety Code and Title 24, California Code of Regulations, Part 5 (California Plumbing Code).
- iii. Retrofit existing plumbing fixtures that do not meet current standards on a phased basis over time.
- iv. Install recovery systems for losses attributable to existing and proposed steam and chilled-water systems.
- v. Prohibit using water as a means of cleaning impervious surfaces.
- vi. Install water-efficient irrigation equipment to maximize water savings for landscaping and retrofit existing systems over time.

(This is identical to Utilities PP 4.15-1[b].)

PP 4.8-2(b) The Campus shall promptly detect and repair leaks in water and irrigation pipes. *(This is identical to Utilities PP 4.15-1[c].)*

PP 4.8-3(c) The Campus shall continue to implement dust control measures consistent with SCAQMD Rule 403—Fugitive Dust during the construction phases of new project development. The following actions are currently recommended to implement Rule 403 and have been quantified by the SCAQMD as being able to reduce dust generation between 30 and 85 percent depending on the source of the dust generation. The Campus shall implement these measures as necessary to reduce fugitive dust. Individual measures shall be specified in construction documents and require implementation by construction contractor:

i. Apply water and/or approved nontoxic chemical soil stabilizers according to manufacturer's specification to all inactive construction areas (previously graded areas that have been inactive for 10 or more days).
ii. Replace ground cover in disturbed areas as quickly as possible.
iii. Enclose, cover, water twice daily, or apply approved chemical soil binders to exposed piles with 5 percent or greater silt content.
iv. Water active grading sites at least twice daily.
v. Suspend all excavating and grading operations when wind speeds (as instantaneous gusts) exceed 25 miles per hour over a 30-minute period.
vi. All trucks hauling dirt, sand, soil, or other loose materials are to be covered or should maintain at least two feet of freeboard (i.e., minimum vertical distance between top of the load and the top of the trailer), in accordance with Section 23114 of the California Vehicle Code.
vii. Sweep streets at the end of the day if visible soil material is carried over to adjacent roads.
viii. Install wheel washers where vehicles enter and exit unpaved roads onto paved roads, or wash off trucks and any equipment leaving the site each trip.
ix. Apply water three times daily or chemical soil stabilizers according to manufacturers' specifications to all unpaved parking or staging areas or unpaved road surfaces.
x. Post and enforce traffic speed limits of 15 miles per hour or less on all unpaved roads.

(This is identical to Air Quality PP 4.3-2[b] and Geology PP 4.6-2[a].)

PP 4.8-3(d) In compliance with NPDES, the campus would continue to implement Best Management Practices, as identified in the UCR Stormwater Management Plan (UCR 2003):

i. Public education and outreach on stormwater projects.
ii. Public involvement/participation.
iii. Illicit discharge detection and elimination.

iv. Pollution prevention/good housekeeping for facilities.
v. Post-construction stormwater management in new development and redevelopment.

(This is identical to Biological Resources PP 4.4-2[b] and PP 4.6-2[b].)

PP 4.8-3(e) Prior to the time of design approval, the Campus will evaluate each specific project to determine if the project runoff would exceed the capacity of the existing storm drain system. If it is found that the capacity would be exceeded, one or more of the following components of the storm drain system would be implemented to minimize the occurrence of local flooding:

i. Multi-project stormwater detention basins.
ii. Single-project detention basins.
iii. Surface detention design.
iv. Expansion or modification of the existing storm drain system.
v. Installation of necessary outlet control facilities.

Additionally, PS Conservation 2 (included under the Biological Resources analysis, which is Section V.4 of this IS/MND) is included in the proposed project, which requires buildings to minimize site disturbance through reduction of stormwater runoff.

Project Impact Analysis

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Would the project violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality?	☐	☒	☐	☐	☐
e) Would the project conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?	☐	☐	☐	☒	☐

Discussion

The analysis of Impacts 4.8-1 and 4.8-7 in the 2005 LRDP EIR concluded that, with implementation of PS Conservation 2 and PP 4.8-1, there would be a less than significant impact related to violation of existing water quality standards or waste discharge requirements (WDRs) and degradation of water quality. A detailed discussion of the regulatory setting for water quality is provided in Section 4.8, Hydrology and Water Quality, of the 2005 LRDP Amendment 2 EIR.

All UC facility design and construction projects must comply with all applicable state building code requirements and all applicable state and federal agency regulations. The project would involve construction activities on more than one acre; therefore, the project incorporates PP 4.8-1 and PP

4.8-3(d), which requires compliance with requirements and water quality standards set forth within the current NPDES permit regulations, as described in Section V.7, Geology and Soils, of this IS/MND. The Clean Water Act establishes a framework for regulating potential water quality impacts through the NPDES program.

Phase I of the NPDES Program requires NPDES permits for storm water discharge from a large number of priority sources, including MS4s serving populations of over 100,000; several categories of industrial activity; and construction activity that disturbs one acre or more.

Phase II of the NPDES Program regulates storm water discharges from Small MS4s (such as schools and universities). As part of Phase II, the SWRCB adopted a General Permit for the Discharge of Storm Water 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). 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:

1. Education and outreach program;
2. Public involvement and participation program;
3. Illicit discharge detection and elimination;
4. Construction site storm water runoff control program;
5. Pollution prevention/good housekeeping for facilities;
6. Post-construction stormwater management program; and
7. Program effectiveness assessment and improvement.

The project site is currently developed with a surface parking lot. It is served by the UCR on-campus drainage system, which connects to local and regional drainage systems. Impermeable surfaces would not appreciably increase with construction of the proposed project.

Construction

Implementation of the proposed project could result in runoff exiting the project site during project construction. Storm water runoff during construction could contain pollutants such as soils and sediments released during grading and excavation activities as well as petroleum-related pollutants due to spills or leaks from heavy equipment and machinery. Other common pollutants that may result from construction activities include solid or liquid chemical spills; concrete and related cutting or curing residues; wastes from paints, stains, sealants, solvents, detergents, glues, acids, lime, plaster, and cleaning agents; and heavy metals from equipment.

The proposed project incorporates PP 4.8-1 and PP 4.8-3(d), which requires compliance with requirements and water quality standards set forth within the current NPDES permit regulations. The SWRCB is authorized by the USEPA to oversee the NPDES program through the Regional Water Quality Control Boards (RWQCBs). The proposed project 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 Storm Water 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 Storm Water 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. Specifically, the proposed project would require completion and filing of a Permit Registration Document with the SWRCB, which consists of a NOI, Risk Assessment, Site Map, Storm Water Pollution Prevention Plan (SWPPP), annual fee, and a signed certification statement. The primary objective of the SWPPP is to identify, construct, implement, and maintain BMPs to reduce or eliminate pollutants in storm water discharges and authorized non-storm water discharges from the construction site during construction.

A SWPPP typically includes both source-control and treatment-control BMPs to reduce water quality impacts. The BMPs that are most often used during construction include watering exposed soils; covering stockpiles of soil; 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; and timing grading to avoid the rainy season (November through April). In addition, coverage under the Construction Permit would also include implementation of post-construction standards to achieve the pre-project volume and rate of storm water runoff from the project area. The proposed project would meet these standards through installation of active and passive treatment units, as described below under “Operation”. The project would also incorporate PP 4.8-3(c), which requires implementation of SCAQMD Rule 403 for management of fugitive dust during construction.

Finally, the proposed project would be required to comply with applicable provisions of the 2019 CBC and 2019 CalGreen Code, which require the reduction of erosion and sedimentation and would further reduce construction-related water quality impacts.

The proposed project is required to comply with all applicable water quality requirements established by the Santa Ana RWQCB and SWRCB. Therefore, consistent with the findings of the 2005 LRDP Amendment 2 EIR, the proposed project would be consistent with the Santa Ana Basin Plan, which is the applicable Water Quality Control Plan.

Because the PPs discussed above are included in the proposed project, short-term construction-related water quality impacts would be less than significant, which is consistent with the findings of the UCR 2005 LRDP EIR.

Operation

As discussed under the analysis of Impact 4.8-1 in the 2005 LRDP EIR, the UCR campus is not considered a point source for regulatory purposes and is not subject to WDRs. In addition, no hazardous wastes generated on campus are discharged into the sewer or storm drainage systems. Therefore, the proposed project would not violate WDRs.

Project site design and the requirements of the applicable MS4 permit are intended to protect water quality and support attainment of water quality standards in downstream receiving water bodies. As previously discussed, UCR is a non-traditional permittee under the Phase II MS4 Small statewide general stormwater permit. As such, 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 must also implement a landscape design and maintenance program to reduce the amount of pesticides, herbicides and fertilizers used on new or decorative landscapes.

Implementation of the project would increase the use intensity of Parking Lot 13, which would result in increased pollutants typical of parking areas, a significant source of chemical contamination to receiving waters. These pollutants are derived from wear of automotive parts (e.g., tires and brake pads), spills and leaks of automotive fluids (e.g., motor oil and coolant), and materials deposited on parking lots from the air (e.g., atmospheric deposition and wind transported pollutants) (Southern California Water Research Project 2001).

Despite the increase in impervious areas on the project site, the constituent pollutants entering the campus and City storm drain systems with proposed project implementation would not substantively change in character compared to existing conditions on campus, as the proposed facilities are essentially the same as existing facilities on campus. In addition, as required by PP 4.8-1 and PP 4.8-3(d), the proposed project would comply with all applicable water quality requirements, including NPDES Phase I requirements (General Construction Permit), as described above, and Phase II Small MS4 General Permit requirements.

The project would include the following design features to minimize stormwater runoff and potential flooding:

- Parking Structure 1 would be designed to prevent discharge of stormwaters off the exterior edges of elevated floors. Drains would be provided to remove water carried in by vehicles or blown in through the exterior wall openings during inclement weather. The minimum floor slope from any point would be one percent to the floor drains to ensure positive drainage.
- Entry and exit drives would be provided with drains to prevent storm drainage from driveways or the street from entering Parking Structure 1.
- All design would follow UCR Post Construction Stormwater Management Requirements and Checklist.
- Paving would use of pervious cast-in-place concrete to enable stormwater infiltration.
- Paving and landscape design would emphasize natural infiltration and evaporation where possible to reduce water run-off during storm events.

Storm drain infrastructure for the project would include area drains, roof drain connections, and piped conveyance of stormwater to the water quality treatment basins/devices and connections to the existing storm drain system. Stormwater would be treated by a coalescing silt/sand oil/water separator (clarifier). Water quality treatment would consist of biofiltration basins, proprietary treatment devices, and/or underground storage vaults. These BMPs would slow the velocity of water and allow sediment and debris to settle out of the water column, thereby minimizing the potential for downstream flooding, erosion/siltation, or exceedances of stormwater drainage system capacity.

Therefore, operation of the proposed project would not violate any water quality standards or otherwise substantially degrade water quality. There would be a less than significant impact related to surface water quality with incorporation of PP 4.8-1 and PP 4.8-3(d), consistent with the findings of the LRDP EIR.

Additionally, according to the 2005 LRDP EIR, the UCR campus is located near the southeastern edge of the Riverside-Arlington groundwater subbasin and is not designated as a groundwater recharge area. Further, the soils underlying the East Campus and the project site are designated as the least-permeable soil type. Therefore, with the treatment BMPs identified previously and the fact that the underlying soils have a low permeability factor, the project would not result in a significant impact related to a sustainable groundwater management plan. The construction of the proposed project would not substantially interfere with groundwater recharge, consistent with the findings of the LRDP EIR.

Therefore, with incorporation of PP 4.8-1 and PP 4.8-3(d), construction and operation of the project would not violate any water quality standards or waste discharge requirements, nor substantially degrade water quality. Impacts were adequately addressed in the LRDP EIR.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would have a less than significant impact related to violating water quality standards or WDRs, a less than significant impact related to substantially degrading surface or groundwater quality, and would not conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan with incorporation of the PPs noted above. The proposed project impacts were adequately addressed in the LRDP EIR.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
b) Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?	☐	☒	☐	☐	☐

Discussion

The analysis of Impact 4.8-2 in the 2005 LRDP EIR concluded that, with implementation of PS Conservation 5 and PP 4.8-2(a) through PP 4.8-2(c), there would be a less than significant impact related to substantial depletion of groundwater supplies or interference with groundwater recharge. The Riverside area is located within the Upper Santa Ana Valley Groundwater Basin, and the UCR Campus, including the project site, is located near the southeastern edge of the Riverside-Arlington Subbasin (Subbasin). Groundwater in the Subbasin is replenished by infiltration from Santa Ana River flow; underflow past the Rialto-Colton Fault; intermittent underflow from the Chino Groundwater Subbasin; return irrigation flow; and deep percolation of precipitation.

As discussed in Section V.19, Utilities and Service Systems, of this IS/MND, the proposed project would involve the construction of a parking structure that would not include any bathrooms. Only a convenience sink will be located in the storage room that would be in use during maintenance activities. Implementation of the project would use water for landscape irrigation and cleaning of Parking Structure 1. However, landscaping already exists on the project site, and no substantial increase in landscaping irrigation would result from construction of a parking structure on the site. The project would not lead to a substantial increase in water use that would increase demand on groundwater supplies. Additionally, the project would incorporate PP 4.8-2(a), which requires implementation of water conservation measures to reduce potable water consumption, and PP 4.8-2(b), which requires the campus to promptly detect and repair leaks in water and irrigation pipes.

As stated in the 2005 LRDP Amendment 2 EIR, the RPU has indicated that it does not anticipate any problems in providing adequate water supply to remaining and new development on the UCR campus. Therefore, the provision of additional water to the UCR campus, which could include groundwater, would not require water supplies in excess of existing entitlements and resources or result in the need for new or expanded entitlements. As such, implementation of the project would not substantially deplete groundwater supplies, which is consistent with the findings of the LRDP EIR.

As identified in the 2005 LRDP EIR, the UCR campus is not a designated groundwater recharge area for the Subbasin, nor does the campus serve as a primary source of groundwater recharge within the Subbasin. The soils underlying the East Campus, including the project site, are designated as Class D, which is the least-permeable soil type. Therefore, an increase in the impervious surface area on the project site would not substantially interfere with groundwater recharge. Therefore, there would be a less than significant impact related to groundwater recharge with incorporation of PP 4.8-2(a) and PP 4.8-2(b), which is consistent with the findings of the LRDP EIR.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would have a less than significant impact related to substantial depletion of groundwater supplies or interference with groundwater recharge such that the project may impede sustainable groundwater management of the basin with incorporation of the PPs noted above. The proposed project impacts were adequately addressed in the LRDP EIR.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
c) Would the project 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 offsite; or	☐	☒	☐	☐	☐
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.	☐	☒	☐	☐	☐

Discussion

The analysis of Impacts 4.8-3 through 4.8-5 in the 2005 LRDP EIR concluded that, with implementation of PS Land Use 2, PS Land Use 3, PS Open Space 1 through 5, PS Conservation 1 through 3, and PP 4.8-3(a) through 4.8(e), there would be a less than significant impact related to alteration of existing drainage patterns and storm drain system capacity.

As described in the 2005 LRDP EIR, the UCR campus is located within two sub-watersheds of the Upper Santa Ana River Watershed, generally divided by the I-215/SR-60 freeway. Most of the East Campus, including the project site, drains into the University Arroyo Watershed. Major storm drainages on campus, including natural drainages, are shown on Figure 4.8-3 of the 2005 LRDP EIR. That figure shows an existing closed drainage system along Big Springs Road north of Parking Lot 13 and a proposed open system running parallel to Big Springs Road, which has since been developed as above ground channels (bioswales) along the northern boundary of the project site. Storm water from the project site drains into these bioswales and the bioswale adjacent to the southern boundary of the project site. The bioswales are located within a no impact zone, and thus would not be impacted by the project; see Figure 4 – Conceptual Site Plan and Landscape Plan.

Consistent with existing conditions, storm water runoff from the project site would discharge into the East Campus' existing storm drain system, which consists of culverts, pipelines, engineered channels of the University Arroyo, and the Gage and Glade Detention Basins, and then into the City of Riverside's storm drain system. Storm water flows from the project site would continue to discharge to the storm drain in Big Springs Road and would not directly enter a natural channel or drainage. The proposed project would not alter the course of a stream or river.

In compliance with PP 4.8-3(d), UCR has evaluated the existing hydrologic conditions of the project site and future conditions with implementation of the proposed project to determine if the proposed project runoff would exceed the capacity of the existing storm drain system. The project site would be designed so stormwater surface drains into a series of catch basins connected by underground storm drain pipes. Storm drain pipes would connect to existing storm drains or drainage devices, or other locations approved by the jurisdiction having authority. Storm water surface flow would not obstruct pedestrian and bicycle pathways. Catch basins would be located within planting areas, where possible. Existing drainage patterns would also be maintained.

The project incorporates PP 4.8-1, which requires compliance with applicable water quality regulations to manage storm water runoff during construction and operation with appropriate BMPs and to ensure that drainage from the project site does not result in erosion or contribute pollutants to runoff. The project also incorporates PS Conservation 2 by designing Parking Structure 1 within previously disturbed area, maintaining existing landscape to the extent feasible, and incorporating appropriate SWPPP and BMPs to prevent stormwater runoff. PP 4.8-3(e) requires that, prior to the time of design approval, the proposed project will be reviewed to ensure that project runoff would not exceed the capacity of the existing storm drain system. Therefore, the project would result in less than significant impacts related to substantial alteration of existing drainage patterns and the potential to cause substantial erosion or flooding on or off site; increased volumes of runoff that could exceed the capacity of the existing UCR or City of Riverside storm drain systems; or substantial additional sources of polluted runoff with incorporation of PS Conservation 2, PP 4.8-1, PP 4.8-3(d), and PP 4.8-3(e). This determination is consistent with the findings of the LRDP EIR.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would have a less than significant impact related to alter the existing drainage pattern of the site or area in a manner which would result in substantial erosion or siltation on- or off-site; alter the existing drainage pattern or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site; 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; or impede or redirect flood flows with incorporation of the PS and PPs noted above. The proposed project impacts were adequately addressed in the LRDP EIR.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
d) Would the project in flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?	☐	☒	☐	☐	☐

Discussion

The analysis of Impacts 4.8-8 through 4.8-11 in the 2005 LRDP EIR concluded that, with implementation of PS Open Space 1, PS Open Space 2, PP 4.8-3(e), PP 4.8-10, and MMs 4.8-9(a) and 4.8- 9(b), there would be less than significant impacts related to placing structures within a 100-year flood hazard area; flooding as a result of failure of a levee or dam; or inundation by seiche, tsunami, or mudflow.

According to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map, and Figure 4.8-2, FEMA Map, of the 2005 LRDP EIR, the western and northern portions of the project site are located in Zone X, a designation used for areas of minimal flood hazard (a one percent chance annual flood hazard). The bioswales lining the south of Big Springs Road, and a portion of Parking Lot 13, are located in the University Wash area (FEMA 2008).

As discussed in the 2005 LRDP EIR, the closest dam upstream from the campus is the Seven Oaks Dam, which is located approximately 24 miles upstream from the City of Riverside. Given the distance between the campus and the Santa Ana River (of more than three miles), the potential for flooding, and subsequent release of pollutants, to occur on the project site as the result of a catastrophic failure of the Seven Oaks Dam is remote. In addition, the potential for catastrophic failure of the Santa Ana Pipeline, which is operated by the California State Department of Water Resources and is located north and east of the campus along Watkins Drive at the base of the Box Springs Mountains, to affect campus lands is also considered remote. Therefore, implementation of the proposed project would not expose people or structures to a significant risk of release of pollutants due to inundation related to flood hazard, including flooding as a result of the failure of a levee or dam, and there would be less than significant impacts consistent with the findings of the LRDP EIR.

As discussed in the 2005 LRDP EIR, the potential for the campus to be affected by a seiche or tsunami is considered extremely remote given the inland location of the campus and the distance to any large water bodies. The potential for mudflows to affect campus development is limited to areas immediately adjacent to the southeast hills or within the existing on-campus arroyos. Although the project site is located adjacent to the bioswale along Big Springs Road and the open space area south of the project site, it is likely that any potential for mudflow would be contained within the bioswale and open space area. A retaining wall south of the proposed parking structure is included to help retain hillside erosion and potential for mudflows.

Although the project site is in an area of minimal (one percent chance) flood hazards, the project does not involve storage or processing of pollutants that would be released due to inundation should such an event occur. As previously discussed, project design and compliance with UCR's MS4 permit and the UCR Post Construction Stormwater Management Requirements would substantially reduce the potential for potential adverse effects from stormwater runoff, which would include water from flooding events. Therefore, implementation of the proposed project would not result in potential inundation of subsequent release of pollutants by a seiche, tsunami, or mudflow, and there would be less than significant impacts, consistent with the findings of the LRDP EIR.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would have less than significant impacts related to placement of housing or structures within a 100-year flood hazard area; exposure of people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam; and release of pollutants due to inundation by flood, tsunami, or seiche. The proposed project impacts were adequately addressed in the LRDP EIR.

11. LAND USE AND PLANNING

The analysis of land use and planning is tiered from the 2005 LRDP EIR and, as applicable, the 2005 Amendment 2 EIR and was addressed in Section 4.9, Land Use and Planning, of both documents. Relevant elements of the proposed project related to land use and planning include the construction of Parking Structure 1, the reconfiguration of Parking Lot 13 surface parking area, improvements to driveways from Big Springs Road, and new pedestrian and bicycle pathways. The following applicable PSs and PPs were adopted as part of the 2005 LRDP Amendment 2 and/or 2005 LRDP Amendment 2 EIR and are incorporated as part of the proposed project and assumed in the analysis presented in this section.

PS Land Use 2	In order to achieve a compact and contiguous academic core and desired development densities, strategies will include infill sites in the developed East Campus academic core as well as expansion to the West Campus academic zone immediately adjacent to the I-215 and SR-60 freeway.
PS Conservation 2	Site buildings and plan site development to minimize site disturbance, reduce erosion and sedimentation, reduce stormwater runoff, and maintain existing landscapes, including healthy mature trees whenever possible.
PS Development Strategy 1	Establish a design review process to provide regular review of building and landscape development on campus.
PS Transportation 3	Provide a continuous network of bicycle lanes and paths throughout the campus, connecting to off campus bicycle routes.
PS Transportation 5	Provide bicycle parking at convenient locations.
PS Open Space 3	In Naturalistic Open Space areas, where arroyos and other natural features exist, preserve wherever feasible existing landforms, native plant materials, and trees. Where appropriate, restore habitat value.
PS Land Use 7	Over time, relocate parking from central campus locations to the periphery of the academic core and replace surface parking with structures, where appropriate.
PP 4.9-1(a)	The Campus shall provide design architects with the 2007 Campus Design Guidelines and instructions to implement the Guidelines, including those sections related to use of consistent scale and massing, compatible architectural style, complementary color palette, preservation of existing site features, and appropriate site and exterior lighting design. *(This is identical to Aesthetics PP 4.1-1.)*
PP 4.9-1(b)	The Campus shall continue to provide design architects with the 2007 Campus Design Guidelines and instructions to develop project-specific landscape plans that are consistent with the Guidelines with respect to the selection of plants, retention of existing trees, and use of water

conserving plants, where feasible. *(This is identical to Aesthetics PP 4.1-2[a].)*

MM 4.1-3(a) Building materials shall be reviewed and approved as part of project-specific design and through approval of construction documents. Mirrored, reflective glass is prohibited on campus.

Additionally, PP 4.1-1 (included under the Aesthetics analysis, which is Section V.1 of this IS/MND) is included in the proposed project, which requires compliance with Campus Design Guidelines.

Project Impact Analysis

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Would the project physically divide an established community?	☐	☒	☐	☐	☐

Discussion

Based on the IS prepared for the 2005 LRDP Amendment 2 EIR, it was concluded that development of the campus under the 2005 LRDP, as amended, would have no impact related to division of an established community. This issue was not carried forward for further analysis in the EIR. The 2005 LRDP, as amended, guides development within the campus boundaries, such as the proposed project, and does not therefore affect the established community outside the UCR campus. Consistent with the findings of the 2005 LRDP Amendment 2 EIR, no impact would occur.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would have no impacts related to physically dividing an established community. The proposed project impacts were adequately addressed in the LRDP EIR.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
b) Would the project cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☒	☐	☐	☐

Discussion

The analysis of Impact 4.9-2 in the 2005 LRDP Amendment 2 EIR concluded that development of the UCR campus under the 2005 LRDP, as amended, which incorporates relevant PSs, PPs, and MMs would not conflict with applicable local or regional land use plans, policies, or regulations.

Following is an evaluation of the proposed project's consistency with the 2005 LRDP, as amended, and applicable local and regional plans, policies, or regulations.

University of California, Riverside 2005 Long Range Development Plan, as Amended

Following is a discussion of the proposed project's consistency with the land use designation, parking supply, and population assumptions, and PSs of the 2005 LRDP, as amended.

LRDP Land Use Designation. The Land Use Plan included in the 2005 LRDP, as amended (shown on Figure 3.0-6 of the 2005 LRDP Amendment 2 EIR and Figure 13 of the 2005 LRDP Amendment 2), identifies 12 general categories of land use for development within the UCR campus boundaries. The project site is designated as "Parking." The Parking land use category allows for surface parking, parking structures, and associated improvements related to parking. The proposed project site location is consistent with the 2005 LRDP Amendment 2 discussion such that the proposed parking structure will be located at the peripheral of the campus boundary and is identified for this use as depicted on Figure 18 of the 2005 LRDP Amendment 2. As such, the proposed project does not conflict with the Parking land use designation, and is consistent with the guidance provided in the LRDP for the location of parking uses.

LRDP Parking Supply. The 2005 LRDP, as amended, projected a total of approximately 17,328 parking spaces on campus by 2020/2021, including approximately 3,781 parking spaces allocated to the SOM. As identified in Table 3.0-6 of the 2005 LRDP Amendment 2 EIR, of this amount, there is a total of approximately 7,759 parking spaces allocated for commuter students and faculty/staff. The existing on-campus parking supply is approximately 10,102 spaces. The project site (Parking Lot 13) currently provides approximately 683 parking spaces that would be removed to construct the new parking structure and reconfigure the remaining surface parking. Parking Structure 1 would provide approximately 1,079 new parking spaces. Approximately 212 surface parking spaces would be added around the perimeter of the structure, resulting in an estimated 804 new parking spaces on the eastern portion of Parking Lot 13. The western portion of Parking Lot 13 would be reconfigured to provide a total of 21 new parking spaces. The project would result in a net increase of approximately 825-850 parking spaces within the project site. Therefore, there is approximately 10,927 to 10,952 parking spaces on campus with implementation of the proposed project. Consequently, the proposed project is well within the remaining parking supply allotted in the 2005 LRDP Amendment 2 EIR.

LRDP POPULATION

The 2005 LRDP, as amended, projected a total enrollment of 25,000 students and 16,393 associated faculty, staff, and visitors for a total campus population of 41,393 by the academic year 2020/2021. Of this amount, 5,853 individuals (non-students) would be associated with the SOM; the projected population for the rest of the campus is 35,540 individuals. Excluding the category of "other individuals,"[11] there are projected to be 32,916 students, faculty, and academic staff and non-academic staff. For comparison, the current student population on campus based on the fall 2018 enrollment is 23,922 students (including 20,581 undergraduate students and 3,341 graduate students) (UCR 2019). Additionally, there are approximately 4,837 faculty, staff, and staff personnel, for a total population of 28,759 individuals (not including other individuals). Therefore, the remaining projected growth on campus (not including SOM and other individuals) is 4,157 individuals.

As discussed previously, it is anticipated that existing UCR staff would assist in the maintenance and operation of the parking structure facility, as needed. The proposed parking structure is not a use that would result in campus population growth; rather, the proposed parking structure would accommodate the parking needs of students, staff/faculty, and visitors who are already coming on to campus and accommodate future vehicular trips that was contemplated in the 2005 LRDP Amendment 2 EIR. Therefore, implementation of the proposed project would not affect the remaining projected growth on campus, as identified in the 2005 LRDP, as amended.

LRDP PLANNING STRATEGIES

The 2005 LRDP, as amended, includes PSs for the following issues to guide expansion and development of the UCR campus: land use, circulation and parking, open space and landscape, and campus and community. These planning strategies are required to be implemented with each development project on campus and have been specifically identified in the 2005 LRDP EIR and 2005 LRDP Amendment 2 EIR, along with general development strategies. Key Planning Strategies that have been incorporated into the project are identified for each topical issue in this IS/MND. Most relevant to the proposed project are the following strategies that are incorporated into the proposed project:

- In order to achieve a compact and contiguous academic core and desired development densities, strategies will include infill sites in the developed East Campus academic core as well as expansion to the West Campus academic zone immediately adjacent to the I-215/SR-60 freeway.
- Site buildings and plan site development to minimize site disturbance, reduce erosion and sedimentation, reduce stormwater runoff, and maintain existing landscapes, including healthy mature trees whenever possible.
- Over time, relocate parking from central campus locations to the periphery of the academic core and replace surface parking with structures, where appropriate.

These strategies (PS Land Use 2, PS Conservation 2, and PS Land Use 7) are incorporated into the proposed project. The project involves development of a parking structure, reconfiguration of a portion of the existing surface parking area, landscape, pedestrian and bicycle pathways, and

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[11] Includes campus visitors, patients, childcare students, student family members (living on campus), daytime extension students, ASUCR, KUCR, and Highlander non-student staff, vendors, and construction workers.

associated on-site improvements. The proposed project would be an infill development at the periphery of the campus boundary, in the area designated for parking in the East Campus. As required by existing regulations, soil erosion, sedimentation, and stormwater runoff from the project site during construction would be controlled through the use of several BMPs, including the use of sandbags as barriers. The construction site would be encircled by sandbags, and stabilized roadways would be provided at construction entrance and exit areas.

Circulation and Parking and Campus PSs relevant to the proposed project include the following:

- Provide a continuous network of bicycle lanes and paths throughout the campus, connecting to off campus bicycle routes.
- Provide bicycle parking at convenient locations.

New pathways would connect pedestrians and bicyclists from Parking Structure 1 to Big Springs Road, to the Department of Chemical Sciences Building, and the main campus centers to the west.

University of California, Riverside Campus Design Guidelines

The UCR Campus Design Guidelines include Site and Architectural Guidelines to establish the basic premises and clear intent for creative design decisions that are made for projects on campus; the Campus Design Guidelines are not intended to be prescriptive. The Site Guidelines address planting, paving, site lighting, furnishings, grading and rainwater management, circulation systems, and campus-wide signage. The Architectural Guidelines address outdoor circulation; building orientation and entrances; relationship of interior to exterior at ground floor; building massing and articulation; building materials and color palette; and building response to climate. A description of the proposed project, which addresses each of these issues, is provided in Section II, Project Description, of this IS/MND.

The proposed project incorporates PP 4.9-1(a), which ensures that the Campus Design Guidelines and instructions to implement the Guidelines are taken into consideration, including those sections related to use of consistent scale and massing, compatible architectural style, complementary color palette, preservation of existing site features, and appropriate site and exterior lighting design. The building materials and color palette to be used would adhere to the Campus Design Guidelines to be visually harmonious with the UCR campus as well as the immediate surrounding buildings (as required by PP 4.1-1 and PP 4.9-1[a]) and would be reviewed as part of the project-specific design review process and through approval of construction documents (refer to MM 4.1-3[a]).

Additionally, the proposed project incorporates PP 4.9-1(b) which ensures that the design team has developed a project-specific landscape plan consistent with the Campus Design Guidelines with respect to the selection of plants, retention of existing trees, and use of water conserving plants, where feasible; see Figure 4 – Conceptual Site Plan and Landscape Plan. Incorporation of PS Open Space 3 ensures that the bioswale along Big Springs Road would not be significantly impacted.

Incorporation of PPs 4.9-1(a) and 4.9-1(b) into the proposed project ensures that the intent of the Campus Design Guidelines related to site and architectural guidelines have been met and incorporation of PS Development Strategy 1 would ensure that the project plans are reviewed and approved in accordance with the Campus Design Guidelines.

Regional and Local Plans

The proposed project would involve construction of a four-level parking structure with approximately 1,079 parking spaces, reconfiguration of a portion of the existing surface parking area, landscape, pedestrian and bicycle pathways, and associated on-site improvements. The proposed project would not be considered regionally significant by SCAG based on the established criteria in Section 15206 of the State CEQA Guidelines, which is applied by SCAG to determine regional significance. Therefore, an assessment of the proposed project's consistency with SCAG's regional plans is not required.

As addressed in Section V.10, Hydrology and Water Quality, of this IS/MND, the proposed project is required to comply with all applicable water quality requirements established by the Santa Ana RWQCB and SWRCB. Therefore, consistent with the findings of the 2005 LRDP Amendment 2 EIR, the proposed project would be consistent with the Basin Plan. As discussed in Section V.3, Air Quality, of this IS/MND, the proposed project would also be consistent with the AQMP.

UCR is part of the UC, a constitutionally created entity of the State of California. As a constitutional entity, the UC is not subject to municipal regulations, such as Riverside County and City of Riverside General Plans. Nevertheless, UCR has considered local plans and policies for the communities surrounding the campus. UCR participated in the development of the current City of Riverside General Plan and the University Neighborhood Plan in an effort to coordinate planning efforts between the City of Riverside and the campus. The City of Riverside General Plan, which includes the campus, has identified UCR as a public facility/institutional land use (Riverside 2007). The project is consistent with this land use designation, consistent with the findings of the 2005 LRDP Amendment 2 EIR.

In summary, consistent with the findings under Impact 4.9-2 of the 2005 LRDP Amendment 2 EIR, there would be a less than significant impact related to conflicts with an applicable land use plan, policy, or regulation of an agency with jurisdiction over the proposed project adopted for the purpose of avoiding or mitigating an environmental effect with incorporation of PS Land Use 2, PS Conservation 2, PS Development Strategy 1, PS Transportation 3, PS Transportation 5, PS Open Space 3, PS Land Use 7, PP 4.9-1(a), PP 4.9-1(b), PP 4.1-1, and MM 4.1-3(a), consistent with the findings of the LRDP EIR.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would not conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the proposed project; therefore, no impact would result with incorporation of the PSs, PPs, and MM noted above. The proposed project impacts were adequately addressed in the LRDP EIR.

12. MINERAL RESOURCES

Mineral resource issues were adequately addressed in the IS prepared for the 2005 LRDP EIR. There are no relevant elements of the proposed project related to Mineral Resources. Additionally, there are no relevant PSs, PPs, or MMs adopted as part of the 2005 LRDP EIR.

Project Impact Analysis

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Would the project result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☒	☐	☐	☐
b) Would the project result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?	☐	☒	☐	☐	☐

Discussion

As identified in the IS for the 2005 LRDP EIR, there are no mineral resources of regional or Statewide importance known to exist on the UCR campus. Also, no mineral resource recovery activities occur on the UCR campus, and no mineral resource recovery sites are delineated in the General Plans for the County of Riverside and City of Riverside, or the University Community Plan, which covers the area around the campus. Therefore, consistent with the findings of the 2005 LRDP EIR, implementation of the proposed project would not result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the State, and no impact would occur, consistent with the findings of the LRDP EIR.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would have no impacts related to (1) the loss of availability of a known mineral resource that would be of value to the region and the residents of the state; or (2) the availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan. The proposed project impacts were adequately addressed in the LRDP EIR.

13. NOISE

The analysis of noise is tiered from the 2005 LRDP EIR (as it relates to development in the East Campus) as supplemented and updated by the 2005 LRDP Amendment 2 EIR (as it relates to increased noise from traffic generated by the 2005 LRDP Amendment 2); it was addressed in Section 4.10, Noise, of those documents. Relevant elements of the proposed project related to noise and vibration include the use of diesel-powered and other heavy equipment during construction. The proposed project would include construction activities at the project site, which would involve demolition, grading, and other construction-related activities. With respect to operations, noise and vibration would be typical of parking structures and parking in surface lots, such as vehicle movement and tire noise, car doors, car alarms, honking, music from the car radios, and noise from elevators and other equipment.

The following applicable PPs and MM were adopted as part of the 2005 LRDP Amendment and/or 2005 LRDP Amendment 2 EIR and are incorporated as part of the proposed project and assumed in the analysis presented in this section.

PP 4.10-1(a)	UCR will incorporate the following siting design measures to reduce long-term noise impacts: i. Truck access, parking area design, and air conditioning/refrigeration units will be designed and evaluated when planning specific individual new facilities to minimize the potential for noise impacts to adjacent developments. ii. Building setbacks, building design and orientation will be used to reduce intrusive noise at sensitive student residential and educational building locations near main campus access routes, such as Blaine Street, Canyon Crest Drive, University Avenue, and Martin Luther King Jr. Boulevard. Noise walls may be advisable to screen existing and proposed facilities located near the I-215/SR-60 freeway.
PP 4.10-2	The UCR Campus shall limit the hours of exterior construction activities from 7:00 AM to 9:00 PM Monday through Friday and 8:00 AM to 6:00 PM on Saturday when necessary. Construction traffic shall follow transportation routes prescribed for all construction traffic to minimize the impact of this traffic (including noise impacts) on the surrounding community.
PP 4.10-6	The Campus shall continue to shield all new stationary sources of noise that would be located in close proximity to noise-sensitive buildings and uses.
PP 4.10-7(a)	To the extent feasible, construction activities shall be limited to 7:00 AM to 9:00 PM Monday through Friday, 8:00 AM to 6:00 PM on Saturday, and no construction on Sunday and national holidays, as appropriate, in order to minimize disruption to area residences surrounding the campus and to on campus uses that are sensitive to noise.
PP 4.10-7(b)	The Campus shall continue to require by contract specifications that construction equipment be required to be muffled or otherwise shielded. Contracts shall specify that engine-driven equipment be fitted with appropriate noise mufflers.
PP 4.10-7(c)	The Campus shall continue to require that stationary construction equipment material and vehicle staging be placed to direct noise away from sensitive receptors.
PP 4.14-2	The Campus shall notify all academic and residential facilities within 300 feet of approved construction sites of the planned schedule of vibration causing activities so that the occupants and/or researchers can take necessary precautionary measures to avoid negative effects to their activities and/or research.

As identified in Section V.3, Air Quality, of this IS/MND, the proposed project also incorporates PS Campus and Community 4 (promote campus-wide non-vehicular transportation), PS Transportation 3 (campus-wide bicycle network to connect to off-campus bicycle routes), PS Transportation 4 (provide bicycle parking), and PP 4.3-1 (campus-wide implementation of a TDM program), which all serve to reduce vehicular trips once vehicles are parked at the parking structure or parking lot.

Noise Sensitive Receptors

Noise-sensitive land uses include those uses where noise exposure could result in health-related risks to individuals and places where quiet is an essential element of the intended purpose. Residential dwellings are of primary concern; land uses such as parks, historic sites, cemeteries, and some recreation areas are considered sensitive to increases in exterior noise levels. Noise-sensitive land uses identified in the 2005 LRDP Amendment 2 EIR are residential areas and a motel. However, recreational uses are also identified for construction noise impact analysis.

The nearest noise sensitive receptors are off-campus residences to the east of the project site and on-campus residences north of the project site. The property line of the nearest off-campus residence, a multi-family complex, is approximately 700 feet from the center of the project site. The Glen Mor student housing complex on the UCR campus is approximately 270 feet from the center of the project site.

Existing Noise Levels

The dominant noise sources in the project area is motor vehicle operation in Parking Lot 13 and on the adjacent Big Springs Road. Motor vehicle noise is a concern because it is characterized by a high number of individual events that often create sustained noise levels. Ambient noise levels are highest during the daytime during peak activity hours on campus.

To characterize ambient noise levels in the project area, four 15-minute sound level measurements were taken using a sound level meter between 10:25 AM and 11:23 AM on Wednesday, October 2, 2019 (refer to Appendix D for sound measurement data). Measurement locations, as shown on Figure 9, were selected based on the potential exposure of surrounding noise-sensitive receptors, mainly residences, to noise generated during construction and operation of the proposed project. As shown in Table 12, the ambient noise level at the project site range from approximately 50 A-weighted decibels (dBA) equivalent noise level (Leq) along the project site’s eastern boundary to 63 dBA Leq near residences north of Big Springs Road and northeast of the project site.

Table 12 Sound Level Measurements

	Measurement Location	Primary Source of Noise	Distance to Centerline of Big Springs Road	Sample Time	Leq[15] (dBA)[1]
NM1	Southeast corner of Parking Lot 13	Traffic in Parking Lot 13	440 feet	10:25 AM – 10:40 AM	53.5
NM2	Along Big Springs Road, north of Parking Lot 13, and south of the Glen Mor Student Residence Complex	Landscaping equipment, traffic on Big Springs Road	50 feet	11:31 AM – 11:46 AM	58.8
NM3	East side of Parking Lot 13	Landscaping equipment	200 feet	10:46 AM – 11:01 AM	50.1
NM4	Along Big Springs Road, east of Valencia Hill Drive, adjacent to off-campus residences	Traffic on Big Springs Road	45 feet	11:08 AM – 11:23 AM	62.5

Source: Rincon Consultants, field measurements on October 2, 2019 using ANSI Type II Integrating sound level meter; see Appendix D.

Notes:

Leq = equivalent noise level; dBA = A-weighted decibels

[1] The Leq is defined as the single steady A-weighted level that is equivalent to the same amount of energy as that contained in the actual fluctuating levels over a period of time (essentially, the average noise level). For this measurement, the Leq was over a 15-minute period (Leq[15]).

Figure 9 – Noise Measurement Locations

Imagery provided by Microsoft Bing and its licensors © 2019.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☒	☐	☐	☐

Discussion

UCR is a part of the UC, a constitutionally-created unit of the State of California. As a State entity, UC is not subject to municipal plans, policies, or regulations such as the County and City General Plans or local ordinances. As identified in the 2005 LRDP EIR, 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 standards are applicable to the UCR campus. Title 24 of the CCR codifies Sound Transmission Control requirements, which establishes uniform minimum noise insulation performance standards for new residences, hotels, motels, dormitories, and apartment houses. The proposed project consists of non-residential educational and dining facilities and the State Title 24 regulations pertaining to those uses are not applicable to the proposed project. In addition, there are no University noise standards applicable to the proposed project. Therefore, there would be no impact based on exceedance of applicable standards, because there are no federal, State, or University noise regulations applicable to the proposed project. However, the following analysis related to construction and operational noise activities are discussed below for informational purposes.

Temporary Construction Noise Increases

Construction activity would result in temporary noise in the project area, exposing surrounding sensitive receptors to increased noise levels. 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., architectural coating). Typical heavy construction equipment during project grading and site preparation would include diesel powered backhoes, graders, and dozers. Construction equipment would not all operate at the same time or location and would not be in constant use during the eight-hour operating day. Mobile equipment moves around the construction site with power applied in cyclic fashion, such as bulldozers, graders, and loaders (FTA 2018). Therefore, noise impacts from construction equipment are assessed from the center of the equipment activity area (i.e., construction site).

Construction noise was estimated using the Federal Highway Administration (FHWA) Roadway Construction Noise Model (RCNM). RCNM predicts construction noise levels for a variety of construction operations based on empirical data and the application of acoustical propagation formulas (FHWA 2017). RCNM provides reference noise levels for standard construction equipment, with an attenuation of 6 dBA per doubling of distance for stationary equipment and 3 dBA per doubling of distance for mobile equipment. The model does not take into consideration topographic variation of the area; as such, it provides more conservative results.

Table 13 summarizes construction noise associated with each phase of construction, based on the equipment list provided by the CalEEMod output.

Table 13 Construction Noise Levels by Phase

		Off-Campus Residences (700 feet east)		Glen Mor Student Housing (270 feet north)	
Construction Phase	Construction Equipment	Maximum Noise Level (dBA Lmax)	Hourly Noise Level (dBA Leq)	Maximum Noise Level (dBA Lmax)	Hourly Noise Level (dBA Leq)
Demolition	Excavators, Rubber Tired Dozers, Tractors/Loaders/Backhoes	61.1	61.1	69.4	69.4
Site Preparation	Rubber Tired Dozers, Tractors/Loaders/Backhoes	61.1	62.3	69.4	70.6
Grading	Graders, Rubber Tired Dozers, Tractors/Loaders/Backhoes	62.1	62.4	70.4	70.7
Building Construction	Crane, Aerial Lifts, Forklifts, Off-Highway Trucks, Plate Compactors, Pumps, Tractors/Loaders/Backhoes	62.1	64.5	70.4	72.8
Paving	Off-Highway Trucks, Paving Equipment, Rollers	66.6	61.1	74.9	69.3
Architectural Coating	Air Compressors	54.7	50.8	63.0	59.0

Source: See Appendix D for RCNM results and Appendix B for CalEEMod results with construction equipment list.

Notes:

dBA = A-weighted decibels; Lmax = maximum sound level during a measurement period or a noise event; Leq = equivalent noise level

As shown in Table 13, construction generated noise would be greater than existing ambient noise levels at the off-campus residential complex and at the Glen Mor student housing complex (ambient noise is shown by Noise Measurements (NM) 2 and 3 in Table 12). Construction noise generated by the proposed project would range from 50.8 to 72.8 dBA Leq at sensitive receptors near the project site.

The 2005 LRDP contains policies to limit construction noise around sensitive receptors, including off-campus residences. PP 4.10-7(a) limits construction activities to 7:00 AM to 9:00 PM Monday through Friday, 8:00 AM to 6:00 PM on Saturday, and no construction on Sunday and national holidays in order to minimize disruption to area residences surrounding the campus and to on campus uses that are sensitive to noise. PP 4.10-7(b) requires construction equipment to be muffled or shielded, and PP 4.10-7(c) requires construction equipment and vehicle staging be placed to direct noise away from sensitive receptors. Additionally, to the extent feasible and without causing schedule delays, the western half of Parking Lot 13 improvements are planned to occur during summer months, when fewer students are residing at Glen Mor.

Consistent with PP 4.10-(a) through PP 4.10-7(c), construction hours, equipment, and staging have been considered to minimize potential noise impacts onto sensitive receptors. MM 4.10-2 from the 2005 LRDP Amendment 2 EIR would be incorporated into the project to require notification of affected persons about the planned construction. Therefore, there would be less than significant noise impacts with incorporation of PP 4.10-7(a) through PP 4.10-7(c) and MM 4.10-2, consistent with the findings of the LRDP EIR.

Permanent Project Operational Noise Increases

The analysis of Impacts 4.10-5 and 4.10-6 in the 2005 LRDP EIR and 2005 LRDP Amendment 2 EIR concluded that development under the 2005 LRDP, as amended, would result in less than significant long-term operational impacts related to:

- On- or off-campus ambient roadway (traffic) noise levels; and
- On- or off-campus ambient stationary source noise levels.

The 2005 LRDP Amendment 2 EIR addressed potential traffic-related noise impacts associated with the remaining development under the 2005 LRDP, as amended, which includes the proposed project. The project itself would not generate new vehicle trips. Rather, vehicles that would travel to the project site reflect student and faculty/staff growth expected to occur overtime from implementation of the 2005 LRDP Amendment 2 EIR and vehicles already traveling to campus that would park in Parking Structure 1 as a result of the removal of surface parking lots on campus. For the purposes of ensuring that adequate access to the project site was provided, trip generation estimates were developed assuming that the project reached 95% occupancy upon opening. Based on the number of new parking spaces being provided and traffic counts collected at similar parking facilities on campus, approximately 330 vehicles are expected to access the project site to utilize the additional parking available during the AM peak hour and approximately 300 vehicles are expected to access the site during the PM peak hour.

ON-SITE NOISE

Neither the University nor the overall UC system have adopted policies or standards related to temporary or long-term noise control. The land use (parking structure) would be compatible with the existing noise environment because the project site currently operates as a parking lot. The parking structure would not exceed the total number of parking spaces approved in the 2005 LRDP Amendment 2 and analyzed in the subsequent EIR. Noise generated by the proposed project would be limited to cars driving on site and parking, similar to the noise at the existing surface parking lot. The type of paving material to be used in Parking Structure 1 would minimize vehicle tire noise (e.g. quiet pavement). There may be some stationary noise associated with mechanical equipment such as elevators, but this noise is not anticipated to be substantial or be noticeable at long distances.

ROADWAY NOISE

The existing noise at the project site is primarily from traffic along Big Springs Road. The analysis of anticipated roadway noise impacts is based on the Traffic Operations Study (TOS) for the project prepared by Fehr and Peers (Appendix E), which estimates the impact to study intersections near the project site. The percentage increase in traffic volumes on area roadways was calculated to determine the increase in traffic noise. Decibels are measured on a logarithmic scale that quantifies sound intensity in a manner similar to the Richter scale used for 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 (Crocker 2007). Consequently, an increase in traffic volume less than a doubling results in a less than 3 dBA increase in roadway noise. For example, a ten percent increase in traffic volumes would raise traffic noise by approximately 0.4 dBA, a 20 percent increase would raise traffic noise by approximately 0.8 dBA, and a 30 percent increase would result in approximately 1.1 dBA increase in traffic noise.[12] The average healthy ear can barely perceive changes of 3 dBA, increase or decrease (i.e., twice the sound energy) and a change of 5 dBA is readily perceptible (eight times the sound energy) (Crocker 2007). The project would have a significant effect due to traffic noise if it would increase roadway noise levels by more than the 3 dBA threshold of perception, which would occur if traffic on area roadways doubled (i.e., 100 percent increase).

As discussed under V.17, Transportation, of this IS/MND, the proposed project would increase traffic on the local circulation system due to rerouting of vehicles to Parking Structure 1 as a result of surface parking being displaced by new campus buildings. Roadway segments that would have the greatest potential to result in substantial roadway noise increases are Big Springs Road (northeast and northwest of the project site), Campus Drive (north and south of Big Springs Road), and Watkins Drive (north and south of Big Springs Road), based on the existing traffic volumes, the proposed trip distribution from the project, and proximity to sensitive receptors.

As show in Table 14, the project would not double the amount of traffic on these roadways in existing year or future year (2025) conditions. Thus, the project would not result in a 3 dBA noise level increase and would not result in a substantial permanent increase in ambient noise levels above existing levels.

Table 14 Roadway Noise Impacts

Roadway Segment	Peak Hour	Existing Trips	Existing Plus Project Trips	Existing Plus Project Approximate Noise Increase (dBA)	Cumulative (Future Year 2025) Trips	Cumulative Plus Project Trips	Cumulative Plus Project Approximate Noise Increase (dBA)	Result in 3 dBA noise increase?
Big Springs Road								
West of project site to Campus Drive	AM	292	388	**1.1**	340	436	**1.8**	**No**
	PM	429	522	**0.8**	480	573	**1.1**	**No**
East of project site to Watkins Drive	AM	365	618	**2.3**	400	653	**2.6**	**No**
	PM	469	699	**1.8**	510	740	**2.0**	**No**
Campus Drive								
South of Botanic Gardens Road	AM	395	533	**1.5**	440	578	**1.8**	**No**
	PM	472	592	**1.1**	520	640	**1.5**	**No**
North of Big Springs Road	AM	300	396	**1.1**	340	446	**1.8**	**No**
	PM	431	524	**0.8**	580	573	**1.1**	**No**
Watkins Drive								
North of Big Springs Road	AM	1,081	1,217	**0.4**	1,240	1,376	**1.1**	**No**
	PM	1,068	1,192	**0.4**	1,300	1,424	**1.1**	**No**
South of Big Springs Road	AM	968	1,065	**0.4**	1,120	1,217	**1.1**	**No**
	PM	1,100	1,188	**0.4**	1,330	1,418	**1.1**	**No**

Source: Fehr and Peers 2019 (Appendix E)

Notes:

dBA = A-weighted decibels

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[12] Based on Rincon's in-house roadway noise screening tables developed using the Federal Highway Administration's (FHWA) Traffic Noise Model (TNM).

The proposed project would incorporate PS Campus and Community 4 (promote campus-wide non-vehicular transportation), PP 4.3-1 (campus-wide implementation of a TDM program), which all serve to reduce vehicular trips thereby minimizing traffic related noise.

Consistent with PP 4.10-1(a) and PP 4.10-6, the design and placement of Parking Structure 1, including access, parking, and on-site stationary equipment, have been considered to minimize potential noise impacts onto sensitive receptors during operation. There would not be a substantial increase in roadway noise due to implementation of the project. Therefore, there would be less than significant noise impacts with incorporation of PP 4.10-1(a) and PP 4.10-6, consistent with the findings of the LRDP EIR.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would result in a less than significant temporary or permanent increase in ambient noise levels with the incorporation of the PPs noted above. The proposed project impacts were adequately addressed in the LRDP EIR.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
b) Generation of excessive groundborne vibration or groundborne noise levels?	☐	☒	☐	☐	☐

Discussion

The 2005 LRDP EIR and 2005 LRDP Amendment 2 EIR adopt the following thresholds for “excessive” vibrations: 65 vibration decibels (VdB) at buildings where vibration would interfere with interior operations (e.g., sensitive on-campus research buildings), 80 VdB at residences and buildings where people normally sleep (e.g., student housing buildings and nearby residences), and 83 VdB at other institutional buildings.

Short-Term Construction Vibration

The analysis of Impact 4.10-3 in the 2005 LRDP EIR and 2005 LRDP Amendment 2 EIR concluded that development on campus would result in less than significant short-term impacts to off-campus persons from vibration during construction, including vibration from heavy trucks. The analysis of Impact 4.10-2 in the 2005 LRDP Amendment 2 EIR concluded that development under the 2005 LRDP, as amended, could result in significant and unavoidable impacts to on-campus sensitive buildings located in close proximity to the construction sites from excessive groundborne vibration.

Construction activities would include landscape and hardscape demolition and removal, excavation and grading, construction of Parking Structure 1, reconfiguration of Parking Lot 13, paving, and associated on-site improvements. The proposed project would not include pile driving or blasting, which are construction activities that generate the highest vibration levels. Heavy trucks would transport materials to and from the project area. During the demolition and grading phases, the operation of heavy or large construction equipment such as bulldozers, excavators, and loaded trucks have the potential to generate perceptible vibration levels at nearby buildings.

As described under the analysis of Impact 4.10-2 in the 2005 LRDP EIR and 2005 LRDP Amendment 2 EIR, where construction occurs more than 50 feet from campus classroom buildings, office buildings, and student housing buildings or where construction occurs more than 300 feet from research buildings with vibration-sensitive equipment, the impact would be less than significant. Based on the information presented in Table 4.10-8 of the LRDP EIRs, Vibration Levels for Construction Equipment, vibration levels from large bulldozers and loaded trucks could reach up to 86 to 87 VdB at buildings located within 25 feet of the equipment in use. This would exceed the 83 VdB threshold for institutional buildings. At a distance of 50 feet, vibration levels for this equipment would not exceed 81 VdB.

Removal of landscape and hardscape areas and grading for the proposed project would occur more than 50 feet from the nearest building (Chemical Sciences Building). The proposed would incorporate PP 4.10-2 and PP 4.10-7(a) limiting the hours of construction where necessary. PP 4.14-2 would notify on-campus facilities within 300 feet of the project site of the planned schedule of vibration activities. MM 4.10-2 from the 2005 LRDP Amendment 2 EIR would be incorporated into the project to require notification of affected persons about the planned construction. Incorporation of PP 4.10-2, PP 4.10-7(a), PP 4.14-2, and MM 4.10-2 would reduce potential vibrational noise impacts to less than significant levels, consistent with the findings of the LRDP EIR.

Operational Vibration

As described in the 2005 LRDP EIR, the existing campus facilities are not a major source of vibration. The proposed project would include activities similar to that of existing conditions (vehicle parking). As such, implementation of the project would not result in vibration levels that would expose persons on- or off-campus to excessive groundborne vibration or noise levels. This impact would be less than significant, consistent with the findings of the 2005 LRDP EIR, as amended.

The project would have a less than significant impact related to vibrational noise levels with incorporation of the PPs and MM noted above. The project impacts were adequately addressed in the LRDP EIR.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would have less than significant impacts related to groundborne vibration or groundborne noise levels with incorporation of the PPs and MM noted above. The proposed project impacts were adequately addressed in the LRDP EIR.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
c) 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 two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	☐	☒	☐	☐	☐

Discussion

As discussed in the IS for the 2005 LRDP Amendment 2 EIR, development under the 2005 LRDP was determined to have no impact related to noise from public or private airport/airstrip operations and was not carried forward for further discussion in the Draft EIR. The UCR campus is not located within the boundaries of any airport land use plan; is more than two miles from the nearest public airport; and is not located in the vicinity of a private airstrip. Consistent with the findings of the 2005 LRDP Amendment 2 EIR, implementation of the proposed project would not expose people in the project area to excessive noise levels related to public or private airport operations, consistent with the findings of the LRDP EIR.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would have no impacts related to the exposure of people to excessive noise levels associated with an airstrip or airport. The proposed project impacts were adequately addressed in the LRDP EIR.

14. POPULATION AND HOUSING

The analysis of population and housing is tiered from the 2005 LRDP Amendment 2 EIR and was addressed in Section 4.11, Population and Housing, of that document. There are no relevant project elements to population and housing. There were no applicable PSs, PPs, or MMs adopted as part of the 2005 LRDP EIR and 2005 LRDP Amendment 2 EIR related to population and housing.

Project Impact Analysis

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Would the project induce substantial 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)?	☐	☒	☐	☐	☐

Discussion

The analysis of Impacts 4.11-1 and 4.11-2 in the 2005 LRDP Amendment 2 EIR determined that although development under the 2005 LRDP Amendment 2 EIR and cumulative development would directly induce substantial population growth, because the projected housing supply in the area would be adequate to serve the additional population, there would be a less than significant impact with implementation of PS Land Use 4 (related to the provision of on-campus housing).

The project would construct a new parking structure and reconfigure a portion of an existing surface parking lot to accommodate existing and projected increase in the number of students, visitors, and staff on the UCR campus as analyzed in the 2005 LRDP, as amended. There would be no housing on site and it is anticipated that existing UCR staff would assist in the maintenance and operation of the parking structure facility, as needed. The proposed parking structure is not a use that would result in campus population growth; rather, the proposed parking structure would accommodate the parking needs of students, staff/faculty, and visitors who are already coming on to campus and accommodate future vehicular trips that was contemplated in the 2005 LRDP Amendment 2 EIR.

Therefore, the proposed project would not result in substantial growth or growth beyond that anticipated with implementation of the 2005 LRDP, as amended. There would be no impact, consistent with the findings of the LRDP EIR.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would have no impacts related to the inducing substantial unplanned population growth in an area, either directly or indirectly. The proposed project impacts were adequately addressed in the LRDP EIR.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
b) Would the project displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	☐	☒	☐	☐	☐

Discussion

The IS prepared for the 2005 LRDP Amendment 2 EIR concluded that there would be no impacts related to the displacement of existing housing or people since implementation of the 2005 LRDP, as amended, would not involve the demolition or removal of housing. The project site is currently a surface parking lot and does not contain housing. Therefore, the proposed project would not displace existing people or housing, nor necessitate the construction of replacement housing, consistent with the findings of the 2005 LRDP EIR.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would have no impacts related to displacement of substantial numbers of existing housing or people that would necessitate the construction of replacement housing. The proposed project impacts were adequately addressed in the LRDP EIR.

15. PUBLIC SERVICES

The analysis of the provision of public services on campus is tiered from the 2005 LRDP EIR and 2005 LRDP Amendment 2 EIR and is addressed in Section 4.12, Public Services, of those documents. Relevant elements of the project related to public services include the operation of Parking Structure 1 and Parking Lot 13.

The following applicable PPs were adopted as part of the 2005 LRDP EIR and 2005 LRDP Amendment 2 EIR; they have been incorporated as part of the proposed project and are assumed in the analysis presented in this section.

PP 4.12-1(a) As development occurs, the following measures will be incorporated:

i. New structures would be designed with adequate fire protection features in compliance with State law and the requirements of the State Fire Marshal. Building designs would be reviewed by appropriate campus staff and government agencies.
ii. Prior to implementation of individual projects, the adequacy of water supply and water pressure will be determined in order to ensure sufficient fire protection services.
iii. Adequate access will be provided to within 50 feet of the main

entrance of occupied buildings to accommodate emergency ambulance service.

- iv. Adequate access for fire apparatus will be provided within 50 feet of stand pipes and sprinkler outlets.
- v. Service roads, 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.
- vi. As implementation of the LRDP occurs, campus fire prevention staffing needs would be assessed; increases in staffing would be determined through such needs assessments.

PP 4.12-1(b) i. Accident prevention features shall be reviewed and incorporated into new structures to minimize the need for emergency response from the City of Riverside.

ii. Increased staffing levels for local fire agencies shall be encouraged to meet needs generated by LRDP project related on-campus population increases.

PP 4.12-2(a) As development under the LRDP occurs, the Campus will hire additional police officers and support staff as necessary to maintain an adequate level of service, staff, and equipment, and will expand the existing police facility when additional space is required.

PP 4.2-2(b) The Campus will continue to participate in the “UNET” program (for coordinated police response and staffing of a community service center), which provides law enforcement services in the vicinity of the campus, with equal participation of UCR and City police staffs.

Project Impact Analysis

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project 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:					
a) Fire protection?	☐	☒	☐	☐	☐

Discussion

The analysis of Impacts 4.12-1 and 4.12-3 in the 2005 LRDP EIR and 2005 LRDP Amendment 2 EIR concluded that, with implementation of PP 4.12-1(a), PP 4.12-1(b), and MM 4.12-1, there would be less than significant direct and cumulative impacts related to the need for new or physically altered fire protection facilities to accommodate the increased demand resulting from implementation of the 2005 LRDP, as amended, and to maintain acceptable service levels. As identified in the 2005 LRDP Amendment 2 EIR, the City of Riverside Fire Department (RFD) indicated that it would be desirable to add a fire station near the campus in order to meet national standards for fire and life safety services with the addition of planned development under the 2005 LRDP, as amended. The 2005 LRDP Amendment 2 EIR concluded that the environmental impact resulting from the potential for the RFD to construct new or expanded fire protection facilities would be less than significant.

Development of the proposed project consist of the construction of a four-level parking structure, reconfiguration of a portion of the existing surface parking area, landscape, pedestrian and bicycle pathways, and associated on-site improvements. It is anticipated that existing UCR staff would assist in the maintenance and operation of the parking structure facility, as needed. The proposed parking structure is not a use that would result in campus population growth; rather, the proposed parking structure would accommodate the parking needs of students, staff/faculty, and visitors who are already coming on to campus and accommodate future vehicular trips that was contemplated in the 2005 LRDP Amendment 2 EIR.

The UCR Campus Fire Marshal of the UCR Office of Emergency Management provides communication from the campus to the RFD in the event of an emergency. Fire Station 4 is the closest fire station to the project site and serves the university, located 1.4 miles northwest from the project site (2.2 miles via vehicle roadways) at 3510 Cranford Avenue Riverside, CA 92507. It employs one captain, one engineer, one firefighter, and one firefighter/paramedic, and has one engine and one water tender. According to the RFD’s Box Canyon Reserve Incident Action Plan, a publicly accessible fire hydrant is located at the corner of Valencia Hill Drive and Big Springs Road, approximately 156 feet from the project site (Riverside 2018). During the first quarter of 2019, turnout time for all 14 fire stations was 2:06. The goal is to reduce “turnout time” to under 2:00 minutes at all fire stations (Riverside 2019).

The RFD is responsible for fire suppression, and the UCR EH&S is responsible for inspection, fire protection engineering, and fire prevention. The campus has 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. The proposed project would comply with all regulations of Sections 13000 et seq. of the California Health and Safety Code, which pertain to fire protection systems, including provision of smoke alarms, fire extinguishers, appropriate building access, and emergency response notification systems. The proposed project incorporates PP 4.12-1(a), which requires new structures to be designed with adequate fire protection features in compliance with State law. It also requires adequacy of water supply and water pressure to be determined prior to implementation of individual projects to ensure sufficient fire protection services for the campus. PP 4.12-1(b) requires accident prevention features to be included in new structures to minimize the demand for emergency response services from RFD. It is anticipated that the project would include fire protection features and fire water infrastructure (e.g., fire hydrants).

Big Springs Road would continue to serve as the main emergency access road for the project site. Project design for the reconfigured Parking Lot 13 would include an emergency access lane of 20 feet via the ingress/egress from Big Springs Road and around Parking Structure 1.

According to the Campus Fire Marshal, RFD can adequately provide fire protection and emergency medical response services without resulting in the need for additional staff or facilities from other departments (Jackson 2019). As such, no new, expanded, or altered fire protection services or facilities would be required to serve the proposed project, and no physical environmental impacts related to the provision of fire protection services would result.

Because emergency access and fire flows would be adequate to serve the proposed project ad no new, expanded, or altered fire protection services or facilities would be required beyond those included as part of the proposed project, impacts associated with the provision of fire protection services from implementation of the proposed project, which incorporates PP 4.12-1(a) and PP 4.12-1(b), are considered less than significant; this is consistent with the findings of the LRDP EIR.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would have a less than significant impact on fire protection services with incorporation of the PPs noted above; no new or altered fire protection services would be required. The proposed project impacts were adequately addressed in the LRDP EIR.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
b) Police protection?	☐	☒	☐	☐	☐

Discussion

The analysis of Impacts 4.12-2 and 4.12-3 in the 2005 LRDP EIR and 2005 LRDP Amendment 2 EIR identified that the incremental increase in the campus population may result in increased response times by the UC Police Department (UCPD). The increased population on campus 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 additional patrol personnel. In order to maintain adequate levels of police protection to serve the anticipated increase in campus population, the UCPD may need to purchase additional equipment and hire additional personnel. However, with implementation of PP 4.12-2(a) and PP 4.12-2(b), there would be less than significant direct and cumulative impacts related to the need for new or physically altered police facilities to accommodate the increased demand resulting from implementation of the 2005 LRDP, as amended, and to maintain acceptable service levels.

The anticipated increase in staffing and equipment of the UCPD with the addition of planned development under the 2005 LRDP, as amended, could require provision of additional space, which could include renovation of the existing UCPD facility, expansion of the existing facility, or the acquisition of a satellite facility (similar to the storefront facility at University Village). The potential environmental effects associated with expanding the existing facility or providing a satellite facility were evaluated in the 2005 LRDP Amendment 2 EIR at a program level, and it was concluded that there would be a less than significant impact.

The UCPD is located on campus at 3500 Canyon Crest Drive Riverside, California 92507. The UCPD has an MOU with the City of Riverside, whereby the UCPD and the Riverside Police Department (RPD) provide reciprocal assistance to each other. The two departments jointly operate a community policing enterprise known as the University Neighborhood Enhancement Team (UNET) in a 17.5-square-mile area in the City of Riverside. In addition to UNET, the UCR campus officers handle incidents within the City. In turn, RPD provides the UCPD with emergency backup and, infrequently, assists in handling emergency calls. As discussed above, the proposed parking structure is not a use that would result in campus population growth; rather, the proposed parking structure would accommodate the parking needs of students, staff/faculty, and visitors who are already coming on to campus and accommodate future vehicular trips that was contemplated in the 2005 LRDP Amendment 2 EIR. The types and volume of service calls for police services at the site would be similar to that of the calls for services for the existing surface parking area at the site. Additionally, the proposed parking structure would incorporate crime prevention related design features, including, but not limited to, security cameras, electronic access/controls, and environmental design features to help prevent or deter criminal activity. PP 4.12-2(a), which ensures the hiring of additional officers as needed to maintain adequate service levels, and PP 4.12-2(b), which ensures continued UCR participation in the UNET program, are also incorporated into the proposed project. UCPD has determined that the project can be adequately served without the need for additional staff or expanded police facilities (UCPD 2019).

Therefore, consistent with the findings of the LRDP EIR, no new or expanded police facilities would be required, and no physical environmental impacts would result with incorporated of the PP 4.12-2(a) and PP 4.12-2(b). There would be less than significant impacts.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would have a less than significant impact to police services with incorporation of the PPs noted above; no new or altered police facilities would be required. The proposed project impacts were adequately addressed in the LRDP EIR.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
c) Schools?	☐	☒	☐	☐	☐

Discussion

As identified in the 2005 LRDP EIR and the IS for the 2005 LRDP Amendment 2 EIR, implementation of the proposed 2005 LRDP Amendment 2 would result in new students in the City of Riverside and surrounding areas, and funds would be available from private residential and commercial development to pay for new facilities. In addition, the Riverside Unified School District (RUSD) and neighboring school districts have options available to accommodate new students. Therefore, it was concluded that implementation of the 2005 LRDP, as amended, would not result in substantial adverse physical impacts associated with the provision of new or physically altered school facilities.

As stated previously, the project proposes development of a new parking structure, reconfiguration of a portion of the existing surface parking area, landscape, pedestrian and bicycle pathways, and associated on site improvements. The proposed parking structure is not a use that would result in campus population growth; rather, the proposed parking structure would accommodate the parking needs of students, staff/faculty, and visitors who are already coming on to campus and accommodate future vehicular trips that was contemplated in the 2005 LRDP Amendment 2 EIR. It is anticipated that existing UCR staff would assist in the maintenance and operation of the parking structure facility, as needed. Thus, the proposed project would not result in a direct increase in new students within the RUSD service area. Therefore, substantial adverse impacts associated with new or physically altered school facilities would not result from implementation of the proposed project, and there would be a less than significant impact, consistent with the findings of the LRDP EIR.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would have a less than significant impact to schools; no new or altered school facilities would be required. The proposed project impacts were adequately addressed in the LRDP EIR.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
d) Parks?	☐	☒	☐	☐	☐

Discussion

The analysis of the proposed project's impacts on parks and other recreation facilities is provided in Section V.15, Recreation, of this IS/MND.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would not involve the development of new and expanded recreational facilities, and no new or altered park/recreation facilities would be required as a result of the proposed project. The proposed project impacts were adequately addressed in the LRDP EIR.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
e) Other public facilities?	☐	☒	☐	☐	☐

Discussion

As identified in the 2005 LRDP EIR and IS for the 2005 LRDP Amendment 2 EIR, implementation of the 2005 LRDP, as amended, would not result in substantial adverse physical impacts associated with the provision of new or physically altered libraries. In addition, UCR provides libraries that are open to the public and are used by its campus population, thus reducing demand on City resources. It was also identified that implementation of planned development under the 2005 LRDP, as amended, would increase the demand on each of the four existing libraries on campus and that satellite libraries may also be developed as part of professional school development. The potential environmental effects associated with the development of satellite libraries were evaluated in the 2005 LRDP EIR at a program level, and it was concluded that there would be a less than significant impact.

As discussed previously, it is anticipated that existing UCR staff would assist in the maintenance and operation of the parking structure facility, as needed. The proposed parking structure is not a use that would result in campus population growth; rather, the proposed parking structure would accommodate the parking needs of students, staff/faculty, and visitors who are already coming on to campus and accommodate future vehicular trips that was contemplated in the 2005 LRDP Amendment 2 EIR. As such, the proposed project would not result in an increased demand for on- or off-campus library services or other public services not anticipated in the 2005 LRDP EIR or 2005 LRDP Amendment 2 EIR. Therefore, consistent with the findings of these EIRs, substantial adverse impacts associated with new or physically altered libraries or other public services would not result from implementation of the proposed project.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would have no impacts on library services or other public services. The proposed project impacts were adequately addressed in the LRDP EIR.

16. RECREATION

The analysis of recreation is tiered from the 2005 LRDP EIR and was addressed in Section 4.13, Recreation, of that document. The proposed project does not include the development of any recreational facilities or propose a use that would result in a substantial increase in campus population above what was anticipated in the LRDP EIR. There are no applicable PSs, PPs, or MMs adopted as part of the 2005 LRDP EIR and 2005 LRDP Amendment 2 EIR related to recreation.

Project Impact Analysis

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Would the project 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?	☐	☒	☐	☐	☐

Discussion

The analysis of Impact 4.13-1 in the 2005 LRDP EIR concluded that the 2005 LRDP includes the implementation of recreational facilities that would be sufficient to serve the planned population growth on campus. Further, it was concluded that with implementation of PS Open Space 7, the increased demand for recreational facilities from additional persons in the City of Riverside would not increase the use of existing neighborhood and regional parks or other recreational facilities such that the substantial physical deterioration of the facility would occur or be accelerated. Therefore, the impact was determined to be less than significant.

As discussed previously in Section V.14, Population and Housing, of this IS/MND, the proposed project would not induce population growth as it would not create new housing or employment, or attract new population to the area. It is anticipated that existing UCR staff would assist in the maintenance and operation of the parking structure facility, as needed. The proposed parking structure is not a use that would result in campus population growth; rather, the proposed parking structure would accommodate the parking needs of students, staff/faculty, and visitors who are already coming on to campus and accommodate future vehicular trips that was contemplated in the 2005 LRDP Amendment 2 EIR. As a result, the proposed project would have no potential to increase the use of parks or recreational facilities in the area. Therefore, consistent with the findings of the LRDP EIR, the proposed project would result in a less than significant impact related to substantial or accelerated physical deterioration of existing neighborhood or regional parks or other recreational facilities.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would have a less than significant impact related to an increase in 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. The proposed project impacts were adequately addressed in the LRDP EIR.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities, which might have an adverse physical effect on the environment?	☐	☒	☐	☐	☐

Discussion

The analysis of Impact 4.13-2 in the 2005 LRDP EIR identified that the implementation of the 2005 LRDP would include the development of new recreational facilities that could result in adverse physical impacts on the environment during the construction period. The development of new recreational facilities is one component of the overall LRDP program and, as such, is part of the whole of the action that was analyzed in the 2005 LRDP EIR. The 2005 LRDP EIR concluded that there would be less than significant impacts related to the construction of recreational facilities with implementation of relevant construction-related PSs, PPs, and MMs, including but not limited to those related to air quality, noise, traffic, and agriculture.

While there are no recreational facilities included as part of the proposed project, as described in Section II, Project Description, of this IS/MND, the proposed project does include new landscape and hardscape improvements throughout the project site in addition to new a pedestrian pathway linking the parking structure to and from the existing sidewalk along East Campus Drive.

The IS provides project-specific environmental review of the construction and operation of the various project components identified above. Local and regional air quality impacts are addressed Under V.3, Air Quality; noise and vibration impacts are addressed under Section V.12, Noise; and traffic impacts are addressed under Section V.16, Transportation and Traffic, of this IS/MND. No additional impacts associated with these improvements would occur beyond those addressed for the proposed project and evaluated in the 2005 LRDP EIR; the proposed project impacts would be less than significant.

The proposed project would not require the construction of new recreational facilities or expansion of existing recreational facilities on or off campus. Therefore, no additional physical impacts would occur with implementation of the proposed project, consistent with the findings of the LRDP EIR.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would have no impacts related to the construction or expansion of recreation facilities. The proposed project impacts were adequately addressed in the LRDP EIR.

17. TRANSPORTATION

The analysis of transportation is tiered from the 2005 LRDP Amendment 2 EIR and was addressed in Section 4.14, Transportation and Traffic, of that document. The analysis of transportation is also based on the Transportation Operations Study and the VMT Overview Memorandum prepared by Fehr & Peers for the project in November 2019 and is included as Appendix E and F of this IS/MND, respectively. Relevant elements of the proposed project related to transportation and planning include the temporary construction activities that would involve heavy trucks on the identified construction routes and operation of Parking Structure 1, Parking Lot 13, driveways from Big Springs Road, and pedestrian and bicycle pathways.

The project site is on the eastern edge of the campus, just south of Big Springs Road, an east-west two-lane road which connects East Campus with the City of Riverside past Valencia Hill Drive. Currently, there are access driveways into Parking Lot 13 from Big Springs Road and one access driveway from UCR Botanic Gardens Road near the Chemical Sciences Building.

Big Springs Road serves as the vehicular, bicycle, and pedestrian connection to Parking Lot 13 (project site) as well as the Big Springs Parking Structure, Parking Lot 14, and the Glen Mor and Lothian Residence Complexes to the north of the project site. An internal campus driveway extends from the southern boundary of Parking Lot 13 to the USDA Salinity Laboratory and associated parking lot. At the southwestern corner of Parking Lot 13, an internal campus driveway splits in two directions: east to Parking Lot 10 and East Campus Drive and becoming Botanic Gardens Drive heading south to the parking lot and driveway of the UCR Botanic Gardens.

The following applicable PSs, PPs, and MMs were adopted as part of the 2005 LRDP Amendment and/or 2005 LRDP Amendment 2 EIR and are incorporated as part of the project and assumed in the analysis presented in this section.

PS Campus and Community 4	Provide strong connections within the campus and its edges to promote walking, bicycling and transit use, rather than vehicular traffic.
PS Transportation 3	Provide a continuous network of bicycle lanes and paths throughout the campus, connecting to off campus bicycle routes.
PS Transportation 5	Provide bicycle parking at convenient locations.
PP 4.14-1	The campus shall continue to implement a Transportation Demand Management program that meets or exceeds all trip reduction and AVR requirements of the SCAQMD. The TDM program may be subject to modification as new technologies are developed or alternate program elements are found to be more effective. *(This is identical to Air Quality PP 4.3-1.)*
PP 4.14-2	The Campus will periodically assess construction schedules of major projects to determine the potential for overlapping construction

activities to result in periods of heavy construction vehicle traffic on individual roadway segments, and adjust construction schedules, work hours, or access routes to the extent feasible to reduce construction-related traffic congestion.

PP 4.14-5 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. *(This is identical to Hazards and Hazardous Materials PP 4.7-7[a].)*

PP 4.14-6 For any construction-related closure of pedestrian routes, the Campus shall provide alternate routes and appropriate signage and provide curb cuts and street crossings to assure alternate routes are accessible.

PP 4.14-8 To maintain adequate access for emergency vehicles when construction projects would result in roadway closures, the Office of Architects and Engineers shall consult with the UCPD, EH&S, and the RFD to disclose roadway closures and identify alternative travel routes. *(This is identical to Hazards and Hazardous Materials PP 4.7-7[b].)*

MM 4.14-1(b) Travel Demand Management. To reduce on- and off-campus vehicle trips and resulting impacts, the University will enhance its Transportation Demand Management (TDM) program. TDM strategies will include measures to increase transit and Shuttle use, encourage alternative transportation modes including bicycle transportation, implement parking policies that reduce demand, and other mechanisms that reduce vehicle trips to and from the campus. The University shall monitor the performance of campus TDM strategies through annual surveys.

MM 4.14-1(d) Sustainability and Monitoring. The University shall review individual projects proposed under the amended 2005 LRDP for consistency with UC sustainable transportation policy and UCR TDM strategies to ensure that bicycle and pedestrian improvements, alternative fuel infrastructure, transit stops, and other project features that promote alternative transportation are incorporated into each project to the extent feasible.

Project Impact Analysis

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Would the project conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?	☐	☒	☐	☐	☐

Discussion

The analysis of Impacts 4.14-1 through 4.14-4 in the 2005 LRDP Amendment 2 EIR, which addresses intersection and roadway capacity, concluded that, with implementation of PS Land Use 4, PS Land Use 7, PS Transportation 1 through 6, PP 4.14-1, MM 4.14-1(a), and the Campus Traffic Mitigation Program (CTMP), composed of MM 4.14-1(b) through MM 4.14-1(f), development under the 2005 LRDP, as amended, would result in the following:

- Less than significant impacts to local roadways under existing plus project conditions and in 2020 and no mitigation is required (Impacts 4.14-3 and 4.14-4);
- Significant and unavoidable impacts to 13 of the 32 study area intersections under the existing plus project condition and 17 intersections under the year 2020 condition; these intersections are under the jurisdiction of the City of Riverside or the California Department of Transportation (Caltrans) (Impacts 4.14-1 and 4.14-2).

As discussed in the 2005 LRDP Amendment 2 EIR, all of the intersection improvements described in the CTMP would fall under the jurisdiction of the City and/or the Caltrans. However, because the City and/or Caltrans have not programmed any improvements to these facilities at the time of preparation of the EIR, the construction of the improvements cannot be ensured, as it depends on actions by the City and/or Caltrans. Furthermore, improvements that would restore operations to acceptable levels are not feasible at some of the 17 total affected intersections under the jurisdiction of the City and/or Caltrans. For these reasons, the identified off-campus intersection impacts (Impacts 4.14-1 and 4.14-2) remain significant and unavoidable.

The analysis of Impact 4.14-5 concluded that, even with implementation of PP 4.14-2, development under the 2005 LRDP, as amended, would result in a significant and unavoidable impact to intersection and roadway capacity due to temporary construction traffic.

Short-Term Construction Traffic

Construction activities associated with the proposed project could result in temporary closure of on-campus traffic lanes or roadway segments in the project vicinity to permit the delivery of construction materials; to transport exported soil; or to provide adequate site access during construction of utility connections or other project-related features located adjacent to, or within, Big Springs Road. The project anticipates the export of approximately 5,259 cy of soil/debris requiring heavy truck trips during grading activities. As previously discussed under Section 2, Air Quality, of this IS/MND, truck capacity is assumed to be 16 cubic yards, resulting in approximately 125 truckloads of export (including empty truck return trips) over a 20-day period, or approximately

6 truckloads per day. Additionally, demolition activities would result in the removal of approximately 5,259 cy of debris, or approximately 658 haul trips. There is a chance that construction of the proposed project may overlap with construction of other on-campus projects that are either proposed or approved; however, it is not anticipated that they would have overlapping construction traffic routes. The proposed project would not require lane closures or other access restrictions for extended periods of time. The proposed construction route would occur from Linden Street to Aberdeen Drive to North Campus Drive to Big Springs Road or from Canyon Crest Drive to West Campus Drive to Big Springs Road. No construction vehicles are allowed on Watkins Drive and would be noted on the construction specifications.

The project contractor would coordinate with UCR staff to ensure that the delivery of construction materials, export of soils, and trips associated with construction workers avoids the peak time when students are attending classes on campus. The proposed project incorporates PP 4.14-2, which requires the campus to assess construction schedules of major projects periodically to determine the potential for overlapping construction activities and adjust construction schedules, work hours, or access routes to the extent feasible to reduce construction-related traffic congestion. Additionally, the proposed project incorporates PP 4.14-5, which requires one travel lane, to minimize construction traffic impacts to the extent feasible. Therefore, potential project-related traffic impacts associated with lane closures and access restrictions during construction would be less than significant. Although the 2005 LRDP Amendment 2 EIR concluded that construction traffic could be significant at some locations along the identified access routes, for the reasons discussed above, in the event there is an overlap of construction activities on campus, it is concluded that the project would result in a less than significant cumulative traffic construction impact with incorporation of PP 4.14-2 and PP 4.14-5 consistent with the findings of the LRDP EIR.

Long-Term Operational Traffic

Changes in CEQA Guidelines regarding transportation impacts have occurred since the adoption of the 2005 LRDP Amendment 2 EIR in 2011. Senate Bill 743 (SB 743) has eliminated auto delay, level of service (LOS), and other similar measures of vehicular capacity or traffic congestion as a basis for determining significant impacts for projects in favor of the evaluation of VMT. A new CEQA Guidelines section 15064.3, subdivision (b), was established to address this topic. UCR is now utilizing the guidelines to assess project impacts as they provide the most current direction from the State and reflect the most defensible guidance available.

While changes to driver delay no longer constitute a CEQA impact, UCR can still conduct a traffic operations study (TOS) to assess the need for any potential improvements to roadways or intersections in the vicinity of campus. Such an evaluation is included in the project-specific TOS provided in Appendix E for informational and planning purposes, but will not be considered further as a CEQA consideration. Impacts associated with VMT and CEQA Guidelines section 15064.3, subdivision (b) are addressed in the next section.

Bicycle and Pedestrian Facilities

The analysis of Impact 4.14-13 in the 2005 LRDP Amendment 2 EIR concluded that development under the 2005 LRDP, as amended, would result in less than significant impacts related to demand for public transit with implementation of PS Transportation 1 and PP 4.14-1.

The proposed project involves the construction of a new parking structure, reconfiguration of the existing surface parking area, and associated on-site improvements and would not impact public transit, bicycle, or pedestrian facilities off campus. Existing pedestrian/bicycle circulations to Parking

Lot 13 would remain. New pedestrian/bicycle pathways would extend north from Parking Structure 1 and connect to an improved pedestrian/bicycle pathway along the northern boundary of Parking Lot 13 and on Big Springs Road. New pedestrian/bicycle pathways would extend south from Parking Structure 1 to a new pedestrian/bicycle pathway that would run along the southern boundary of Parking Lot 13 and connect to the Department of Chemistry building and the western side of campus. The site would include a ride-share drop off area. Signage for clear wayfinding in and around Parking Structure 1 and for UCR destinations would be provided. With implementation of the proposed project, it is anticipated that existing UCR staff would assist in the maintenance and operation of the parking structure facility, as needed. The proposed parking structure is not a use that would result in campus population growth; rather, the proposed parking structure would accommodate the parking needs of students, staff/faculty, and visitors who are already coming on to campus and accommodate future vehicular trips that was contemplated in the 2005 LRDP Amendment 2 EIR. Since there is no anticipated increase in population with implementation of the proposed project, the project is not expected to result in direct or indirect population growth in the area that would create an additional demand for alternative transportation facilities not anticipated in the 2005 LRDP Amendment 2 EIR.

The proposed project would be consistent with the goal of the 2005 LRDP to emphasize strong connections and ease of access within campus and with the surrounding community. Specifically, the project would be consistent with the following PSs:

- **PS Campus and Community 4.** Provide strong connections within the campus and its edges to promote walking, bicycling and transit use, rather than vehicular traffic.
- **PS Transportation 3.** Provide a continuous network of bicycle lanes and paths throughout the campus, connecting to off campus bicycle routes.
- **PS Transportation 5.** Provide bicycle parking at convenient locations.

Thus, consistent with the findings of the 2005 LRDP Amendment 2 EIR, the proposed project would not conflict with the adopted policies, plans, or programs that support alternative transportation with incorporation of PS Campus and Community 4, PS Transportation, and PS Transportation 5 and would result in a less than significant impact.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The project would not conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities with the incorporation of the PSs noted above. The proposed project impacts were adequately addressed in the LRDP EIR.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
b) Would the project conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b)?	☐	☐	☐	☐	☒

Discussion

CEQA Guidelines Section 15064.3(b) identifies criteria for evaluating transportation impacts. Generally, VMT is the most appropriate measure of transportation impacts. VMT refers to the amount and distance of automobile travel attributable to a project. Specifically, the guidelines state that VMT exceeding an applicable threshold of significance may indicate a significant impact. The TOS provides a focused analysis to analyze the changes to vehicle travel flows in the surrounding area with the construction of the project. A VMT Memorandum (Appendix F) was prepared for the proposed project and is summarized below.

The proposed project would construct a parking structure that would accommodate existing and future campus growth from implementation of the 2005 LRDP Amendment 2 EIR as well as accommodate existing surface parking that would be displaced by development of new campus buildings. The need for additional parking to accommodate growth in students, faculty/staff, and campus visitors was identified in UCR's 2005 LRDP. The 2005 LRDP identified several future sites for new parking facilities, including the project site.

Construction

During construction, the project would temporarily generate vehicle-trips for workers, truck hauling trips, and truck-trips for the delivery of supplies and construction equipment. Parking for students, faculty, and staff that is displaced in Parking Lot 13 during construction would be provided by existing parking lots and structures on campus. Construction workers would park on the eastern side of Parking Lot 13. Construction workers/vendors trips would range from 13 to 230 per day depending on the construction stage, and occur over approximately 13 months.

Construction access would be allowed through campus from west of Parking Lot 13 on Big Springs Road and would not be allowed from east of the project site through off-campus residential areas. The primary construction route would be Canyon Crest Drive across SR-215, to West Campus Drive, to East Campus Drive, and to Big Springs Road. Alternatively, access would be allowed from W. Linden Street to Aberdeen Drive, to East Campus Drive, and to Big Springs Road.

Any effects to the transportation network during construction would be temporary. Given the duration of construction and activity levels anticipated, the project would not have a significant impact related to VMT during construction.

Operation

The project itself would not generate new vehicle trips. Rather, vehicles that would travel to the project site reflect student and faculty/staff growth expected to occur overtime from implementation of the 2005 LRDP Amendment 2 EIR and vehicles already traveling to campus that would park in Parking Structure 1 as a result of the removal of surface parking lots on campus. For the purposes of ensuring that adequate access to the project site was provided, trip generation estimates were developed assuming that the project reached 95% occupancy upon opening. Based on the number of new parking spaces being provided and traffic counts collected at similar parking facilities on campus, approximately 330 vehicles are expected to access the project site to utilize the additional parking available during the AM peak hour and approximately 300 vehicles are expected to access the site during the PM peak hour.

Given that the project would not generate new vehicle trips and that vehicle-trips generated during construction would be temporary, no impacts to VMT under CEQA Guidelines Section 15064.3, Subdivision (b) would occur with the project.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would not conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b). Since CEQA Guidelines section 15064.3, subdivision (b) was not in effect it was not previously evaluated in the LRDP EIR. Based on the evaluation herein, no impacts would occur.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
c) Would the project substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☒	☐	☐	☐

Discussion

The analysis of Impacts 4.14-8 through 4.14-10 in the 2005 LRDP Amendment 2 EIR, which addresses transportation hazards, concluded that, with implementation of PP 4.14-4, PP 4.14-5, and PP 4.14-6, development under the 2005 LRDP, as amended, would result in less than significant impacts related to (1) vehicular traffic hazards due to design or land use incompatibilities during long-term operation; (2) vehicular traffic hazards during construction due to closure of roadway segments; or (3) pedestrian hazards during construction due to closure of sidewalks or paths.

Vehicular Hazards During Construction

As discussed under Threshold V.17(a), construction activities associated with the proposed project could result in temporary closure of traffic lanes or roadway segments to permit the delivery of construction materials; to transport demolition materials; to provide adequate site access; or during construction of project-related features located adjacent to or within Big Springs Road, such as driveway improvements. Disruption to roadways is expected to be minimal as most of construction activity would occur within the project site.

The temporary reduction of roadway capacity, the narrowing of traffic lanes, and the occasional interruption of traffic flow on streets associated with proposed project-related construction activities could pose hazards to vehicular traffic due to localized traffic congestion, decreased turning radii, or the condition of roadway surfaces. To minimize traffic disruption and congestion, the project incorporates PP 4.14-2, which requires coordination of major construction projects on campus, and PP 4.14-5, which requires one travel lane to minimize construction traffic impacts to the extent feasible. With implementation of these PPs, construction-related traffic disruptions would be less than significant.

Vehicular Hazards during Operation

The proposed project does not include permanent modifications to on-campus or City of Riverside roadways. Access to Big Springs Road, East Campus Drive, or UCR Botanic Gardens Road would not be permanently impacted. An additional access point, Portal D, is being considered at the northeastern portion of the site and would serve as the southern leg of the intersection at Big Springs Road and Valencia Hill Drive, and would be inbound-only or inbound and outbound.

A code-compliant 20-foot emergency access lane would be constructed through Parking Lot 13 and around Parking Structure 1, as well as adequate emergency access and maneuvering capabilities for fire trucks and emergency responders inside and around Parking Structure 1, which would be reviewed and approved by the DCFM. Additionally, Parking Structure 1 design includes provisions for increasing vehicular safety, such as designing the ramp angle within the structure to reduce sunlight glare while driving. All elements of vehicle access and roadway improvements, including size, configuration, vertical and horizontal alignment, lane widths, striping, signage, lighting and traffic control measures (i.e. stop signs and speed bumps) are to be designed and constructed in accordance with the University's Technical specifications, Caltrans Standard Plans, and/or Standard Specifications for Public Works Construction (SSPWC).

Therefore, implementation of the proposed project would not increase hazards due to design features or incompatible uses. Consistent with the findings of the LRDP EIR, operation of the project would result in a less than significant impact related to vehicular hazards.

Pedestrian and Bicycle Hazards During Construction and Operation

Existing pedestrian routes in the vicinity of the project site include, but are not limited to, the sidewalk on Big Springs Road and the pedestrian pathway adjacent to UCR Botanic Gardens Road near the Chemical Sciences Building. There are designated bicycle routes along Big Springs Road. During construction, these pedestrian and bicyclist movements would be maintained to the extent feasible with potential detours with any lane closures along Big Springs Road during construction activities. PP 4.14-6 is incorporated into the project; therefore, alternate pedestrian routes, which also accommodate bicyclists, would be identified to maintain the same travel movement and signage would be installed to facilitate wayfinding. PP 4.14-5, which requires use of flag persons to ensure traffic control during construction, would also ensure that there is safe movement through the construction access area. Additionally, the project would construct new pedestrian and bicycle pathways that connect the core campus and Parking Lot 13. Therefore, implementation of the proposed project would not increase hazards due to design features or incompatible uses. As such, consistent with the findings of the 2005 LRDP Amendment 2 EIR, there would be less than significant impacts related to pedestrian and bicycle hazards during construction or operation.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would have a less than significant impact related to a substantial increase in traffic hazards due to a design feature or incompatible uses. The proposed project impacts were adequately addressed in the LRDP EIR.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
d) Would the project result in inadequate emergency access?	☐	☒	☐	☐	☐

Discussion

The analysis of Impacts 4.14-11 and 4.14-12 in the 2005 LRDP Amendment 2 EIR, which addressed emergency access, concluded that construction and operation of development under the 2005 LRDP, as amended, would result in less than significant impacts to emergency access with implementation of PS Transportation 4.

Emergency Access during Construction

Vehicular and emergency access to the project site is currently provided from Big Springs Road and East Campus Drive to UCR Botanic Gardens Road. This access will remain accessible to emergency vehicles during construction activities. Construction activities associated with the proposed project could result in temporary closure of on-campus traffic lanes or roadway segments along Big Springs Road. The reduction of roadway capacity, the narrowing of traffic lanes, and the occasional interruption of traffic flow could temporarily impair emergency access. Construction activities would be planned so that the one lane along Big Springs Road would be maintained at all times. Police, medical, and rescue operations would be able to use this space. Furthermore, the project incorporates PP 4.14-8 and emergency service agencies would be consulted regarding street closures to ensure adequate access for emergency vehicles during construction. Therefore, consistent with the findings of the 2005 LRDP Amendment 2 EIR, construction of the proposed project would result in less than significant impacts related to vehicular hazards during construction with incorporation of PP 4.14-8.

Emergency Access during Operation

Emergency vehicles access the campus via roadways such as the I-215/SR-60 freeways and University Avenue from each of the cardinal directions. Once emergency vehicles are on campus, the internal roadway network is adequate to allow these vehicles to reach their designated locations, including the project site. As discussed above, a code-compliant 20-foot emergency access lane would be constructed through Parking Lot 13 and around Parking Structure 1, as well as adequate emergency access and maneuvering capabilities for fire trucks and emergency responders inside and around Parking Structure 1, which would be reviewed and approved by the DCFM.

Additionally, consistent with the campus' standard procedures, the DCFM would review and approve the project to ensure that circulation and design features in Parking Structure 1 and Parking Lot 13 allow adequate emergency vehicle access in compliance with the CBC. Therefore, consistent with the findings of the 2005 LRDP Amendment 2 EIR, there would be less than significant impacts related to emergency access during operation of the project.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The project would have a less than significant impact related to emergency access with incorporation of the PP noted above. The proposed project impacts were adequately addressed in the LRDP EIR.

18. TRIBAL CULTURAL RESOURCES

In September 2014, Governor Brown signed AB 52 (Chapter 532, Statutes of 2014), which creates a new category of environmental resources that must be considered under CEQA: "tribal cultural resources." The legislation imposes new requirements for offering to consult with California Native American tribes regarding projects that may affect a tribal cultural resource, emphasizes a broad definition of what may be considered to be a tribal cultural resource, and includes a list of recommended MMs.

Recognizing that tribes may have expertise regarding their tribal history and practices, AB 52 which became effective on July 1, 2015, requires lead agencies to provide notice to tribes that are traditionally and culturally affiliated with the geographic area of a proposed project, if they have requested such notice in writing. The project notification is required prior to the lead agency's release of a Notice of Preparation of an EIR or NOI to adopt an MND or ND. Once Native American tribes receive a project notification, they have 30 days to respond as to whether they wish to initiate consultation regarding the project, including subjects such as mitigation for any potential project impacts. If a tribe request consultation and the lead agency and the tribe ultimately agree on mitigation to address any potentially significant impacts to tribal cultural resources, the MMs agreed upon during consultation must be recommended for inclusion in the environmental document. To date, UCR has received two requests for project notification pursuant to AB 52 (From the Agua Caliente Band of Cahuilla Indians and the Torres Martinez Desert Cahuilla Indians).

In January 2019, updates to the State CEQA Guidelines were adopted, which included the addition of a Tribal Cultural Resources section, as addressed in this section.

There are no relevant elements of the proposed project related to tribal cultural resources, and no PSs, PPs, or MMs are applicable.

Project Impact Analysis

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project 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:					
a) 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	☐	☐	☐	☐	☒

Discussion

The analysis of Impact 4.5-1 in the 2005 LRDP EIR concluded that there would be less than significant impacts associated with modification of historic or potentially historic resources during construction activities with implementation of PS Conservation 4, MM 4.5-1(a), and MM 4.5-1(b). The analysis of Impact 4.5-2 concluded there would be significant and unavoidable impacts with demolition of historic or potentially historic resources even with implementation of PS Conservation 4, PS Land Use 3, PS Open Space 5, PP 4.5-2, MM 4.5-1(a), MM 4.5-1(b), and MM 4.5-2. A detailed discussion of the regulatory setting and existing cultural resources is provided in Section 4.4, Cultural Resources, of the 2005 LRDP EIR. As identified, relevant regulatory programs include the NHPA of 1966, California Senate Bill 297, and the CRHR. The 2005 LRDP EIR identified a total of eight campus structures located on both the East Campus and West Campus that were considered by CRM Tech (2002) to be potentially eligible for listing in the NRHP and/or the CRHR. It also identified structures exceeding 45 years of age that were evaluated and determined not to be eligible for listing as a historic resource. In addition, the 2005 LRDP EIR included a compilation of structures that would be of age for evaluation as potentially historic by the end of the 2005 LRDP planning horizon (2015-2016). The planning horizon was extended to 2020-2021 as part of the 2005 LRDP Amendment 2 and, as such, would result in additional campus buildings that are potentially historic. None of these structures are located on the project site.

The project site and temporary construction staging and laydown area are currently developed with a surface parking area, trees and ornamental landscape, and hardscape areas. There are no structures on the project site. Based on the review of aerial photographs, site visit, and given that no structures are on site, no impacts to historical resources are anticipated with development of the proposed project.

Although the LRDP planning area contains potentially significant resources, as discussed above, the project area does not contain any known historical resources. As such, no impacts to historical resources would occur, consistent with the findings of the LRDP EIR.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would have no impact related to the potential to cause a substantial adverse change to a significant historical resource as defined in Section 15064.5 of the State CEQA Guidelines. The proposed project impacts were adequately addressed in the LRDP EIR.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
Would the project 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:					
b) 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 Resources Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.	☐	☐	☒	☐	☐

Discussion

As previously addressed in the 2005 LRDP EIR and the 2019 Constraint Study in preparation for the campus' new LRDP, a cultural resources records search and literature review was completed at the EIC at UCR. No significant tribal cultural resources were identified within the project area. A Sacred Lands File (SLF) Check was performed in 2003 by the Native American Heritage Commission (NAHC) for the 2005 LRDP EIR and did not indicate the presence of sites of Native American cultural or religious value on the campus.

The 2019 Cultural Constraint Study requested an additional SLF Check for the entire UCR campus. The NAHC completed its SLF search on December 19, 2018. The results were positive for Tribal Cultural Resources and/or sacred sites for the campus' LRDP boundary. The NAHC recommended consulting with the Cahuilla Band of Indians for additional details regarding any resources considered sacred by the Tribe. UCR requested a SLF Check specifically for the project area in July 2019. The project area yielded negative for Tribal Cultural Resources and/or sacred sites on the project site. These results suggest that although UCR is known to have Tribal Cultural Resources and/or sacred sites, none have been identified within the project area. However, these results should be confirmed via Tribal Consultation.

To date, UCR has received two requests for project notification pursuant to AB 52 (from the Agua Caliente Band of Cahuilla Indians and the Torres Martinez Desert Cahuilla Indians). On August 7, 2019, UCR provided these tribes with notification of the proposed project. No response was received by the Torres-Martinez Desert Cahuilla Indians. On September 6, 2019, the Agua Caliente Band of Cahuilla Indians responded to this request stating that the project area is not within the boundaries of the Agua Caliente Band of Cahuilla Indians Reservation; however, the project area is within the tribes' Traditional Use Area. The tribe requested government-to-government consultation and also requested copies of any cultural resources documentation generated in connection with the project. On September 6, 2019, UCR responded to the Agua Caliente Band of Cahuilla Indians requesting to schedule a consultation with the tribe and stated that no specific cultural assessments are to be conducted for the project, but tribal cultural resources will be discussed and analyzed in this IS/MND and the tribe will be added to the NOI distribution list. On October 17, 2019, UCR contacted the Agua Caliente Band of Cahuilla Indians representative via telephone to discuss the proposed project and a follow up email was sent to the tribe on October 22, 2019 concluding government-to-government consultation based on the phone conversation that took place. No mitigation from the tribes was requested. Nonetheless, UCR's standard contractor specifications address protection and recovery of buried artifacts, including archaeological resources, and the standard requirements are incorporated into the project as MM CUL-1. This mitigation measure identifies steps to be taken in the event archaeological resources, including Native American cultural resources, are discovered during construction activities.

Additional Project-Level Mitigation Measures

Refer to MM CUL-1 in Section V.5, Cultural Resources.

Level of Significance

The proposed project would have a less than significant impact related to tribal cultural resources with implementation of MM CUL-1.

19. UTILITIES AND SERVICE SYSTEMS

The analysis of utilities and service systems (i.e., water supply, solid waste, wastewater) is tiered from the 2005 LRDP Amendment 2 EIR and was addressed in Section 4.15, Utilities, of that document. Relevant elements of the project related to utilities and service systems include the construction and operation of Parking Structure 1, the reconfiguration of Parking Lot 13 surface parking, and the installation of associated utility and irrigation systems.

The following applicable PPs were adopted as part of the 2005 LRDP Amendment 2 EIR and are incorporated as part of the proposed project and assumed in the analysis presented in this section.

PP 4.15-1(a) Improvements to the campus water distribution system, including necessary pump capacity, will be made as required to serve new projects. Project-specific CEQA analysis of environmental effects that would occur prior to project-specific approval will consider the continued adequacy of the domestic/fire water systems, and no new development would occur without a demonstration that appropriate domestic/fire water supplies continue to be available.

PP 4.15-1(b) To further reduce the campus' impact on domestic water resources, to the extent feasible, UCR will:

i. Install hot water recirculation devices (to reduce water waste).

ii. Continue to require all new construction to comply with applicable State laws requiring water-efficient plumbing fixtures, including but not limited to the Health and Safety Code and Title 24, California Code of Regulations, Part 5 (California Plumbing Code).

iii. Retrofit existing plumbing fixtures that do not meet current standards on a phased basis over time.

iv. Install recovery systems for losses attributable to existing and proposed steam and chilled-water systems.

v. Prohibit using water as a means of cleaning impervious surfaces.

vi. Install water-efficient irrigation equipment to local evaporation rates to maximize water savings for landscaping and retrofit existing systems over time.

(This is identical to Hydrology PP 4.8-2[a].)

PP 4.15-1(c) The Campus shall promptly detect and repair leaks in water and irrigation pipes. *(This is identical to Hydrology PP 4.8-2[b].)*

PP 4.15-5 The Campus will continue to comply with all applicable water quality requirements established by the SARWQCB. *(This is identical to Hydrology PP 4.8-1)*

Project Impact Analysis

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Would the project require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?	☐	☒	☐	☐	☐

Discussion

Water/Wastewater Treatment

The analysis of Impact 4.15-2 in the 2005 LRDP Amendment 2 EIR concluded there would be a less than significant impact related to construction of new or expanded water treatment facilities with implementation of PP 4.15-1(a) and PP 4.15-1(d). The analysis of Impact 4.15-4 in the 2005 LRDP Amendment 2 EIR concluded there would be a less than significant impact related to construction of new or expanded wastewater conveyance systems with implementation of MM 4.15-4. In addition, the EIR indicated that campus development under the amended 2005 LRDP would also be required to follow water conservation policies listed in the UC Sustainable Practices Policy and adhere to goals listed in the water section of the Sustainability Action Plan (SAP).

As identified under the analysis of Impact 4.15-3 of the 2005 LRDP Amendment 2 EIR, the UCR campus does not treat or discharge wastewater to any surface waters. Wastewater generated at the campus is collected and discharged into the City's sewer system from where it is conveyed to the Riverside Water Quality Control Plant (RWQCP) for treatment and disposal. Therefore, the campus is not considered a point-source of water pollution for regulatory purposes and is not subject currently to any Waste Discharge Requirements established by the Santa Ana RWQCB. Consequently, the proposed project would not exceed wastewater treatment requirements. No impact would occur, consistent with the findings of the 2005 LRDP Amendment 2 EIR.

Water Infrastructure

As identified in Table 4.15-4, Existing and Projected UCR Campus Water Demand, from the 2005 LRDP Amendment 2 EIR, the total water consumption on campus in 2009-2010 was 2.5 million gallons per day (mgd); the entire demand was generated on the East Campus. The projected campus-wide water demand in 2020 is estimated in the 2005 LRDP Amendment 2 EIR at 5.3 mgd, including 3.0 mgd on the East Campus. This represents an estimated increase in water demand associated with the East Campus of 0.5 mgd.

The proposed project would include construction of a four-level parking structure with approximately 1,079 parking spaces, reconfiguration of a portion of the existing surface parking area, landscape, pedestrian and bicycle pathways, and associated on-site improvements at the project site. There would not be a significant increase in water use from existing conditions, or beyond that anticipated in the LRDP as implementation of the proposed project would include water of landscaped areas similar to that of existing landscaped areas on site and occasional spray down of the parking area during operational maintenance activities. A new mainline would need to be provided for Parking Structure 1 irrigation and to reroute the existing mainline. Due to the asbestos lining of the existing pipe, any removal, attachments, or modifications to the mainline pipe will require a licensed mitigation crew. All mitigation would be coordinated with EH&S, and all activities would be required to adhere to State and UCR safety requirements, as discussed in Section V.9, Hazards and Hazardous Materials, of this IS/MND. Implementation of the proposed project is anticipated to generate a water consumption of approximately 650 gallons of water per day (0.000065 mgd). The proposed water usage is well below the projected additional water demand associated with development on the East Campus of 3.0 mgd assumed in the 2005 LRDP, as amended. Therefore, the proposed project's water consumption would be well within the increase anticipated in the 2005 LRDP Amendment 2 EIR. Additionally, the proposed project would incorporate PP 4.15-1(b) to implement water consumption reduction measures and PP 4.15-1(c) to ensure that leaks in water and irrigation pipes are repaired.

The domestic water system at UCR consists of an underground distribution system, a pumping system, storage tanks, and connections to the City's municipal water distribution system. The 2005 LRDP Amendment 2 EIR concluded that because the City would be able to provide the necessary water using existing or planned water facilities, implementation of the 2005 LRDP, as amended, would not require the construction of new or expanded water facilities. As required by PP 4.15-1(a), the campus has reviewed the adequacy of the domestic/fire water systems that would serve the proposed project.

Industrial (non-potable water) would be provided for hose bibs at all levels of Parking Structure 1 for maintenance purposes. Domestic water connection would be provided for convenience sink located in the storage room. Domestic water and fire supply would be supplied from the existing infrastructure along Big Springs Road. Existing flow rates are sufficient with existing main sizes and distribution pumps to allow for connection of the proposed project to the campus water lines. No new or expanded water lines would be necessary beyond those within the project limits to connect the proposed project to existing lines.

A fire water connection would be made to feed the proposed two new hydrants, along with Fire Department Connection assemblies. No new or expanded water lines would be necessary beyond those within the project limits to connect the fire water infrastructure to existing lines. The impact area for installation of these water lines would be within the construction impact limits of the project site. Physical impacts have been addressed in the analysis throughout this IS/MND. Continued implementation of PP 4.15-1(b) and PP 4.15-1(c), which emphasizes a variety of water conservation practices, would further reduce water use and the utilization of water infrastructure. Therefore, consistent with the findings of the LRDP EIR, this impact would be less than significant.

Wastewater Infrastructure

Wastewater on campus is collected in the sanitary sewer system on campus, which consists of a network of lines owned and maintained by UCR. An existing 15-inch sanitary sewer line is located north of the project site. The proposed project is not a use that generates a substantial amount of wastewater. The proposed project would include drains that would discharge to the existing sewer line. No bathrooms would be included on the project site; however, the project would include a sink basin in the storage room in Parking Structure 1 that would be connected to the existing sewer line. Thus, no new or expanded sewer laterals or main lines would be necessary with proposed project implementation beyond the sewer lines within the project area to connect the proposed project to the existing sewer main.

The impact area for the installation of these sewer lines is within the construction impact limits of the project site, and the physical impacts have been addressed in the analysis throughout this IS/MND. Consistent with the findings of the LRDP EIR, there would be less than significant impacts related to wastewater infrastructure of wastewater treatment facility capacity. In addition, because wastewater generation is correlated to water usage, continued water conservation practices would reduce the volume of wastewater generated. Continued implementation of PP 4.15-1(b) and PP 4.15-1(c), which emphasizes a variety of water conservation practices, would further reduce wastewater generation and utilization of sewer line capacity. Therefore, consistent with the findings of the LRDP EIR, this impact would be less than significant.

Electrical Infrastructure/Natural Gas

The analysis of Impacts 4.15-8 through 4.15-10 in the 2005 LRDP Amendment 2 EIR concluded there would be a less than significant impact to the need to construct new or expanded energy (electricity and gas) production or transmission facilities or to the inefficient use of energy.

As identified in the 2005 LRDP Amendment 2 EIR, the RPU provides electricity to the UCR campus. The energy is received through a 69 kilovolt (kV) line at a substation west of the I-215/SR-60 freeway. From this point, the power is reduced to a usable voltage and distributed to individual buildings and transformers. UCR is in the process of transitioning the East Campus to 12 kV distribution lines and transformers; portions of the East Campus are currently operating under a 5 kV system.

The 2005 LRDP Amendment 2 EIR concluded that the peak power demands on campus are 25.5 megavolt amps (MVA), and the total campus development under the 2005 LRDP, as amended, would demand 49 MVA, which is an increase of 23.5 MVA over existing conditions at the time. The total capacity of the existing 12 kV substation is 54 MVA, so the 2005 LRDP Amendment 2 EIR concluded that the existing campus electrical distribution system would be able to accommodate the anticipated demand of development under the 2005 LRDP, as amended, of which the proposed project is a part. Additionally, it was concluded that the RPU would have adequate infrastructure to serve the remaining and new development on campus.

The proposed project is estimated to generate a total electric demand of 275 kVA, which is not anticipated to require additional electricity substations or construction or relocation of electrical infrastructure which could cause significant environmental effects. It should be noted that campus development under the 2005 LRDP, as amended, would be required to follow energy conservation policies listed in the UC Sustainability Practices Policy, minimize energy use in order for the campus to attain the GHG reduction goals, and comply with any future conservation goals or programs enacted by the UC. The proposed project would be equipped with infrastructure that would allow it to use solar power at a future time. Other project design features, including motion sensor LED lighting, would further decrease electricity demand. Therefore, the electric demand and required infrastructure of the proposed project has been determined taking these requirements into consideration. Consistent with the findings of the 2005 LRDP Amendment 2 EIR, there would be a less than significant impact related to construction of new or expanded electrical infrastructure or the inefficient use of energy.

As identified in the 2005 LRDP Amendment 2 EIR, UCR uses natural gas for heating and some cooling needs for research and instructional lab purposes. Natural gas is provided to the East Campus by SoCalGas. The 2005 LRDP Amendment 2 EIR concluded that the total campus development under the 2005 LRDP, as amended, would demand 45,458 therms per day, which is an increase of 31,700 therms per day over existing conditions at the time. SoCalGas has indicated that it could provide gas service to the campus to accommodate future development under the 2005 LRDP, as amended. No natural gas consumption would occur as part of the proposed project. Therefore, consistent with the findings of the 2005 LRDP Amendment 2 EIR, there would be no impact related to construction of new or expanded natural gas infrastructure or the inefficient use of natural gas.

Telecommunications Infrastructure

The project would not involve any components requiring telecommunications infrastructure and would not involve the relocation of existing telecommunications facilities. Therefore, no impact related to telecommunications facilities would occur. Impacts associated with the proposed project were adequately addressed in the LRDP EIR.

Stormwater Drainage

Please refer to the analysis of drainage provided under Section V.9, Hydrology and Water Quality, of this IS/MND. In summary, the analysis concluded that operation of the proposed project would not exceed the capacity of the existing storm drain system, and there would be a less than significant impact, consistent with the findings of the 2005 LRDP Amendment 2 EIR.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

Water/Wastewater Treatment

The proposed project would not require construction of new wastewater treatment facilities beyond the installation of new lines to connect to the proposed project; the physical limits of utility construction are within the impact area addressed throughout this IS. The proposed project would have a less than significant impact related to the capacity of existing wastewater systems. Impacts associated with the proposed project were adequately addressed in the LRDP EIR.

Water Infrastructure

There are adequate water distribution facilities available to serve the proposed project with incorporation of the PPs noted above, resulting in a less than significant impact. Impacts associated with the proposed project were adequately addressed in the LRDP EIR.

Wastewater Infrastructure

There are adequate wastewater collection facilities available to serve the proposed project with incorporation of the PPs noted above, resulting in a less than significant impact. Impacts associated with the proposed project were adequately addressed in the LRDP EIR.

Electrical Infrastructure/Natural Gas

The proposed project would have a less than significant impact related to provision of electricity to the project site or the inefficient use of energy. The proposed project would have no impact related to natural gas. Impacts associated with the proposed project were adequately addressed in the LRDP EIR.

Telecommunications Infrastructure

The proposed project would have no impact related to telecommunications facilities. Impacts associated with the proposed project were adequately addressed in the LRDP EIR.

Stormwater Drainage

There is a less than significant impact related to the need for new or expanded storm drainage facilities beyond the installation of new storm waste management facilities to serve the proposed project. The physical limits of construction are within the impact area addressed throughout this IS/MND. Impacts associated with the proposed project were adequately addressed in the LRDP EIR.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
b) Would the project have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years?	☐	☒	☐	☐	☐

Discussion

The analysis of Impact 4.15-1 in the 2005 LRDP Amendment 2 EIR concluded there would be a less than significant impact related to water supply with implementation of PP 4.15-1(a) through PP 4.15-1(d). In addition, the EIR identified that campus development under the amended 2005 LRDP would also be required to follow water conservation policies listed in the UC Sustainable Practices Policy; adhere to goals listed in the water section of the SAP; and comply with any future conservation goals or programs enacted by the UC.

As described in the 2005 LRDP Amendment 2 EIR, RPU supplies domestic water to UCR. RPU's water supply consists primarily of groundwater, with additional sources, including recycled water and imported water. UCR also has rights to potable water in the Gage Canal. All existing and planned water supply entitlements, water rights, and/or water service contracts that may be used to serve development associated with the 2005 LRDP, as amended, are set forth in the current City of Riverside Urban Water Management Plan (UWMP). The 2015 UWMP identifies adequate potable water supplies to meet future demands (through 2040) within the RPU's water supply service area, which includes the UCR campus, under normal weather conditions. Specifically, the 2015 UWMP projects surplus water supplies under all scenarios, including multiple dry years (Riverside 2016).

The 2005 LRDP Amendment 2 EIR concluded there would be adequate water supplies for implementation of the 2005 LRDP, as amended, with implementation of PP 4.15-1(a) through PP 4.15-1(d). As previously discussed, the project would require minimal water usage for landscaping and maintenance activities. Implementation of the proposed project is anticipated to generate a water consumption of approximately 650 gallons of water per day (0.000065 mgd). The proposed water usage is well below the projected additional water demand associated with development on the East Campus of 3.0 mgd assumed in the 2005 LRDP, as amended. Therefore, the proposed project's water consumption would be well within the increase anticipated in the 2005 LRDP Amendment 2 EIR. Additionally, the proposed project would incorporate PP 4.15-1(b) to implement water consumption reduction measures and PP 4.15-1(c) to ensure that leaks in water and irrigation pipes are repaired.

Continued implementation of PP 4.15-1(a), PP 4.15-1(b), and PP 4.15-1(c) ensures adequate water supplies are available to serve the proposed project. As such, consistent with the findings of the 2005 LRDP Amendment 2 EIR, there would be a less than significant impact related to water supply with incorporation of the PPs noted above.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years. Impacts would be less than significant with incorporation of the PPs noted above. The proposed project impacts were adequately addressed in the LRDP EIR.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
c) Would the project 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?	☐	☒	☐	☐	☐

Discussion

The analysis of Impact 4.15-3 in the 2005 LRDP Amendment 2 EIR concluded there would be a less than significant impact related to construction of new or expanded water treatment facilities with implementation of PP 4.15-5 and MM 4.15-3. As identified in the 2005 LRDP Amendment 2 EIR, the Sewerage Systems Services Program and its Treatment Services unit, administered by the RPU, collects, treats, and disposes of all wastewater generated within the City of Riverside and is responsible for compliance with State and federal requirements governing the treatment and discharge of all domestic and industrial wastewater generated in its service area, including the UCR campus. The RWQCP provides treatment of all campus-generated wastewater, with UCR operating its own collection system that connects to the City's system. The RWQCP currently treats an average of 30 mgd and has a capacity of 40 mgd. The plant is currently being expanded and retrofitted and would have a capacity of 46 mgd. The City's Wastewater Integrated Master Plan addresses facility needs for projected wastewater influent flow through the year 2025 and identifies improvements that would increase the capacity of the RWQCP up to 52.2 mgd, although at this time, the City is increasing the treatment capacity of the RWQCP to 46 mgd (Riverside 2008).

The 2005 LRDP Amendment 2 EIR also determined that implementation of the 2005 LRDP, as amended, would not generate a volume of wastewater that would exceed the capacity of the City's RWQCP wastewater treatment system in combination with the provider's existing service commitments. As previously discussed, Parking Structure 1 would include one basin sink and internal drains that would connect to the existing UCR sanitary sewer system. Aside from stormwater flows, water would be used only for maintenance and the project would produce a minimal amount of wastewater. Therefore, the project would not produce any wastewater that would exceed treatment requirements of the RWQCB or the capacity of any wastewater treatment provider or require or result in the construction of new wastewater treatment facilities or expansion of existing facilities. Additionally, because the proposed project is within the allotted parking structures assumed for the campus in the 2005 LRDP Amendment 2 EIR, the wastewater generated would also be accommodated by the City's RWQCP. Furthermore, as required by PP 4.15-5, the proposed project would comply with all applicable water quality requirements established by the RWQCB. Consistent with the findings of the LRDP EIR, impacts would be less than significant.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would implement relevant PP noted above and would not generate wastewater that exceeds the capacity of the wastewater treatment facilities resulting in a less than significant impact. The proposed project impacts were adequately addressed in the LRDP EIR.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
d) Would the project 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) Would the project comply with federal, state, and local management and reduction statutes and regulations related to solid waste?	☐	☒	☐	☐	☐

Discussion

The analysis of Impact 4.15-6 in the 2005 LRDP Amendment 2 EIR concluded there would be a less than significant impact related to landfill capacity. The analysis of Impact 4.15-7 in the 2005 LRDP Amendment 2 EIR concluded there would be a less than significant impact related to compliance with applicable Federal, State, and local solid waste-related statutes and regulations. During and after construction of the project, UCR would be required to comply with applicable elements of AB 1327, Chapter 18 (California Solid Waste Reuse and Recycling Access Act of 1991), and other applicable local, State, and Federal solid waste disposal standards. Further reduction in solid waste generation would occur with implementation of the UC Policy on Sustainable Practices.

The City of Riverside Solid Waste Division is responsible for the collection and handling of residential refuse, recycling, and green waste (compostable organic waste) generated within the City of Riverside. The Robert A. Nelson Transfer Station, located at 1830 Agua Mansa Road, receives refuse from western Riverside County, including the UCR campus. The transfer station is owned by the Riverside County Department of Waste Resources (RCDWR) and operated by Burrtec Waste Industries. The transfer station is permitted to accept up to 4,000 tons of solid waste per day and is currently processing approximately 2,500 to 3,000 tons of solid waste per day (Burrtec 2019). The operations division of the RCDWR receives, compacts, and buries refuse received at the various landfill sites at several locations in the County (UCR 2011b).

On the UCR campus, trash is collected and placed in containers located throughout the campus. The RCDWR is responsible for the landfilling of non-hazardous county waste. In this effort, RCDWR operates six landfills, has a contract agreement for waste disposal with an additional private landfill, and administers several transfer station leases (RCDWR 2019). These facilities are regulated at the Federal, State, and local levels and monitored for compliance.

Consistent with the UC Sustainable Practices Policy, the UCR campus is currently committed to diverting at least 75 percent of its solid waste from landfills and diverting 100 percent by 2020. To accomplish this, UCR implements a waste/source reduction and recycling program that 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 north of Lot 30. UCR collects the recyclables and waste on campus and delivers these materials to the transfer station for hauling. Athens Services picks up the recyclable material for recycling. UCR delivers waste, in UCR haul trucks, to the Nelson Transfer Station from which Burrtec 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. Therefore, the total amount of solid waste generated by construction and operation of the proposed project would be substantially reduced compared to the waste generation factors in the 2005 LRDP Amendment 2 EIR.

Solid waste would be generated during construction and operation of the proposed project. With respect to construction-related waste generation, approximately 10,294 tons during the approximately one-month construction demolition phase. With respect to project operations, approximately 10.56 tons of solid waste would be generated per year.

As discussed in the 2005 LRDP Amendment 2 EIR, it is anticipated that solid waste from UCR would continue to be disposed at the Badlands Landfill, in the City of Moreno Valley, which had an estimated capacity of approximately 6.5 million tons as of October 2016. Based on the current permit, the landfill is expected to close in 2022. The Badlands Landfill is permitted for a maximum of 4,500 tons per day (tpd) for disposal plus 300 tpd for beneficial reuse (CalRecycle 2019). The approximately 10.56 tons of solid waste per year (0.03 tpd) from the proposed project would represent a negligible amount of the landfill’s permitted daily capacity of 4,500 tpd. Therefore, the anticipated solid waste generation from the proposed project can be accommodated within the remaining permitted capacity of the Badlands Landfill, and there would be a less than significant impact related to solid waste disposal, consistent with the findings of the 2005 LRDP Amendment 2 EIR.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would have a less than significant impact related to generation of solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, attainment of solid waste reduction goals, or compliance with Federal, State, and local management and reduction statutes and regulations related to solid waste. The proposed project impacts were adequately addressed in the LRDP EIR.

20. WILDFIRE

In January 2019, updates to the State CEQA Guidelines were adopted, which included the addition of a Wildfire section, as addressed in this section. There are no relevant elements of the proposed project related to wildfire, and no PSs, PPs, or MMs are applicable.

Project Impact Analysis

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
a) If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project substantially impair an adopted emergency response plan or emergency evacuation plan?	☐	☒	☐	☐	☐

Discussion

According to the Fire and Resource Assessment Program *Very High Fire Hazard Severity Zones in LRA As Recommended by CAL FIRE* map for the City of Riverside, the project area is not located in a Very High Fire Hazard Severity Zone (VHFHSZ); however, it is located approximately 625 feet north of an identified VHFHSZ (CAL FIRE 2019). As discussed in Section V.9, Hazards and Hazardous Materials, the project would not impair the ability of emergency services to respond to emergencies on the UCR campus. Construction of the project would not obstruct emergency response or evacuation. The project would incorporate PP 4.7-7(a), which requires the maintenance of at least one unobstructed lane in both directions on campus roadways, to the extent feasible, and PP 4.7-7(b), which requires consultation between UCR and UCP, RFD, and EH&S to identify alternative travel routes for emergency vehicle access when construction projects result in roadway closures. Additionally, MM 4.7-7(b) requires the campus' Emergency Operations Plan be reviewed on an annual basis and updated as appropriate to account for new on-campus development.

Operation of the project would not impede off-campus emergency response. The RFD has created emergency response maps for the open lands in the City of Riverside. The response maps were created through the collaborative efforts of Fire, Information Technology, and the Parks and Recreation Departments. According to the Box Canyon Reserve Incident Action Plan emergency response map, the closest Reception Center and Staging Area to the project site is at Islander Park on the corner of Big Springs Road and Mt. Vernon Avenue. Type I Engine fire access is available on certain trails at Islander Park, at the foothills of the Box Springs Mountains (RFD 2018). The project would not permanently impede access on any roads, trails, reception centers, or staging areas.

Therefore, the project would have a less than significant impact related to implementation of or physical interference with an adopted emergency response plan or emergency evacuation plan with incorporation of PP 4.7-7(a), PP 4.7-7(b), and MM 4.7-7(b), consistent with the findings of the 2005 LRDP EIR.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would have a less than significant impact related to impairment of an adopted emergency response plan or emergency evacuation plan with implementation of relevant PPs and MM noted above. The proposed project impacts were adequately addressed in the LRDP EIR.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
b) If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?	☐	☐	☐	☒	☐

Discussion

The analysis of Impact 4.7-8 in the 2005 LRDP EIR concluded that, with implementation of PS Open Space 1, MM 4.7-8(a), and MM 4.7-8(b), development under the 2005 LRDP would have a less than significant impact related to wildfires. The 2005 LRDP EIR identified the campus areas that may be subject to wildland fires, which include the following areas located adjacent to the southeast hills and the Botanic Gardens: the area south of South Campus Drive and areas currently occupied by Parking Lots 13 and V10, east of East Campus Drive.

According to the Fire and Resource Assessment Program *Very High Fire Hazard Severity Zones in LRA As Recommended by CAL FIRE* map for the City of Riverside, the site is not located in a VHFHSZ; however, it is located approximately 625 feet north of an identified VHFHSZ (CAL FIRE 2019). The UCR campus is subject to Santa Ana winds, which are strong, extremely 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. 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 (UCR 2012). As the entire campus is subject to fire risks caused by Santa Ana winds, the project itself would not exacerbate this risk.

As discussed in Section 7, *Geology and Soils*, the project site does not contain slopes more than 30 feet in height and steeper than 2:1 (h:v) in inclination, and none are anticipated by the project. Implementation of the project would not expose people and/or structures to potentially substantial adverse effects resulting from landslides, and therefore would not expose people to pollutant concentrations from a wildfire.

The UCR Fire Prevention and Life Safety Policy, requires that all construction, alterations, renovations, and interior space dividers are subject to fire code review and inspection by EH&S. 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

During the plan check review, the Campus Building Official and Campus Fire Marshal will review the project plans to ensure that the design of the parking structure complies with all the required codes noted above. As such, the project would not exacerbate wildfire risks, and would not expose occupants to pollutant concentrations or the uncontrolled spread of wildfire. This impact would be less than significant.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would have less than significant impacts related to exposure of project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire. These proposed project impacts were not previously evaluated in the LRDP EIR, but would be less than significant.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
c) If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project 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?	☐	☐	☐	☒	☐

Discussion

The 2005 LRDP Amendment 2 EIR concluded there would be a less than significant impact related to construction of new or expanded water treatment facilities with implementation of PP 4.15-1(a) and PP 4.15-1(d). The 2005 LRDP Amendment 2 EIR concluded there would be a less than significant impact related to the construction of new or expanded wastewater conveyance systems with implementation of MM 4.15-4. In addition, the 2005 LRDP Amendment 2 EIR identified that campus development under the amended 2005 LRDP would also be required to follow water conservation policies listed in the Sustainable Practices Policy and adhere to goals listed in the water section of the Sustainability Plan.

According to the Fire and Resource Assessment Program *Very High Fire Hazard Severity Zones in LRA As Recommended by CAL FIRE* map for the City of Riverside, the site is not located in a VHFHSZ; however, it is located approximately 625 feet north of an identified VHFHSZ (CAL FIRE 2019).As discussed in Section V.19, Utilities and Service Systems, the project would not cause significant environmental effects associated with the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, or other utilities. The project would require installation or relocation of water and sewer laterals to serve the project. New or relocated utilities and systems associated with the project would comply with state and local fire codes to reduce the risk of fires, and none of these potential infrastructure improvements would exacerbate fire risk on-site. On the contrary, the emergency access road around Parking Structure 1, proposed new fire hydrants, standpipes, and other infrastructure associated with the project would reduce fire risk by providing increased access to emergency services.

Continued implementation of PP 4.15-1(b) and PP 4.15-1(c), which emphasizes a variety of water conservation practices, would further reduce water use and the utilization of water infrastructure. Therefore, consistent with the findings of the LRDP EIR, this impact would be less than significant.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would have less than significant impacts related to 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, with implementation of relevant PPs. The proposed project impacts were adequately addressed in the LRDP EIR.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
d) If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project 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?	☐	☐	☐	☒	☐

Discussion

As indicated in Section V.7, Geology and Soils, the project would not expose people or structures to significant risks, including impacts from hazards associated with landslides or slope instability with implementation of PS Open Space 1, PS Open Space 2, PS Conservation 2, and PPs 4.6-1(a) through 4.6-1(c), consistent with the analysis of Impact 4.6-1 in the 2005 LRDP EIR.

According to the Fire and Resource Assessment Program *Very High Fire Hazard Severity Zones in LRA As Recommended by CAL FIRE* map for the City of Riverside, the site is not located in a VHFHSZ; however, it is located approximately 625 feet north of an identified VHFHSZ (CAL FIRE 2019). As specified in Section V.10, Hydrology, the project would have a less than significant impact related to alteration of existing drainage patterns and storm drain system capacity with implementation of implementation of PS Land Use 2, PS Land Use 3, PS Open Space 1 through 5, PS Conservation 1 through 3, and PP 4.8-3(a) through 4.8(e), consistent with the analysis of Impacts 4.8-3 through 4.8-5 in the 2005 LRDP EIR.

Additionally, as discussed in Section V.10, Hydrology, the potential for impacts from release of pollutants from floods or flood hazards would be less than significant. Although the 2005 LRDP EIR Amendment 2 did not directly address the potential for risk of release of pollutants due to inundation, it did address the potential for future development to increase pollutant runoff and the potential for impacts to future development due to floods, tsunami, or seiche zones in Section V.8, Hydrology. The project impacts were adequately addressed in the LRDP EIR.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project impacts would be less than significant related to the exposure of people or structures to significant risks, including downslopes or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage change, with implementation of relevant PPs and PSs. The proposed project impacts were adequately addressed in the LRDP EIR.

21. MANDATORY FINDINGS OF SIGNIFICANCE

Project Impact Analysis

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
The lead agency shall find that a project may have a significant effect on the environment and thereby require an EIR to be prepared for the project where there is substantial evidence, in light of the whole record, that any of the following conditions may occur. Where prior to commencement of the environmental analysis a project proponent agrees to mitigation measures or project modifications that would avoid any significant effect on the environment or would mitigate the significant environmental effect, a lead agency need not prepare an EIR solely because without mitigation the environmental effects would have been significant (per Section 15065 of the State CEQA Guidelines):					
a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	☐	☐	☒	☐	☐

Discussion

As discussed in Section V.4, Biological Resources, of this IS/MND, the proposed project would not have a substantial impact to special status plant and wildlife species or sensitive habitats and wildlife corridors. The proposed project incorporates PS Open Space 3 (preserve natural resources, including trees, where feasible, in Naturalistic Open Space areas), MM 4.4-4(a) (surveys for nesting bird and raptor species prior to construction) and MM 4.4-4(b) (protection of active nests during construction) from the 2005 LRDP Amendment 2 EIR, and, as a result, would have a less than significant impact on nesting species. The proposed project also includes tree retention and replacement to ensure a less than significant impact related to removal of trees. The project would comply with PP 4.4-2(b) and PP 4.4-2(b) noted in the 2005 LRDP EIR and 2005 LRDP Amendment 2 EIR to use BMPs as identified in the UCR Stormwater Management Plan, which would reduce stormwater runoff and control erosion in and around the project site and reduce impacts to the adjacent bioswales. Therefore, the potential for the proposed project to degrade the quality of the environment related to biological resources would result in a less than significant impact.

As discussion under Section V.5, Cultural Resources, of this IS/MND, there are no historic resources within or adjacent to the project area. Therefore, the proposed project would not have any impacts on historical resources. The project site is not located in an area on campus associated with known or previously documented historic or archeological resources. However, there remains the potential to encounter unanticipated archaeological resources during ground-disturbing activities associated with project construction. Incorporation of Mitigation Measure CUL-1, as identified in Section V.5, Cultural Resources, of this IS/MND, would reduce potential impacts to archaeological resources and reduce potential impacts related to the potential to eliminate important examples of the major periods of California history or prehistory to less than significant to a less-than-significant level. Additionally, the proposed project would comply with PP 4.5-5 in the inadvertent discovery of human remains during construction activities.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project has a less than significant impact related to the potential to degrade the quality of the environment; substantially reduce the habitat of a fish or wildlife species; cause a fish or wildlife population to drop below self-sustaining levels; threaten to eliminate a plant or animal community; substantially reduce the number or restrict the range of a rare or Endangered plant or animal with incorporation of the PS, PPs, and MMs noted above.

The proposed project would have a less than significant impact related to elimination of important examples of the major periods of California history or prehistory with incorporation of the PP and MM noted above.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of past, present and probable future projects)?	☐	☐	☒	☐	☐

Discussion

As identified through the analysis presented in this IS/MND, the proposed project would not result in significant environmental impacts during construction or operation with continued implementation of applicable PSs, PPs, and MMs (identified for each environmental topic analyzed above in Sections V.1 through V.20 of this IS/MND) and project-specific MMs. Potential cumulative construction impacts related to air quality and traffic have been addressed in Section V.3 and V.17 of this IS/MND, respectively, and are determined to be less than significant.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would have less than significant cumulatively considerable impacts with incorporation of the PSs, PPs, MMs, and project-specific MMs noted throughout the various sections of the IS/MND.

Threshold(s)	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant With Project-Level Mitigation Incorporated	Less Than Significant Impact	No Impact
c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☐	☒	☐	☐

Discussion

As indicated in the analysis presented in this IS/MND, implementation of the proposed project would not result in potentially significant impacts that could degrade the quality of the environment or cause substantial adverse effects on human beings, either directly or indirectly.

The proposed project would not result in new or more significant impacts than addressed and disclosed in the 2005 LRDP EIR and 2005 Amendment 2 LRDP EIR with continued implementation of applicable PSs, PPs, and MMs (identified for each environmental topic analyzed above in Sections V.1 through V.20 of this IS/MND) from the MMRP adopted as part of the 2005 LRDP EIR and 2005 Amendment 2 LRDP EIR.

Additional Project-Level Mitigation Measures

None required.

Level of Significance

The proposed project would have a less than significant related to the potential to have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly with incorporation of PSs, PPs, and MMs noted throughout the various sections of the IS/MND.

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VII. LIST OF PREPARERS

Rincon Consultants, Inc. prepared this IS-MND under contract to UCR. Persons involved in data gathering analysis, project management, and quality control are listed below.

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Alison Krumbein, Senior Counsel, Land Use - Office of the General Counsel

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Appendix A

Shade and Shadow Summary

UCR Parking Structure 1
Project Number: 956553

December 2, 2019: **ConstructionStart**
December 31, 2020: **Substantial Completion**

Parking Structure 1 (956553)
Shadow Study Summary

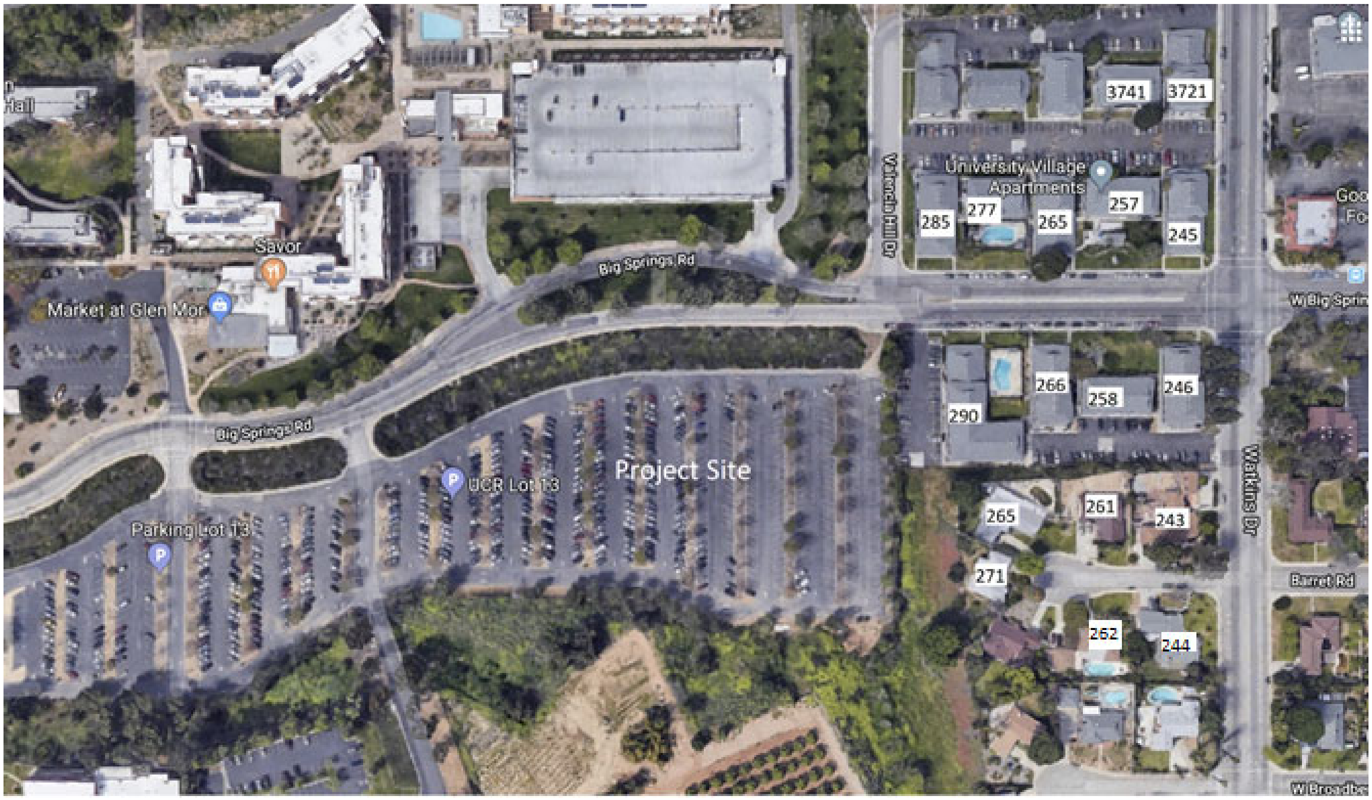
Shade and shadow exhibits for the proposed project site and adjacent residential neighbors have been prepared. This study demonstrates that there will be minimal hour shadow impact to the surrounding properties. The only property with greatest impact are university Village Apartment units located at 290 and 285 W. Big Springs Rd. with maximum shadow time in winter of nearly 2:45 hours with varying partial and full shade of the buildings. All other units experience an average of roughly 1.5 hours of full or partial unit shading by the proposed Parking Structure 1 project.

Addresses of the impacted units directly adjacent to East of the project site include units 290, 266, 258 & 246 on Big Springs Rd. Units affected to the North East corner across street include 285, 277, 265, 257, & 245 on Big Springs Rd. Additional impacted units on far North-East side include 3721 & 3741 on Watkins Dr.

Unit type is predominantly apartment complex buildings varying from 1-2 stories

The following summary of shadow is conservative in that the shadow tool assumes a flat topography when in actuality the following (6) residential homes at 243, 244, 261, 262, 265 & 271 Barret Rd. are ~ 20 ‘ higher than the project site. Therefore it can be expected that the actual impact and duration of shadow will be less than that presented in the following summary.

Please see following seasonal charts and attached exhibits with 27’ height structure for shade-time depictions.



January 21, 2020 (Winter)				
ADDRESS	**SHADE START**	**SHADE FINISH**	**HOURS SHADE**	
285 W. Big Springs Rd.	15:44	17:02	01:28h	
277 W. Big Springs Rd.	16:07	17:02	01:05h	
265 W. Big Springs Rd.	15:48	17:02	01:24h	
257 W. Big Springs Rd.	16:07	17:02	01:05h	
245 W. Big Springs Rd.	16:11	17:02	01:01h	
290 W. Big Springs Rd.	14:44	17:02	02:28h	
266 W. Big Springs Rd.	15:39	17:02	01:33h	
258 W. Big Springs Rd.	15:53	17:02	01:19h	
246 W. Big Springs Rd.	16:16	17:02	00:56h	
3721 Watkins Dr.	16:34	17:02	00:28h	
3741 Watkins Dr.	16:34	17:02	00:28h	
243 Barret Rd.	No impact			
261 Barret Rd.	No impact			
265 Barret Rd.	No impact			
271 Barret Rd.	No impact			

April 21, 2020 (Spring)

ADDRESS	SHADE START	SHADE FINISH	HOURS SHADE	
285 W. Big Springs Rd.	No impact			
277 W. Big Springs Rd.	No impact			
265 W. Big Springs Rd.	No impact			
257 W. Big Springs Rd.	No impact			
245 W. Big Springs Rd.	No impact			
290 W. Big Springs Rd.	16:39	19:15	02:36h	
266 W. Big Springs Rd.	17:48	18:38	00:50h	
258 W. Big Springs Rd.	No impact			
246 W. Big Springs Rd.	No impact			
3721 Watkins Dr.	No impact			
3741 Watkins Dr.	No impact			
243 Barret Rd.	18:24	19:15	00:51h	
261 Barret Rd.	18:06	19:15	01:09h	
265 Barret Rd.	17:15	19:15	2:00h	
271 Barret Rd.	17:38	19:15	01:37h	

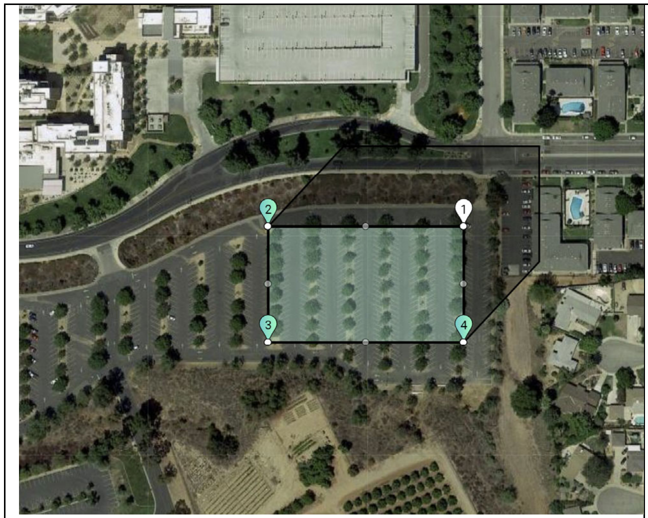
July 21, 2020 (Summer)

ADDRESS	SHADE START	SHADE FINISH	HOURS SHADE	
285 W. Big Springs Rd.	No impact			
277 W. Big Springs Rd.	No impact			
265 W. Big Springs Rd.	No impact			
257 W. Big Springs Rd.	No impact			
245 W. Big Springs Rd.	No impact			
290 W. Big Springs Rd.	17:06	19:51	02:45h	
266 W. Big Springs Rd.	No impact			
258 W. Big Springs Rd.	No impact			
246 W. Big Springs Rd.	No impact			
3721 Watkins Dr.	No impact			
3741 Watkins Dr.	No impact			
243 Barret Rd.	18:29	19:51	01:22h	
261 Barret Rd.	18:18	19:51	01:33h	
265 Barret Rd.	17:43	19:51	02:08h	
271 Barret Rd.	17:43	19:51	02:08h	
262 Barret Rd.	18:43	19:51	01:08h	
244 Barret Rd.	18:52	19:51	00:59h	

October 21, 2020 (Fall)

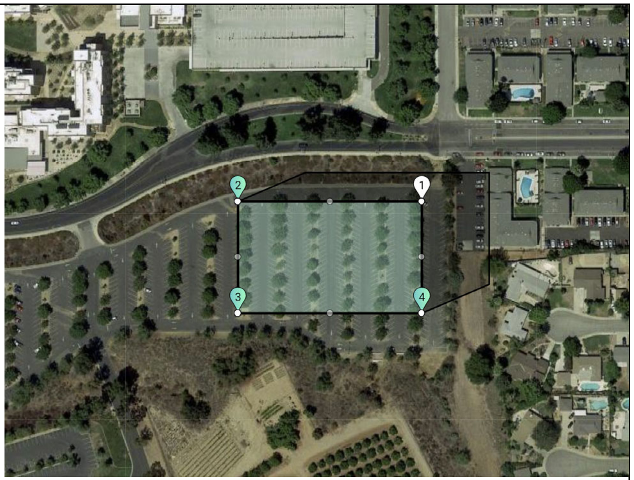
ADDRESS	**SHADE START**	**SHADE FINISH**	**HOURS SHADE**	
285 W. Big Springs Rd.	No Impact			
277 W. Big Springs Rd.	No impact			
265 W. Big Springs Rd.	17:25	18:01	00:36h	
257 W. Big Springs Rd.	No impact			
245 W. Big Springs Rd.	17:25	18:01	00:36h	
290 W. Big Springs Rd.	15:39	18:01	02:22h	
266 W. Big Springs Rd.	16:39	18:01	01:22h	
258 W. Big Springs Rd.	16:53	18:01	01:08h	
246 W. Big Springs Rd.	17:11	18:01	00:50h	
3721 Watkins Dr.	No impact			
3741 Watkins Dr.	No impact			
243 Barret Rd.	No impact			
261 Barret Rd.	No impact			
265 Barret Rd.	17:11	18:01	00:50h	
271 Barret Rd.	No impact			

Shadow Study Exhibit, Jan-Mar 2020

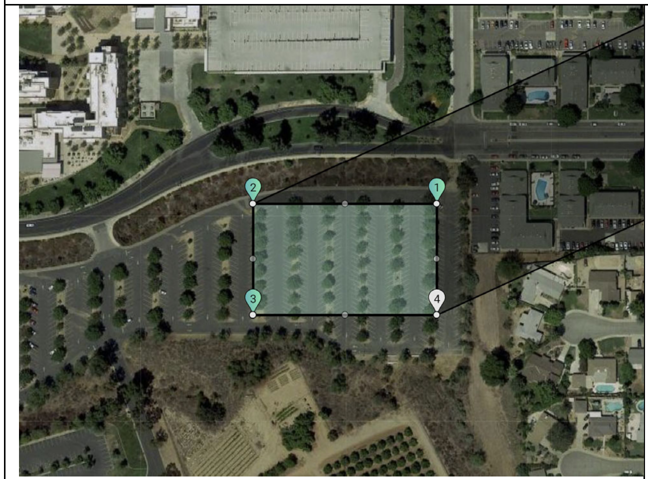


January 21 – 14:44

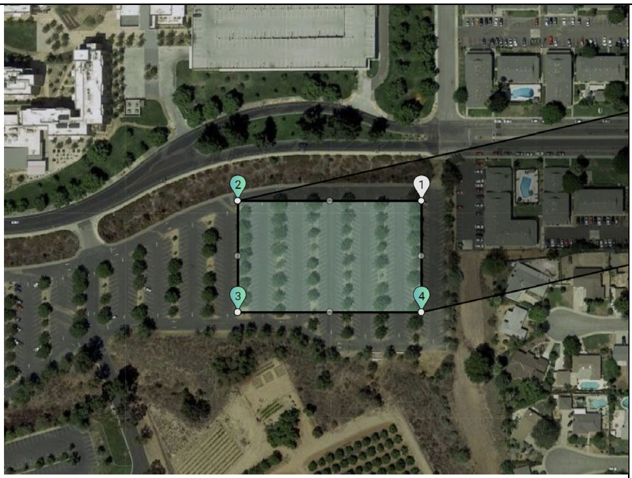
February 21 – 15:07



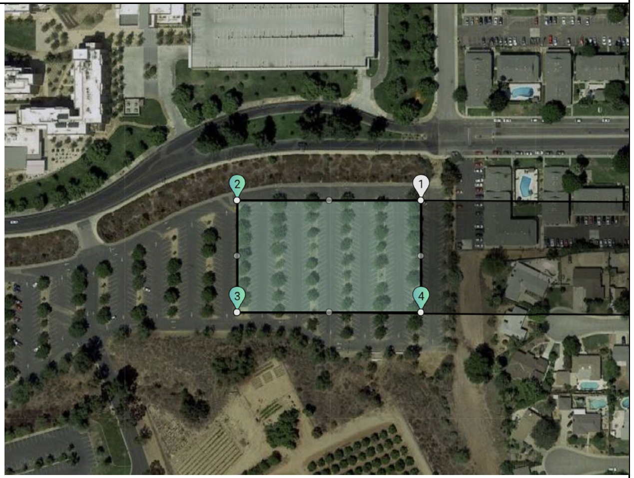
March 21 – 16:25



January 21 – 17:02



February 21 – 17:34



March 21 – 18:56

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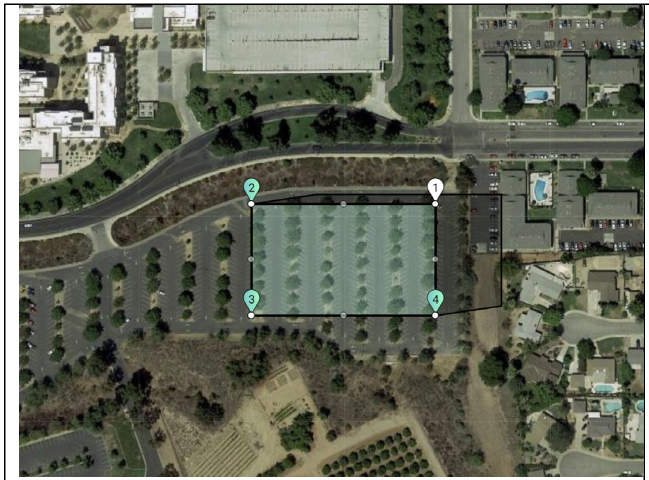
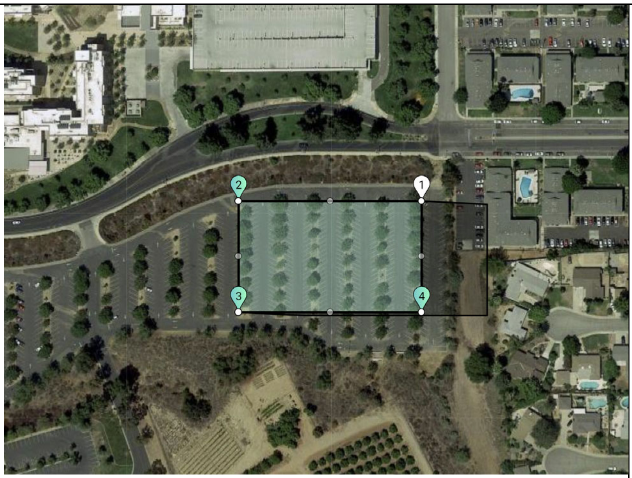
UCR Parking Structure 1
Project Number: 956553

December 2, 2019: **Construction Start**
December 31, 2120: **Project Completion**

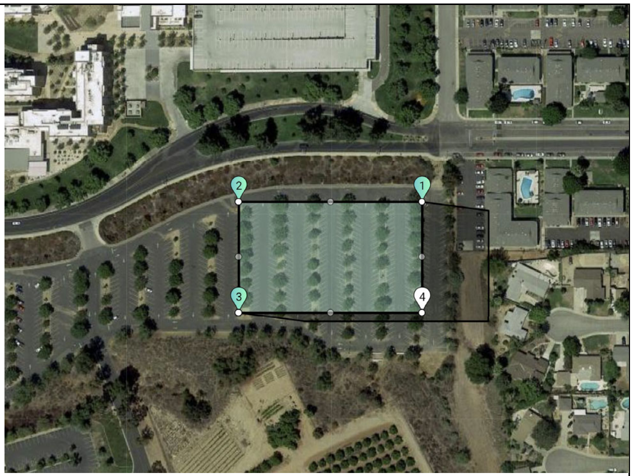
Shadow Study Exhibit, Apr-Jun 2020



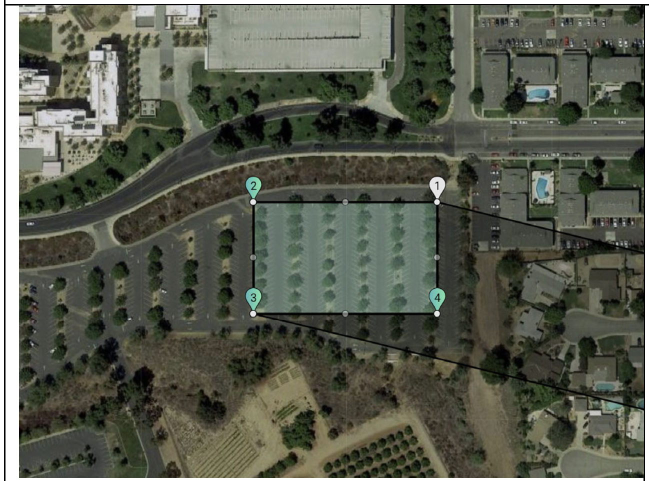
April 21 – 16:39



May 21 – 16:57



June 21 – 17:11



April 21 – 19:15

May 21 – 19:42

June 21 – 19:56

UCR Planning, Design & Construction

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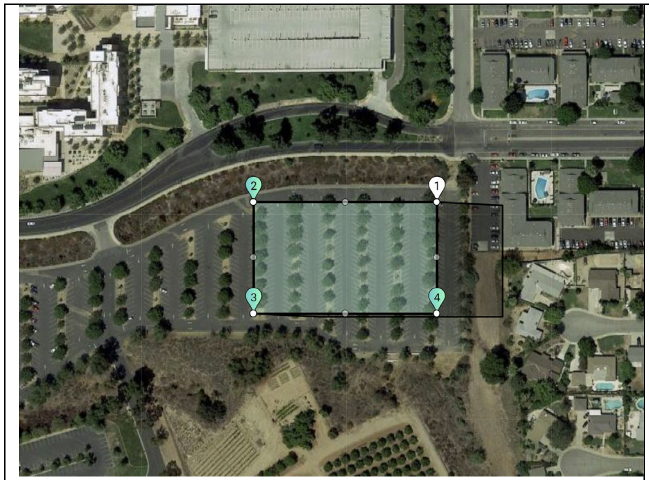
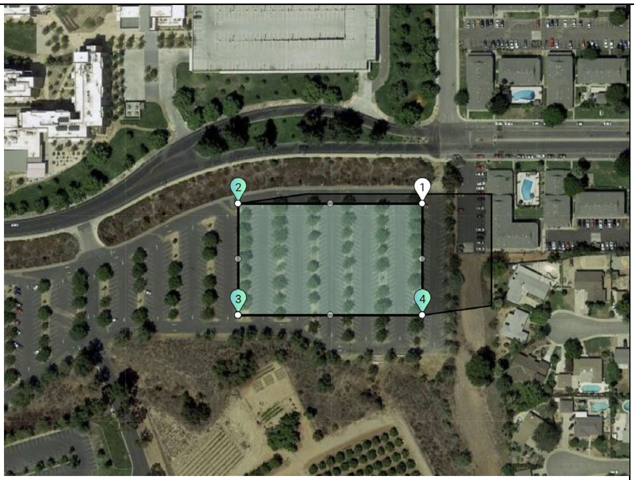
UCR Parking Structure 1
Project Number: 956553

December 2, 2019: **Construction Start**
December 31, 2120: **Project Completion**

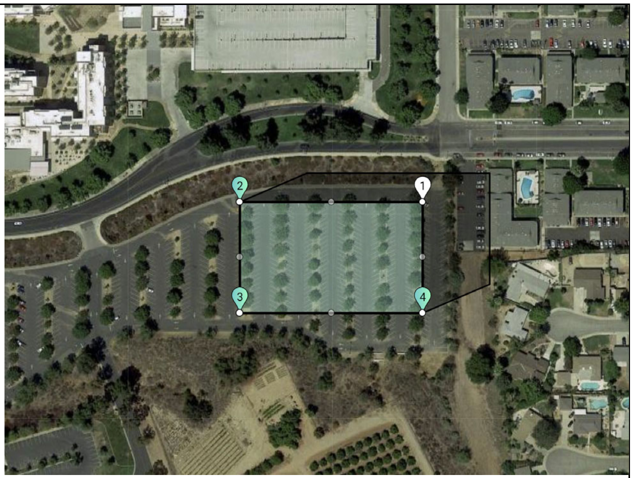
Shadow Study Exhibit, July-Sep 2020



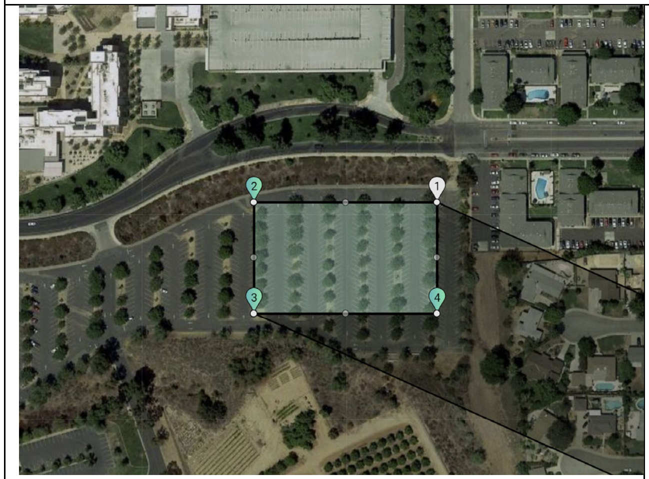
July 21 – 17:06



August 21 – 16:48

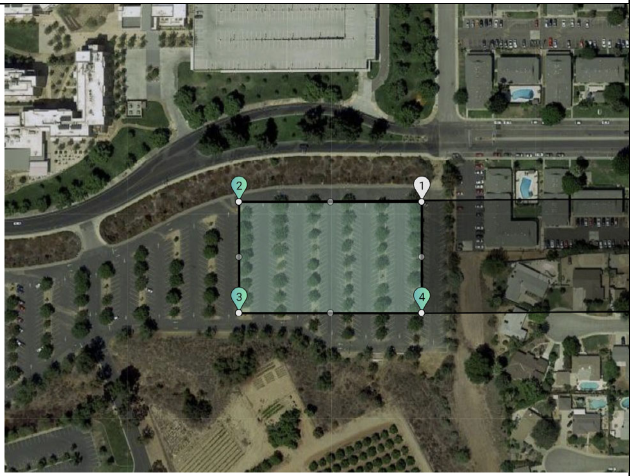


September 21 – 16:11



July 21 – 19:51

August 21 – 19:24

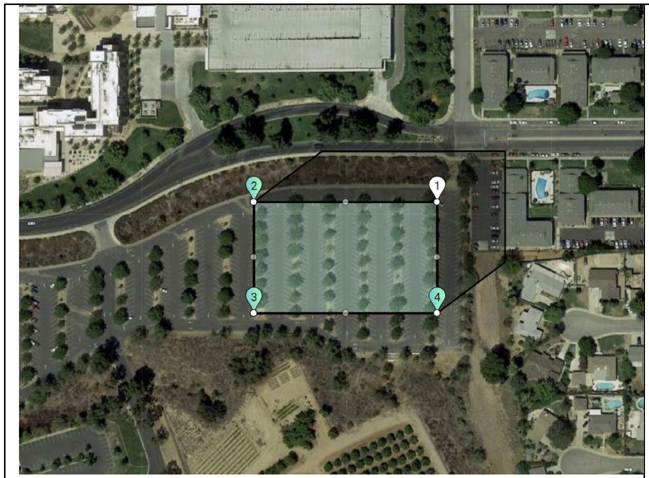


September 21 – 18:33

UCR Parking Structure 1
Project Number: 956553

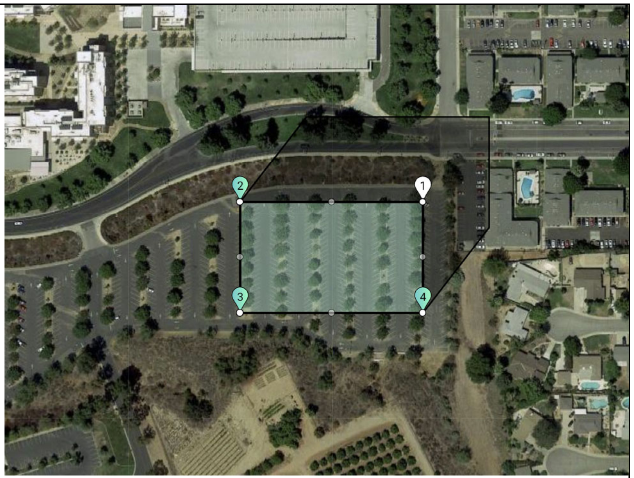
December 2, 2019: **Construction Start**
December 31, 2120: **Project Completion**

Shadow Study Exhibit, Oct-Dec 2020

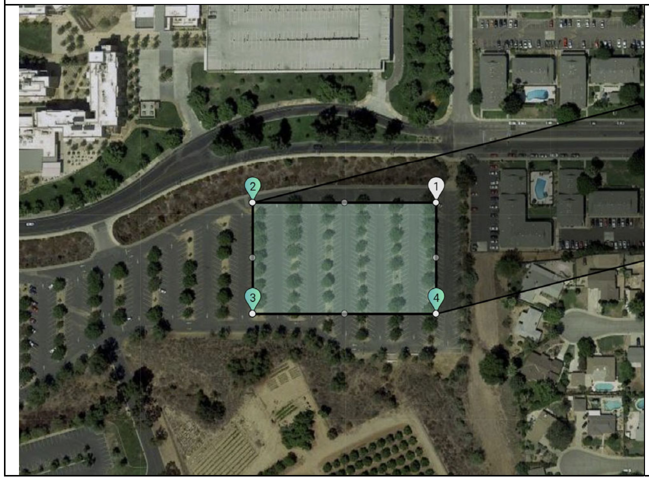


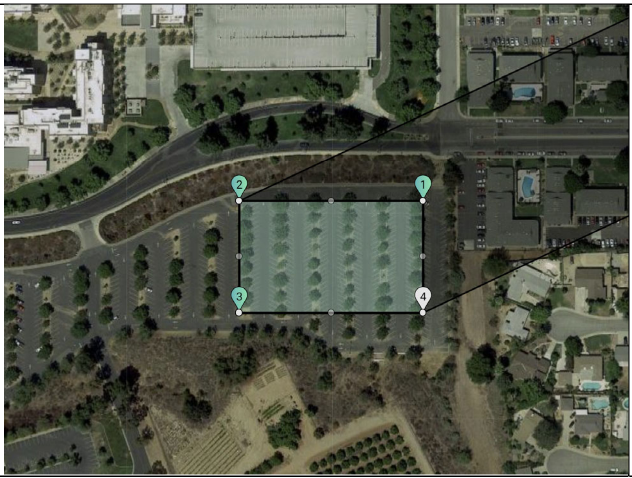
October 21 – 15:39

November 21 – 14:17



December 21 – 14:21





October 21 – 18:01	November 21 – 16:34	December 21 – 16:34

UCR Parking Structure 1
Project Number: 956553

December 2, 2019: **Construction Start**
December 31, 2120: **Project Completion**

Appendix B

Air Quality and Energy Analysis Worksheets

Construction Fuel Consumption Calculations

UCR Parking Structure

Compression-Ignition Engine Brake-Specific Fuel Consumption (BSFC) Factors **[1]**:

HP: 0 to 100	0.0588	HP: >100	0.0529

Equipment Fuel Consumption

PhaseName	OffRoadEquipmentType	Amount	Hours	HorsePower	LoadFactor	Fuel (gallons)
Demolition	Concrete/Industrial Saws	0	0	97	0.37	0.0
Demolition	Excavators	1	8	158	0.38	507.8
Demolition	Rubber Tired Dozers	1	8	247	0.4	835.6
Demolition	Tractors/Loaders/Backhoes	3	8	97	0.37	1012.3
Site Preparation	Rubber Tired Dozers	3	8	247	0.4	626.7
Site Preparation	Tractors/Loaders/Backhoes	4	8	97	0.37	337.4
Grading	Excavators	0	8	158	0.38	0.0
Grading	Graders	1	8	187	0.41	648.4
Grading	Rubber Tired Dozers	1	8	247	0.4	835.6
Grading	Tractors/Loaders/Backhoes	3	8	97	0.37	1012.3
Building Construction	Aerial Lifts	1	8	110	0.31	3316.6
Building Construction	Cranes	1	7	231	0.29	5701.0
Building Construction	Forklifts	2	8	89	0.2	3849.3
Building Construction	Generator Sets	0	8	84	0.74	0.0
Building Construction	Off-Highway Trucks	8	8	402	0.38	118860.2
Building Construction	Plate Compactors	2	8	8	0.43	743.9
Building Construction	Pumps	1	8	84	0.74	6721.1
Building Construction	Tractors/Loaders/Backhoes	2	8	97	0.37	7761.3
Building Construction	Welders	0	8	46	0.45	0.0
Architectural Coating	Air Compressors	1	6	78	0.48	198.0
Paving	Cement and Mortar Mixers	0	6	9	0.56	0.0
Paving	Off-Highway Trucks	3	8	402	0.38	3875.9
Paving	Pavers	0	8	130	0.42	0.0
Paving	Paving Equipment	1	8	132	0.36	401.9
Paving	Rollers	2	8	80	0.38	571.7
Paving	Tractors/Loaders/Backhoes	0	8	97	0.37	0.0

Total Equipment Fuel Consumption	157817.1 gallons

Trip Fuel Consumption

PhaseName	Trip Type	Working Days	Trips/ day	Trip Length (mi)	MPG[2]	Fuel (gal)
Demolition	WorkerTripNumber	20	13	14.7	24	159.3
Demolition	VendorTripNumber	20	0	6.9	7.4	0.0
Demolition	HaulingTripNumber	20	32.85	10	7.4	887.8
Site Preparation	WorkerTripNumber	5	18	14.7	24	55.1
Site Preparation	VendorTripNumber	5	0	6.9	7.4	0.0
Site Preparation	HaulingTripNumber	5	0	20	7.4	0.0
Grading	WorkerTripNumber	20	13	14.7	24	159.3
Grading	VendorTripNumber	20	0	6.9	7.4	0.0
Grading	HaulingTripNumber	20	6.25	20	7.4	337.8
Building Construction	WorkerTripNumber	230	150	14.7	24	21131.3
Building Construction	VendorTripNumber	230	80	6.9	7.4	17156.8
Building Construction	HaulingTripNumber	230	0	20	7.4	0.0
Architectural Coating	WorkerTripNumber	15	41	14.7	24	376.7
Architectural Coating	VendorTripNumber	15	0	6.9	7.4	0.0
Architectural Coating	HaulingTripNumber	15	0	20	7.4	0.0
Paving	WorkerTripNumber	20	15	14.7	24	183.8
Paving	VendorTripNumber	20	0	6.9	7.4	0.0
Paving	HaulingTripNumber	20	0	20	7.4	0.0
Total Worker Trip Fuel Consumption (gallons)					**22065.3**	
Total Vendor/Haul Trip Fuel Consumption (gallons)					**18382.4**	

Sources:

[1] United States Environmental Protection Agency. 2018. *Exhaust and Crankcase Emission Factors for Nonroad Compression-Ignition Engines in MOVES2014b* . July 2018. Available at: https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P100UXEN.pdf.

[2] United States Department of Transportation, Bureau of Transportation Statistics. 2018. *National Transportation Statistics 2018* . Available at: https://www.bts.gov/sites/bts.dot.gov/files/docs/browse-statistical-products-and-data/national-transportation-statistics/223001/ntsentire2018q4.pdf.

PhaseName	Days
Demolition	20
Site Preparation	5
Grading	20
Building Construction	230
Architectural Coating	15
Paving	20

PhaseName	WorkerTripN	VendorTri	HaulingTr	WorkerTri	VendorTri	HaulingTr	WorkerVe	VendorVe	HaulingVehicleClass
Demolition	13	0	657	14.7	6.9	10	LD_Mix	HDT_Mix	HHDT
Site Preparation	18	0	0	14.7	6.9	20	LD_Mix	HDT_Mix	HHDT
Grading	13	0	125	14.7	6.9	20	LD_Mix	HDT_Mix	HHDT
Building Construction	150	80	0	14.7	6.9	20	LD_Mix	HDT_Mix	HHDT
Architectural Coating	41	0	0	14.7	6.9	20	LD_Mix	HDT_Mix	HHDT
Paving	15	0	0	14.7	6.9	20	LD_Mix	HDT_Mix	HHDT

UCR Parking Structure 1

South Coast AQMD Air District, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Parking Lot	212.00	Space	2.59	113,000.00	0
Unenclosed Parking with Elevator	1,079.00	Space	2.30	375,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	31
Climate Zone	10			**Operational Year**	2022
Utility Company	Riverside Public Utilities				
CO2 Intensity (lb/MWhr)	1325.65	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Information from BOD and from UCR staff.

Construction Phase - Schedule adjusted to match anticipated project schedule.

Off-road Equipment - Based on Demolition construction equipment list. Dump trucks for hauling are accounted for in construction haul trips (see Trips and VMT).

Off-road Equipment -

Off-road Equipment - Equipment list adjusted to match grading equipment list provided by client.

Off-road Equipment - Adjusted to match building construction/underground infrastructure equipment list from UCR staff. Aerial lift is proxy for Pettibone handler, Off-Highway Trucks are used for cement trucks (5-10 per day), pump is used for concrete pumper.

Off-road Equipment - Adjusted to match paving equipment list from UCR staff. Off-Highway trucks include 1-2 asphalt trucks and 1 concrete truck.

Off-road Equipment -

Grading - Based on grading plan estimate of 8,000 cy cut, and 7,000 cy used as fill.

Demolition - Based on demolition debris estimate from client.

Trips and VMT - Demolition haul trips adjusted based on information provided by UCR staff (estimated 329 trips not accounting for empty return trips). Demo haul
length adjusted based on estimate from client. Worker trips adjusted based on maximum number of workers anticipated to be on site (provided by UCR staff).

Architectural Coating - Assumed compliance with SCAQMD Rule 1113

Area Coating - Assumed compliance with SCAQMD Rule 1113

Construction Off-road Equipment Mitigation - Assumed compliance with SCAQMD Rule 403. Pursuant to MM 4.3-1(b) of the LRDP EIR, all off-road construction
equipment between January 1, 2012 - Dec. 31, 2014 shall meet Tier 3 standards, and all equipment post-January 1, 2015 shall meet Tier 4 standards

Mobile Land Use Mitigation -

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Nonresidential_Exterior	100.00	50.00
tblArchitecturalCoating	EF_Nonresidential_Interior	100.00	50.00
tblArchitecturalCoating	EF_Parking	100.00	50.00
tblAreaCoating	Area_EF_Nonresidential_Exterior	100	50
tblAreaCoating	Area_EF_Nonresidential_Interior	100	50
tblAreaCoating	Area_EF_Parking	100	50
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3

tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstructionPhase	NumDays	18.00	15.00
tblConstructionPhase	NumDays	8.00	20.00
tblConstructionPhase	NumDays	18.00	20.00
tblConstructionPhase	PhaseEndDate	1/21/2021	12/30/2020
tblConstructionPhase	PhaseEndDate	12/2/2020	12/18/2020
tblConstructionPhase	PhaseEndDate	1/15/2020	1/31/2020
tblConstructionPhase	PhaseEndDate	12/28/2020	1/15/2021
tblConstructionPhase	PhaseStartDate	12/29/2020	12/10/2020
tblConstructionPhase	PhaseStartDate	1/16/2020	2/3/2020
tblConstructionPhase	PhaseStartDate	12/3/2020	12/21/2020
tblGrading	MaterialExported	0.00	1,000.00
tblLandUse	LandUseSquareFeet	84,800.00	113,000.00
tblLandUse	LandUseSquareFeet	431,600.00	375,000.00
tblLandUse	LotAcreage	1.91	2.59
tblLandUse	LotAcreage	9.71	2.30
tblOffRoadEquipment	HorsePower	63.00	110.00
tblOffRoadEquipment	LoadFactor	0.37	0.37
tblOffRoadEquipment	LoadFactor	0.31	0.31
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	OffRoadEquipmentType		Tractors/Loaders/Backhoes
tblOffRoadEquipment	OffRoadEquipmentType		Aerial Lifts
tblOffRoadEquipment	OffRoadEquipmentType		Off-Highway Trucks
tblOffRoadEquipment	OffRoadEquipmentType		Plate Compactors
tblOffRoadEquipment	OffRoadEquipmentType		Pumps

tblOffRoadEquipment	OffRoadEquipmentType		Off-Highway Trucks
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	UsageHours	8.00	0.00
tblOffRoadEquipment	UsageHours	6.00	8.00
tblOffRoadEquipment	UsageHours	7.00	8.00
tblOffRoadEquipment	UsageHours	6.00	8.00
tblTripsAndVMT	HaulingTripLength	20.00	10.00
tblTripsAndVMT	HaulingTripNumber	1,018.00	658.00
tblTripsAndVMT	WorkerTripNumber	205.00	150.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2019	0.0277	0.3294	0.1843	4.3000e-004	0.1327	0.0144	0.1471	0.0278	0.0133	0.0411	0.0000	39.8088	39.8088	8.8600e-003	0.0000	40.0303

2020	0.9936	9.2536	6.4052	0.0199	0.3468	0.3440	0.6909	0.1174	0.3188	0.4362	0.0000	1,773.2751	1,773.2751	0.4430	0.0000	1,784.3511
2021	0.0154	0.1194	0.0973	2.8000e-004	9.1000e-004	5.0300e-003	5.9300e-003	2.4000e-004	4.6300e-003	4.8700e-003	0.0000	24.5254	24.5254	7.7000e-003	0.0000	24.7179
Maximum	**0.9936**	**9.2536**	**6.4052**	**0.0199**	**0.3468**	**0.3440**	**0.6909**	**0.1174**	**0.3188**	**0.4362**	**0.0000**	**1,773.2751**	**1,773.2751**	**0.4430**	**0.0000**	**1,784.3511**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2019	0.0277	0.3294	0.1843	4.3000e-004	0.0622	0.0144	0.0766	0.0132	0.0133	0.0265	0.0000	39.8088	39.8088	8.8600e-003	0.0000	40.0302
2020	0.9936	9.2536	6.4052	0.0199	0.2959	0.3440	0.6399	0.0907	0.3188	0.4095	0.0000	1,773.2735	1,773.2735	0.4430	0.0000	1,784.3494
2021	0.0154	0.1194	0.0973	2.8000e-004	9.1000e-004	5.0300e-003	5.9300e-003	2.4000e-004	4.6300e-003	4.8700e-003	0.0000	24.5254	24.5254	7.7000e-003	0.0000	24.7179
Maximum	**0.9936**	**9.2536**	**6.4052**	**0.0199**	**0.2959**	**0.3440**	**0.6399**	**0.0907**	**0.3188**	**0.4095**	**0.0000**	**1,773.2735**	**1,773.2735**	**0.4430**	**0.0000**	**1,784.3494**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**25.29**	**0.00**	**14.40**	**28.43**	**0.00**	**8.58**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	**Start Date**	**End Date**	**Maximum Unmitigated ROG + NOX (tons/quarter)**	**Maximum Mitigated ROG + NOX (tons/quarter)**
1	**12-2-2019**	**3-1-2020**	1.5299	1.5299
2	**3-2-2020**	**6-1-2020**	2.7712	2.7712
3	**6-2-2020**	**9-1-2020**	2.7701	2.7701
4	**9-2-2020**	**12-1-2020**	2.7424	2.7424
5	**12-2-2020**	**3-1-2021**	0.8065	0.8065
		Highest	2.7712	2.7712

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0365	1.5000e-004	0.0165	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005	0.0000	0.0320	0.0320	8.0000e-005	0.0000	0.0342
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	461.2308	461.2308	0.0101	2.0900e-003	462.1051
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0365**	**1.5000e-004**	**0.0165**	**0.0000**	**0.0000**	**6.0000e-005**	**6.0000e-005**	**0.0000**	**6.0000e-005**	**6.0000e-005**	**0.0000**	**461.2628**	**461.2628**	**0.0102**	**2.0900e-003**	**462.1393**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0365	1.5000e-004	0.0165	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005	0.0000	0.0320	0.0320	8.0000e-005	0.0000	0.0342
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	461.2308	461.2308	0.0101	2.0900e-003	462.1051
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0365**	**1.5000e-004**	**0.0165**	**0.0000**	**0.0000**	**6.0000e-005**	**6.0000e-005**	**0.0000**	**6.0000e-005**	**6.0000e-005**	**0.0000**	**461.2628**	**461.2628**	**0.0102**	**2.0900e-003**	**462.1393**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**

Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	12/2/2019	12/27/2019	5	20	
2	Site Preparation	Site Preparation	12/28/2019	1/3/2020	5	5	
3	Grading	Grading	1/4/2020	1/31/2020	5	20	
4	Building Construction	Building Construction	2/3/2020	12/18/2020	5	230	
5	Paving	Paving	12/21/2020	1/15/2021	5	20	
6	Architectural Coating	Architectural Coating	12/10/2020	12/30/2020	5	15	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 10

Acres of Paving: 4.89

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 29,280

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	6.00	78	0.48
Paving	Cement and Mortar Mixers	0	6.00	9	0.56
Demolition	Concrete/Industrial Saws	0	0.00	81	0.73
Demolition	Excavators	1	8.00	158	0.38
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	2	8.00	89	0.20
Grading	Excavators	0	8.00	158	0.38
Paving	Pavers	0	8.00	130	0.42
Paving	Rollers	2	8.00	80	0.38
Demolition	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Rubber Tired Dozers	1	8.00	247	0.40

Building Construction	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Building Construction	Generator Sets	0	8.00	84	0.74
Grading	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Paving	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Graders	1	8.00	187	0.41
Paving	Paving Equipment	1	8.00	132	0.36
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Building Construction	Welders	0	8.00	46	0.45
Demolition	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Building Construction	Aerial Lifts	1	8.00	110	0.31
Building Construction	Off-Highway Trucks	8	8.00	402	0.38
Building Construction	Plate Compactors	2	8.00	8	0.43
Building Construction	Pumps	1	8.00	84	0.74
Paving	Off-Highway Trucks	3	8.00	402	0.38

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	5	13.00	0.00	658.00	14.70	6.90	10.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	5	13.00	0.00	125.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	17	150.00	80.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	41.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Water Exposed Area

3.2 Demolition - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1101	0.0000	0.1101	0.0167	0.0000	0.0167	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0209	0.2174	0.1443	2.3000e-004		0.0118	0.0118		0.0109	0.0109	0.0000	20.6424	20.6424	6.5300e-003	0.0000	20.8057
Total	**0.0209**	**0.2174**	**0.1443**	**2.3000e-004**	**0.1101**	**0.0118**	**0.1220**	**0.0167**	**0.0109**	**0.0276**	**0.0000**	**20.6424**	**20.6424**	**6.5300e-003**	**0.0000**	**20.8057**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.7000e-003	0.0658	0.0118	1.5000e-004	2.8300e-003	1.9000e-004	3.0200e-003	7.8000e-004	1.8000e-004	9.6000e-004	0.0000	14.2409	14.2409	1.2000e-003	0.0000	14.2709
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	6.3000e-004	5.0000e-004	5.4200e-003	1.0000e-005	1.4300e-003	1.0000e-005	1.4400e-003	3.8000e-004	1.0000e-005	3.9000e-004	0.0000	1.3251	1.3251	4.0000e-005	0.0000	1.3261
Total	**2.3300e-003**	**0.0663**	**0.0172**	**1.6000e-004**	**4.2600e-003**	**2.0000e-004**	**4.4600e-003**	**1.1600e-003**	**1.9000e-004**	**1.3500e-003**	**0.0000**	**15.5660**	**15.5660**	**1.2400e-003**	**0.0000**	**15.5970**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					

Fugitive Dust					0.0496	0.0000	0.0496	7.5000e-003	0.0000	7.5000e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0209	0.2174	0.1443	2.3000e-004		0.0118	0.0118		0.0109	0.0109	0.0000	20.6424	20.6424	6.5300e-003	0.0000	20.8057
Total	**0.0209**	**0.2174**	**0.1443**	**2.3000e-004**	**0.0496**	**0.0118**	**0.0614**	**7.5000e-003**	**0.0109**	**0.0184**	**0.0000**	**20.6424**	**20.6424**	**6.5300e-003**	**0.0000**	**20.8057**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.7000e-003	0.0658	0.0118	1.5000e-004	2.8300e-003	1.9000e-004	3.0200e-003	7.8000e-004	1.8000e-004	9.6000e-004	0.0000	14.2409	14.2409	1.2000e-003	0.0000	14.2709
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	6.3000e-004	5.0000e-004	5.4200e-003	1.0000e-005	1.4300e-003	1.0000e-005	1.4400e-003	3.8000e-004	1.0000e-005	3.9000e-004	0.0000	1.3251	1.3251	4.0000e-005	0.0000	1.3261
Total	**2.3300e-003**	**0.0663**	**0.0172**	**1.6000e-004**	**4.2600e-003**	**2.0000e-004**	**4.4600e-003**	**1.1600e-003**	**1.9000e-004**	**1.3500e-003**	**0.0000**	**15.5660**	**15.5660**	**1.2400e-003**	**0.0000**	**15.5970**

3.3 Site Preparation - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0181	0.0000	0.0181	9.9300e-003	0.0000	9.9300e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	4.3400e-003	0.0456	0.0221	4.0000e-005		2.3900e-003	2.3900e-003		2.2000e-003	2.2000e-003	0.0000	3.4169	3.4169	1.0800e-003	0.0000	3.4439
Total	**4.3400e-003**	**0.0456**	**0.0221**	**4.0000e-005**	**0.0181**	**2.3900e-003**	**0.0205**	**9.9300e-003**	**2.2000e-003**	**0.0121**	**0.0000**	**3.4169**	**3.4169**	**1.0800e-003**	**0.0000**	**3.4439**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	9.0000e-005	7.0000e-005	7.5000e-004	0.0000	2.0000e-004	0.0000	2.0000e-004	5.0000e-005	0.0000	5.0000e-005	0.0000	0.1835	0.1835	1.0000e-005	0.0000	0.1836
Total	**9.0000e-005**	**7.0000e-005**	**7.5000e-004**	**0.0000**	**2.0000e-004**	**0.0000**	**2.0000e-004**	**5.0000e-005**	**0.0000**	**5.0000e-005**	**0.0000**	**0.1835**	**0.1835**	**1.0000e-005**	**0.0000**	**0.1836**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					8.1300e-003	0.0000	8.1300e-003	4.4700e-003	0.0000	4.4700e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	4.3400e-003	0.0456	0.0221	4.0000e-005		2.3900e-003	2.3900e-003		2.2000e-003	2.2000e-003	0.0000	3.4169	3.4169	1.0800e-003	0.0000	3.4439
Total	**4.3400e-003**	**0.0456**	**0.0221**	**4.0000e-005**	**8.1300e-003**	**2.3900e-003**	**0.0105**	**4.4700e-003**	**2.2000e-003**	**6.6700e-003**	**0.0000**	**3.4169**	**3.4169**	**1.0800e-003**	**0.0000**	**3.4439**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					

Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	9.0000e-005	7.0000e-005	7.5000e-004	0.0000	2.0000e-004	0.0000	2.0000e-004	5.0000e-005	0.0000	5.0000e-005	0.0000	0.1835	0.1835	1.0000e-005	0.0000	0.1836
Total	**9.0000e-005**	**7.0000e-005**	**7.5000e-004**	**0.0000**	**2.0000e-004**	**0.0000**	**2.0000e-004**	**5.0000e-005**	**0.0000**	**5.0000e-005**	**0.0000**	**0.1835**	**0.1835**	**1.0000e-005**	**0.0000**	**0.1836**

3.3 Site Preparation - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0271	0.0000	0.0271	0.0149	0.0000	0.0149	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	6.1100e-003	0.0636	0.0323	6.0000e-005		3.3000e-003	3.3000e-003		3.0300e-003	3.0300e-003	0.0000	5.0146	5.0146	1.6200e-003	0.0000	5.0552
Total	**6.1100e-003**	**0.0636**	**0.0323**	**6.0000e-005**	**0.0271**	**3.3000e-003**	**0.0304**	**0.0149**	**3.0300e-003**	**0.0179**	**0.0000**	**5.0146**	**5.0146**	**1.6200e-003**	**0.0000**	**5.0552**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.2000e-004	9.0000e-005	1.0200e-003	0.0000	3.0000e-004	0.0000	3.0000e-004	8.0000e-005	0.0000	8.0000e-005	0.0000	0.2667	0.2667	1.0000e-005	0.0000	0.2669
Total	**1.2000e-004**	**9.0000e-005**	**1.0200e-003**	**0.0000**	**3.0000e-004**	**0.0000**	**3.0000e-004**	**8.0000e-005**	**0.0000**	**8.0000e-005**	**0.0000**	**0.2667**	**0.2667**	**1.0000e-005**	**0.0000**	**0.2669**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0122	0.0000	0.0122	6.7000e-003	0.0000	6.7000e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	6.1100e-003	0.0636	0.0323	6.0000e-005		3.3000e-003	3.3000e-003		3.0300e-003	3.0300e-003	0.0000	5.0146	5.0146	1.6200e-003	0.0000	5.0551
Total	**6.1100e-003**	**0.0636**	**0.0323**	**6.0000e-005**	**0.0122**	**3.3000e-003**	**0.0155**	**6.7000e-003**	**3.0300e-003**	**9.7300e-003**	**0.0000**	**5.0146**	**5.0146**	**1.6200e-003**	**0.0000**	**5.0551**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.2000e-004	9.0000e-005	1.0200e-003	0.0000	3.0000e-004	0.0000	3.0000e-004	8.0000e-005	0.0000	8.0000e-005	0.0000	0.2667	0.2667	1.0000e-005	0.0000	0.2669
Total	**1.2000e-004**	**9.0000e-005**	**1.0200e-003**	**0.0000**	**3.0000e-004**	**0.0000**	**3.0000e-004**	**8.0000e-005**	**0.0000**	**8.0000e-005**	**0.0000**	**0.2667**	**0.2667**	**1.0000e-005**	**0.0000**	**0.2669**

3.4 Grading - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	tons/yr										MT/yr					
Fugitive Dust					0.0656	0.0000	0.0656	0.0337	0.0000	0.0337	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0218	0.2397	0.1279	2.4000e-004		0.0116	0.0116		0.0106	0.0106	0.0000	21.5218	21.5218	6.9600e-003	0.0000	21.6958
Total	**0.0218**	**0.2397**	**0.1279**	**2.4000e-004**	**0.0656**	**0.0116**	**0.0772**	**0.0337**	**0.0106**	**0.0443**	**0.0000**	**21.5218**	**21.5218**	**6.9600e-003**	**0.0000**	**21.6958**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	4.8000e-004	0.0175	3.5000e-003	5.0000e-005	1.0700e-003	6.0000e-005	1.1300e-003	2.9000e-004	5.0000e-005	3.5000e-004	0.0000	4.7165	4.7165	3.3000e-004	0.0000	4.7246
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.8000e-004	4.4000e-004	4.9200e-003	1.0000e-005	1.4300e-003	1.0000e-005	1.4400e-003	3.8000e-004	1.0000e-005	3.9000e-004	0.0000	1.2840	1.2840	4.0000e-005	0.0000	1.2849
Total	**1.0600e-003**	**0.0180**	**8.4200e-003**	**6.0000e-005**	**2.5000e-003**	**7.0000e-005**	**2.5700e-003**	**6.7000e-004**	**6.0000e-005**	**7.4000e-004**	**0.0000**	**6.0005**	**6.0005**	**3.7000e-004**	**0.0000**	**6.0095**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0295	0.0000	0.0295	0.0152	0.0000	0.0152	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0218	0.2397	0.1279	2.4000e-004		0.0116	0.0116		0.0106	0.0106	0.0000	21.5217	21.5217	6.9600e-003	0.0000	21.6957
Total	**0.0218**	**0.2397**	**0.1279**	**2.4000e-004**	**0.0295**	**0.0116**	**0.0411**	**0.0152**	**0.0106**	**0.0258**	**0.0000**	**21.5217**	**21.5217**	**6.9600e-003**	**0.0000**	**21.6957**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	4.8000e-004	0.0175	3.5000e-003	5.0000e-005	1.0700e-003	6.0000e-005	1.1300e-003	2.9000e-004	5.0000e-005	3.5000e-004	0.0000	4.7165	4.7165	3.3000e-004	0.0000	4.7246
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.8000e-004	4.4000e-004	4.9200e-003	1.0000e-005	1.4300e-003	1.0000e-005	1.4400e-003	3.8000e-004	1.0000e-005	3.9000e-004	0.0000	1.2840	1.2840	4.0000e-005	0.0000	1.2849
Total	**1.0600e-003**	**0.0180**	**8.4200e-003**	**6.0000e-005**	**2.5000e-003**	**7.0000e-005**	**2.5700e-003**	**6.7000e-004**	**6.0000e-005**	**7.4000e-004**	**0.0000**	**6.0005**	**6.0005**	**3.7000e-004**	**0.0000**	**6.0095**

3.5 Building Construction - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.8058	7.7633	5.2310	0.0151		0.3171	0.3171		0.2939	0.2939	0.0000	1,318.7823	1,318.7823	0.4078	0.0000	1,328.9775
Total	**0.8058**	**7.7633**	**5.2310**	**0.0151**		**0.3171**	**0.3171**		**0.2939**	**0.2939**	**0.0000**	**1,318.7823**	**1,318.7823**	**0.4078**	**0.0000**	**1,328.9775**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0308	0.9818	0.2432	2.3400e-003	0.0580	4.8100e-003	0.0628	0.0167	4.6000e-003	0.0213	0.0000	226.2757	226.2757	0.0149	0.0000	226.6471
Worker	0.0770	0.0590	0.6533	1.8900e-003	0.1893	1.4600e-003	0.1907	0.0503	1.3500e-003	0.0516	0.0000	170.3724	170.3724	4.8900e-003	0.0000	170.4946
Total	**0.1078**	**1.0408**	**0.8965**	**4.2300e-003**	**0.2473**	**6.2700e-003**	**0.2535**	**0.0670**	**5.9500e-003**	**0.0730**	**0.0000**	**396.6481**	**396.6481**	**0.0197**	**0.0000**	**397.1417**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.8058	7.7633	5.2310	0.0151		0.3171	0.3171		0.2939	0.2939	0.0000	1,318.7807	1,318.7807	0.4078	0.0000	1,328.9759
Total	**0.8058**	**7.7633**	**5.2310**	**0.0151**		**0.3171**	**0.3171**		**0.2939**	**0.2939**	**0.0000**	**1,318.7807**	**1,318.7807**	**0.4078**	**0.0000**	**1,328.9759**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0308	0.9818	0.2432	2.3400e-003	0.0580	4.8100e-003	0.0628	0.0167	4.6000e-003	0.0213	0.0000	226.2757	226.2757	0.0149	0.0000	226.6471
Worker	0.0770	0.0590	0.6533	1.8900e-003	0.1893	1.4600e-003	0.1907	0.0503	1.3500e-003	0.0516	0.0000	170.3724	170.3724	4.8900e-003	0.0000	170.4946

Total	**0.1078**	**1.0408**	**0.8965**	**4.2300e-003**	**0.2473**	**6.2700e-003**	**0.2535**	**0.0670**	**5.9500e-003**	**0.0730**	**0.0000**	**396.6481**	**396.6481**	**0.0197**	**0.0000**	**397.1417**

3.6 Paving - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0118	0.1142	0.0801	2.2000e-004		4.8000e-003	4.8000e-003		4.4200e-003	4.4200e-003	0.0000	19.4225	19.4225	6.2800e-003	0.0000	19.5796
Paving	1.5300e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0133**	**0.1142**	**0.0801**	**2.2000e-004**		**4.8000e-003**	**4.8000e-003**		**4.4200e-003**	**4.4200e-003**	**0.0000**	**19.4225**	**19.4225**	**6.2800e-003**	**0.0000**	**19.5796**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.0000e-004	2.3000e-004	2.5600e-003	1.0000e-005	7.4000e-004	1.0000e-005	7.5000e-004	2.0000e-004	1.0000e-005	2.0000e-004	0.0000	0.6667	0.6667	2.0000e-005	0.0000	0.6672
Total	**3.0000e-004**	**2.3000e-004**	**2.5600e-003**	**1.0000e-005**	**7.4000e-004**	**1.0000e-005**	**7.5000e-004**	**2.0000e-004**	**1.0000e-005**	**2.0000e-004**	**0.0000**	**0.6667**	**0.6667**	**2.0000e-005**	**0.0000**	**0.6672**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0118	0.1142	0.0801	2.2000e-004		4.8000e-003	4.8000e-003		4.4200e-003	4.4200e-003	0.0000	19.4225	19.4225	6.2800e-003	0.0000	19.5796
Paving	1.5300e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0133**	**0.1142**	**0.0801**	**2.2000e-004**		**4.8000e-003**	**4.8000e-003**		**4.4200e-003**	**4.4200e-003**	**0.0000**	**19.4225**	**19.4225**	**6.2800e-003**	**0.0000**	**19.5796**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.0000e-004	2.3000e-004	2.5600e-003	1.0000e-005	7.4000e-004	1.0000e-005	7.5000e-004	2.0000e-004	1.0000e-005	2.0000e-004	0.0000	0.6667	0.6667	2.0000e-005	0.0000	0.6672
Total	**3.0000e-004**	**2.3000e-004**	**2.5600e-003**	**1.0000e-005**	**7.4000e-004**	**1.0000e-005**	**7.5000e-004**	**2.0000e-004**	**1.0000e-005**	**2.0000e-004**	**0.0000**	**0.6667**	**0.6667**	**2.0000e-005**	**0.0000**	**0.6672**

3.6 Paving - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0132	0.1191	0.0944	2.7000e-004		5.0200e-003	5.0200e-003		4.6200e-003	4.6200e-003	0.0000	23.7370	23.7370	7.6800e-003	0.0000	23.9290
Paving	1.8700e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Total	**0.0151**	**0.1191**	**0.0944**	**2.7000e-004**		**5.0200e-003**	**5.0200e-003**		**4.6200e-003**	**4.6200e-003**	**0.0000**	**23.7370**	**23.7370**	**7.6800e-003**	**0.0000**	**23.9290**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.4000e-004	2.5000e-004	2.8700e-003	1.0000e-005	9.1000e-004	1.0000e-005	9.1000e-004	2.4000e-004	1.0000e-005	2.5000e-004	0.0000	0.7884	0.7884	2.0000e-005	0.0000	0.7890
Total	**3.4000e-004**	**2.5000e-004**	**2.8700e-003**	**1.0000e-005**	**9.1000e-004**	**1.0000e-005**	**9.1000e-004**	**2.4000e-004**	**1.0000e-005**	**2.5000e-004**	**0.0000**	**0.7884**	**0.7884**	**2.0000e-005**	**0.0000**	**0.7890**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0132	0.1191	0.0944	2.7000e-004		5.0200e-003	5.0200e-003		4.6200e-003	4.6200e-003	0.0000	23.7370	23.7370	7.6800e-003	0.0000	23.9289
Paving	1.8700e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0151**	**0.1191**	**0.0944**	**2.7000e-004**		**5.0200e-003**	**5.0200e-003**		**4.6200e-003**	**4.6200e-003**	**0.0000**	**23.7370**	**23.7370**	**7.6800e-003**	**0.0000**	**23.9289**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.4000e-004	2.5000e-004	2.8700e-003	1.0000e-005	9.1000e-004	1.0000e-005	9.1000e-004	2.4000e-004	1.0000e-005	2.5000e-004	0.0000	0.7884	0.7884	2.0000e-005	0.0000	0.7890
Total	**3.4000e-004**	**2.5000e-004**	**2.8700e-003**	**1.0000e-005**	**9.1000e-004**	**1.0000e-005**	**9.1000e-004**	**2.4000e-004**	**1.0000e-005**	**2.5000e-004**	**0.0000**	**0.7884**	**0.7884**	**2.0000e-005**	**0.0000**	**0.7890**

3.7 Architectural Coating - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.0339					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.8200e-003	0.0126	0.0137	2.0000e-005		8.3000e-004	8.3000e-004		8.3000e-004	8.3000e-004	0.0000	1.9149	1.9149	1.5000e-004	0.0000	1.9187
Total	**0.0358**	**0.0126**	**0.0137**	**2.0000e-005**		**8.3000e-004**	**8.3000e-004**		**8.3000e-004**	**8.3000e-004**	**0.0000**	**1.9149**	**1.9149**	**1.5000e-004**	**0.0000**	**1.9187**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Worker	1.3700e-003	1.0500e-003	0.0117	3.0000e-005	3.3700e-003	3.0000e-005	3.4000e-003	9.0000e-004	2.0000e-005	9.2000e-004	0.0000	3.0371	3.0371	9.0000e-005	0.0000	3.0393
Total	**1.3700e-003**	**1.0500e-003**	**0.0117**	**3.0000e-005**	**3.3700e-003**	**3.0000e-005**	**3.4000e-003**	**9.0000e-004**	**2.0000e-005**	**9.2000e-004**	**0.0000**	**3.0371**	**3.0371**	**9.0000e-005**	**0.0000**	**3.0393**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.0339					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.8200e-003	0.0126	0.0137	2.0000e-005		8.3000e-004	8.3000e-004		8.3000e-004	8.3000e-004	0.0000	1.9149	1.9149	1.5000e-004	0.0000	1.9186
Total	**0.0358**	**0.0126**	**0.0137**	**2.0000e-005**		**8.3000e-004**	**8.3000e-004**		**8.3000e-004**	**8.3000e-004**	**0.0000**	**1.9149**	**1.9149**	**1.5000e-004**	**0.0000**	**1.9186**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.3700e-003	1.0500e-003	0.0117	3.0000e-005	3.3700e-003	3.0000e-005	3.4000e-003	9.0000e-004	2.0000e-005	9.2000e-004	0.0000	3.0371	3.0371	9.0000e-005	0.0000	3.0393
Total	**1.3700e-003**	**1.0500e-003**	**0.0117**	**3.0000e-005**	**3.3700e-003**	**3.0000e-005**	**3.4000e-003**	**9.0000e-004**	**2.0000e-005**	**9.2000e-004**	**0.0000**	**3.0371**	**3.0371**	**9.0000e-005**	**0.0000**	**3.0393**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Improve Pedestrian Network

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Parking Lot	0.00	0.00	0.00		
Unenclosed Parking with Elevator	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Parking Lot	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Unenclosed Parking with	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Parking Lot	0.549559	0.042893	0.201564	0.118533	0.015569	0.005846	0.021394	0.034255	0.002099	0.001828	0.004855	0.000709	0.000896
Unenclosed Parking with Elevator	0.549559	0.042893	0.201564	0.118533	0.015569	0.005846	0.021394	0.034255	0.002099	0.001828	0.004855	0.000709	0.000896

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	461.2308	461.2308	0.0101	2.0900e-003	462.1051
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	461.2308	461.2308	0.0101	2.0900e-003	462.1051
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unenclosed Parking with	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unenclosed Parking with	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Parking Lot	39550	23.7816	5.2000e-004	1.1000e-004	23.8267
Unenclosed Parking with	727500	437.4492	9.5700e-003	1.9800e-003	438.2785
Total		**461.2308**	**0.0101**	**2.0900e-003**	**462.1051**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Parking Lot	39550	23.7816	5.2000e-004	1.1000e-004	23.8267
Unenclosed Parking with	727500	437.4492	9.5700e-003	1.9800e-003	438.2785

Total		**461.2308**	**0.0101**	**2.0900e-003**	**462.1051**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0365	1.5000e-004	0.0165	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005	0.0000	0.0320	0.0320	8.0000e-005	0.0000	0.0342
Unmitigated	0.0365	1.5000e-004	0.0165	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005	0.0000	0.0320	0.0320	8.0000e-005	0.0000	0.0342

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	3.3900e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0316					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	1.5300e-003	1.5000e-004	0.0165	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005	0.0000	0.0320	0.0320	8.0000e-005	0.0000	0.0342
Total	**0.0365**	**1.5000e-004**	**0.0165**	**0.0000**		**6.0000e-005**	**6.0000e-005**		**6.0000e-005**	**6.0000e-005**	**0.0000**	**0.0320**	**0.0320**	**8.0000e-005**	**0.0000**	**0.0342**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	3.3900e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0316					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	1.5300e-003	1.5000e-004	0.0165	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005	0.0000	0.0320	0.0320	8.0000e-005	0.0000	0.0342
Total	**0.0365**	**1.5000e-004**	**0.0165**	**0.0000**		**6.0000e-005**	**6.0000e-005**		**6.0000e-005**	**6.0000e-005**	**0.0000**	**0.0320**	**0.0320**	**8.0000e-005**	**0.0000**	**0.0342**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Unenclosed Parking with	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Unenclosed Parking with	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000

Unmitigated	0.0000	0.0000	0.0000	0.0000

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Unenclosed Parking with	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Unenclosed Parking with	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

UCR Parking Structure 1

South Coast AQMD Air District, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Parking Lot	212.00	Space	2.59	113,000.00	0
Unenclosed Parking with Elevator	1,079.00	Space	2.30	375,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	31
Climate Zone	10			**Operational Year**	2022
Utility Company	Riverside Public Utilities				
CO2 Intensity (lb/MWhr)	1325.65	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Information from BOD and from UCR staff.

Construction Phase - Schedule adjusted to match anticipated project schedule.

Off-road Equipment - Based on Demolition construction equipment list. Dump trucks for hauling are accounted for in construction haul trips (see Trips and VMT).

Off-road Equipment -

Off-road Equipment - Equipment list adjusted to match grading equipment list provided by client.

Off-road Equipment - Adjusted to match building construction/underground infrastructure equipment list from UCR staff. Aerial lift is proxy for Pettibone handler, Off-
Highway Trucks are used for cement trucks (5-10 per day), pump is used for concrete pumper.

Off-road Equipment - Adjusted to match paving equipment list from UCR staff. Off-Highway trucks include 1-2 asphalt trucks and 1 concrete truck.

Off-road Equipment -

Grading - Based on grading plan estimate of 8,000 cy cut, and 7,000 cy used as fill.

Demolition - Based on demolition debris estimate from client.

Trips and VMT - Demolition haul trips adjusted based on information provided by UCR staff (estimated 329 trips not accounting for empty return trips). Demo haul
length adjusted based on estimate from client. Worker trips adjusted based on maximum number of workers anticipated to be on site (provided by UCR staff).

Architectural Coating - Assumed compliance with SCAQMD Rule 1113

Area Coating - Assumed compliance with SCAQMD Rule 1113

Construction Off-road Equipment Mitigation - Assumed compliance with SCAQMD Rule 403. Pursuant to MM 4.3-1(b) of the LRDP EIR, all off-road construction
equipment between January 1, 2012 - Dec. 31, 2014 shall meet Tier 3 standards, and all equipment post-January 1, 2015 shall meet Tier 4 standards where
Mobile Land Use Mitigation -

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Nonresidential_Exterior	100.00	50.00
tblArchitecturalCoating	EF_Nonresidential_Interior	100.00	50.00
tblArchitecturalCoating	EF_Parking	100.00	50.00
tblAreaCoating	Area_EF_Nonresidential_Exterior	100	50
tblAreaCoating	Area_EF_Nonresidential_Interior	100	50
tblAreaCoating	Area_EF_Parking	100	50
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3

tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstructionPhase	NumDays	18.00	15.00
tblConstructionPhase	NumDays	8.00	20.00
tblConstructionPhase	NumDays	18.00	20.00
tblConstructionPhase	PhaseEndDate	1/21/2021	12/30/2020
tblConstructionPhase	PhaseEndDate	12/2/2020	12/18/2020
tblConstructionPhase	PhaseEndDate	1/15/2020	1/31/2020
tblConstructionPhase	PhaseEndDate	12/28/2020	1/15/2021
tblConstructionPhase	PhaseStartDate	12/29/2020	12/10/2020
tblConstructionPhase	PhaseStartDate	1/16/2020	2/3/2020
tblConstructionPhase	PhaseStartDate	12/3/2020	12/21/2020
tblGrading	MaterialExported	0.00	1,000.00
tblLandUse	LandUseSquareFeet	84,800.00	113,000.00
tblLandUse	LandUseSquareFeet	431,600.00	375,000.00
tblLandUse	LotAcreage	1.91	2.59
tblLandUse	LotAcreage	9.71	2.30
tblOffRoadEquipment	HorsePower	63.00	110.00
tblOffRoadEquipment	LoadFactor	0.37	0.37
tblOffRoadEquipment	LoadFactor	0.31	0.31
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	OffRoadEquipmentType		Tractors/Loaders/Backhoes
tblOffRoadEquipment	OffRoadEquipmentType		Aerial Lifts
tblOffRoadEquipment	OffRoadEquipmentType		Off-Highway Trucks
tblOffRoadEquipment	OffRoadEquipmentType		Plate Compactors
tblOffRoadEquipment	OffRoadEquipmentType		Pumps

tblOffRoadEquipment	OffRoadEquipmentType		Off-Highway Trucks
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	UsageHours	8.00	0.00
tblOffRoadEquipment	UsageHours	6.00	8.00
tblOffRoadEquipment	UsageHours	7.00	8.00
tblOffRoadEquipment	UsageHours	6.00	8.00
tblTripsAndVMT	HaulingTripLength	20.00	10.00
tblTripsAndVMT	HaulingTripNumber	1,018.00	658.00
tblTripsAndVMT	WorkerTripNumber	205.00	150.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2019	4.4232	45.6341	22.8718	0.0401	18.2675	2.3919	20.6594	9.9840	2.2006	12.1846	0.0000	4,019.9974	4,019.9974	1.1983	0.0000	4,041.3258

2020	12.9001	78.1661	57.1259	0.1765	18.2675	2.9265	20.4664	9.9840	2.7209	12.0071	0.0000	17,303.8176	17,303.8176	4.1315	0.0000	17,407.1038
2021	2.8004	21.6989	17.7345	0.0508	0.1677	0.9144	1.0821	0.0445	0.8412	0.8857	0.0000	4,923.4908	4,923.4908	1.5431	0.0000	4,962.0683
Maximum	**12.9001**	**78.1661**	**57.1259**	**0.1765**	**18.2675**	**2.9265**	**20.6594**	**9.9840**	**2.7209**	**12.1846**	**0.0000**	**17,303.8176**	**17,303.8176**	**4.1315**	**0.0000**	**17,407.1038**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2019	4.4232	45.6341	22.8718	0.0401	8.3310	2.3919	10.7229	4.5222	2.2006	6.7227	0.0000	4,019.9974	4,019.9974	1.1983	0.0000	4,041.3258
2020	12.9001	78.1661	57.1259	0.1765	8.3310	2.9265	10.5300	4.5222	2.7209	6.5452	0.0000	17,303.8175	17,303.8175	4.1315	0.0000	17,407.1038
2021	2.8004	21.6989	17.7345	0.0508	0.1677	0.9144	1.0821	0.0445	0.8412	0.8857	0.0000	4,923.4908	4,923.4908	1.5431	0.0000	4,962.0683
Maximum	**12.9001**	**78.1661**	**57.1259**	**0.1765**	**8.3310**	**2.9265**	**10.7229**	**4.5222**	**2.7209**	**6.7227**	**0.0000**	**17,303.8175**	**17,303.8175**	**4.1315**	**0.0000**	**17,407.1038**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**54.15**	**0.00**	**47.08**	**54.58**	**0.00**	**43.56**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.2037	1.2100e-003	0.1320	1.0000e-005		4.7000e-004	4.7000e-004		4.7000e-004	4.7000e-004		0.2825	0.2825	7.5000e-004		0.3012
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.2037**	**1.2100e-003**	**0.1320**	**1.0000e-005**	**0.0000**	**4.7000e-004**	**4.7000e-004**	**0.0000**	**4.7000e-004**	**4.7000e-004**		**0.2825**	**0.2825**	**7.5000e-004**	**0.0000**	**0.3012**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.2037	1.2100e-003	0.1320	1.0000e-005		4.7000e-004	4.7000e-004		4.7000e-004	4.7000e-004		0.2825	0.2825	7.5000e-004		0.3012
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.2037**	**1.2100e-003**	**0.1320**	**1.0000e-005**	**0.0000**	**4.7000e-004**	**4.7000e-004**	**0.0000**	**4.7000e-004**	**4.7000e-004**		**0.2825**	**0.2825**	**7.5000e-004**	**0.0000**	**0.3012**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	12/2/2019	12/27/2019	5	20	
2	Site Preparation	Site Preparation	12/28/2019	1/3/2020	5	5	
3	Grading	Grading	1/4/2020	1/31/2020	5	20	
4	Building Construction	Building Construction	2/3/2020	12/18/2020	5	230	
5	Paving	Paving	12/21/2020	1/15/2021	5	20	
6	Architectural Coating	Architectural Coating	12/10/2020	12/30/2020	5	15	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 10

Acres of Paving: 4.89

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 29,280

<u>OffRoad Equipment</u>

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	6.00	78	0.48
Paving	Cement and Mortar Mixers	0	6.00	9	0.56
Demolition	Concrete/Industrial Saws	0	0.00	81	0.73
Demolition	Excavators	1	8.00	158	0.38
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	2	8.00	89	0.20
Grading	Excavators	0	8.00	158	0.38
Paving	Pavers	0	8.00	130	0.42
Paving	Rollers	2	8.00	80	0.38
Demolition	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Building Construction	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Building Construction	Generator Sets	0	8.00	84	0.74
Grading	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Paving	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Graders	1	8.00	187	0.41
Paving	Paving Equipment	1	8.00	132	0.36
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Building Construction	Welders	0	8.00	46	0.45
Demolition	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Building Construction	Aerial Lifts	1	8.00	110	0.31
Building Construction	Off-Highway Trucks	8	8.00	402	0.38
Building Construction	Plate Compactors	2	8.00	8	0.43
Building Construction	Pumps	1	8.00	84	0.74

Paving	Off-Highway Trucks	3	8.00	402	0.38

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	5	13.00	0.00	658.00	14.70	6.90	10.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	5	13.00	0.00	125.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	17	150.00	80.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	41.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Water Exposed Area

3.2 Demolition - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					11.0141	0.0000	11.0141	1.6676	0.0000	1.6676			0.0000			0.0000
Off-Road	2.0909	21.7400	14.4273	0.0230		1.1843	1.1843		1.0896	1.0896		2,275.4393	2,275.4393	0.7199		2,293.4374
Total	**2.0909**	**21.7400**	**14.4273**	**0.0230**	**11.0141**	**1.1843**	**12.1984**	**1.6676**	**1.0896**	**2.7572**		**2,275.4393**	**2,275.4393**	**0.7199**		**2,293.4374**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.1667	6.4570	1.1131	0.0147	0.2878	0.0188	0.3066	0.0789	0.0180	0.0969		1,591.0296	1,591.0296	0.1284		1,594.2398
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0637	0.0443	0.5841	1.5400e-003	0.1453	1.1300e-003	0.1464	0.0385	1.0400e-003	0.0396		153.5286	153.5286	4.8000e-003		153.6486
Total	**0.2304**	**6.5013**	**1.6972**	**0.0163**	**0.4331**	**0.0199**	**0.4530**	**0.1174**	**0.0190**	**0.1365**		**1,744.5581**	**1,744.5581**	**0.1332**		**1,747.8884**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					4.9563	0.0000	4.9563	0.7504	0.0000	0.7504			0.0000			0.0000
Off-Road	2.0909	21.7400	14.4273	0.0230		1.1843	1.1843		1.0896	1.0896	0.0000	2,275.4393	2,275.4393	0.7199		2,293.4374
Total	**2.0909**	**21.7400**	**14.4273**	**0.0230**	**4.9563**	**1.1843**	**6.1406**	**0.7504**	**1.0896**	**1.8400**	**0.0000**	**2,275.4393**	**2,275.4393**	**0.7199**		**2,293.4374**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.1667	6.4570	1.1131	0.0147	0.2878	0.0188	0.3066	0.0789	0.0180	0.0969		1,591.0296	1,591.0296	0.1284		1,594.2398

Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0637	0.0443	0.5841	1.5400e-003	0.1453	1.1300e-003	0.1464	0.0385	1.0400e-003	0.0396		153.5286	153.5286	4.8000e-003		153.6486
Total	**0.2304**	**6.5013**	**1.6972**	**0.0163**	**0.4331**	**0.0199**	**0.4530**	**0.1174**	**0.0190**	**0.1365**		**1,744.5581**	**1,744.5581**	**0.1332**		**1,747.8884**

3.3 Site Preparation - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					18.0663	0.0000	18.0663	9.9307	0.0000	9.9307			0.0000			0.0000
Off-Road	4.3350	45.5727	22.0630	0.0380		2.3904	2.3904		2.1991	2.1991		3,766.4529	3,766.4529	1.1917		3,796.2445
Total	**4.3350**	**45.5727**	**22.0630**	**0.0380**	**18.0663**	**2.3904**	**20.4566**	**9.9307**	**2.1991**	**12.1298**		**3,766.4529**	**3,766.4529**	**1.1917**		**3,796.2445**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0882	0.0613	0.8088	2.1400e-003	0.2012	1.5700e-003	0.2028	0.0534	1.4400e-003	0.0548		212.5780	212.5780	6.6500e-003		212.7442
Total	**0.0882**	**0.0613**	**0.8088**	**2.1400e-003**	**0.2012**	**1.5700e-003**	**0.2028**	**0.0534**	**1.4400e-003**	**0.0548**		**212.5780**	**212.5780**	**6.6500e-003**		**212.7442**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					8.1298	0.0000	8.1298	4.4688	0.0000	4.4688			0.0000			0.0000
Off-Road	4.3350	45.5727	22.0630	0.0380		2.3904	2.3904		2.1991	2.1991	0.0000	3,766.4529	3,766.4529	1.1917		3,796.2445
Total	**4.3350**	**45.5727**	**22.0630**	**0.0380**	**8.1298**	**2.3904**	**10.5202**	**4.4688**	**2.1991**	**6.6679**	**0.0000**	**3,766.4529**	**3,766.4529**	**1.1917**		**3,796.2445**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0882	0.0613	0.8088	2.1400e-003	0.2012	1.5700e-003	0.2028	0.0534	1.4400e-003	0.0548		212.5780	212.5780	6.6500e-003		212.7442
Total	**0.0882**	**0.0613**	**0.8088**	**2.1400e-003**	**0.2012**	**1.5700e-003**	**0.2028**	**0.0534**	**1.4400e-003**	**0.0548**		**212.5780**	**212.5780**	**6.6500e-003**		**212.7442**

3.3 Site Preparation - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					18.0663	0.0000	18.0663	9.9307	0.0000	9.9307			0.0000			0.0000

Off-Road	4.0765	42.4173	21.5136	0.0380		2.1974	2.1974		2.0216	2.0216		3,685.1016	3,685.1016	1.1918		3,714.8975
Total	**4.0765**	**42.4173**	**21.5136**	**0.0380**	**18.0663**	**2.1974**	**20.2637**	**9.9307**	**2.0216**	**11.9523**		**3,685.1016**	**3,685.1016**	**1.1918**		**3,714.8975**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0814	0.0547	0.7359	2.0700e-003	0.2012	1.5300e-003	0.2027	0.0534	1.4100e-003	0.0548		205.9951	205.9951	5.9200e-003		206.1432
Total	**0.0814**	**0.0547**	**0.7359**	**2.0700e-003**	**0.2012**	**1.5300e-003**	**0.2027**	**0.0534**	**1.4100e-003**	**0.0548**		**205.9951**	**205.9951**	**5.9200e-003**		**206.1432**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					8.1298	0.0000	8.1298	4.4688	0.0000	4.4688			0.0000			0.0000
Off-Road	4.0765	42.4173	21.5136	0.0380		2.1974	2.1974		2.0216	2.0216	0.0000	3,685.1016	3,685.1016	1.1918		3,714.8975
Total	**4.0765**	**42.4173**	**21.5136**	**0.0380**	**8.1298**	**2.1974**	**10.3272**	**4.4688**	**2.0216**	**6.4904**	**0.0000**	**3,685.1016**	**3,685.1016**	**1.1918**		**3,714.8975**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0814	0.0547	0.7359	2.0700e-003	0.2012	1.5300e-003	0.2027	0.0534	1.4100e-003	0.0548		205.9951	205.9951	5.9200e-003		206.1432
Total	**0.0814**	**0.0547**	**0.7359**	**2.0700e-003**	**0.2012**	**1.5300e-003**	**0.2027**	**0.0534**	**1.4100e-003**	**0.0548**		**205.9951**	**205.9951**	**5.9200e-003**		**206.1432**

3.4 Grading - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.5580	0.0000	6.5580	3.3683	0.0000	3.3683			0.0000			0.0000
Off-Road	2.1838	23.9732	12.7852	0.0245		1.1566	1.1566		1.0640	1.0640		2,372.3667	2,372.3667	0.7673		2,391.5485
Total	**2.1838**	**23.9732**	**12.7852**	**0.0245**	**6.5580**	**1.1566**	**7.7146**	**3.3683**	**1.0640**	**4.4324**		**2,372.3667**	**2,372.3667**	**0.7673**		**2,391.5485**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0475	1.7009	0.3384	4.8500e-003	0.1092	5.4800e-003	0.1147	0.0299	5.2500e-003	0.0352		523.9558	523.9558	0.0352		524.8348

Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0588	0.0395	0.5315	1.4900e-003	0.1453	1.1000e-003	0.1464	0.0385	1.0200e-003	0.0396		148.7743	148.7743	4.2800e-003		148.8812
Total	**0.1063**	**1.7404**	**0.8699**	**6.3400e-003**	**0.2545**	**6.5800e-003**	**0.2611**	**0.0685**	**6.2700e-003**	**0.0747**		**672.7300**	**672.7300**	**0.0394**		**673.7160**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.9511	0.0000	2.9511	1.5158	0.0000	1.5158			0.0000			0.0000
Off-Road	2.1838	23.9732	12.7852	0.0245		1.1566	1.1566		1.0640	1.0640	0.0000	2,372.3667	2,372.3667	0.7673		2,391.5485
Total	**2.1838**	**23.9732**	**12.7852**	**0.0245**	**2.9511**	**1.1566**	**4.1077**	**1.5158**	**1.0640**	**2.5798**	**0.0000**	**2,372.3667**	**2,372.3667**	**0.7673**		**2,391.5485**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0475	1.7009	0.3384	4.8500e-003	0.1092	5.4800e-003	0.1147	0.0299	5.2500e-003	0.0352		523.9558	523.9558	0.0352		524.8348
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0588	0.0395	0.5315	1.4900e-003	0.1453	1.1000e-003	0.1464	0.0385	1.0200e-003	0.0396		148.7743	148.7743	4.2800e-003		148.8812
Total	**0.1063**	**1.7404**	**0.8699**	**6.3400e-003**	**0.2545**	**6.5800e-003**	**0.2611**	**0.0685**	**6.2700e-003**	**0.0747**		**672.7300**	**672.7300**	**0.0394**		**673.7160**

3.5 Building Construction - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	7.0073	67.5066	45.4871	0.1310		2.7577	2.7577		2.5553	2.5553		12,640.9445	12,640.9445	3.9090		12,738.6687
Total	**7.0073**	**67.5066**	**45.4871**	**0.1310**		**2.7577**	**2.7577**		**2.5553**	**2.5553**		**12,640.9445**	**12,640.9445**	**3.9090**		**12,738.6687**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.2627	8.3948	1.9990	0.0206	0.5120	0.0416	0.5536	0.1474	0.0398	0.1872		2,195.5876	2,195.5876	0.1379		2,199.0339
Worker	0.6787	0.4562	6.1323	0.0172	1.6767	0.0127	1.6894	0.4447	0.0117	0.4564		1,716.6262	1,716.6262	0.0494		1,717.8600
Total	**0.9414**	**8.8510**	**8.1313**	**0.0378**	**2.1887**	**0.0543**	**2.2430**	**0.5921**	**0.0515**	**0.6436**		**3,912.2138**	**3,912.2138**	**0.1872**		**3,916.8939**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	7.0073	67.5066	45.4871	0.1310		2.7577	2.7577		2.5553	2.5553	0.0000	12,640.9445	12,640.9445	3.9090		12,738.6687

Total	**7.0073**	**67.5066**	**45.4871**	**0.1310**		**2.7577**	**2.7577**		**2.5553**	**2.5553**	**0.0000**	**12,640.9445**	**12,640.9445**	**3.9090**		**12,738.6687**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.2627	8.3948	1.9990	0.0206	0.5120	0.0416	0.5536	0.1474	0.0398	0.1872		2,195.5876	2,195.5876	0.1379		2,199.0339
Worker	0.6787	0.4562	6.1323	0.0172	1.6767	0.0127	1.6894	0.4447	0.0117	0.4564		1,716.6262	1,716.6262	0.0494		1,717.8600
Total	**0.9414**	**8.8510**	**8.1313**	**0.0378**	**2.1887**	**0.0543**	**2.2430**	**0.5921**	**0.0515**	**0.6436**		**3,912.2138**	**3,912.2138**	**0.1872**		**3,916.8939**

3.6 Paving - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.6230	25.3667	17.8086	0.0491		1.0670	1.0670		0.9816	0.9816		4,757.7064	4,757.7064	1.5387		4,796.1748
Paving	0.3393					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**2.9623**	**25.3667**	**17.8086**	**0.0491**		**1.0670**	**1.0670**		**0.9816**	**0.9816**		**4,757.7064**	**4,757.7064**	**1.5387**		**4,796.1748**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0679	0.0456	0.6132	1.7200e-003	0.1677	1.2700e-003	0.1689	0.0445	1.1700e-003	0.0456		171.6626	171.6626	4.9400e-003		171.7860
Total	**0.0679**	**0.0456**	**0.6132**	**1.7200e-003**	**0.1677**	**1.2700e-003**	**0.1689**	**0.0445**	**1.1700e-003**	**0.0456**		**171.6626**	**171.6626**	**4.9400e-003**		**171.7860**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.6230	25.3667	17.8086	0.0491		1.0670	1.0670		0.9816	0.9816	0.0000	4,757.7064	4,757.7064	1.5387		4,796.1748
Paving	0.3393					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**2.9623**	**25.3667**	**17.8086**	**0.0491**		**1.0670**	**1.0670**		**0.9816**	**0.9816**	**0.0000**	**4,757.7064**	**4,757.7064**	**1.5387**		**4,796.1748**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0679	0.0456	0.6132	1.7200e-003	0.1677	1.2700e-003	0.1689	0.0445	1.1700e-003	0.0456		171.6626	171.6626	4.9400e-003		171.7860
Total	**0.0679**	**0.0456**	**0.6132**	**1.7200e-003**	**0.1677**	**1.2700e-003**	**0.1689**	**0.0445**	**1.1700e-003**	**0.0456**		**171.6626**	**171.6626**	**4.9400e-003**		**171.7860**

3.6 Paving - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.3978	21.6578	17.1694	0.0491		0.9132	0.9132		0.8401	0.8401		4,757.3803	4,757.3803	1.5386		4,795.8461
Paving	0.3393					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**2.7371**	**21.6578**	**17.1694**	**0.0491**		**0.9132**	**0.9132**		**0.8401**	**0.8401**		**4,757.3803**	**4,757.3803**	**1.5386**		**4,795.8461**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0633	0.0411	0.5651	1.6700e-003	0.1677	1.2300e-003	0.1689	0.0445	1.1400e-003	0.0456		166.1105	166.1105	4.4700e-003		166.2222
Total	**0.0633**	**0.0411**	**0.5651**	**1.6700e-003**	**0.1677**	**1.2300e-003**	**0.1689**	**0.0445**	**1.1400e-003**	**0.0456**		**166.1105**	**166.1105**	**4.4700e-003**		**166.2222**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.3978	21.6578	17.1694	0.0491		0.9132	0.9132		0.8401	0.8401	0.0000	4,757.3803	4,757.3803	1.5386		4,795.8461
Paving	0.3393					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**2.7371**	**21.6578**	**17.1694**	**0.0491**		**0.9132**	**0.9132**		**0.8401**	**0.8401**	**0.0000**	**4,757.3803**	**4,757.3803**	**1.5386**		**4,795.8461**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0633	0.0411	0.5651	1.6700e-003	0.1677	1.2300e-003	0.1689	0.0445	1.1400e-003	0.0456		166.1105	166.1105	4.4700e-003		166.2222
Total	**0.0633**	**0.0411**	**0.5651**	**1.6700e-003**	**0.1677**	**1.2300e-003**	**0.1689**	**0.0445**	**1.1400e-003**	**0.0456**		**166.1105**	**166.1105**	**4.4700e-003**		**166.2222**

3.7 Architectural Coating - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	4.5238					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000

Off-Road	0.2422	1.6838	1.8314	2.9700e-003		0.1109	0.1109		0.1109	0.1109		281.4481	281.4481	0.0218		281.9928
Total	**4.7659**	**1.6838**	**1.8314**	**2.9700e-003**		**0.1109**	**0.1109**		**0.1109**	**0.1109**		**281.4481**	**281.4481**	**0.0218**		**281.9928**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1855	0.1247	1.6762	4.7100e-003	0.4583	3.4800e-003	0.4618	0.1215	3.2000e-003	0.1247		469.2112	469.2112	0.0135		469.5484
Total	**0.1855**	**0.1247**	**1.6762**	**4.7100e-003**	**0.4583**	**3.4800e-003**	**0.4618**	**0.1215**	**3.2000e-003**	**0.1247**		**469.2112**	**469.2112**	**0.0135**		**469.5484**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	4.5238					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2422	1.6838	1.8314	2.9700e-003		0.1109	0.1109		0.1109	0.1109	0.0000	281.4481	281.4481	0.0218		281.9928
Total	**4.7659**	**1.6838**	**1.8314**	**2.9700e-003**		**0.1109**	**0.1109**		**0.1109**	**0.1109**	**0.0000**	**281.4481**	**281.4481**	**0.0218**		**281.9928**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1855	0.1247	1.6762	4.7100e-003	0.4583	3.4800e-003	0.4618	0.1215	3.2000e-003	0.1247		469.2112	469.2112	0.0135		469.5484
Total	**0.1855**	**0.1247**	**1.6762**	**4.7100e-003**	**0.4583**	**3.4800e-003**	**0.4618**	**0.1215**	**3.2000e-003**	**0.1247**		**469.2112**	**469.2112**	**0.0135**		**469.5484**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Improve Pedestrian Network

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Parking Lot	0.00	0.00	0.00		

Unenclosed Parking with Elevator	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Parking Lot	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Unenclosed Parking with	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Parking Lot	0.549559	0.042893	0.201564	0.118533	0.015569	0.005846	0.021394	0.034255	0.002099	0.001828	0.004855	0.000709	0.000896
Unenclosed Parking with Elevator	0.549559	0.042893	0.201564	0.118533	0.015569	0.005846	0.021394	0.034255	0.002099	0.001828	0.004855	0.000709	0.000896

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Unenclosed Parking with	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Unenclosed Parking with	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	lb/day									lb/day					
Mitigated	0.2037	1.2100e-003	0.1320	1.0000e-005		4.7000e-004	4.7000e-004		4.7000e-004	4.7000e-004		0.2825	0.2825	7.5000e-004		0.3012
Unmitigated	0.2037	1.2100e-003	0.1320	1.0000e-005		4.7000e-004	4.7000e-004		4.7000e-004	4.7000e-004		0.2825	0.2825	7.5000e-004		0.3012

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0186					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.1729					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	0.0123	1.2100e-003	0.1320	1.0000e-005		4.7000e-004	4.7000e-004		4.7000e-004	4.7000e-004		0.2825	0.2825	7.5000e-004		0.3012
Total	**0.2037**	**1.2100e-003**	**0.1320**	**1.0000e-005**		**4.7000e-004**	**4.7000e-004**		**4.7000e-004**	**4.7000e-004**		**0.2825**	**0.2825**	**7.5000e-004**		**0.3012**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0186					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.1729					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	0.0123	1.2100e-003	0.1320	1.0000e-005		4.7000e-004	4.7000e-004		4.7000e-004	4.7000e-004		0.2825	0.2825	7.5000e-004		0.3012

Total	**0.2037**	**1.2100e-003**	**0.1320**	**1.0000e-005**		**4.7000e-004**	**4.7000e-004**		**4.7000e-004**	**4.7000e-004**		**0.2825**	**0.2825**	**7.5000e-004**		**0.3012**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

UCR Parking Structure 1

South Coast AQMD Air District, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Parking Lot	212.00	Space	2.59	113,000.00	0
Unenclosed Parking with Elevator	1,079.00	Space	2.30	375,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	31
Climate Zone	10			**Operational Year**	2022
Utility Company	Riverside Public Utilities				
CO2 Intensity (lb/MWhr)	1325.65	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Information from BOD and from UCR staff.

Construction Phase - Schedule adjusted to match anticipated project schedule.

Off-road Equipment - Based on Demolition construction equipment list. Dump trucks for hauling are accounted for in construction haul trips (see Trips and VMT).

Off-road Equipment -

Off-road Equipment - Equipment list adjusted to match grading equipment list provided by client.

Off-road Equipment - Adjusted to match building construction/underground infrastructure equipment list from UCR staff. Aerial lift is proxy for Pettibone handler, Off-
Highway Trucks are used for cement trucks (5-10 per day), pump is used for concrete pumper.

Off-road Equipment - Adjusted to match paving equipment list from UCR staff. Off-Highway trucks include 1-2 asphalt trucks and 1 concrete truck.

Off-road Equipment -

Grading - Based on grading plan estimate of 8,000 cy cut, and 7,000 cy used as fill.

Demolition - Based on demolition debris estimate from client.

Trips and VMT - Demolition haul trips adjusted based on information provided by UCR staff (estimated 329 trips not accounting for empty return trips). Demo haul
length adjusted based on estimate from client. Worker trips adjusted based on maximum number of workers anticipated to be on site (provided by UCR staff).

Architectural Coating - Assumed compliance with SCAQMD Rule 1113

Area Coating - Assumed compliance with SCAQMD Rule 1113

Construction Off-road Equipment Mitigation - Assumed compliance with SCAQMD Rule 403. Pursuant to MM 4.3-1(b) of the LRDP EIR, all off-road construction
equipment between January 1, 2012 - Dec. 31, 2014 shall meet Tier 3 standards, and all equipment post-January 1, 2015 shall meet Tier 4 standards where available.

Mobile Land Use Mitigation -

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Nonresidential_Exterior	100.00	50.00
tblArchitecturalCoating	EF_Nonresidential_Interior	100.00	50.00
tblArchitecturalCoating	EF_Parking	100.00	50.00
tblAreaCoating	Area_EF_Nonresidential_Exterior	100	50
tblAreaCoating	Area_EF_Nonresidential_Interior	100	50
tblAreaCoating	Area_EF_Parking	100	50
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
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tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstructionPhase	NumDays	18.00	15.00
tblConstructionPhase	NumDays	8.00	20.00
tblConstructionPhase	NumDays	18.00	20.00
tblConstructionPhase	PhaseEndDate	1/21/2021	12/30/2020
tblConstructionPhase	PhaseEndDate	12/2/2020	12/18/2020
tblConstructionPhase	PhaseEndDate	1/15/2020	1/31/2020
tblConstructionPhase	PhaseEndDate	12/28/2020	1/15/2021
tblConstructionPhase	PhaseStartDate	12/29/2020	12/10/2020
tblConstructionPhase	PhaseStartDate	1/16/2020	2/3/2020
tblConstructionPhase	PhaseStartDate	12/3/2020	12/21/2020
tblGrading	MaterialExported	0.00	1,000.00
tblLandUse	LandUseSquareFeet	84,800.00	113,000.00
tblLandUse	LandUseSquareFeet	431,600.00	375,000.00
tblLandUse	LotAcreage	1.91	2.59
tblLandUse	LotAcreage	9.71	2.30
tblOffRoadEquipment	HorsePower	63.00	110.00
tblOffRoadEquipment	LoadFactor	0.37	0.37
tblOffRoadEquipment	LoadFactor	0.31	0.31
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	OffRoadEquipmentType		Tractors/Loaders/Backhoes
tblOffRoadEquipment	OffRoadEquipmentType		Aerial Lifts
tblOffRoadEquipment	OffRoadEquipmentType		Off-Highway Trucks
tblOffRoadEquipment	OffRoadEquipmentType		Plate Compactors
tblOffRoadEquipment	OffRoadEquipmentType		Pumps

tblOffRoadEquipment	OffRoadEquipmentType		Off-Highway Trucks
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	UsageHours	8.00	0.00
tblOffRoadEquipment	UsageHours	6.00	8.00
tblOffRoadEquipment	UsageHours	7.00	8.00
tblOffRoadEquipment	UsageHours	6.00	8.00
tblTripsAndVMT	HaulingTripLength	20.00	10.00
tblTripsAndVMT	HaulingTripNumber	1,018.00	658.00
tblTripsAndVMT	WorkerTripNumber	205.00	150.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2019	4.4310	45.6399	22.7927	0.0400	18.2675	2.3919	20.6594	9.9840	2.2006	12.1846	0.0000	3,965.2909	3,965.2909	1.1979	0.0000	3,995.2379

2020	12.9909	78.2126	56.5776	0.1744	18.2675	2.9271	20.4664	9.9840	2.7215	12.0071	0.0000	17,098.8921	17,098.8921	4.1375	0.0000	17,202.3280
2021	2.8063	21.7028	17.6772	0.0507	0.1677	0.9144	1.0821	0.0445	0.8412	0.8857	0.0000	4,912.7305	4,912.7305	1.5428	0.0000	4,951.3004
Maximum	**12.9909**	**78.2126**	**56.5776**	**0.1744**	**18.2675**	**2.9271**	**20.6594**	**9.9840**	**2.7215**	**12.1846**	**0.0000**	**17,098.8921**	**17,098.8921**	**4.1375**	**0.0000**	**17,202.3280**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2019	4.4310	45.6399	22.7927	0.0400	8.3310	2.3919	10.7229	4.5222	2.2006	6.7227	0.0000	3,965.2909	3,965.2909	1.1979	0.0000	3,995.2379
2020	12.9909	78.2126	56.5776	0.1744	8.3310	2.9271	10.5300	4.5222	2.7215	6.5452	0.0000	17,098.8921	17,098.8921	4.1375	0.0000	17,202.3280
2021	2.8063	21.7028	17.6772	0.0507	0.1677	0.9144	1.0821	0.0445	0.8412	0.8857	0.0000	4,912.7305	4,912.7305	1.5428	0.0000	4,951.3004
Maximum	**12.9909**	**78.2126**	**56.5776**	**0.1744**	**8.3310**	**2.9271**	**10.7229**	**4.5222**	**2.7215**	**6.7227**	**0.0000**	**17,098.8921**	**17,098.8921**	**4.1375**	**0.0000**	**17,202.3280**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**54.15**	**0.00**	**47.08**	**54.58**	**0.00**	**43.56**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.2037	1.2100e-003	0.1320	1.0000e-005		4.7000e-004	4.7000e-004		4.7000e-004	4.7000e-004		0.2825	0.2825	7.5000e-004		0.3012
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.2037**	**1.2100e-003**	**0.1320**	**1.0000e-005**	**0.0000**	**4.7000e-004**	**4.7000e-004**	**0.0000**	**4.7000e-004**	**4.7000e-004**		**0.2825**	**0.2825**	**7.5000e-004**	**0.0000**	**0.3012**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.2037	1.2100e-003	0.1320	1.0000e-005		4.7000e-004	4.7000e-004		4.7000e-004	4.7000e-004		0.2825	0.2825	7.5000e-004		0.3012
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.2037**	**1.2100e-003**	**0.1320**	**1.0000e-005**	**0.0000**	**4.7000e-004**	**4.7000e-004**	**0.0000**	**4.7000e-004**	**4.7000e-004**		**0.2825**	**0.2825**	**7.5000e-004**	**0.0000**	**0.3012**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	12/2/2019	12/27/2019	5	20	
2	Site Preparation	Site Preparation	12/28/2019	1/3/2020	5	5	
3	Grading	Grading	1/4/2020	1/31/2020	5	20	
4	Building Construction	Building Construction	2/3/2020	12/18/2020	5	230	
5	Paving	Paving	12/21/2020	1/15/2021	5	20	
6	Architectural Coating	Architectural Coating	12/10/2020	12/30/2020	5	15	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 10

Acres of Paving: 4.89

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 29,280

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	6.00	78	0.48
Paving	Cement and Mortar Mixers	0	6.00	9	0.56
Demolition	Concrete/Industrial Saws	0	0.00	81	0.73
Demolition	Excavators	1	8.00	158	0.38
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	2	8.00	89	0.20
Grading	Excavators	0	8.00	158	0.38
Paving	Pavers	0	8.00	130	0.42
Paving	Rollers	2	8.00	80	0.38
Demolition	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Building Construction	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Building Construction	Generator Sets	0	8.00	84	0.74
Grading	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Paving	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Graders	1	8.00	187	0.41
Paving	Paving Equipment	1	8.00	132	0.36
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Building Construction	Welders	0	8.00	46	0.45
Demolition	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Building Construction	Aerial Lifts	1	8.00	110	0.31
Building Construction	Off-Highway Trucks	8	8.00	402	0.38
Building Construction	Plate Compactors	2	8.00	8	0.43
Building Construction	Pumps	1	8.00	84	0.74

Paving	Off-Highway Trucks	3	8.00	402	0.38

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	5	13.00	0.00	658.00	14.70	6.90	10.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	5	13.00	0.00	125.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	17	150.00	80.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	41.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Water Exposed Area

3.2 Demolition - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					11.0141	0.0000	11.0141	1.6676	0.0000	1.6676			0.0000			0.0000
Off-Road	2.0909	21.7400	14.4273	0.0230		1.1843	1.1843		1.0896	1.0896		2,275.4393	2,275.4393	0.7199		2,293.4374
Total	**2.0909**	**21.7400**	**14.4273**	**0.0230**	**11.0141**	**1.1843**	**12.1984**	**1.6676**	**1.0896**	**2.7572**		**2,275.4393**	**2,275.4393**	**0.7199**		**2,293.4374**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.1747	6.4541	1.2678	0.0143	0.2878	0.0195	0.3073	0.0789	0.0186	0.0975		1,540.4714	1,540.4714	0.1371		1,543.8976
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0693	0.0485	0.5270	1.4400e-003	0.1453	1.1300e-003	0.1464	0.0385	1.0400e-003	0.0396		143.6053	143.6053	4.4900e-003		143.7174
Total	**0.2440**	**6.5027**	**1.7948**	**0.0157**	**0.4331**	**0.0206**	**0.4537**	**0.1174**	**0.0197**	**0.1371**		**1,684.0766**	**1,684.0766**	**0.1415**		**1,687.6150**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					4.9563	0.0000	4.9563	0.7504	0.0000	0.7504			0.0000			0.0000
Off-Road	2.0909	21.7400	14.4273	0.0230		1.1843	1.1843		1.0896	1.0896	0.0000	2,275.4393	2,275.4393	0.7199		2,293.4374
Total	**2.0909**	**21.7400**	**14.4273**	**0.0230**	**4.9563**	**1.1843**	**6.1406**	**0.7504**	**1.0896**	**1.8400**	**0.0000**	**2,275.4393**	**2,275.4393**	**0.7199**		**2,293.4374**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.1747	6.4541	1.2678	0.0143	0.2878	0.0195	0.3073	0.0789	0.0186	0.0975		1,540.4714	1,540.4714	0.1371		1,543.8976

Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0693	0.0485	0.5270	1.4400e-003	0.1453	1.1300e-003	0.1464	0.0385	1.0400e-003	0.0396		143.6053	143.6053	4.4900e-003		143.7174
Total	**0.2440**	**6.5027**	**1.7948**	**0.0157**	**0.4331**	**0.0206**	**0.4537**	**0.1174**	**0.0197**	**0.1371**		**1,684.0766**	**1,684.0766**	**0.1415**		**1,687.6150**

3.3 Site Preparation - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					18.0663	0.0000	18.0663	9.9307	0.0000	9.9307			0.0000			0.0000
Off-Road	4.3350	45.5727	22.0630	0.0380		2.3904	2.3904		2.1991	2.1991		3,766.4529	3,766.4529	1.1917		3,796.2445
Total	**4.3350**	**45.5727**	**22.0630**	**0.0380**	**18.0663**	**2.3904**	**20.4566**	**9.9307**	**2.1991**	**12.1298**		**3,766.4529**	**3,766.4529**	**1.1917**		**3,796.2445**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0960	0.0672	0.7297	2.0000e-003	0.2012	1.5700e-003	0.2028	0.0534	1.4400e-003	0.0548		198.8380	198.8380	6.2100e-003		198.9933
Total	**0.0960**	**0.0672**	**0.7297**	**2.0000e-003**	**0.2012**	**1.5700e-003**	**0.2028**	**0.0534**	**1.4400e-003**	**0.0548**		**198.8380**	**198.8380**	**6.2100e-003**		**198.9933**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					8.1298	0.0000	8.1298	4.4688	0.0000	4.4688			0.0000			0.0000
Off-Road	4.3350	45.5727	22.0630	0.0380		2.3904	2.3904		2.1991	2.1991	0.0000	3,766.4529	3,766.4529	1.1917		3,796.2445
Total	**4.3350**	**45.5727**	**22.0630**	**0.0380**	**8.1298**	**2.3904**	**10.5202**	**4.4688**	**2.1991**	**6.6679**	**0.0000**	**3,766.4529**	**3,766.4529**	**1.1917**		**3,796.2445**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0960	0.0672	0.7297	2.0000e-003	0.2012	1.5700e-003	0.2028	0.0534	1.4400e-003	0.0548		198.8380	198.8380	6.2100e-003		198.9933
Total	**0.0960**	**0.0672**	**0.7297**	**2.0000e-003**	**0.2012**	**1.5700e-003**	**0.2028**	**0.0534**	**1.4400e-003**	**0.0548**		**198.8380**	**198.8380**	**6.2100e-003**		**198.9933**

3.3 Site Preparation - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					18.0663	0.0000	18.0663	9.9307	0.0000	9.9307			0.0000			0.0000

Off-Road	4.0765	42.4173	21.5136	0.0380		2.1974	2.1974		2.0216	2.0216		3,685.1016	3,685.1016	1.1918		3,714.8975
Total	**4.0765**	**42.4173**	**21.5136**	**0.0380**	**18.0663**	**2.1974**	**20.2637**	**9.9307**	**2.0216**	**11.9523**		**3,685.1016**	**3,685.1016**	**1.1918**		**3,714.8975**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0888	0.0599	0.6626	1.9300e-003	0.2012	1.5300e-003	0.2027	0.0534	1.4100e-003	0.0548		192.6657	192.6657	5.5300e-003		192.8038
Total	**0.0888**	**0.0599**	**0.6626**	**1.9300e-003**	**0.2012**	**1.5300e-003**	**0.2027**	**0.0534**	**1.4100e-003**	**0.0548**		**192.6657**	**192.6657**	**5.5300e-003**		**192.8038**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					8.1298	0.0000	8.1298	4.4688	0.0000	4.4688			0.0000			0.0000
Off-Road	4.0765	42.4173	21.5136	0.0380		2.1974	2.1974		2.0216	2.0216	0.0000	3,685.1016	3,685.1016	1.1918		3,714.8975
Total	**4.0765**	**42.4173**	**21.5136**	**0.0380**	**8.1298**	**2.1974**	**10.3272**	**4.4688**	**2.0216**	**6.4904**	**0.0000**	**3,685.1016**	**3,685.1016**	**1.1918**		**3,714.8975**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0888	0.0599	0.6626	1.9300e-003	0.2012	1.5300e-003	0.2027	0.0534	1.4100e-003	0.0548		192.6657	192.6657	5.5300e-003		192.8038
Total	**0.0888**	**0.0599**	**0.6626**	**1.9300e-003**	**0.2012**	**1.5300e-003**	**0.2027**	**0.0534**	**1.4100e-003**	**0.0548**		**192.6657**	**192.6657**	**5.5300e-003**		**192.8038**

3.4 Grading - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.5580	0.0000	6.5580	3.3683	0.0000	3.3683			0.0000			0.0000
Off-Road	2.1838	23.9732	12.7852	0.0245		1.1566	1.1566		1.0640	1.0640		2,372.3667	2,372.3667	0.7673		2,391.5485
Total	**2.1838**	**23.9732**	**12.7852**	**0.0245**	**6.5580**	**1.1566**	**7.7146**	**3.3683**	**1.0640**	**4.4324**		**2,372.3667**	**2,372.3667**	**0.7673**		**2,391.5485**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0488	1.7227	0.3643	4.7600e-003	0.1092	5.5700e-003	0.1148	0.0299	5.3300e-003	0.0353		514.3113	514.3113	0.0367		515.2284

Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0642	0.0433	0.4785	1.4000e-003	0.1453	1.1000e-003	0.1464	0.0385	1.0200e-003	0.0396		139.1474	139.1474	3.9900e-003		139.2472
Total	**0.1130**	**1.7660**	**0.8428**	**6.1600e-003**	**0.2545**	**6.6700e-003**	**0.2612**	**0.0685**	**6.3500e-003**	**0.0748**		**653.4587**	**653.4587**	**0.0407**		**654.4757**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.9511	0.0000	2.9511	1.5158	0.0000	1.5158			0.0000			0.0000
Off-Road	2.1838	23.9732	12.7852	0.0245		1.1566	1.1566		1.0640	1.0640	0.0000	2,372.3667	2,372.3667	0.7673		2,391.5485
Total	**2.1838**	**23.9732**	**12.7852**	**0.0245**	**2.9511**	**1.1566**	**4.1077**	**1.5158**	**1.0640**	**2.5798**	**0.0000**	**2,372.3667**	**2,372.3667**	**0.7673**		**2,391.5485**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0488	1.7227	0.3643	4.7600e-003	0.1092	5.5700e-003	0.1148	0.0299	5.3300e-003	0.0353		514.3113	514.3113	0.0367		515.2284
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0642	0.0433	0.4785	1.4000e-003	0.1453	1.1000e-003	0.1464	0.0385	1.0200e-003	0.0396		139.1474	139.1474	3.9900e-003		139.2472
Total	**0.1130**	**1.7660**	**0.8428**	**6.1600e-003**	**0.2545**	**6.6700e-003**	**0.2612**	**0.0685**	**6.3500e-003**	**0.0748**		**653.4587**	**653.4587**	**0.0407**		**654.4757**

3.5 Building Construction - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	7.0073	67.5066	45.4871	0.1310		2.7577	2.7577		2.5553	2.5553		12,640.9445	12,640.9445	3.9090		12,738.6687
Total	**7.0073**	**67.5066**	**45.4871**	**0.1310**		**2.7577**	**2.7577**		**2.5553**	**2.5553**		**12,640.9445**	**12,640.9445**	**3.9090**		**12,738.6687**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.2752	8.3861	2.2287	0.0200	0.5120	0.0422	0.5542	0.1474	0.0404	0.1878		2,132.1025	2,132.1025	0.1481		2,135.8037
Worker	0.7402	0.4995	5.5213	0.0161	1.6767	0.0127	1.6894	0.4447	0.0117	0.4564		1,605.5474	1,605.5474	0.0461		1,606.6986
Total	**1.0154**	**8.8856**	**7.7500**	**0.0361**	**2.1887**	**0.0549**	**2.2436**	**0.5921**	**0.0521**	**0.6442**		**3,737.6499**	**3,737.6499**	**0.1941**		**3,742.5022**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	7.0073	67.5066	45.4871	0.1310		2.7577	2.7577		2.5553	2.5553	0.0000	12,640.9445	12,640.9445	3.9090		12,738.6687

Total	**7.0073**	**67.5066**	**45.4871**	**0.1310**		**2.7577**	**2.7577**		**2.5553**	**2.5553**	**0.0000**	**12,640.9445**	**12,640.9445**	**3.9090**		**12,738.6687**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.2752	8.3861	2.2287	0.0200	0.5120	0.0422	0.5542	0.1474	0.0404	0.1878		2,132.1025	2,132.1025	0.1481		2,135.8037
Worker	0.7402	0.4995	5.5213	0.0161	1.6767	0.0127	1.6894	0.4447	0.0117	0.4564		1,605.5474	1,605.5474	0.0461		1,606.6986
Total	**1.0154**	**8.8856**	**7.7500**	**0.0361**	**2.1887**	**0.0549**	**2.2436**	**0.5921**	**0.0521**	**0.6442**		**3,737.6499**	**3,737.6499**	**0.1941**		**3,742.5022**

3.6 Paving - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.6230	25.3667	17.8086	0.0491		1.0670	1.0670		0.9816	0.9816		4,757.7064	4,757.7064	1.5387		4,796.1748
Paving	0.3393					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**2.9623**	**25.3667**	**17.8086**	**0.0491**		**1.0670**	**1.0670**		**0.9816**	**0.9816**		**4,757.7064**	**4,757.7064**	**1.5387**		**4,796.1748**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0740	0.0500	0.5521	1.6100e-003	0.1677	1.2700e-003	0.1689	0.0445	1.1700e-003	0.0456		160.5547	160.5547	4.6000e-003		160.6699
Total	**0.0740**	**0.0500**	**0.5521**	**1.6100e-003**	**0.1677**	**1.2700e-003**	**0.1689**	**0.0445**	**1.1700e-003**	**0.0456**		**160.5547**	**160.5547**	**4.6000e-003**		**160.6699**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.6230	25.3667	17.8086	0.0491		1.0670	1.0670		0.9816	0.9816	0.0000	4,757.7064	4,757.7064	1.5387		4,796.1748
Paving	0.3393					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**2.9623**	**25.3667**	**17.8086**	**0.0491**		**1.0670**	**1.0670**		**0.9816**	**0.9816**	**0.0000**	**4,757.7064**	**4,757.7064**	**1.5387**		**4,796.1748**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0740	0.0500	0.5521	1.6100e-003	0.1677	1.2700e-003	0.1689	0.0445	1.1700e-003	0.0456		160.5547	160.5547	4.6000e-003		160.6699
Total	**0.0740**	**0.0500**	**0.5521**	**1.6100e-003**	**0.1677**	**1.2700e-003**	**0.1689**	**0.0445**	**1.1700e-003**	**0.0456**		**160.5547**	**160.5547**	**4.6000e-003**		**160.6699**

3.6 Paving - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.3978	21.6578	17.1694	0.0491		0.9132	0.9132		0.8401	0.8401		4,757.3803	4,757.3803	1.5386		4,795.8461
Paving	0.3393					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**2.7371**	**21.6578**	**17.1694**	**0.0491**		**0.9132**	**0.9132**		**0.8401**	**0.8401**		**4,757.3803**	**4,757.3803**	**1.5386**		**4,795.8461**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0692	0.0450	0.5078	1.5600e-003	0.1677	1.2300e-003	0.1689	0.0445	1.1400e-003	0.0456		155.3502	155.3502	4.1600e-003		155.4543
Total	**0.0692**	**0.0450**	**0.5078**	**1.5600e-003**	**0.1677**	**1.2300e-003**	**0.1689**	**0.0445**	**1.1400e-003**	**0.0456**		**155.3502**	**155.3502**	**4.1600e-003**		**155.4543**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.3978	21.6578	17.1694	0.0491		0.9132	0.9132		0.8401	0.8401	0.0000	4,757.3803	4,757.3803	1.5386		4,795.8461
Paving	0.3393					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**2.7371**	**21.6578**	**17.1694**	**0.0491**		**0.9132**	**0.9132**		**0.8401**	**0.8401**	**0.0000**	**4,757.3803**	**4,757.3803**	**1.5386**		**4,795.8461**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0692	0.0450	0.5078	1.5600e-003	0.1677	1.2300e-003	0.1689	0.0445	1.1400e-003	0.0456		155.3502	155.3502	4.1600e-003		155.4543
Total	**0.0692**	**0.0450**	**0.5078**	**1.5600e-003**	**0.1677**	**1.2300e-003**	**0.1689**	**0.0445**	**1.1400e-003**	**0.0456**		**155.3502**	**155.3502**	**4.1600e-003**		**155.4543**

3.7 Architectural Coating - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	4.5238					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000

Off-Road	0.2422	1.6838	1.8314	2.9700e-003		0.1109	0.1109		0.1109	0.1109		281.4481	281.4481	0.0218		281.9928
Total	**4.7659**	**1.6838**	**1.8314**	**2.9700e-003**		**0.1109**	**0.1109**		**0.1109**	**0.1109**		**281.4481**	**281.4481**	**0.0218**		**281.9928**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.2023	0.1365	1.5092	4.4000e-003	0.4583	3.4800e-003	0.4618	0.1215	3.2000e-003	0.1247		438.8496	438.8496	0.0126		439.1643
Total	**0.2023**	**0.1365**	**1.5092**	**4.4000e-003**	**0.4583**	**3.4800e-003**	**0.4618**	**0.1215**	**3.2000e-003**	**0.1247**		**438.8496**	**438.8496**	**0.0126**		**439.1643**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	4.5238					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2422	1.6838	1.8314	2.9700e-003		0.1109	0.1109		0.1109	0.1109	0.0000	281.4481	281.4481	0.0218		281.9928
Total	**4.7659**	**1.6838**	**1.8314**	**2.9700e-003**		**0.1109**	**0.1109**		**0.1109**	**0.1109**	**0.0000**	**281.4481**	**281.4481**	**0.0218**		**281.9928**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.2023	0.1365	1.5092	4.4000e-003	0.4583	3.4800e-003	0.4618	0.1215	3.2000e-003	0.1247		438.8496	438.8496	0.0126		439.1643
Total	**0.2023**	**0.1365**	**1.5092**	**4.4000e-003**	**0.4583**	**3.4800e-003**	**0.4618**	**0.1215**	**3.2000e-003**	**0.1247**		**438.8496**	**438.8496**	**0.0126**		**439.1643**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Improve Pedestrian Network

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Parking Lot	0.00	0.00	0.00		

Unenclosed Parking with Elevator	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Parking Lot	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Unenclosed Parking with	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Parking Lot	0.549559	0.042893	0.201564	0.118533	0.015569	0.005846	0.021394	0.034255	0.002099	0.001828	0.004855	0.000709	0.000896
Unenclosed Parking with Elevator	0.549559	0.042893	0.201564	0.118533	0.015569	0.005846	0.021394	0.034255	0.002099	0.001828	0.004855	0.000709	0.000896

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Unenclosed Parking with	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Unenclosed Parking with	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	lb/day										lb/day					
Mitigated	0.2037	1.2100e-003	0.1320	1.0000e-005		4.7000e-004	4.7000e-004		4.7000e-004	4.7000e-004		0.2825	0.2825	7.5000e-004		0.3012
Unmitigated	0.2037	1.2100e-003	0.1320	1.0000e-005		4.7000e-004	4.7000e-004		4.7000e-004	4.7000e-004		0.2825	0.2825	7.5000e-004		0.3012

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0186					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.1729					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	0.0123	1.2100e-003	0.1320	1.0000e-005		4.7000e-004	4.7000e-004		4.7000e-004	4.7000e-004		0.2825	0.2825	7.5000e-004		0.3012
Total	**0.2037**	**1.2100e-003**	**0.1320**	**1.0000e-005**		**4.7000e-004**	**4.7000e-004**		**4.7000e-004**	**4.7000e-004**		**0.2825**	**0.2825**	**7.5000e-004**		**0.3012**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0186					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.1729					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	0.0123	1.2100e-003	0.1320	1.0000e-005		4.7000e-004	4.7000e-004		4.7000e-004	4.7000e-004		0.2825	0.2825	7.5000e-004		0.3012

Total	**0.2037**	**1.2100e-003**	**0.1320**	**1.0000e-005**		**4.7000e-004**	**4.7000e-004**		**4.7000e-004**	**4.7000e-004**		**0.2825**	**0.2825**	**7.5000e-004**		**0.3012**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Appendix C

Geology and Soils Report

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April 30, 2019

Project No. 18-4232

Mr. Dave Bomba
University of California Riverside
1223 University Avenue Ste. 240
Riverside, CA 92507

Subject: ***Preliminary Geotechnical Investigation for the Proposed Parking Structure in Lot 13, Big Springs Road, University of California Riverside, County of Riverside, California***

Inland Engineering Technologies, Inc. (IET) is pleased to submit herewith IET's preliminary geotechnical investigation report for the proposed parking structure in Lot 13, Big Springs Road, University of California Riverside, County of Riverside, California. This report presents the results of IET's field investigation, laboratory testing and IET's engineering judgment, opinions, conclusions, and suggestions pertaining to the geotechnical design aspects of the proposed development.

It has been a pleasure to be of service to you on this project. Should you have any questions regarding the content of this report or should you require additional information, please do not hesitate to contact this office at your earliest convenience.

Respectfully submitted,

INLAND ENGINEERING TECHNOLOGIES, INC.

James Worley
President

Yogi Pirathapan, GE 2834
Geotechnical Engineer

PIRATHAPAN YOGESWARAN
2834
EXP 9/19

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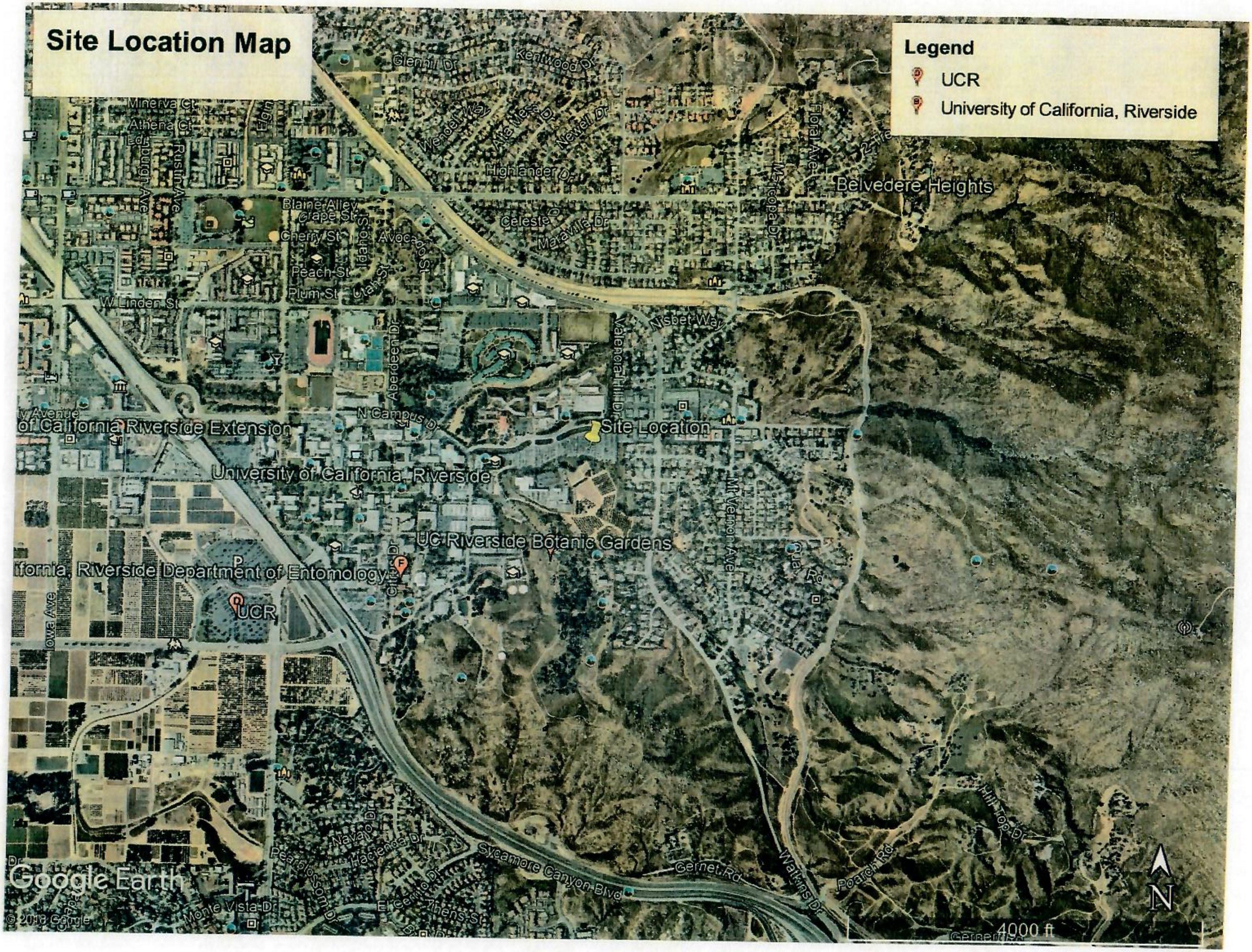

1.0 INTRODUCTION

1.1 Purpose and Scope of Services

The main purpose of the subsurface investigation was to evaluate the pertinent geotechnical conditions at the site and to provide geotechnical design criteria for grading construction, foundation design, and other relevant aspects relative to the proposed development of the site. This report presents the results of the geotechnical investigation for the proposed development.

IET's scope of services included:

- Review of previous geotechnical reports and geologic maps pertinent to the site (Appendix A).
- A subsurface investigation including the excavation, sampling, and logging of five (5) borings and (3) additional exploratory borings for proposed lot lights. Logs of the borings are presented in Appendix B, and its approximate location is depicted on Figure 2. The borings were excavated to evaluate the general characteristics of the subsurface conditions on the site including classification of site soils, determination of depth to groundwater, and to obtain representative soil samples.
- Geologic mapping of the site.
- Laboratory testing of representative soil samples obtained during the subsurface investigation (Appendix C).
- Liquefaction analysis and seismic-induced settlement (Appendix D).
- Engineering and geologic analysis of the data with respect to the proposed development.
- Preparation of this report presenting IET's findings, conclusions and preliminary geotechnical suggestions for the proposed development.

1.2 Location and Site Description

The subject site is in Lot 13 on Big Springs Road, University of California Riverside, County of Riverside, California. The general location of the site is shown on Figure 1 – Site Location Map. The subject site is currently occupied with an existing parking lot.

1.3 Proposed Development

No preliminary plans were available for IET's review at the time this report was prepared. It is IET's understanding that the proposed parking structure will be a four-story, concrete structure; the proposed structure will be supported by spread footings.

1.4 Subsurface Investigation

IET's subsurface investigation was performed on December 14, 2018 which consisted of five (5) approximately 8-inch diameter borings to a depth of approximately 38 feet below existing ground surface. IET's attempt to advance the deepest boring down to at least 50 feet encountered refusal. On April 25. 2019 (3) additional exploratory borings were advanced for suggestions for proposed lot light foundations. The boring locations were coordinated on the site in order to avoid potential underground conflicts and to accommodate rig accessibility. Prior to the subsurface work, an underground utilities clearance was obtained from a representative from University of California Riverside. The approximate boring locations are shown on Figure 2- Boring Location Map. At the conclusion of the subsurface investigation, the borings were backfilled with native materials. Minor settlement of the backfill soils may occur over time.

During the subsurface investigation, representative bulk samples were retained for laboratory testing. Laboratory testing was performed on representative soil samples and included in-situ density and moisture content, #200 wash, direct shear, soluble Sulfates, resistivity, pH, and Chloride content. A discussion of the tests performed and a summary of the results are presented in Appendix C.

2.0 GEOTECHNICAL CONDITIONS

2.1 Local Geology and Soil Conditions

The earth materials on the site are primarily comprised of top soil and quaternary axial channel deposits. A general description of the earth materials observed on the site is provided in the following paragraphs:

- Top Soil: Top soil was encountered in the upper 1 foot below the existing surface. This material generally consists of light to dark brown, moist, very dense, fine grained silty sand with gravel.
- Quaternary Axial Channel Deposits (Qya): Quaternary axial channel deposits were encountered below the top soil to the maximum explored depth of approximately 38 feet below ground surface. This alluvial unit consists predominantly of light to dark brown, dry to moist, very dense fine-grained silty sand with gravel.

2.2 Groundwater

No groundwater was encountered in the current subsurface investigation up to approximately 38 feet below ground surface. Based on a review of the data from nearby DWR well within 2½ miles, it appeared that groundwater could be more than 50 feet below ground surface.

2.3 Liquefaction

Liquefaction is a seismic phenomenon in which loose, saturated, granular soils behave similarly to a fluid when subject to high-intensity ground shaking. Liquefaction occurs when three general conditions exist: 1) shallow groundwater; 2) low density non-cohesive (granular) soils; and 3) high-intensity ground motion. Studies indicate that saturated, loose to medium dense, near surface cohesionless soils exhibit the highest liquefaction potential, while dry, dense, cohesionless soils and cohesive soils exhibit low to negligible liquefaction potential.

Due to the absence of groundwater in the upper 35 feet and the dense nature of onsite soils below approximately 35 feet, the potential for liquefaction at the site is nil.

2.4 Seismic Induced Settlement

Seismic-induced settlement of dry sand can occur as the sand particles tend to settle and densify as a result of a seismic event. Seismically-induced dry sand settlement calculations were performed considering a Peak Ground Acceleration (PGAm) of 0.0.583g. PGAm was derived in accordance with the 2016 CBC. A dry sand settlement of approximately 1-inch is estimated for the design conditions. We estimated these settlements based on the procedures proposed by Tokimatsu and Seed (1987) and in accordance with *Recommended Procedures for Implementation of DMG Special Publication 117, Guidelines for Analyzing and Mitigating Liquefaction in California*. The calculations are attached in Appendix D.

For design purposes differential settlement may be assumed to be approximately one-half of the total settlement. Based on the above, the estimated differential settlement that may be considered in site development is approximately ½-inch over a span of 30 feet.

2.5 Seismic Design Parameters

The seismic design parameters were determined based on the 2016 CBC. A site coordinate of 33.97491° N, 117.31850° W was used to derive the seismic parameters presented below.

Table 1- Seismic Design Parameters

Seismic Soil Parameters	
Site Class Definition	D
Mapped Spectral Response Acceleration Parameter Ss	1.504
Mapped Spectral Response Acceleration Parameter, S_1	0.633
Site Coefficient Fa	1.0
Site Coefficient F_v	1.5
Adjusted Maximum Considered Earthquake (MCE) Spectral Response Acceleration Parameter S_{MS}	1.504
Adjusted Maximum Considered Earthquake (MCE) Spectral Response Acceleration Parameter S_{M1}	0.949
Design Spectral Response Acceleration Parameter, S_{DS}	1.003
Design Spectral Response Acceleration Parameter, S_{D1}	0.633

2.6 Slope Stability

No slopes more than 30 feet in height and steeper than 2:1 (h:v) in inclination is anticipated, therefore, slope stability is not necessary at this time.

2.7 Laboratory Testing

Laboratory tests were performed on representative samples obtained from the borings and included in-situ density and moisture content, #200wash, direct shear, soluble Sulfates, resistivity, pH, and Chloride content. A discussion of the tests performed, and a summary of the results are presented in Appendix C.

3.0 CONCLUSIONS

Based on the results of the geotechnical investigation, it is IET's opinion that the proposed development is feasible from a geotechnical standpoint, provided the conclusions and geotechnical suggestions contained in this report are considered and incorporated into the project design process. The following is a summary of the primary geotechnical factors determined from the geotechnical investigation.

- Based on IET's subsurface exploration and review of pertinent geologic maps and reports, the site is underlain by top soil and quaternary axial channel deposits.
- Groundwater is not considered a constraint for the proposed development.
- Based on the review of the data, field exploration, and liquefaction analysis, the site has nil potential for liquefaction.
- From a geotechnical perspective, the existing onsite soils appear to be suitable material for use as fill, provided they are relatively free from rocks (larger than 8 inches in maximum dimension), construction debris, and organic material.
- It is anticipated that the onsite soils may be excavated with conventional heavy-duty construction equipment.

4.0 GEOTECHNICAL SUGGESTIONS

4.1 Site Earthwork

IET anticipates that earthwork at the site will consist of site preparation and remedial grading followed by construction of slab-on-grade type foundations. All earthwork and grading should be performed in accordance with all applicable requirements of the appropriate reviewing agency.

4.1.1 Site Preparation

Vegetation and debris should be removed and properly disposed of offsite. All debris from the proposed demolition activities at the site should be removed and properly disposed of offsite. Areas to receive fill and/or other surface improvements should be scarified to a minimum depth of 6 inches, brought to a near-optimum moisture condition, and recompacted to at least 90 percent relative compaction (based on ASTM D1557).

4.1.2 Removal and Recompaction

Compressible materials not removed by the planned grading should be excavated to competent material and replaced with compacted fill soils. In the parking structure footprint at least the upper 5 feet below the existing grade or 3 feet below the proposed footings bottom, whichever is deeper, should be removed and replaced as compacted fill. The removal and recompaction should be extended to at least 5 feet outside the building footprint.

In the pavement area the upper 1 foot should be removed and recompacted. Localized, deeper removals should be anticipated where deemed necessary by the geotechnical consultant based on observations during grading.

4.1.3 Import Soils for Grading

In the event import soils are needed to achieve final design grades, all potential import materials should be free of deleterious/oversize materials (greater than 6 inches in dimension), non-expansive, and approved by the project geotechnical consultant prior to commencement of delivery onsite.

4.1.4 Temporary Stability of Removal Excavations

All excavations for the proposed development should be performed in accordance with current OSHA (Occupational Safety and Health Agency) regulations and those of other regulatory agencies, as appropriate.

Temporary excavations maybe cut vertically up to four feet. Excavations over four feet should be slot-cut, shored, or cut to a 1H:1V (horizontal, H: vertical, V) slope gradient. Surface water should be diverted away from the exposed cut, and not be allowed to pond on top of the excavations. Temporary cuts should not be left open for an extended period of time.

4.1.5 Fill Placement and Compaction

Areas prepared to receive structural fill and/or other surface improvements should be scarified to a minimum depth of 6 inches, brought to at least optimum-moisture content, and recompacted to at least 95 percent relative compaction (based on ASTM Test Method D1557). The optimum lift thickness to produce a uniformly compacted fill will depend on the type and size of compaction equipment used. In general, fill should be placed in uniform lifts generally not exceeding 8 inches in compacted thickness. Placement and compaction of fill should be performed in accordance with local grading ordinances under the observation and testing of the geotechnical consultant.

4.1.6 Trench Backfill and Compaction

The onsite soils may generally be suitable as trench backfill provided, they are screened of rocks and other material over 6 inches in diameter and organic matter. Trench backfill should be compacted in uniform lifts (generally not exceeding 8 inches in compacted thickness) by mechanical means to at least 90 percent relative compaction (per ASTM Test Method D1557).

If trenches are shallow and the use of conventional equipment may result in damage to the utilities; clean sand, having sand equivalent (SE) of 30 or greater, should be used to bed and shade the utilities. Sand backfill should be densified. The densification may be accomplished by jetting or flooding and then tamping to ensure adequate compaction. A representative from IET should observe, probe, and test the backfill to verify compliance with the project specifications.

4.2 Foundation Selection

Preliminary suggestions for conventional foundation design and construction are presented herein. When the final structural loads for the proposed structures are known they should be provided to IET's office to verify the suggestions presented herein.

The information and suggestions presented in this section are not meant to supersede design by the project structural engineer or civil engineer specializing in the structural design nor a corrosion consultant.

4.2.1 Conventional Foundations

The proposed footings may be founded at a minimum depth of 24-inch. Shallow foundations may be designed for a maximum allowable bearing capacity of 4,000psf for 24-inch square footings with a minimum of 24 inches embedment into certified compacted fill. The bearing capacity value may be increased by 1/3 for wind load and seismic load. A factor of safety greater than 3 was used in evaluating the above bearing capacity values. The bearing capacities should be re-evaluated when loads and footing sizes have been finalized.

Lateral forces on footings may be resisted by passive earth resistance and friction at the bottom of the footing. Foundations may be designed for a coefficient of friction of 0.40, and a passive earth pressure of 250psf/ft. The passive earth pressure incorporates a factor of safety of about 1.5. When combining passive and friction forces, passive resistance should be reduced by 1/3.

All footing excavations should be cut square and level, and should be free of sloughed materials.

4.2.2 Parking Lot Light Pole Foundations

It is IET's understanding that caissons are proposed to support parking lot light poles. The proposed caissons should be embedded to at least 8 feet below the design grade. A passive lateral earth pressure of 250psf/ft may be used in the design of the proposed caissons. The lateral earth pressure incorporates a factor of safety of about 1.5. A triangular lateral earth pressure distribution may be assumed and the lateral earth pressure should be limited to a maximum value of 4,500psf. A one-third increase in the passive pressure may be used for short loading such as wind or seismic loads. The upper 2 feet immediately below the finished grade should be ignored when determining the passive lateral resistance, unless the top surface is covered with concrete. An end bearing value of approximately 3,500psf may be used. The end bearing value incorporates a factor of safety of about 3.

4.3 Building Floor Slabs

As a minimum, 5-inch thick slab reinforced with #4 bars, 18-inch on center, both ways, is recommended. Interior floor slabs with moisture sensitive floor coverings should be underlain by a 10-mil thick moisture/vapor barrier to help reduce the upward migration of moisture from the underlying subgrade soils. The moisture/vapor barrier product used should meet the performance standards of an ASTM E 1745 Class A material, and be properly installed in accordance with ACI publication 302. It is the responsibility of the contractor to ensure that the moisture/vapor barrier systems are placed in accordance with the project plans and specifications, and that the moisture/vapor retarder materials are free of tears and punctures prior to concrete placement. Additional moisture reduction and/or prevention measures may be needed, depending on the performance requirements of future interior floor coverings.

Sand layer requirements are the purview of the structural engineer, and should be provided in accordance with ACI Publication 302 "Guide for Concrete Floor and Slab Construction". Ultimately, the design of the moisture retarder system and recommendations for concrete placement and curing are the purview of the foundation engineer, in consideration of the project requirements provided by the architect and developer.

Prior to placing concrete, the subgrade soils of the floor slab should be pre-watered to achieve a moisture content that is at least equal or slightly greater than optimum moisture content. This moisture content should penetrate to a minimum depth of 12 inches into the subgrade soils.

4.4 ***Pavement Suggestions***

R-value testing (per CTM 301) on a representative sample showed an R-value of 63. For design purposes, IET used an R-value of 50. The pavement recommendations presented here is based on a Traffic Index (TI) of 5.0 and an R-value of 50 for the proposed parking lot entrance on the northeast corner. For asphaltic concrete pavement, 3 inches of asphaltic concrete over 4 inches is suggested.

Subgrade soils immediately below the aggregate base (base) should be compacted to a minimum of 90 percent relative compaction based on ASTM D1557 to a minimum depth of 12 inches. Final subgrade compaction should be performed prior to placing base or asphaltic concrete and after all utility trench backfills have been compacted and tested.

Base materials should consist of Class 2 aggregate base conforming to Section 26-1.02B of the State of California Standard Specifications or crushed aggregate base conforming to Section 200-2 of the Standard Specifications for Public Works Construction (Greenbook). Base materials should be compacted to a minimum of 95 percent relative compaction based on ASTM D1557. The base materials should be at or slightly below optimum moisture content when compacted. Asphaltic concrete materials and construction should conform to Section 203 of the Greenbook.

4.5 ***Erosion Protection of Slopes***

The southern slopes on the parking lot should be maintained at a gradient of 2:1(h:v) or flatter and be hydroseeded to minimize erosion. In-lieu of hydroseeding, erosion resistance vegetation or placement of jute matting/wattles may be considered. Proper slope irrigation practice is important to minimize erosion. V-ditches and swales should be constructed on the slope as necessary. Root balls of any dead trees (if any) should not be allowed and be removed completely and replaced with compacted fill.

4.6 ***Structural Setbacks***

Structural setbacks, in addition to those required per the 2016 CBC are not required due to geologic or geotechnical conditions within the site.

4.7 ***Corrosivity to Concrete and Metal***

Corrosivity testing should be performed at the completion of the grading. As a minimum, corrosivity testing should include soluble Sulfate content, Chloride content, minimum resistivity, and pH. IET is not a corrosion-engineering firm.
In general, soil environments that are detrimental to concrete have high concentrations of soluble sulfates and/or pH values of less than 5.5. ACI 318R-05 Table 4.3.1 provides specific guidelines for the concrete mix design based on different amount of soluble sulfate content. The minimum amount of chloride ions in the soil environment that are corrosive to steel, either in the form of reinforcement protected by concrete cover, or plain steel substructures such as steel pipes or piles, is 500 ppm per California Test 422. Corrosion testing was performed on selected samples and test results are provided in Appendix C.

Based on testing performed during this investigation within the project site, the onsite soils are classified as having a <u>negligible</u> sulfate exposure condition in accordance with ACI 318R-05 Table 4.3.1. The onsite soils should be considered to have moderate Chloride exposure. The onsite soils are also moderately corrosive to buried metals due to high resistivity. The onsite soils should be mitigated for corrosion. Despite the minimum suggestions above, IET is not a corrosion-engineering firm. Therefore, if necessary, a corrosion engineer should be consulted.

4.8 Control of Surface Water and Drainage Control

Positive drainage of surface water away from structures is very important. No water should be allowed to pond adjacent to structures. Positive drainage may be accomplished by providing drainage away from structures at a gradient of at least 2 percent for a distance of at least 5 feet, and further maintained by a swale or drainage path at a gradient of at least 1 percent. Where necessary, drainage paths may be shortened by use of area drains and collector pipes.

Planters with open bottoms adjacent to structures should be avoided. Planters should not be designed adjacent to structures unless provisions for drainage, such as catch basins, liners, and/or area drains, are made. Over watering must be avoided.

4.9 Slope Landscaping and Maintenance

Adequate slope and pad drainage facilities are essential in the design of the finish grading for the subject site. The overall stability of graded slopes should not be adversely affected provided all drainage provisions are properly constructed and maintained thereafter and provided all engineered slopes are landscaped with a deep rooted, drought tolerant and maintenance free plant species, as recommended by the project landscape architect.

4.10 Future Plan Reviews, Construction Observation and Testing

Future plan reviews are necessary to ensure that geotechnical suggestions and conclusions from Inland Engineering Technologies, Inc. feasibility and preliminary studies have been incorporated into the plans. Modifications to the plan may arise from IET's review therefore IET's review should be performed as soon as practical. Such reviews should include, but are not limited to:

- Foundation Plans
- Storm Drain/Sewer/Water/Dry Utility Plans

Plans should be forwarded to the project geotechnical engineer and/or engineering geologist for review and comments, as deemed necessary. In addition, the grading plan should reference the approved soils report and indicate that all grading shall be performed as recommended by the approved report.

The geotechnical suggestions provided in this report are based on limited subsurface observations and geotechnical analysis. The interpolated subsurface conditions should be checked in the field during construction by a representative of IET.

Construction observation and testing should also be performed by the geotechnical consultant during future grading, excavations, backfill of utility trenches, preparation of pavement subgrade and placement of aggregate base, foundation or retaining wall construction or when an unusual soil condition is encountered at the site. Grading plans, foundation plans, and final project drawings should be reviewed by this office prior to construction.

5.0 LIMITATIONS

IET's services were performed using the degree of care and skill ordinarily exercised, under similar circumstances, by reputable engineers and geologists practicing in this or similar localities. No other warranty, expressed or implied, is made as to the conclusions and professional advice included in this report. The samples taken and submitted for laboratory testing, the observations made and the in-situ field testing performed are believed representative of the entire project; however, soil and geologic conditions revealed by excavation may be different than IET's preliminary findings. If this occurs, the changed conditions must be evaluated by the project soils engineer and geologist and design(s) adjusted as required or alternate design(s) suggested.

This report is issued with the understanding that it is the responsibility of the owner, or of his/her representative, to ensure that the information and geotechnical suggestions contained herein are brought to the attention of the architect and/or project engineer and incorporated into the plans, and the necessary steps are taken to see that the contractor and/or subcontractor properly implements the geotechnical suggestions in the field. The contractor and/or subcontractor should notify the owner if they consider any of the suggestions presented herein to be unsafe.

The findings of this report are valid as of the present date. However, changes in the conditions of a property can and do occur with the passage of time, whether they be due to natural processes or the works of man on this or adjacent properties.

In addition, changes in applicable or appropriate standards may occur, whether they result from legislation or the broadening of knowledge. Accordingly, the findings of this report may be invalidated wholly or partially by changes outside IET's control.

<u>APPENDIX A</u>

REFERENCES

APPENDIX A

References

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APPENDIX B

FIELD EXPLORATION

APPENDIX B

Field Exploration

B-1 General

IET's personnel carried out a reconnaissance of the site. The locations of the exploratory excavations were chosen to obtain subsurface information needed to achieve the objective for this investigation.

A visual survey was conducted to verify that the proposed excavations would not encounter any subsurface utility lines. No underground lines were encountered during the field exploratory program.

B-2 Excavation, Drilling and Sampling

The subsurface exploration program for this project was performed on December 14, 2018 and consisted of the excavation of five (5) borings, B-1 through B-5, to a maximum depth of 38 feet below the existing grade. On April 25. 2019 (3) additional exploratory borings were advanced for suggestions for proposed lot lights. IET's attempt to drill the deepest boring down to at least 50 feet encountered refusal. The approximate locations of the boring are shown on Figure 2 – Boring Location Map.

Borings B-1 through B-5 were excavated using a truck-mounted, 8-inch-diameter hollow-stem auger drill rig supplied by Discovery Drilling company of California. The borings were excavated and sampled at regular intervals: generally, every 5 feet to the maximum excavated depth of the boring. The borings were sampled using a 2-3/8 inch-inside-diameter (ID) Modified California Sampler or a 1-3/8-inch ID Standard Penetration Test (SPT) sampler. Samples were obtained as the sampler was driven into the bottom of the borings by a 140-pound CME automatic-trip hammer free falling from a height of 30 inches.

The ring samples were placed in plastic cans, labeled, and transported to the laboratory. The SPT soil samples were examined and carefully removed from the sampler, bagged, sealed, labeled, and transported to the laboratory for testing as well.

Bulk samples also were collected during the course of drilling by taking cuttings obtained from the auger flights. The bulk samples were selected for classification and testing purposes and may represent a mixture of soils within the noted depths. Recovered samples were bagged and returned to the laboratory for further classification and testing.

B-3 Miscellaneous

The boring logs describe the earth materials encountered, sampling method used, and field and laboratory tests performed. The log also shows the boring number, date of completion, and the name of the logger and drilling subcontractor. A representative of IET logged the boring in accordance with the Standard Practice for Description and Identification of Soils (Visual-Manual Procedure) ASTM D2488. The boundaries between soil types shown on the log are approximate and the transition between different soil layers may be gradual. The log of the boring is presented on the following pages.

Geotechnical Boring Log B-1

Date: 12/14/2018

Page: 1 of 1

Project Name: UCR Parking Lot 13

Project Number: 18-4232

Drilling Company: Discovery

Type of Rig: CME-75

Drive Weight: 140 lbs

Drop: 30"

Hole Dia: 8"

Elevation of Top of Hole: -

Hole Location: See Figure 2

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number		Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION Logged By: GSU Sampled By: GSU	Type of Test
	0							SM	**Top Soil** Silty SAND with Gravel: light brown, moist, very dense, fine grained	
			R-1		35 50/4"	108	6		**Quaternary Young Axial Channel Deposits (Qya)** Silty SAND wih Gravel: dark brown, moist, very dense, fine grained	
	5									
			R-2		45 50/4"	108	6		Passing #200 = 38%	#200 wash
			R-3		35 50/4"	106	4			
	10									
			R-4		14 16	109	3			
	15									
			SPT-1		3 3 5				Passing #200 = 15%	#200 wash
	20									
			SPT-2		4 5 6					
	25									
			SPT-3		4 4 4				Passing #200 = 41%	#200 wash
	30									

Geotechnical Boring Log B-1

Date: 12/14/2018

Page: 2 of 2

Project Name: UCR Parking Lot 13

Project Number: 14-4232

Drilling Company: Discovery

Type of Rig: CME-75

Drive Weight: 140 lbs

Drop: 30"

Hole Dia: 8"

Elevation of Top of Hole:

Hole Location: See Figure 2

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION Logged By: GSU Sampled By: GSU	Type of Test
	30		SPT-4	6 6 8			SM	Silty SAND: brown, moist, very dense, fine grained, with gravel	
	35		SPT-5	12 24 26				Passing #200 = 22%	#200 wash
								Refusal at 38'	
								Total Depth Drilled = 38' Total Depth Sampled = 36.5' No Groundwater Encountered Boring Backfilled with Soils Cuttings	
	40								
	45								
	50								
	55								
	60								

Geotechnical Boring Log B-2

Date: 12/14/2018
Page: 1 of 1
Project Name: UCR Parking Lot 13
Project Number: 18-4232
Drilling Company: Discovery
Type of Rig: CME-75
Drive Weight: 140 lbs
Drop: 30"
Hole Dia: 8"
Elevation of Top of Hole: -
Hole Location: See Figure 2

Logged By: GSU
Sampled By: GSU

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	0						SM	**Top Soil** Silty SAND with Gravel: dark brown, moist, very dense, fine grained	
			R-1	34 50/6"	109	6		**Quaternary Young Axial Channel Deposits (Qya)** Silty SAND with Gravel: light brown, moist, very dense, fine grained	
	5		R-2	13 17	104	4			
			R-3	6 10	102	3			
	10		R-4	6 8	110	2			
	15							Total Depth Drilled = 10' Total Depth Sampled = 11' No Groundwater Encountered Boring Backfilled with Soils Cuttings	
	20								
	25								
	30								

Geotechnical Boring Log B-3

Date: 12/14/2018

Page: 1 of 1

Project Name: UCR Parking Lot 13

Project Number: 18-4232

Drilling Company: Discovery

Type of Rig: CME-75

Drive Weight: 140 lbs

Drop: 30"

Hole Dia: 8"

Elevation of Top of Hole: -

Hole Location: See Figure 2

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION Logged By: GSU Sampled By: GSU	Type of Test
	0						SM	**Top Soil** Silty SAND with Gravel: dark brown, moist, very dense, fine grained	
			R-1	30 50	117	5		**Quaternary Young Axial Channel Deposits (Qya)** Silty SAND with Gravel: dark brown, moist, very dense, fine grained	
	5		R-2	8 11	96	6			
			R-3	4 6	106	2			
	10		R-4	6 9	106	1		light brown, dry	
	15		SPT1	3 3 5					
	20							Total Depth Drilled = 15' Total Depth Sampled = 16.5' No Groundwater Encountered Boring Backfilled with Soils Cuttings	
	25								
	30								

Geotechnical Boring Log B-4

Date: 12/14/2018	**Page:** 1 of 1
Project Name: UCR Parking Lot 13	**Project Number:** 18-4232
Drilling Company: Discovery	**Type of Rig:** CME-75
Drive Weight: 140 lbs	**Drop:** 30" **Hole Dia:** 8"
Elevation of Top of Hole: -	**Hole Location:** See Figure 2

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION Logged By: GSU Sampled By: GSU	Type of Test
	0						SM	**Top Soil** Silty SAND with Gravel: light brown, moist, very dense, fine grained	
								Quaternary Young Axial Channel Deposits (Qya) Silty SAND with Gravel: light brown, moist, very dense, fine grained	
			R-1	4 7	103	2			
	5		R-2	5 8	101	3			
			R-3	5 8	105	1		dry	
	10		R-4	4 8	108	2			
	15		SPT1	3 4 6					
	20							Total Depth Drilled = 15' Total Depth Sampled = 16.5' No Groundwater Encountered Boring Backfilled with Soils Cuttings	
	25								
	30								

Geotechnical Boring Log B-5

Date: 12/14/2018
Page: 1 of 1
Project Name: UCR Parking Lot 13
Project Number: 18-4232
Drilling Company: Discovery
Type of Rig: CME-75
Drive Weight: 140 lbs
Drop: 30"
Hole Dia: 8"
Elevation of Top of Hole: -
Hole Location: See Figure 2

Logged By: GSU
Sampled By: GSU

Elevation (ft)	Depth (ft)	Graphic Log	Sample Number	Blow Count	Dry Density (pcf)	Moisture (%)	USCS Symbol	DESCRIPTION	Type of Test
	0						SM	**Top Soil** Silty SAND with Gravel: dark brown, moist, very dense, fine grained	
			R-1	11 15	104	6		**Quaternary Young Axial Channel Deposits (Qya)** Silty SAND with Gravel: dark brown, moist, very dense, fine grained	
	5		R-2	8 9	105	6			
			R-3	6 7	106	4			
	10		R-4	6 8	110	3			
	15							Total Depth Drilled = 10' Total Depth Sampled = 11' No Groundwater Encountered Boring Backfilled with Soils Cuttings	
	20								
	25								
	30								

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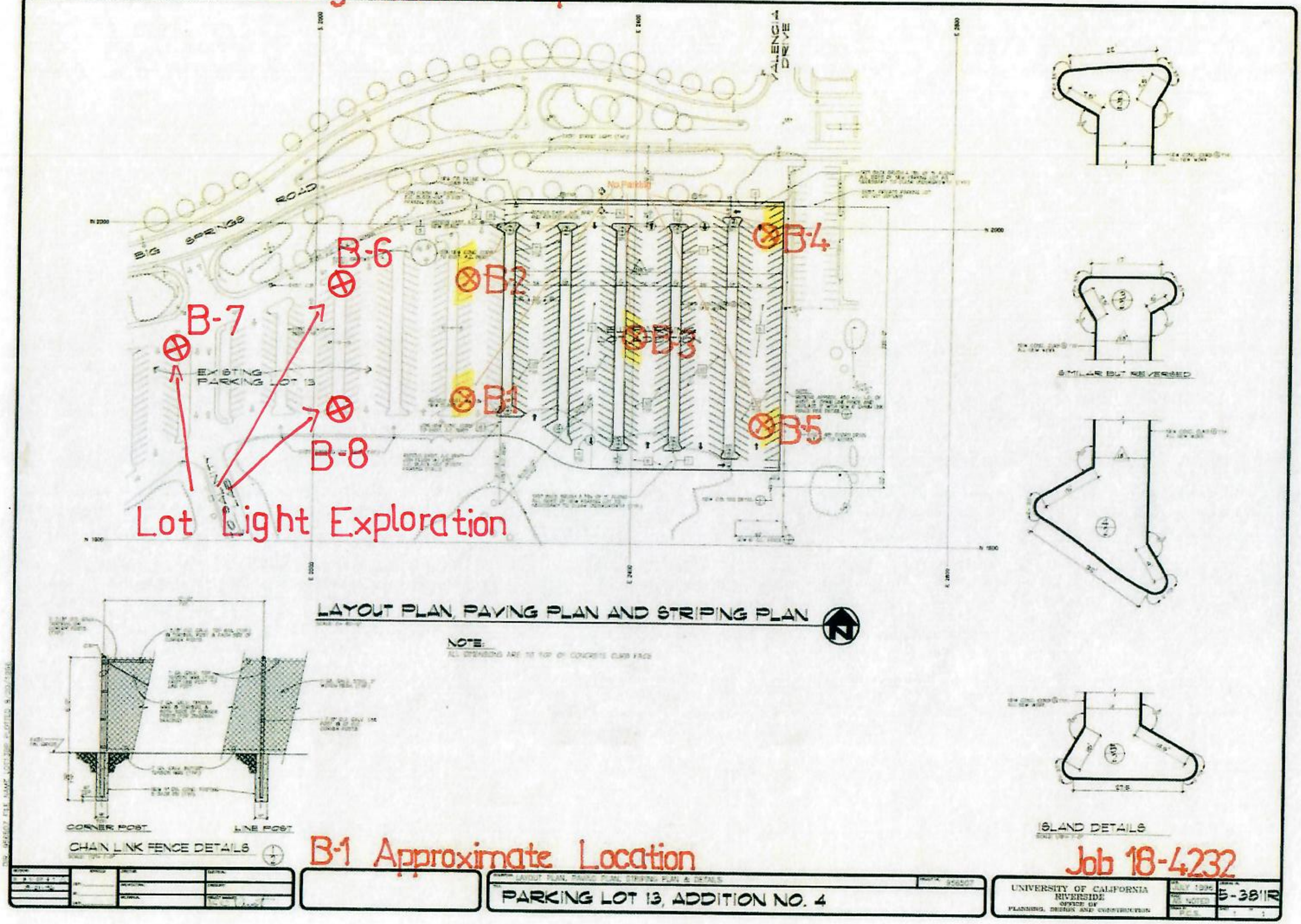
Boring Location Map



APPENDIX C

LABORATORY TESTING PROCEDURES AND TEST RESULTS

APPENDIX C

Laboratory Testing Procedures and Test Results

The laboratory testing program was directed towards providing quantitative data relating to the relevant engineering properties of the soils. Samples considered representative of site conditions were tested in general accordance with American Society for Testing and Materials (ASTM) procedure and/or California Test Methods (CTM), where applicable. The following summary is a brief outline of the test type and a table summarizing the test results.

Soil Classification: Soils were classified according the Unified Soil Classification System (USCS) in accordance with ASTM Test Methods D2487 and D2488. This system uses relies on the Atterberg Limits and grain size distribution of a soil. The soil classifications (or group symbol) are shown on the laboratory test data, and boring log.

Moisture and Density Determination Tests: Moisture content (ASTM D2216) and dry density determinations (ASTM D2937) were performed on relatively undisturbed samples obtained from the test boring. The results of these tests are presented in the boring log. Where applicable, only moisture content was determined from undisturbed or disturbed samples.

Grain Size Distribution*:* Representative samples were dried, weighed, and soaked in water until individual soil particles were separated (per ASTM D421) and then washed on a No. 200 sieve. The portion retained on the No. 200 sieve was dried and then sieved on a U.S. Standard brass sieve set in accordance with ASTM D422 (CTM 202). Test results are presented on the boring logs.

Direct Shear: Direct shear tests were performed on selected remolded and/or undisturbed samples, which were soaked for a minimum of 24 hours under a surcharge equal to the applied normal force during testing. After transfer of the sample to the shear box, and reloading the sample, pore pressures set up in the sample due to the transfer were allowed to dissipate for a period of approximately 1 hour prior to application of shearing force. The samples were tested under various normal loads, a motor-driven, strain-controlled, direct-shear testing apparatus at a strain rate of less than 0.1 inch per minute. The test results are presented in the test data.

SAMPLE LOCATION	*SAMPLE DESCRIPTION*	*FRICTION ANGLE (degrees)*	*APPARENT COHESION (psf)*
B-5 @ 5'	Silty SAND	23	479

Soluble Sulfates: The soluble sulfate contents of selected samples were determined by standard geotechnical methods (CTM 417). The test results are presented in the table below:

SAMPLE LOCATION	*SAMPLE DESCRIPTION*	*SULFATE CONTENT (%)*	*SULFATE EXPOSURE**
B-1, Bag-1 @ 0-5'	Dark brown Silty Sand	0.01	Negligible

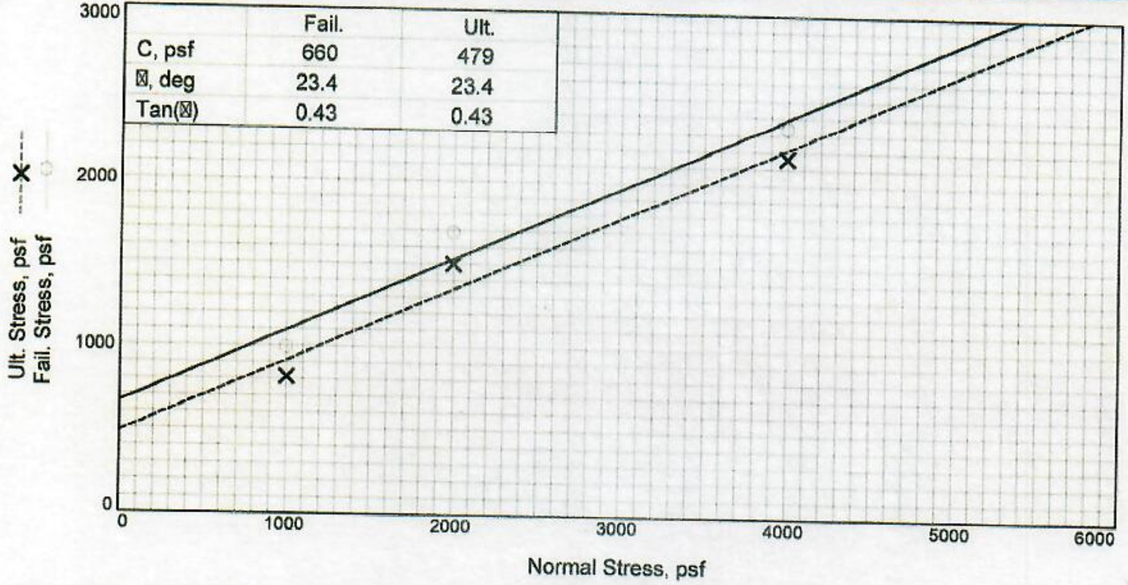
* Per ACI 318R-05 Table 4.3.1

Minimum Resistivity and pH Tests: Minimum resistivity and pH tests were performed with CTM 643. The results are presented in the table below:

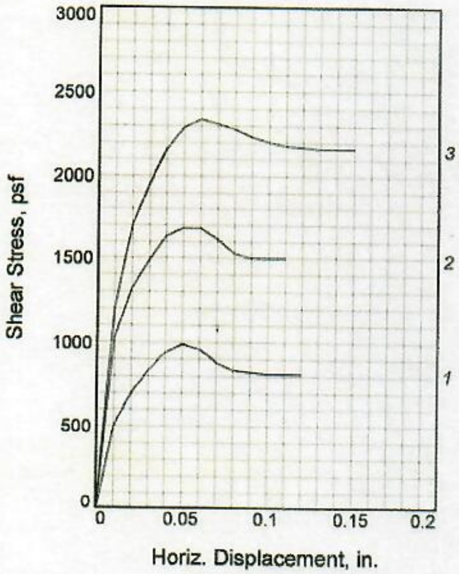
SAMPLE LOCATION	*SAMPLE DESCRIPTION*	*pH*	*MINIMUM RESISTIVITY (ohm-cm)*
B-1, Bag-1 @ 0-5'	Dark brown Silty Sand	7.4	3,050

Chloride Content: Chloride content was tested with CTM 422. The results are presented below:

SAMPLE LOCATION	*SAMPLE DESCRIPTION*	*CHLORIDE CONTENT (ppm)*
B-1, Bag-1 @ 0-5'	Dark brown Silty Sand	19



	Fail.	Ult.
C, psf	660	479
⊠, deg	23.4	23.4
Tan(⊠)	0.43	0.43



	Sample No.	1	2	3
Initial	Water Content, %	10.6	10.6	10.6
	Dry Density, pcf	103.0	102.1	102.7
	Saturation, %	48.0	46.3	47.0
	Void Ratio	0.5764	0.6025	0.5931
	Diameter, in.	2.42	2.42	2.42
	Height, in.	1.00	1.00	1.00
At Test	Water Content, %	17.5	15.5	14.8
	Dry Density, pcf	103.0	102.1	102.7
	Saturation, %	79.1	67.5	65.3
	Void Ratio	0.5764	0.6025	0.5931
	Diameter, in.	2.42	2.42	2.42
	Height, in.	1.00	1.00	1.00
Normal Stress, psf		1000	2000	4000
Fail. Stress, psf		988	1682	2338
Displacement, in.		0.05	0.05	0.06
Ult. Stress, psf		812	1497	2162
Displacement, in.		0.10	0.09	0.13
Strain rate, in./min.		0.100	0.100	0.100

Sample Type: INSITU
Description: Silty sand

Specific Gravity= 2.6
Remarks: SAMPLED BY O.S.S.

Figure

Client: IET
Project: 18-4232
Location: B5 @ 7'
Sample Number: B5@5
Proj. No.: L-51 **Date Sampled:**

DIRECT SHEAR TEST REPORT

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Tested By: MM **Checked By:** JP

APPENDIX D

SEISMIC-INDUCED SETTLEMENT CALCULATIONS

Seismic Induced Settlement Calculation for Dry Sands

Magnitude of earthquake :	7.00	**Mw**	
a_{max} :	0.58	**g**	

Hammer Energy Ratio (E_m)	1.30
Hole Diameter Factor (C_B)	1.00
Sampling Meth Factor (C_s)	1.20

Layer Number	Depth to Top of Layer (ft)	Depth to Bot. of Layer (ft)	Layer Thickness (ft)	Depth to Center of Layer (ft)	Raw N values	Total Dry Density (pcf)	σ_{eff} at Center of the Layer (psf)	Rod Length Factor : C_R	N_{60}	$(N1)_{60}$	Fine Content	$(N1)_{60,CS}$	$\sigma_m' = \sigma_{eff}\ (1+2k_0)/3$ (psf)	$G_{max}=20\ (\sigma m')^{0.5}*((N_1)_{60cs})^{1/3}$ (ksf)	$r_d=(1-(0.1*\ depth)/30)$	$\gamma_{eff}\ G_{eff}/G_{max}=0.65*amax*seff*rd\ /\ Gmax$	Shear Strain : γ_{eff}	Vol. Strain: ε_c	Vol. Strain Corrected for M $2*0.075*M^{1.285}$	Settlement = 12* (Vol strain)*(Layer thickness) (in)
1	0	5	5	2.5	50	130.0	325	0.75	59	145	38	179	217	1631	0.99	7.4E-05	1.4E-04	2.3E-05	2.1E-05	0.00
2	5	7	2	6.0	50	130.0	780	0.75	59	94	38	117	520	2198	0.98	1.3E-04	2.8E-04	4.5E-05	4.1E-05	0.00
3	7	10	3	8.5	50	130.0	1105	0.75	59	79	38	99	737	2477	0.97	1.6E-04	3.7E-04	5.8E-05	5.3E-05	0.00
4	10	13	3	11.5	20	130.0	1495	0.75	23	27	15	31	997	1958	0.96	2.8E-04	8.4E-04	4.3E-04	3.9E-04	0.03
5	13	18	5	15.5	8	130.0	2015	0.85	11	11	15	14	1343	1734	0.95	4.2E-04	2.1E-03	3.3E-03	3.0E-03	0.36
6	18	23	5	20.5	11	130.0	2665	0.95	16	14	15	17	1777	2160	0.93	4.3E-04	1.7E-03	1.9E-03	1.8E-03	0.21
7	23	28	5	25.5	8	130.0	3315	0.95	12	9	41	16	2210	2350	0.92	4.9E-04	1.8E-03	2.4E-03	2.2E-03	0.26
8	28	33	5	30.5	14	130.0	3965	1	22	16	41	24	2643	2919	0.90	4.6E-04	1.4E-03	1.1E-03	1.0E-03	0.00
9	33	38	5	35.5	50	130.0	4615	1	78	51	22	60	3077	4285	0.88	3.6E-04	7.8E-04	1.2E-04	1.1E-04	0.00
			38																**Total Settlement (inches)**	0.9

Note:

(N1)60 was calculated by the method suggested in DMG Special Publication SP117

Settlement Analysis, Tokimatsu and Seed 1987, ASCE, Evaluation of Settlements in Dry Sands Due to Eathquake Shaking, Journal of the Goetechnical Engineering Division, ASCE, Vol 113, No. 8, Agust 1987

Appendix D

Noise Analysis Worksheets

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Ambient Noise Survey Data Sheet

Instructions: Document noise measurement locations with a photo of the site, including the noise meter. Additionally, take notes on general and secondary noise sources, including the instantaneous noise level if possible. As a reminder, A/C weighting should be set to "A" and generally response time should be set to "fast." For additional information, please review the *Noise Measurement Protocol* in the pelican case.

Project Name: UCR Parking Structure 1 **Job Number:** 19-07230
Date: 10/2/19 **Operator Name:** John S.

Measurement #1

Location: NM1 **Begin time:** 10:25 a.m. **Finish time:** 10:40 a.m.
Measurement No.: 001 **Wind (mph):** light **Direction:** Variable
Cloud Cover Class: Overcast (>80%) Light (20-80%) [✓ Sunny (<20%)]
Calibration (dB): Start: 94.0 End: 93.9
Primary Noise Sources: Cars circulating parking lot **Distance:**
Secondary Noise Sources: landscaping equipment in distance, birds, traffic along Big springs
Notes: ~~landscaping~~ equ

Traffic Count: Passenger Cars:
Medium to Heavy Duty Trucks (3 axles): Heavy Duty Trucks (4+ axles):
Instantaneous Noise Sources/Levels (e.g., airplane, bus airbrake, etc.):
Leq: 53.5 **SEL:** 83.1 **Lmax:** 77.2 **Lmin:** 44.2 **PK:** 88.0
L(05): 51.2 **L(10):** 49.9 **L(50):** 47.4 **L(90):** 45.7 **L(95):** 45.4
Response: [✓ Slow] Fast Peak Impulse

Measurement #2

Location: NM3 **Begin time:** 10:46 a.m. **Finish time:** 11:01 a.m.
Measurement No.: 002 **Wind (mph):** light **Direction:** variable
Cloud Cover Class: Overcast (>80%) Light (20-80%) [✓ Sunny (<20%)]
Calibration (dB): Start: 94.0 End: 94.3
Primary Noise Sources: landscaping equipment **Distance:** ~500 ft.
Secondary Noise Sources: Cars circulating parking lot, doors slamming. ~100ft.
Notes: plane overhead @ 2 min.

Traffic Count: Passenger Cars:
Medium to Heavy Duty Trucks (3 axles): Heavy Duty Trucks (4+ axles):
Instantaneous Noise Sources/Levels (e.g., airplane, bus airbrake, etc.):
Leq: 50.1 **SEL:** 79.6 **Lmax:** 63.7 **Lmin:** 43.7 **PK:** 84.1
L(05): 53.0 **L(10):** 51.3 **L(50):** 48.6 **L(90):** 45.4 **L(95):** 44.8
Response: Slow Fast Peak Impulse

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Environmental Scientists Planners Engineers
www.rinconconsultants.com

Ambient Noise Survey Data Sheet

Instructions: Document noise measurement locations with a photo of the site, including the noise meter. Additionally, take notes on general and secondary noise sources, including the instantaneous noise level if possible. As a reminder, A/C weighting should be set to "A" and generally response time should be set to "fast." For additional information, please review the *Noise Measurement Protocol* in the pelican case.

Project Name: UCR Parking Structure **Job Number:** 19-07230
Date: 10/2/19 **Operator Name:** John S.

Measurement #1

Location: NM4 **Begin time:** 11:08 a.m. **Finish time:** 11:23 a.m.
Measurement No.: 003 **Wind (mph):** light **Direction:** variable
Cloud Cover Class: Overcast (>80%) Light (20-80%) [✓ Sunny (<20%)]
Calibration (dB): Start: 94.0 End: 93.9
Primary Noise Sources: landscaping equipment **Distance:** ~35 ft.
Secondary Noise Sources: traffic along Big Springs
Notes: Cars cross storm grates when passing, creating louder noise
plane overhead @ 1:30
Traffic Count: Passenger Cars: 79
Medium to Heavy Duty Trucks (3 axles): 0 Heavy Duty Trucks (4+ axles): 0
Instantaneous Noise Sources/Levels (e.g., airplane, bus airbrake, etc.):
Leq: 62.5 **SEL:** 92.0 **Lmax:** 69.5 **Lmin:** 47.4 **PK:** 99.9
L(05): 67.0 **L(10):** 66.1 **L(50):** 60.7 **L(90):** 54.7 **L(95):** 52.1
Response: [✓ Slow] Fast Peak Impulse

Measurement #2

Location: NM 2 **Begin time:** 11:31 a.m. **Finish time:** 11:46 a.m.
Measurement No.: 004 **Wind (mph):** light **Direction:** variable
Cloud Cover Class: Overcast (>80%) Light (20-80%) [✓ Sunny (<20%)]
Calibration (dB): Start: 94.0 End: 93.7
Primary Noise Sources: traffic on Big Springs **Distance:** ~35 ft.
Secondary Noise Sources: landscaping equipment
Notes: lawnmowers passing @ 14:30 - 15:00
Traffic Count: Passenger Cars: 71
Medium to Heavy Duty Trucks (3 axles): ||| ③ Heavy Duty Trucks (4+ axles): 0
Instantaneous Noise Sources/Levels (e.g., airplane, bus airbrake, etc.):
Leq: 958.8 **SEL:** 88.2 **Lmax:** 75.9 **Lmin:** 45.0 **PK:** 86.7
L(05): 61.4 **L(10):** 59.7 **L(50):** 53.0 **L(90):** 47.8 **L(95):** 46.4
Response: [✓ Slow] Fast Peak Impulse

Form Updated: 10/2/2019

```
-         Freq Weight : A
-         Time Weight : SLOW
-         Level Range : 40-100
-         Max dB : 77.2 - 2019/10/02 10:37:35
-         Level Range : 40-100
-         SEL : 83.1
-         Leq : 53.5
-
          No.s            Date Time     (dB)
         ----------------------------------------------------------------------
             1  2019/10/02 10:25:38     47.4
             2  2019/10/02 10:25:41     46.1
             3  2019/10/02 10:25:44     47.2
             4  2019/10/02 10:25:47     47.2
             5  2019/10/02 10:25:50     47.3
             6  2019/10/02 10:25:53     47.5
             7  2019/10/02 10:25:56     45.3
             8  2019/10/02 10:25:59     45.6
             9  2019/10/02 10:26:02     49.4
            10  2019/10/02 10:26:05     48.6
            11  2019/10/02 10:26:08     45.3
            12  2019/10/02 10:26:11     44.2
            13  2019/10/02 10:26:14     44.2
            14  2019/10/02 10:26:17     47.1
            15  2019/10/02 10:26:20     47.5
            16  2019/10/02 10:26:23     49.0
            17  2019/10/02 10:26:26     45.8
            18  2019/10/02 10:26:29     47.0
            19  2019/10/02 10:26:32     50.1
            20  2019/10/02 10:26:35     45.5
            21  2019/10/02 10:26:38     46.1
            22  2019/10/02 10:26:41     45.7
            23  2019/10/02 10:26:44     46.0
            24  2019/10/02 10:26:47     45.5
            25  2019/10/02 10:26:50     45.7
            26  2019/10/02 10:26:53     45.8
            27  2019/10/02 10:26:56     45.8
            28  2019/10/02 10:26:59     45.1
            29  2019/10/02 10:27:02     45.4
            30  2019/10/02 10:27:05     45.3
            31  2019/10/02 10:27:08     44.7
            32  2019/10/02 10:27:11     48.1
            33  2019/10/02 10:27:14     45.6
            34  2019/10/02 10:27:17     45.0
            35  2019/10/02 10:27:20     45.4
            36  2019/10/02 10:27:23     45.5
            37  2019/10/02 10:27:26     45.9
            38  2019/10/02 10:27:29     46.4
            39  2019/10/02 10:27:32     46.5
            40  2019/10/02 10:27:35     46.6
            41  2019/10/02 10:27:38     46.9
            42  2019/10/02 10:27:41     47.5
            43  2019/10/02 10:27:44     47.3
            44  2019/10/02 10:27:47     47.0
            45  2019/10/02 10:27:50     47.4
            46  2019/10/02 10:27:53     47.9
            47  2019/10/02 10:27:56     47.8
            48  2019/10/02 10:27:59     47.6
            49  2019/10/02 10:28:02     47.7
            50  2019/10/02 10:28:05     48.1
            51  2019/10/02 10:28:08     48.0
            52  2019/10/02 10:28:11     47.6
            53  2019/10/02 10:28:14     47.7
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            85  2019/10/02 10:29:50     47.9
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300  2019/10/02 10:40:35     47.1
```

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-         Time Weight : SLOW
-         Level Range : 40-100
-         Max dB : 75.9 - 2019/10/02 11:46:13
-         Level Range : 40-100
-         SEL : 88.2
-         Leq : 58.8
-
          No.s            Date Time      (dB)
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             2  2019/10/02 11:31:20     53.2
             3  2019/10/02 11:31:23     64.1
             4  2019/10/02 11:31:26     58.6
             5  2019/10/02 11:31:29     55.1
             6  2019/10/02 11:31:32     54.3
             7  2019/10/02 11:31:35     58.8
             8  2019/10/02 11:31:38     59.2
             9  2019/10/02 11:31:41     55.5
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            24  2019/10/02 11:32:26     51.6
            25  2019/10/02 11:32:29     51.6
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            47  2019/10/02 11:33:35     52.2
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190  2019/10/02 11:40:44     51.1
191  2019/10/02 11:40:47     60.6
192  2019/10/02 11:40:50     60.6
193  2019/10/02 11:40:53     55.0
194  2019/10/02 11:40:56     51.7
195  2019/10/02 11:40:59     48.4
196  2019/10/02 11:41:02     50.0
197  2019/10/02 11:41:05     60.6
198  2019/10/02 11:41:08     58.3
199  2019/10/02 11:41:11     52.4
200  2019/10/02 11:41:14     53.7
201  2019/10/02 11:41:17     55.3
202  2019/10/02 11:41:20     60.4
203  2019/10/02 11:41:23     53.5
204  2019/10/02 11:41:26     47.4
205  2019/10/02 11:41:29     47.2
206  2019/10/02 11:41:32     46.8
207  2019/10/02 11:41:35     45.4
208  2019/10/02 11:41:38     45.3
209  2019/10/02 11:41:41     45.7
210  2019/10/02 11:41:44     46.7
211  2019/10/02 11:41:47     47.2
212  2019/10/02 11:41:50     46.9
213  2019/10/02 11:41:53     47.9
214  2019/10/02 11:41:56     51.0
215  2019/10/02 11:41:59     60.3
216  2019/10/02 11:42:02     55.5
217  2019/10/02 11:42:05     48.4
218  2019/10/02 11:42:08     46.3
219  2019/10/02 11:42:11     47.0
220  2019/10/02 11:42:14     46.7
221  2019/10/02 11:42:17     50.5
222  2019/10/02 11:42:20     55.4
223  2019/10/02 11:42:23     50.4
224  2019/10/02 11:42:26     48.3
225  2019/10/02 11:42:29     45.9
226  2019/10/02 11:42:32     45.7
227  2019/10/02 11:42:35     45.3
228  2019/10/02 11:42:38     45.4
229  2019/10/02 11:42:41     48.1
230  2019/10/02 11:42:44     54.3
231  2019/10/02 11:42:47     56.2
232  2019/10/02 11:42:50     50.5
233  2019/10/02 11:42:53     48.2
234  2019/10/02 11:42:56     52.8
235  2019/10/02 11:42:59     52.1
236  2019/10/02 11:43:02     50.9
237  2019/10/02 11:43:05     59.2
238  2019/10/02 11:43:08     55.3
239  2019/10/02 11:43:11     47.7
240  2019/10/02 11:43:14     45.4
241  2019/10/02 11:43:17     45.2
242  2019/10/02 11:43:20     47.2
243  2019/10/02 11:43:23     46.4
244  2019/10/02 11:43:26     50.5
245  2019/10/02 11:43:29     59.1
246  2019/10/02 11:43:32     64.4
247  2019/10/02 11:43:35     58.1
248  2019/10/02 11:43:38     62.6
249  2019/10/02 11:43:41     58.3
250  2019/10/02 11:43:44     59.7
251  2019/10/02 11:43:47     63.3
252  2019/10/02 11:43:50     53.9
253  2019/10/02 11:43:53     49.4
254  2019/10/02 11:43:56     58.1
255  2019/10/02 11:43:59     54.1
256  2019/10/02 11:44:02     55.5
257  2019/10/02 11:44:05     62.1
258  2019/10/02 11:44:08     58.5
259  2019/10/02 11:44:11     56.4
260  2019/10/02 11:44:14     51.4
261  2019/10/02 11:44:17     49.7
262  2019/10/02 11:44:20     49.4
263  2019/10/02 11:44:23     51.3
264  2019/10/02 11:44:26     56.7
265  2019/10/02 11:44:29     60.2
266  2019/10/02 11:44:32     55.6
267  2019/10/02 11:44:35     52.0
268  2019/10/02 11:44:38     50.6
269  2019/10/02 11:44:41     49.0
270  2019/10/02 11:44:44     48.0
271  2019/10/02 11:44:47     48.3
272  2019/10/02 11:44:50     47.0
273  2019/10/02 11:44:53     48.3
274  2019/10/02 11:44:56     48.4
275  2019/10/02 11:44:59     47.5
276  2019/10/02 11:45:02     47.7
277  2019/10/02 11:45:05     48.3
278  2019/10/02 11:45:08     47.5
279  2019/10/02 11:45:11     53.6
280  2019/10/02 11:45:14     57.9
281  2019/10/02 11:45:17     58.0
282  2019/10/02 11:45:20     54.6
283  2019/10/02 11:45:23     51.6
```

```
284  2019/10/02 11:45:26     53.3
285  2019/10/02 11:45:29     60.4
286  2019/10/02 11:45:32     61.5
287  2019/10/02 11:45:35     57.7
288  2019/10/02 11:45:38     54.3
289  2019/10/02 11:45:41     55.8
290  2019/10/02 11:45:44     56.9
291  2019/10/02 11:45:47     56.1
292  2019/10/02 11:45:50     58.1
293  2019/10/02 11:45:53     60.7
294  2019/10/02 11:45:56     62.5
295  2019/10/02 11:45:59     64.4
296  2019/10/02 11:46:02     67.7
297  2019/10/02 11:46:05     72.9
298  2019/10/02 11:46:08     75.5
299  2019/10/02 11:46:11     75.8
300  2019/10/02 11:46:14     72.4
```

```
-         Freq Weight : A
-         Time Weight : SLOW
-         Level Range : 40-100
-         Max dB : 63.7 - 2019/10/02 10:48:12
-         Level Range : 40-100
-         SEL : 79.6
-         Leq : 50.1
-
          No.s            Date Time     (dB)
         ----------------------------------------------------------------------
             1  2019/10/02 10:46:00     50.4
             2  2019/10/02 10:46:03     50.3
             3  2019/10/02 10:46:06     50.0
             4  2019/10/02 10:46:09     49.6
             5  2019/10/02 10:46:12     49.6
             6  2019/10/02 10:46:15     50.0
             7  2019/10/02 10:46:18     49.8
             8  2019/10/02 10:46:21     49.9
             9  2019/10/02 10:46:24     49.7
            10  2019/10/02 10:46:27     49.4
            11  2019/10/02 10:46:30     49.2
            12  2019/10/02 10:46:33     49.9
            13  2019/10/02 10:46:36     49.6
            14  2019/10/02 10:46:39     49.7
            15  2019/10/02 10:46:42     49.2
            16  2019/10/02 10:46:45     48.7
            17  2019/10/02 10:46:48     48.8
            18  2019/10/02 10:46:51     50.4
            19  2019/10/02 10:46:54     49.5
            20  2019/10/02 10:46:57     49.9
            21  2019/10/02 10:47:00     48.8
            22  2019/10/02 10:47:03     49.2
            23  2019/10/02 10:47:06     48.7
            24  2019/10/02 10:47:09     49.8
            25  2019/10/02 10:47:12     48.8
            26  2019/10/02 10:47:15     48.5
            27  2019/10/02 10:47:18     49.1
            28  2019/10/02 10:47:21     49.8
            29  2019/10/02 10:47:24     48.4
            30  2019/10/02 10:47:27     49.3
            31  2019/10/02 10:47:30     48.0
            32  2019/10/02 10:47:33     48.1
            33  2019/10/02 10:47:36     47.9
            34  2019/10/02 10:47:39     48.4
            35  2019/10/02 10:47:42     48.2
            36  2019/10/02 10:47:45     48.1
            37  2019/10/02 10:47:48     49.1
            38  2019/10/02 10:47:51     52.6
            39  2019/10/02 10:47:54     52.1
            40  2019/10/02 10:47:57     54.3
            41  2019/10/02 10:48:00     55.6
            42  2019/10/02 10:48:03     56.2
            43  2019/10/02 10:48:06     60.8
            44  2019/10/02 10:48:09     62.8
            45  2019/10/02 10:48:12     61.1
            46  2019/10/02 10:48:15     58.2
            47  2019/10/02 10:48:18     56.9
            48  2019/10/02 10:48:21     56.7
            49  2019/10/02 10:48:24     54.9
            50  2019/10/02 10:48:27     51.8
            51  2019/10/02 10:48:30     49.8
            52  2019/10/02 10:48:33     50.0
            53  2019/10/02 10:48:36     49.1
            54  2019/10/02 10:48:39     49.5
            55  2019/10/02 10:48:42     49.0
            56  2019/10/02 10:48:45     48.3
            57  2019/10/02 10:48:48     47.9
            58  2019/10/02 10:48:51     48.4
            59  2019/10/02 10:48:54     49.0
            60  2019/10/02 10:48:57     49.5
            61  2019/10/02 10:49:00     50.1
            62  2019/10/02 10:49:03     50.5
            63  2019/10/02 10:49:06     51.4
            64  2019/10/02 10:49:09     51.5
            65  2019/10/02 10:49:12     51.0
            66  2019/10/02 10:49:15     52.3
            67  2019/10/02 10:49:18     50.8
            68  2019/10/02 10:49:21     50.3
            69  2019/10/02 10:49:24     51.7
            70  2019/10/02 10:49:27     51.2
            71  2019/10/02 10:49:30     52.4
            72  2019/10/02 10:49:33     52.0
            73  2019/10/02 10:49:36     51.3
            74  2019/10/02 10:49:39     51.2
            75  2019/10/02 10:49:42     51.8
            76  2019/10/02 10:49:45     51.2
            77  2019/10/02 10:49:48     50.1
            78  2019/10/02 10:49:51     50.5
            79  2019/10/02 10:49:54     49.9
            80  2019/10/02 10:49:57     49.8
            81  2019/10/02 10:50:00     50.4
            82  2019/10/02 10:50:03     50.2
            83  2019/10/02 10:50:06     50.1
            84  2019/10/02 10:50:09     50.0
            85  2019/10/02 10:50:12     49.5
```

```
 86  2019/10/02 10:50:15     49.4
 87  2019/10/02 10:50:18     49.0
 88  2019/10/02 10:50:21     48.7
 89  2019/10/02 10:50:24     50.4
 90  2019/10/02 10:50:27     49.8
 91  2019/10/02 10:50:30     48.1
 92  2019/10/02 10:50:33     48.2
 93  2019/10/02 10:50:36     48.5
 94  2019/10/02 10:50:39     47.7
 95  2019/10/02 10:50:42     48.5
 96  2019/10/02 10:50:45     48.8
 97  2019/10/02 10:50:48     48.2
 98  2019/10/02 10:50:51     49.0
 99  2019/10/02 10:50:54     48.4
100  2019/10/02 10:50:57     48.9
101  2019/10/02 10:51:00     46.8
102  2019/10/02 10:51:03     46.2
103  2019/10/02 10:51:06     47.8
104  2019/10/02 10:51:09     46.9
105  2019/10/02 10:51:12     47.7
106  2019/10/02 10:51:15     47.8
107  2019/10/02 10:51:18     48.2
108  2019/10/02 10:51:21     47.4
109  2019/10/02 10:51:24     47.8
110  2019/10/02 10:51:27     48.7
111  2019/10/02 10:51:30     49.2
112  2019/10/02 10:51:33     50.5
113  2019/10/02 10:51:36     50.6
114  2019/10/02 10:51:39     49.5
115  2019/10/02 10:51:42     51.0
116  2019/10/02 10:51:45     55.7
117  2019/10/02 10:51:48     57.9
118  2019/10/02 10:51:51     53.3
119  2019/10/02 10:51:54     50.4
120  2019/10/02 10:51:57     50.0
121  2019/10/02 10:52:00     49.3
122  2019/10/02 10:52:03     49.3
123  2019/10/02 10:52:06     49.1
124  2019/10/02 10:52:09     50.0
125  2019/10/02 10:52:12     49.2
126  2019/10/02 10:52:15     48.7
127  2019/10/02 10:52:18     48.4
128  2019/10/02 10:52:21     48.9
129  2019/10/02 10:52:24     49.5
130  2019/10/02 10:52:27     49.4
131  2019/10/02 10:52:30     48.0
132  2019/10/02 10:52:33     47.0
133  2019/10/02 10:52:36     48.4
134  2019/10/02 10:52:39     48.6
135  2019/10/02 10:52:42     48.7
136  2019/10/02 10:52:45     47.2
137  2019/10/02 10:52:48     48.3
138  2019/10/02 10:52:51     48.6
139  2019/10/02 10:52:54     48.3
140  2019/10/02 10:52:57     48.5
141  2019/10/02 10:53:00     47.4
142  2019/10/02 10:53:03     47.4
143  2019/10/02 10:53:06     46.6
144  2019/10/02 10:53:09     47.3
145  2019/10/02 10:53:12     47.5
146  2019/10/02 10:53:15     46.9
147  2019/10/02 10:53:18     47.5
148  2019/10/02 10:53:21     47.6
149  2019/10/02 10:53:24     46.8
150  2019/10/02 10:53:27     45.8
151  2019/10/02 10:53:30     46.9
152  2019/10/02 10:53:33     48.7
153  2019/10/02 10:53:36     48.1
154  2019/10/02 10:53:39     47.3
155  2019/10/02 10:53:42     47.8
156  2019/10/02 10:53:45     47.6
157  2019/10/02 10:53:48     47.2
158  2019/10/02 10:53:51     47.1
159  2019/10/02 10:53:54     47.2
160  2019/10/02 10:53:57     48.3
161  2019/10/02 10:54:00     47.9
162  2019/10/02 10:54:03     48.6
163  2019/10/02 10:54:06     49.2
164  2019/10/02 10:54:09     48.4
165  2019/10/02 10:54:12     48.0
166  2019/10/02 10:54:15     48.9
167  2019/10/02 10:54:18     48.6
168  2019/10/02 10:54:21     49.9
169  2019/10/02 10:54:24     49.5
170  2019/10/02 10:54:27     49.9
171  2019/10/02 10:54:30     50.0
172  2019/10/02 10:54:33     49.9
173  2019/10/02 10:54:36     49.3
174  2019/10/02 10:54:39     49.3
175  2019/10/02 10:54:42     49.0
176  2019/10/02 10:54:45     50.0
177  2019/10/02 10:54:48     47.8
178  2019/10/02 10:54:51     47.6
179  2019/10/02 10:54:54     47.9
180  2019/10/02 10:54:57     47.4
181  2019/10/02 10:55:00     48.9
182  2019/10/02 10:55:03     48.4
183  2019/10/02 10:55:06     50.7
184  2019/10/02 10:55:09     49.3
```

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185  2019/10/02 10:55:12     49.0
186  2019/10/02 10:55:15     50.7
187  2019/10/02 10:55:18     50.7
188  2019/10/02 10:55:21     51.1
189  2019/10/02 10:55:24     50.8
190  2019/10/02 10:55:27     50.6
191  2019/10/02 10:55:30     50.5
192  2019/10/02 10:55:33     50.6
193  2019/10/02 10:55:36     51.6
194  2019/10/02 10:55:39     50.6
195  2019/10/02 10:55:42     50.0
196  2019/10/02 10:55:45     48.5
197  2019/10/02 10:55:48     48.6
198  2019/10/02 10:55:51     49.1
199  2019/10/02 10:55:54     48.0
200  2019/10/02 10:55:57     47.6
201  2019/10/02 10:56:00     48.2
202  2019/10/02 10:56:03     49.7
203  2019/10/02 10:56:06     50.2
204  2019/10/02 10:56:09     52.2
205  2019/10/02 10:56:12     54.6
206  2019/10/02 10:56:15     51.5
207  2019/10/02 10:56:18     48.0
208  2019/10/02 10:56:21     47.2
209  2019/10/02 10:56:24     46.4
210  2019/10/02 10:56:27     46.8
211  2019/10/02 10:56:30     47.3
212  2019/10/02 10:56:33     46.7
213  2019/10/02 10:56:36     46.6
214  2019/10/02 10:56:39     46.0
215  2019/10/02 10:56:42     46.0
216  2019/10/02 10:56:45     45.6
217  2019/10/02 10:56:48     47.1
218  2019/10/02 10:56:51     46.8
219  2019/10/02 10:56:54     47.5
220  2019/10/02 10:56:57     47.2
221  2019/10/02 10:57:00     49.0
222  2019/10/02 10:57:03     50.2
223  2019/10/02 10:57:06     49.4
224  2019/10/02 10:57:09     50.8
225  2019/10/02 10:57:12     50.7
226  2019/10/02 10:57:15     49.6
227  2019/10/02 10:57:18     50.2
228  2019/10/02 10:57:21     50.6
229  2019/10/02 10:57:24     51.4
230  2019/10/02 10:57:27     57.0
231  2019/10/02 10:57:30     58.2
232  2019/10/02 10:57:33     53.4
233  2019/10/02 10:57:36     51.7
234  2019/10/02 10:57:39     50.8
235  2019/10/02 10:57:42     48.5
236  2019/10/02 10:57:45     45.3
237  2019/10/02 10:57:48     44.8
238  2019/10/02 10:57:51     45.4
239  2019/10/02 10:57:54     48.0
240  2019/10/02 10:57:57     48.6
241  2019/10/02 10:58:00     51.1
242  2019/10/02 10:58:03     45.6
243  2019/10/02 10:58:06     51.4
244  2019/10/02 10:58:09     47.5
245  2019/10/02 10:58:12     45.5
246  2019/10/02 10:58:15     44.8
247  2019/10/02 10:58:18     44.5
248  2019/10/02 10:58:21     45.5
249  2019/10/02 10:58:24     45.6
250  2019/10/02 10:58:27     45.1
251  2019/10/02 10:58:30     46.1
252  2019/10/02 10:58:33     47.0
253  2019/10/02 10:58:36     46.1
254  2019/10/02 10:58:39     46.5
255  2019/10/02 10:58:42     45.5
256  2019/10/02 10:58:45     45.4
257  2019/10/02 10:58:48     45.7
258  2019/10/02 10:58:51     46.9
259  2019/10/02 10:58:54     45.9
260  2019/10/02 10:58:57     46.7
261  2019/10/02 10:59:00     46.3
262  2019/10/02 10:59:03     47.9
263  2019/10/02 10:59:06     45.7
264  2019/10/02 10:59:09     44.6
265  2019/10/02 10:59:12     46.0
266  2019/10/02 10:59:15     46.0
267  2019/10/02 10:59:18     48.0
268  2019/10/02 10:59:21     47.2
269  2019/10/02 10:59:24     47.4
270  2019/10/02 10:59:27     45.6
271  2019/10/02 10:59:30     46.3
272  2019/10/02 10:59:33     45.0
273  2019/10/02 10:59:36     45.6
274  2019/10/02 10:59:39     46.0
275  2019/10/02 10:59:42     45.6
276  2019/10/02 10:59:45     45.6
277  2019/10/02 10:59:48     44.3
278  2019/10/02 10:59:51     44.6
279  2019/10/02 10:59:54     45.4
280  2019/10/02 10:59:57     45.7
281  2019/10/02 11:00:00     44.8
282  2019/10/02 11:00:03     44.3
283  2019/10/02 11:00:06     44.1
```

```
284  2019/10/02 11:00:09     45.1
285  2019/10/02 11:00:12     43.8
286  2019/10/02 11:00:15     45.2
287  2019/10/02 11:00:18     45.7
288  2019/10/02 11:00:21     46.3
289  2019/10/02 11:00:24     45.6
290  2019/10/02 11:00:27     44.7
291  2019/10/02 11:00:30     44.0
292  2019/10/02 11:00:33     43.7
293  2019/10/02 11:00:36     45.1
294  2019/10/02 11:00:39     45.0
295  2019/10/02 11:00:42     45.4
296  2019/10/02 11:00:45     45.0
297  2019/10/02 11:00:48     45.4
298  2019/10/02 11:00:51     46.8
299  2019/10/02 11:00:54     46.5
300  2019/10/02 11:00:57     44.9
```

```
-         Freq Weight : A
-         Time Weight : SLOW
-         Level Range : 40-100
-         Max dB : 69.5 - 2019/10/02 11:12:17
-         Level Range : 40-100
-         SEL : 92.0
-         Leq : 62.5
-
          No.s            Date Time     (dB)
         ----------------------------------------------------------------------
             1  2019/10/02 11:08:38     51.0
             2  2019/10/02 11:08:41     52.2
             3  2019/10/02 11:08:44     67.0
             4  2019/10/02 11:08:47     56.8
             5  2019/10/02 11:08:50     50.4
             6  2019/10/02 11:08:53     52.8
             7  2019/10/02 11:08:56     63.9
             8  2019/10/02 11:08:59     60.8
             9  2019/10/02 11:09:02     52.0
            10  2019/10/02 11:09:05     49.6
            11  2019/10/02 11:09:08     48.4
            12  2019/10/02 11:09:11     48.8
            13  2019/10/02 11:09:14     48.3
            14  2019/10/02 11:09:17     53.3
            15  2019/10/02 11:09:20     56.4
            16  2019/10/02 11:09:23     61.6
            17  2019/10/02 11:09:26     52.6
            18  2019/10/02 11:09:29     48.6
            19  2019/10/02 11:09:32     50.2
            20  2019/10/02 11:09:35     64.5
            21  2019/10/02 11:09:38     56.0
            22  2019/10/02 11:09:41     63.8
            23  2019/10/02 11:09:44     61.5
            24  2019/10/02 11:09:47     53.7
            25  2019/10/02 11:09:50     51.2
            26  2019/10/02 11:09:53     56.9
            27  2019/10/02 11:09:56     56.2
            28  2019/10/02 11:09:59     53.3
            29  2019/10/02 11:10:02     55.4
            30  2019/10/02 11:10:05     58.6
            31  2019/10/02 11:10:08     58.7
            32  2019/10/02 11:10:11     60.4
            33  2019/10/02 11:10:14     60.6
            34  2019/10/02 11:10:17     60.8
            35  2019/10/02 11:10:20     61.0
            36  2019/10/02 11:10:23     59.4
            37  2019/10/02 11:10:26     54.8
            38  2019/10/02 11:10:29     52.3
            39  2019/10/02 11:10:32     52.1
            40  2019/10/02 11:10:35     52.0
            41  2019/10/02 11:10:38     53.5
            42  2019/10/02 11:10:41     53.8
            43  2019/10/02 11:10:44     53.5
            44  2019/10/02 11:10:47     56.7
            45  2019/10/02 11:10:50     60.7
            46  2019/10/02 11:10:53     54.5
            47  2019/10/02 11:10:56     52.9
            48  2019/10/02 11:10:59     59.3
            49  2019/10/02 11:11:02     61.0
            50  2019/10/02 11:11:05     56.8
            51  2019/10/02 11:11:08     64.8
            52  2019/10/02 11:11:11     61.0
            53  2019/10/02 11:11:14     60.4
            54  2019/10/02 11:11:17     62.0
            55  2019/10/02 11:11:20     63.1
            56  2019/10/02 11:11:23     65.3
            57  2019/10/02 11:11:26     65.2
            58  2019/10/02 11:11:29     65.2
            59  2019/10/02 11:11:32     67.3
            60  2019/10/02 11:11:35     67.1
            61  2019/10/02 11:11:38     66.0
            62  2019/10/02 11:11:41     64.6
            63  2019/10/02 11:11:44     64.7
            64  2019/10/02 11:11:47     65.2
            65  2019/10/02 11:11:50     68.5
            66  2019/10/02 11:11:53     63.8
            67  2019/10/02 11:11:56     63.7
            68  2019/10/02 11:11:59     63.5
            69  2019/10/02 11:12:02     65.4
            70  2019/10/02 11:12:05     65.3
            71  2019/10/02 11:12:08     64.8
            72  2019/10/02 11:12:11     65.7
            73  2019/10/02 11:12:14     68.0
            74  2019/10/02 11:12:17     68.5
            75  2019/10/02 11:12:20     67.2
            76  2019/10/02 11:12:23     65.6
            77  2019/10/02 11:12:26     66.8
            78  2019/10/02 11:12:29     65.1
            79  2019/10/02 11:12:32     64.7
            80  2019/10/02 11:12:35     64.7
            81  2019/10/02 11:12:38     63.3
            82  2019/10/02 11:12:41     61.2
            83  2019/10/02 11:12:44     61.6
            84  2019/10/02 11:12:47     60.1
            85  2019/10/02 11:12:50     59.4
```

```
 86  2019/10/02 11:12:53     59.4
 87  2019/10/02 11:12:56     60.9
 88  2019/10/02 11:12:59     61.2
 89  2019/10/02 11:13:02     63.6
 90  2019/10/02 11:13:05     65.0
 91  2019/10/02 11:13:08     68.1
 92  2019/10/02 11:13:11     66.7
 93  2019/10/02 11:13:14     67.3
 94  2019/10/02 11:13:17     66.1
 95  2019/10/02 11:13:20     66.0
 96  2019/10/02 11:13:23     64.8
 97  2019/10/02 11:13:26     65.0
 98  2019/10/02 11:13:29     65.5
 99  2019/10/02 11:13:32     66.0
100  2019/10/02 11:13:35     66.7
101  2019/10/02 11:13:38     65.9
102  2019/10/02 11:13:41     65.4
103  2019/10/02 11:13:44     67.0
104  2019/10/02 11:13:47     65.8
105  2019/10/02 11:13:50     65.3
106  2019/10/02 11:13:53     66.9
107  2019/10/02 11:13:56     66.9
108  2019/10/02 11:13:59     68.7
109  2019/10/02 11:14:02     67.1
110  2019/10/02 11:14:05     66.8
111  2019/10/02 11:14:08     68.0
112  2019/10/02 11:14:11     66.0
113  2019/10/02 11:14:14     65.6
114  2019/10/02 11:14:17     66.5
115  2019/10/02 11:14:20     66.1
116  2019/10/02 11:14:23     66.2
117  2019/10/02 11:14:26     67.6
118  2019/10/02 11:14:29     66.9
119  2019/10/02 11:14:32     67.5
120  2019/10/02 11:14:35     67.7
121  2019/10/02 11:14:38     66.8
122  2019/10/02 11:14:41     65.0
123  2019/10/02 11:14:44     64.4
124  2019/10/02 11:14:47     64.3
125  2019/10/02 11:14:50     62.3
126  2019/10/02 11:14:53     61.8
127  2019/10/02 11:14:56     60.1
128  2019/10/02 11:14:59     59.7
129  2019/10/02 11:15:02     57.2
130  2019/10/02 11:15:05     57.2
131  2019/10/02 11:15:08     55.2
132  2019/10/02 11:15:11     54.8
133  2019/10/02 11:15:14     56.2
134  2019/10/02 11:15:17     57.1
135  2019/10/02 11:15:20     56.4
136  2019/10/02 11:15:23     57.1
137  2019/10/02 11:15:26     60.1
138  2019/10/02 11:15:29     61.2
139  2019/10/02 11:15:32     60.5
140  2019/10/02 11:15:35     59.2
141  2019/10/02 11:15:38     57.1
142  2019/10/02 11:15:41     60.4
143  2019/10/02 11:15:44     58.9
144  2019/10/02 11:15:47     60.7
145  2019/10/02 11:15:50     60.7
146  2019/10/02 11:15:53     60.9
147  2019/10/02 11:15:56     59.9
148  2019/10/02 11:15:59     60.2
149  2019/10/02 11:16:02     60.4
150  2019/10/02 11:16:05     61.0
151  2019/10/02 11:16:08     59.7
152  2019/10/02 11:16:11     60.1
153  2019/10/02 11:16:14     59.3
154  2019/10/02 11:16:17     59.6
155  2019/10/02 11:16:20     59.7
156  2019/10/02 11:16:23     60.1
157  2019/10/02 11:16:26     61.3
158  2019/10/02 11:16:29     59.7
159  2019/10/02 11:16:32     60.9
160  2019/10/02 11:16:35     61.2
161  2019/10/02 11:16:38     60.4
162  2019/10/02 11:16:41     60.6
163  2019/10/02 11:16:44     60.0
164  2019/10/02 11:16:47     60.1
165  2019/10/02 11:16:50     59.8
166  2019/10/02 11:16:53     59.1
167  2019/10/02 11:16:56     58.9
168  2019/10/02 11:16:59     59.7
169  2019/10/02 11:17:02     59.7
170  2019/10/02 11:17:05     61.2
171  2019/10/02 11:17:08     63.5
172  2019/10/02 11:17:11     63.5
173  2019/10/02 11:17:14     61.5
174  2019/10/02 11:17:17     60.9
175  2019/10/02 11:17:20     59.8
176  2019/10/02 11:17:23     58.8
177  2019/10/02 11:17:26     58.6
178  2019/10/02 11:17:29     58.8
179  2019/10/02 11:17:32     59.3
180  2019/10/02 11:17:35     62.9
181  2019/10/02 11:17:38     61.5
182  2019/10/02 11:17:41     61.8
183  2019/10/02 11:17:44     61.4
184  2019/10/02 11:17:47     61.1
```

```
185  2019/10/02 11:17:50     60.6
186  2019/10/02 11:17:53     61.6
187  2019/10/02 11:17:56     59.7
188  2019/10/02 11:17:59     60.1
189  2019/10/02 11:18:02     60.6
190  2019/10/02 11:18:05     59.8
191  2019/10/02 11:18:08     60.4
192  2019/10/02 11:18:11     59.7
193  2019/10/02 11:18:14     61.7
194  2019/10/02 11:18:17     63.4
195  2019/10/02 11:18:20     62.3
196  2019/10/02 11:18:23     64.8
197  2019/10/02 11:18:26     66.8
198  2019/10/02 11:18:29     67.8
199  2019/10/02 11:18:32     65.5
200  2019/10/02 11:18:35     63.6
201  2019/10/02 11:18:38     62.1
202  2019/10/02 11:18:41     61.0
203  2019/10/02 11:18:44     60.1
204  2019/10/02 11:18:47     59.8
205  2019/10/02 11:18:50     64.0
206  2019/10/02 11:18:53     62.2
207  2019/10/02 11:18:56     62.0
208  2019/10/02 11:18:59     67.2
209  2019/10/02 11:19:02     63.4
210  2019/10/02 11:19:05     61.7
211  2019/10/02 11:19:08     62.5
212  2019/10/02 11:19:11     68.3
213  2019/10/02 11:19:14     62.2
214  2019/10/02 11:19:17     65.2
215  2019/10/02 11:19:20     62.5
216  2019/10/02 11:19:23     58.5
217  2019/10/02 11:19:26     58.5
218  2019/10/02 11:19:29     62.5
219  2019/10/02 11:19:32     60.9
220  2019/10/02 11:19:35     59.7
221  2019/10/02 11:19:38     60.6
222  2019/10/02 11:19:41     60.2
223  2019/10/02 11:19:44     59.4
224  2019/10/02 11:19:47     59.0
225  2019/10/02 11:19:50     58.0
226  2019/10/02 11:19:53     60.4
227  2019/10/02 11:19:56     60.2
228  2019/10/02 11:19:59     58.8
229  2019/10/02 11:20:02     58.1
230  2019/10/02 11:20:05     60.2
231  2019/10/02 11:20:08     62.6
232  2019/10/02 11:20:11     63.3
233  2019/10/02 11:20:14     60.3
234  2019/10/02 11:20:17     59.7
235  2019/10/02 11:20:20     59.3
236  2019/10/02 11:20:23     61.0
237  2019/10/02 11:20:26     62.0
238  2019/10/02 11:20:29     63.4
239  2019/10/02 11:20:32     66.0
240  2019/10/02 11:20:35     65.2
241  2019/10/02 11:20:38     65.3
242  2019/10/02 11:20:41     64.8
243  2019/10/02 11:20:44     61.2
244  2019/10/02 11:20:47     60.8
245  2019/10/02 11:20:50     60.9
246  2019/10/02 11:20:53     63.1
247  2019/10/02 11:20:56     60.3
248  2019/10/02 11:20:59     58.9
249  2019/10/02 11:21:02     59.1
250  2019/10/02 11:21:05     59.4
251  2019/10/02 11:21:08     59.5
252  2019/10/02 11:21:11     59.2
253  2019/10/02 11:21:14     60.4
254  2019/10/02 11:21:17     60.9
255  2019/10/02 11:21:20     62.3
256  2019/10/02 11:21:23     63.2
257  2019/10/02 11:21:26     64.1
258  2019/10/02 11:21:29     62.9
259  2019/10/02 11:21:32     62.1
260  2019/10/02 11:21:35     63.5
261  2019/10/02 11:21:38     62.3
262  2019/10/02 11:21:41     62.6
263  2019/10/02 11:21:44     59.3
264  2019/10/02 11:21:47     60.6
265  2019/10/02 11:21:50     61.6
266  2019/10/02 11:21:53     61.6
267  2019/10/02 11:21:56     62.3
268  2019/10/02 11:21:59     61.7
269  2019/10/02 11:22:02     58.6
270  2019/10/02 11:22:05     60.8
271  2019/10/02 11:22:08     61.4
272  2019/10/02 11:22:11     59.0
273  2019/10/02 11:22:14     58.5
274  2019/10/02 11:22:17     58.9
275  2019/10/02 11:22:20     59.8
276  2019/10/02 11:22:23     61.0
277  2019/10/02 11:22:26     59.8
278  2019/10/02 11:22:29     58.9
279  2019/10/02 11:22:32     58.8
280  2019/10/02 11:22:35     59.8
281  2019/10/02 11:22:38     60.1
282  2019/10/02 11:22:41     61.4
283  2019/10/02 11:22:44     61.8
```

```
284  2019/10/02 11:22:47     64.5
285  2019/10/02 11:22:50     56.8
286  2019/10/02 11:22:53     54.0
287  2019/10/02 11:22:56     53.9
288  2019/10/02 11:22:59     53.6
289  2019/10/02 11:23:02     55.1
290  2019/10/02 11:23:05     55.7
291  2019/10/02 11:23:08     56.7
292  2019/10/02 11:23:11     59.1
293  2019/10/02 11:23:14     59.4
294  2019/10/02 11:23:17     60.7
295  2019/10/02 11:23:20     60.7
296  2019/10/02 11:23:23     59.9
297  2019/10/02 11:23:26     57.4
298  2019/10/02 11:23:29     57.2
299  2019/10/02 11:23:32     56.7
300  2019/10/02 11:23:35     59.3
```

```
                Roadway Construction Noise Model (RCNM),Version 1.1


Report date:          11/07/2019

Case Description:       UCR - Architectural Coating


                          **** Receptor #1 ****


                                  Baselines (dBA)

Description           Land Use       Daytime    Evening    Night

-----------           --------       -------    -------    -----

MFR - Big Springs Rd    Residential       65.0       55.0     45.0


                             Equipment

                             ---------

                                 Spec    Actual    Receptor    Estimated

                        Impact  Usage    Lmax    Lmax     Distance    Shielding

Description                 Device   (%)     (dBA)   (dBA)     (feet)      (dBA)

-----------                 ------  -----    -----   -----     --------    ---------

Compressor (air)              No     40           77.7       700.0        0.0


                             Results

                             -------

                                        Noise Limits (dBA)                   Noise Limit Exceedance (dBA)

                                 --------------------------------------------    --------------------------------------------

                       Calculated (dBA)       Day         Evening        Night           Day          Evening         Night

                       ----------------   --------------   -------------  --------------    --------------  --------------  --------------

Equipment                  Lmax    Leq       Lmax    Leq     Lmax    Leq     Lmax    Leq      Lmax    Leq     Lmax
Leq     Lmax    Leq

---------------------     ------  ------     ------  ------  ------  ------  ------  ------    ------  ------  ------  ------  ------  ------
```

```
Compressor (air)          54.7   50.8      N/A    N/A    N/A    N/A    N/A    N/A     N/A    N/A    N/A
N/A    N/A    N/A

              Total    54.7   50.8      N/A    N/A    N/A    N/A    N/A    N/A     N/A    N/A    N/A    N/A
N/A    N/A


                        **** Receptor #2 ****


                                Baselines (dBA)

Description      Land Use      Daytime    Evening    Night

-----------      --------      -------    -------    -----

GlenMor Housing   Residential      65.0      55.0     45.0


                            Equipment

                            ---------

                                   Spec    Actual    Receptor    Estimated

                      Impact  Usage    Lmax    Lmax      Distance    Shielding

Description                 Device   (%)     (dBA)   (dBA)     (feet)      (dBA)

-----------                 ------  -----    -----   -----     --------    ---------

Compressor (air)              No     40          77.7       270.0        0.0


                            Results

                            -------

                                          Noise Limits (dBA)                Noise Limit Exceedance (dBA)

                                   ---------------------------------------------    ---------------------------------------------

                     Calculated (dBA)       Day        Evening        Night           Day        Evening        Night

                     ----------------   --------------   -------------  --------------    --------------  --------------  --------------

Equipment                  Lmax    Leq       Lmax    Leq     Lmax    Leq     Lmax    Leq      Lmax    Leq     Lmax
Leq     Lmax    Leq

---------------------      ------  ------     ------  ------  ------  ------  ------  ------    ------  ------  ------  ------  ------  ------
```

Compressor (air)	63.0	59.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	63.0	59.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

```
               Roadway Construction Noise Model (RCNM),Version 1.1


Report date:          11/07/2019
Case Description:       UCR - Construction


                            **** Receptor #1 ****


                                  Baselines (dBA)
Description           Land Use       Daytime    Evening    Night
-----------           --------       -------    -------    -----
MFR - Big Springs Rd    Residential       65.0       55.0     45.0


                               Equipment
                               ---------
                                   Spec    Actual    Receptor    Estimated
                      Impact  Usage    Lmax    Lmax      Distance    Shielding
Description                  Device   (%)     (dBA)   (dBA)      (feet)       (dBA)
-----------                 ------  -----    -----   -----     --------    ---------
Man Lift                     No     20           74.7       700.0         0.0
All Other Equipment > 5 HP       No     50     85.0             700.0         0.0
All Other Equipment > 5 HP       No     50     85.0             700.0         0.0
Pumps                        No     50           80.9       700.0         0.0
Flat Bed Truck                  No     40           74.3       700.0         0.0
Flat Bed Truck                  No     40           74.3       700.0         0.0
Flat Bed Truck                  No     40           74.3       700.0         0.0
Flat Bed Truck                  No     40           74.3       700.0         0.0
Flat Bed Truck                  No     40           74.3       700.0         0.0
Flat Bed Truck                  No     40           74.3       700.0         0.0
Flat Bed Truck                  No     40           74.3       700.0         0.0
```

```
Flat Bed Truck                No     40          74.3       700.0        0.0

Compactor (ground)            No     20          83.2       700.0        0.0

Compactor (ground)            No     20          83.2       700.0        0.0


                        Results

                        -------

                                 Noise Limits (dBA)                Noise Limit Exceedance (dBA)

                            ----------------------------------------------    ----------------------------------------------

                    Calculated (dBA)       Day         Evening        Night          Day         Evening        Night

                    ----------------   --------------   -------------  --------------    --------------  --------------  --------------

Equipment                Lmax    Leq      Lmax    Leq     Lmax    Leq     Lmax    Leq      Lmax    Leq     Lmax
Leq     Lmax    Leq

----------------------     ------  ------     ------  ------  ------  ------  ------  ------    ------  ------  ------  ------  ------  ------

Man Lift                51.8    44.8       N/A     N/A     N/A     N/A     N/A     N/A      N/A     N/A     N/A     N/A
N/A     N/A

All Other Equipment > 5 HP    62.1    59.1       N/A     N/A     N/A     N/A     N/A     N/A      N/A     N/A     N/A
N/A     N/A     N/A

All Other Equipment > 5 HP    62.1    59.1       N/A     N/A     N/A     N/A     N/A     N/A      N/A     N/A     N/A
N/A     N/A     N/A

Pumps                   58.0    55.0       N/A     N/A     N/A     N/A     N/A     N/A      N/A     N/A     N/A     N/A
N/A     N/A

Flat Bed Truck            51.3    47.3       N/A     N/A     N/A     N/A     N/A     N/A      N/A     N/A     N/A     N/A
N/A     N/A

Flat Bed Truck            51.3    47.3       N/A     N/A     N/A     N/A     N/A     N/A      N/A     N/A     N/A     N/A
N/A     N/A

Flat Bed Truck            51.3    47.3       N/A     N/A     N/A     N/A     N/A     N/A      N/A     N/A     N/A     N/A
N/A     N/A

Flat Bed Truck            51.3    47.3       N/A     N/A     N/A     N/A     N/A     N/A      N/A     N/A     N/A     N/A
N/A     N/A

Flat Bed Truck            51.3    47.3       N/A     N/A     N/A     N/A     N/A     N/A      N/A     N/A     N/A     N/A
N/A     N/A

Flat Bed Truck            51.3    47.3       N/A     N/A     N/A     N/A     N/A     N/A      N/A     N/A     N/A     N/A
N/A     N/A
```

```
Flat Bed Truck            51.3   47.3      N/A    N/A    N/A    N/A    N/A    N/A     N/A    N/A    N/A    N/A
N/A    N/A

Flat Bed Truck            51.3   47.3      N/A    N/A    N/A    N/A    N/A    N/A     N/A    N/A    N/A    N/A
N/A    N/A

Compactor (ground)         60.3   53.3      N/A    N/A    N/A    N/A    N/A    N/A     N/A    N/A    N/A
N/A    N/A    N/A

Compactor (ground)         60.3   53.3      N/A    N/A    N/A    N/A    N/A    N/A     N/A    N/A    N/A
N/A    N/A    N/A

               Total     62.1   64.5      N/A    N/A    N/A    N/A    N/A    N/A     N/A    N/A    N/A    N/A
N/A    N/A


                         **** Receptor #2 ****


                                  Baselines (dBA)

Description       Land Use       Daytime    Evening    Night

-----------       --------       -------    -------    -----

GlenMor Housing    Residential       65.0      55.0     45.0


                             Equipment

                             ---------

                                     Spec    Actual    Receptor    Estimated

                        Impact  Usage    Lmax    Lmax     Distance    Shielding

Description                Device   (%)    (dBA)   (dBA)     (feet)      (dBA)

-----------                ------  -----    -----   -----     --------    ---------

Man Lift                      No     20           74.7       270.0         0.0

All Other Equipment > 5 HP       No     50     85.0            270.0         0.0

All Other Equipment > 5 HP       No     50     85.0            270.0         0.0

Pumps                         No     50           80.9       270.0         0.0

Flat Bed Truck                  No     40           74.3       270.0         0.0

Flat Bed Truck                  No     40           74.3       270.0         0.0
```

```
Flat Bed Truck              No    40          74.3      270.0        0.0

Flat Bed Truck              No    40          74.3      270.0        0.0

Flat Bed Truck              No    40          74.3      270.0        0.0

Flat Bed Truck              No    40          74.3      270.0        0.0

Flat Bed Truck              No    40          74.3      270.0        0.0

Flat Bed Truck              No    40          74.3      270.0        0.0

Compactor (ground)              No    20          83.2      270.0        0.0

Compactor (ground)              No    20          83.2      270.0        0.0


                        Results

                        -------

                                  Noise Limits (dBA)                    Noise Limit Exceedance (dBA)

                             ---------------------------------------------    ---------------------------------------------

                  Calculated (dBA)       Day         Evening        Night           Day          Evening         Night

                  ----------------   --------------   -------------  --------------    --------------  --------------  --------------

Equipment                   Lmax    Leq       Lmax    Leq     Lmax    Leq     Lmax    Leq       Lmax    Leq     Lmax
Leq     Lmax    Leq

----------------------      ------  ------     ------  ------  ------  ------  ------  ------     ------  ------  ------  ------  ------  ------

Man Lift                  60.1    53.1       N/A     N/A     N/A     N/A     N/A     N/A      N/A     N/A     N/A     N/A
N/A     N/A

All Other Equipment > 5 HP    70.4    67.3       N/A     N/A     N/A     N/A     N/A     N/A      N/A     N/A     N/A
N/A     N/A     N/A

All Other Equipment > 5 HP    70.4    67.3       N/A     N/A     N/A     N/A     N/A     N/A      N/A     N/A     N/A
N/A     N/A     N/A

Pumps                     66.3    63.3       N/A     N/A     N/A     N/A     N/A     N/A      N/A     N/A     N/A     N/A
N/A     N/A

Flat Bed Truck              59.6    55.6       N/A     N/A     N/A     N/A     N/A     N/A      N/A     N/A     N/A     N/A
N/A     N/A

Flat Bed Truck              59.6    55.6       N/A     N/A     N/A     N/A     N/A     N/A      N/A     N/A     N/A     N/A
N/A     N/A

Flat Bed Truck              59.6    55.6       N/A     N/A     N/A     N/A     N/A     N/A      N/A     N/A     N/A     N/A
N/A     N/A
```

Flat Bed Truck	59.6	55.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Flat Bed Truck	59.6	55.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Flat Bed Truck	59.6	55.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Flat Bed Truck	59.6	55.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Flat Bed Truck	59.6	55.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compactor (ground)	68.6	61.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compactor (ground)	68.6	61.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	70.4	72.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

```
                    Roadway Construction Noise Model (RCNM),Version 1.1


Report date:          11/07/2019

Case Description:       UCR - Demolition


                         **** Receptor #1 ****


                              Baselines (dBA)

Description           Land Use       Daytime    Evening    Night

-----------           --------       -------    -------    -----

MFR - Big Springs Rd    Residential       65.0       55.0     45.0


                            Equipment

                            ---------

                       Spec    Actual    Receptor    Estimated

          Impact  Usage    Lmax    Lmax      Distance    Shielding

Description  Device    (%)     (dBA)   (dBA)      (feet)       (dBA)

-----------  ------  -----    -----   -----     --------    ---------

Excavator       No     40           80.7       700.0         0.0

Dozer           No     40           81.7       700.0         0.0

Backhoe         No     40           77.6       700.0         0.0

Tractor         No     40    84.0              700.0         0.0

Backhoe         No     40           77.6       700.0         0.0


                            Results

                            -------

                                    Noise Limits (dBA)                   Noise Limit Exceedance (dBA)

                              ---------------------------------------------    ---------------------------------------------

                    Calculated (dBA)       Day         Evening         Night            Day          Evening         Night
```

```
                ----------------   --------------   -------------  --------------    --------------  --------------  --------------

Equipment              Lmax    Leq       Lmax    Leq     Lmax    Leq     Lmax    Leq      Lmax    Leq     Lmax    Leq
Lmax    Leq

----------------------  ------  ------     ------  ------  ------  ------  ------  ------    ------  ------  ------  ------  ------  ------

Excavator              57.8    53.8       N/A     N/A     N/A     N/A     N/A     N/A      N/A     N/A     N/A     N/A
N/A     N/A

Dozer                  58.7    54.8       N/A     N/A     N/A     N/A     N/A     N/A      N/A     N/A     N/A     N/A
N/A     N/A

Backhoe                54.6    50.7       N/A     N/A     N/A     N/A     N/A     N/A      N/A     N/A     N/A     N/A
N/A     N/A

Tractor                61.1    57.1       N/A     N/A     N/A     N/A     N/A     N/A      N/A     N/A     N/A     N/A
N/A     N/A

Backhoe                54.6    50.7       N/A     N/A     N/A     N/A     N/A     N/A      N/A     N/A     N/A     N/A
N/A     N/A

           Total     61.1    61.1       N/A     N/A     N/A     N/A     N/A     N/A      N/A     N/A     N/A     N/A     N/A
N/A


                        **** Receptor #2 ****


                               Baselines (dBA)

Description       Land Use       Daytime    Evening    Night

-----------       --------       -------    -------    -----

GlenMor Housing    Residential       65.0       55.0     45.0


                           Equipment

                           ---------

                      Spec    Actual    Receptor    Estimated

          Impact  Usage    Lmax    Lmax     Distance    Shielding

Description  Device   (%)    (dBA)   (dBA)     (feet)      (dBA)

-----------  ------  -----    -----   -----     --------    ---------

Excavator       No     40          80.7       270.0        0.0
```

```
Dozer          No    40          81.7       270.0        0.0

Backhoe          No    40          77.6       270.0        0.0

Tractor        No    40    84.0             270.0        0.0

Backhoe          No    40          77.6       270.0        0.0


                         Results

                         -------

                                   Noise Limits (dBA)                    Noise Limit Exceedance (dBA)

                            ---------------------------------------------    ---------------------------------------------

                Calculated (dBA)       Day         Evening        Night            Day         Evening        Night

                ----------------   --------------   -------------  --------------    --------------  --------------  --------------

Equipment              Lmax    Leq       Lmax    Leq     Lmax    Leq     Lmax    Leq      Lmax    Leq     Lmax    Leq
Lmax    Leq

----------------------  ------  ------     ------  ------  ------  ------  ------  ------    ------  ------  ------  ------  ------  ------

Excavator              66.1    62.1       N/A    N/A    N/A    N/A    N/A    N/A     N/A    N/A    N/A    N/A
N/A    N/A

Dozer                67.0    63.0       N/A    N/A    N/A    N/A    N/A    N/A     N/A    N/A    N/A    N/A
N/A    N/A

Backhoe              62.9    58.9       N/A    N/A    N/A    N/A    N/A    N/A     N/A    N/A    N/A    N/A
N/A    N/A

Tractor              69.4    65.4       N/A    N/A    N/A    N/A    N/A    N/A     N/A    N/A    N/A    N/A
N/A    N/A

Backhoe              62.9    58.9       N/A    N/A    N/A    N/A    N/A    N/A     N/A    N/A    N/A    N/A
N/A    N/A

           Total     69.4    69.4       N/A    N/A    N/A    N/A    N/A    N/A     N/A    N/A    N/A    N/A    N/A
N/A
```

```
                Roadway Construction Noise Model (RCNM),Version 1.1


Report date:          11/07/2019

Case Description:       UCR - Grading


                      **** Receptor #1 ****


                          Baselines (dBA)

Description           Land Use       Daytime    Evening    Night

-----------          --------       -------    -------    -----

MFR - Big Springs Rd    Residential       65.0       55.0     45.0


                        Equipment

                        ---------

                        Spec    Actual    Receptor    Estimated

              Impact  Usage    Lmax    Lmax      Distance    Shielding

Description        Device   (%)     (dBA)   (dBA)      (feet)       (dBA)

-----------        ------  -----    -----   -----     --------    ---------

Grader              No     40     85.0              700.0         0.0

Dozer               No     40            81.7       700.0         0.0

Tractor             No     40     84.0              700.0         0.0

Front End Loader       No     40            79.1       700.0         0.0

Backhoe              No     40            77.6       700.0         0.0


                        Results

                        -------

                              Noise Limits (dBA)                  Noise Limit Exceedance (dBA)

                          ---------------------------------------------    ---------------------------------------------

                Calculated (dBA)       Day         Evening        Night           Day         Evening        Night
```

```
                ----------------   --------------   -------------  --------------    --------------  --------------  --------------

Equipment              Lmax    Leq       Lmax    Leq     Lmax    Leq     Lmax    Leq       Lmax    Leq     Lmax    Leq
Lmax    Leq

----------------------  ------  ------     ------  ------  ------  ------  ------  ------    ------  ------  ------  ------  ------  ------

Grader                 62.1    58.1       N/A     N/A     N/A     N/A     N/A     N/A      N/A     N/A     N/A     N/A
N/A     N/A

Dozer                  58.7    54.8       N/A     N/A     N/A     N/A     N/A     N/A      N/A     N/A     N/A     N/A
N/A     N/A

Tractor                61.1    57.1       N/A     N/A     N/A     N/A     N/A     N/A      N/A     N/A     N/A     N/A
N/A     N/A

Front End Loader        56.2    52.2       N/A     N/A     N/A     N/A     N/A     N/A      N/A     N/A     N/A     N/A
N/A     N/A

Backhoe                54.6    50.7       N/A     N/A     N/A     N/A     N/A     N/A      N/A     N/A     N/A     N/A
N/A     N/A

            Total     62.1    62.4       N/A     N/A     N/A     N/A     N/A     N/A      N/A     N/A     N/A     N/A     N/A
N/A


                         **** Receptor #2 ****


                                  Baselines (dBA)

Description       Land Use       Daytime    Evening    Night

-----------       --------       -------    -------    -----

GlenMor Housing    Residential       65.0       55.0     45.0


                             Equipment

                             ---------

                             Spec    Actual    Receptor    Estimated

                Impact  Usage    Lmax    Lmax      Distance    Shielding

Description       Device   (%)    (dBA)   (dBA)      (feet)       (dBA)

-----------        ------  -----    -----   -----     --------    ---------

Grader              No     40    85.0              270.0         0.0
```

```
Dozer                No     40          81.7       270.0        0.0

Tractor              No     40    84.0            270.0        0.0

Front End Loader       No     40          79.1       270.0        0.0

Backhoe              No     40          77.6       270.0        0.0


                         Results

                         -------

                                        Noise Limits (dBA)                    Noise Limit Exceedance (dBA)

                             ---------------------------------------------    ---------------------------------------------

                  Calculated (dBA)       Day         Evening        Night           Day         Evening        Night

                  ----------------   --------------   -------------  --------------    --------------  --------------  --------------

Equipment             Lmax    Leq       Lmax    Leq     Lmax    Leq     Lmax    Leq       Lmax    Leq     Lmax    Leq
Lmax    Leq

----------------------  ------  ------     ------  ------  ------  ------  ------  ------    ------  ------  ------  ------  ------  ------

Grader               70.4    66.4       N/A    N/A    N/A    N/A    N/A    N/A     N/A    N/A    N/A    N/A
N/A    N/A

Dozer                67.0    63.0       N/A    N/A    N/A    N/A    N/A    N/A     N/A    N/A    N/A    N/A
N/A    N/A

Tractor              69.4    65.4       N/A    N/A    N/A    N/A    N/A    N/A     N/A    N/A    N/A    N/A
N/A    N/A

Front End Loader        64.5    60.5       N/A    N/A    N/A    N/A    N/A    N/A     N/A    N/A    N/A    N/A
N/A    N/A

Backhoe               62.9    58.9       N/A    N/A    N/A    N/A    N/A    N/A     N/A    N/A    N/A    N/A
N/A    N/A

           Total     70.4    70.7       N/A    N/A    N/A    N/A    N/A    N/A     N/A    N/A    N/A    N/A    N/A
N/A
```

```
                Roadway Construction Noise Model (RCNM),Version 1.1


Report date:          11/07/2019

Case Description:       UCR - Paving


                       **** Receptor #1 ****


                              Baselines (dBA)

Description          Land Use       Daytime    Evening    Night

-----------           --------       -------    -------    -----

MFR - Big Springs Rd    Residential       65.0       55.0     45.0


                          Equipment

                          ---------

                           Spec    Actual    Receptor    Estimated

                 Impact  Usage    Lmax    Lmax     Distance    Shielding

Description         Device   (%)     (dBA)   (dBA)      (feet)      (dBA)

-----------          ------  -----    -----   -----     --------    ---------

Flat Bed Truck          No     40           74.3       700.0         0.0

Flat Bed Truck          No     40           74.3       700.0         0.0

Flat Bed Truck          No     40           74.3       700.0         0.0

Pavement Scarafier       No     20           89.5       700.0         0.0

Roller                  No     20           80.0       700.0         0.0

Roller                  No     20           80.0       700.0         0.0


                          Results

                          -------

                                   Noise Limits (dBA)                  Noise Limit Exceedance (dBA)

                            ---------------------------------------------    ---------------------------------------------
```

```
                Calculated (dBA)      Day        Evening       Night          Day        Evening       Night
                ----------------   --------------   -------------  --------------    --------------  --------------  --------------
Equipment            Lmax    Leq      Lmax    Leq    Lmax    Leq    Lmax    Leq     Lmax    Leq    Lmax    Leq
Lmax    Leq
---------------------  ------  ------    ------  ------  ------  ------  ------  ------    ------  ------  ------  ------  ------  ------
Flat Bed Truck         51.3    47.3      N/A    N/A    N/A    N/A    N/A    N/A     N/A    N/A    N/A    N/A
N/A    N/A
Flat Bed Truck         51.3    47.3      N/A    N/A    N/A    N/A    N/A    N/A     N/A    N/A    N/A    N/A
N/A    N/A
Flat Bed Truck         51.3    47.3      N/A    N/A    N/A    N/A    N/A    N/A     N/A    N/A    N/A    N/A
N/A    N/A
Pavement Scarafier       66.6    59.6      N/A    N/A    N/A    N/A    N/A    N/A     N/A    N/A    N/A
N/A    N/A    N/A
Roller               57.1    50.1      N/A    N/A    N/A    N/A    N/A    N/A     N/A    N/A    N/A    N/A
N/A    N/A
Roller               57.1    50.1      N/A    N/A    N/A    N/A    N/A    N/A     N/A    N/A    N/A    N/A
N/A    N/A
          Total     66.6    61.1      N/A    N/A    N/A    N/A    N/A    N/A     N/A    N/A    N/A    N/A    N/A
N/A

                     **** Receptor #2 ****

                            Baselines (dBA)
Description       Land Use       Daytime    Evening    Night
-----------      --------      -------    -------    -----
GlenMor Housing    Residential       65.0      55.0     45.0

                        Equipment
                        ---------
                         Spec    Actual    Receptor    Estimated
               Impact  Usage    Lmax    Lmax     Distance    Shielding
Description         Device   (%)     (dBA)   (dBA)     (feet)      (dBA)
```

```
-----------          ------  -----    -----   -----     --------    ---------

Flat Bed Truck          No     40           74.3       270.0         0.0

Flat Bed Truck          No     40           74.3       270.0         0.0

Flat Bed Truck          No     40           74.3       270.0         0.0

Pavement Scarafier       No     20           89.5       270.0         0.0

Roller                  No     20           80.0       270.0         0.0

Roller                  No     20           80.0       270.0         0.0


                        Results

                        -------

                                  Noise Limits (dBA)                  Noise Limit Exceedance (dBA)

                           ---------------------------------------------    ---------------------------------------------

                  Calculated (dBA)       Day         Evening        Night           Day         Evening        Night

                  ----------------   --------------   -------------  --------------    --------------  --------------  --------------

Equipment               Lmax    Leq       Lmax    Leq     Lmax    Leq     Lmax    Leq      Lmax    Leq     Lmax    Leq
Lmax    Leq

---------------------  ------  ------     ------  ------  ------  ------  ------  ------    ------  ------  ------  ------  ------  ------

Flat Bed Truck          59.6    55.6       N/A    N/A    N/A    N/A    N/A    N/A     N/A    N/A    N/A    N/A
N/A    N/A

Flat Bed Truck          59.6    55.6       N/A    N/A    N/A    N/A    N/A    N/A     N/A    N/A    N/A    N/A
N/A    N/A

Flat Bed Truck          59.6    55.6       N/A    N/A    N/A    N/A    N/A    N/A     N/A    N/A    N/A    N/A
N/A    N/A

Pavement Scarafier       74.9    67.9       N/A    N/A    N/A    N/A    N/A    N/A     N/A    N/A    N/A
N/A    N/A    N/A

Roller                  65.4    58.4       N/A    N/A    N/A    N/A    N/A    N/A     N/A    N/A    N/A    N/A
N/A    N/A

Roller                  65.4    58.4       N/A    N/A    N/A    N/A    N/A    N/A     N/A    N/A    N/A    N/A
N/A    N/A

           Total      74.9    69.3       N/A    N/A    N/A    N/A    N/A    N/A     N/A    N/A    N/A    N/A    N/A
N/A
```

```
                 Roadway Construction Noise Model (RCNM),Version 1.1


Report date:          11/07/2019

Case Description:       UCR - Site Preparation


                          **** Receptor #1 ****


                                Baselines (dBA)

Description            Land Use       Daytime    Evening    Night

-----------            --------       -------    -------    -----

MFR - Big Springs Rd    Residential       65.0       55.0     45.0


                            Equipment

                            ---------

                            Spec    Actual    Receptor    Estimated

               Impact  Usage    Lmax    Lmax      Distance    Shielding

Description        Device   (%)     (dBA)   (dBA)      (feet)       (dBA)

-----------        ------  -----    -----   -----     --------    ---------

Dozer               No     40           81.7       700.0         0.0

Dozer               No     40           81.7       700.0         0.0

Dozer               No     40           81.7       700.0         0.0

Tractor             No     40    84.0             700.0         0.0

Backhoe               No     40           77.6       700.0         0.0

Front End Loader       No     40           79.1       700.0         0.0


                            Results

                            -------

                                    Noise Limits (dBA)                  Noise Limit Exceedance (dBA)

                              ---------------------------------------------    ---------------------------------------------
```

```
                Calculated (dBA)      Day        Evening       Night          Day        Evening       Night

                ----------------  --------------  -------------  --------------   --------------  --------------  --------------

Equipment              Lmax    Leq      Lmax    Leq     Lmax    Leq     Lmax    Leq      Lmax    Leq     Lmax    Leq
Lmax    Leq

---------------------  ------  ------    ------  ------  ------  ------  ------  ------    ------  ------  ------  ------  ------  ------

Dozer                 58.7    54.8      N/A     N/A     N/A     N/A     N/A     N/A      N/A     N/A     N/A     N/A
N/A     N/A

Dozer                 58.7    54.8      N/A     N/A     N/A     N/A     N/A     N/A      N/A     N/A     N/A     N/A
N/A     N/A

Dozer                 58.7    54.8      N/A     N/A     N/A     N/A     N/A     N/A      N/A     N/A     N/A     N/A
N/A     N/A

Tractor               61.1    57.1      N/A     N/A     N/A     N/A     N/A     N/A      N/A     N/A     N/A     N/A
N/A     N/A

Backhoe                 54.6    50.7      N/A     N/A     N/A     N/A     N/A     N/A      N/A     N/A     N/A     N/A
N/A     N/A

Front End Loader        56.2    52.2      N/A     N/A     N/A     N/A     N/A     N/A      N/A     N/A     N/A     N/A
N/A     N/A

          Total     61.1    62.3      N/A     N/A     N/A     N/A     N/A     N/A      N/A     N/A     N/A     N/A     N/A
N/A


                    **** Receptor #2 ****


                           Baselines (dBA)

Description      Land Use      Daytime    Evening    Night

-----------      --------      -------    -------    -----

GlenMor Housing    Residential       65.0      55.0     45.0


                       Equipment

                       ---------

                       Spec    Actual    Receptor    Estimated

             Impact  Usage    Lmax    Lmax     Distance    Shielding

Description       Device   (%)    (dBA)   (dBA)     (feet)      (dBA)
```

```
-----------       ------  -----   -----   -----    --------    ---------

Dozer              No    40         81.7      270.0        0.0

Dozer              No    40         81.7      270.0        0.0

Dozer              No    40         81.7      270.0        0.0

Tractor            No    40    84.0            270.0        0.0

Backhoe              No    40         77.6      270.0        0.0

Front End Loader       No    40         79.1      270.0        0.0


                         Results

                         -------

                                      Noise Limits (dBA)                Noise Limit Exceedance (dBA)

                             ---------------------------------------------   ---------------------------------------------

                  Calculated (dBA)      Day        Evening       Night          Day        Evening        Night

                  ----------------   --------------   -------------  --------------    --------------  --------------  --------------

Equipment              Lmax    Leq      Lmax    Leq    Lmax    Leq    Lmax    Leq     Lmax    Leq    Lmax    Leq
Lmax    Leq

---------------------  ------  ------    ------  ------  ------  ------  ------  ------    ------  ------  ------  ------  ------  ------

Dozer               67.0    63.0      N/A    N/A    N/A    N/A    N/A    N/A     N/A    N/A    N/A    N/A
N/A    N/A

Dozer               67.0    63.0      N/A    N/A    N/A    N/A    N/A    N/A     N/A    N/A    N/A    N/A
N/A    N/A

Dozer               67.0    63.0      N/A    N/A    N/A    N/A    N/A    N/A     N/A    N/A    N/A    N/A
N/A    N/A

Tractor              69.4    65.4      N/A    N/A    N/A    N/A    N/A    N/A     N/A    N/A    N/A    N/A
N/A    N/A

Backhoe               62.9    58.9      N/A    N/A    N/A    N/A    N/A    N/A     N/A    N/A    N/A    N/A
N/A    N/A

Front End Loader        64.5    60.5      N/A    N/A    N/A    N/A    N/A    N/A     N/A    N/A    N/A    N/A
N/A    N/A

           Total     69.4    70.6      N/A    N/A    N/A    N/A    N/A    N/A     N/A    N/A    N/A    N/A    N/A
N/A
```

Appendix E

Transportation Operations Study

UC Riverside

Parking Structure 1

Transportation Operations Study

Prepared for:
University of California, Riverside

November 4, 2019

OC19-0631

FEHR & PEERS

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Appendices

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1. Executive Summary

Fehr & Peers has completed a transportation operations study for the proposed University of California Riverside (UC Riverside) Parking Structure 1 (Project). This report summarizes the methodology, findings and conclusions of the traffic operations analysis, including identification of potential improvements, where feasible.

The traffic operations analysis considered Existing and Cumulative (Year 2025) conditions with and without the Project in place. The preliminary design shows that Parking Structure 1 will have a total of 1,079 spaces, the eastern portions of Lot 13 will have a total of 212 surface spaces and the western portion of Lot 13 will have 217 spaces. Since Lot 13 currently has 683 parking spaces, the Project results in an increase of 825 parking spaces. Given that final design is still underway, the traffic operations analysis reflects the potential addition of up to 850 net new spaces with the Project.

While the Project itself would not generate new vehicle trips, the vehicles accessing the project site during the AM and PM peak hours were assigned to the nearby intersections assuming they were all new trips. In reality, these vehicles reflect student and faculty/staff growth expected to occur overtime and existing vehicle trips rerouting to Parking Structure 1 as a result of surface parking being displaced by new campus buildings. Assuming 95% parking occupancy, approximately 330 vehicles are expected to access the Project site to utilize the additional parking available during the AM peak hour and approximately 300 vehicles are expected to access the site during the PM peak hour.

Under Existing conditions, all intersections operate acceptably at LOS D or better except for Intersection 9: Watkins Drive & Big Springs Road during the AM and PM peak hours. The Watkins Drive & Big Springs Road intersection currently operates at LOS F during the AM peak hour and LOS E during the PM peak hour. With the Project, additional vehicles are expected to travel through this intersection to access the new parking that will be provided with Structure 1. Assuming that the new parking reaches 95% occupancy upon opening, the delay at the Watkins Drive & Big Springs Road intersection is expected to increase by approximately 15 seconds during the AM peak hour and 10 seconds during the PM peak hour.

Under Cumulative conditions, three intersections are expected to operate at LOS E or F by 2025: Intersection 6: Linden Street & Aberdeen Drive, Intersection 7: Canyon Crest Drive & Linden Street, and Intersection 9: Watkins Drive & Big Springs Road. These three intersections would continue to operate at LOS E or F with the Project. The reduction in level of service at Intersections 6 and 7 under Cumulative conditions is primarily due to the amount of growth assumed in the northern portion of the campus by

Year 2025. Specifically, buildout of the North District Development site is assumed to occur under the Cumulative conditions analysis. The North District Development project explored various improvements that may be needed upon buildout, including potential improvements at all three intersections listed above. For projects with multiple phases of development, UC Riverside monitors conditions overtime to determine the actual need and timing for improvements to nearby intersections that may be required.

The need for potential improvements was determined through the analysis of study intersections under Existing Plus Project and Cumulative Plus Project conditions. Given that poor traffic operations at Intersections 6 and 7 only occur under Cumulative conditions due to background growth projections and development of the North District Development, improvements needed with the opening of the Project are not being considered. In addition, these intersections are expected to operate acceptably assuming 95% occupancy of the Project under Existing Plus Project conditions.

Operations at Intersection 9: Watkins Drive & Big Springs Road are LOS E/F under Existing conditions and vehicle delay is expected to increase by approximately 15 seconds during the AM peak hour and 10 seconds during the PM peak hour with the Project. Under Cumulative conditions, background traffic growth is expected to worsen operations and the Project would add a similar amount of additional delay as under Existing Plus Project conditions (15 second increase in the AM peak hour and 13 second increase in the PM peak hour). Given that this intersection currently operates unacceptably and that the Project is expected to worsen delay, the following improvement can be considered for implementation:

- Intersection 9: Watkins Drive & Big Springs Road – The installation of a traffic signal would improve operations to LOS C or better during the AM and PM peak hours under both Existing and Cumulative conditions with the Project.

The Watkins Drive & Big Springs Road intersection is under the jurisdiction of the City of Riverside. The City has previously identified the need for a traffic signal at this location and applied for grant funding to implement the signalization; however, the grant funding was not awarded. Therefore, UC Riverside and the City are exploring other funding options. While the signalization of this intersection is not a requirement of the Project, providing a signal will help to minimize driver delays and provide a protected crossing for pedestrians.

2. Introduction

Fehr & Peers has completed a transportation operations study for the proposed University of California Riverside (UC Riverside) Parking Structure 1 (Project) in Riverside, California. This report summarizes the methodology, findings and conclusions of the analysis, including identification of potential improvements, where feasible. This chapter summarizes the characteristics of the Project, outlines the geographic scope of the transportation analysis, and presents the analysis scenarios.

2.1 Purpose of Transportation Operations Study

Senate Bill 743 (SB 743) 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. On September 27, 2013, California Governor Jerry Brown signed SB 743 into law and started a process that changes transportation impact analysis as part of CEQA compliance. These changes include elimination of auto delay, level of service (LOS), and other similar measures of vehicular capacity or traffic congestion as a basis for determining significant impacts for projects in California.

In January 2016, OPR updated the CEQA Guidelines "Revised Proposal on Updates to the CEQA Guidelines on Evaluating Transportation Impacts in CEQA". In this update, the evaluation of vehicle miles traveled (VMT) was recognized as "generally the most appropriate measure of transportation impacts." In November 2017, OPR proposed a new section to the CEQA Guidelines, 15064.3, for use in determining the significance of transportation impacts. The purpose of this section is to describe specific elements for considering the transportation impacts of a project given the use of VMT as the primary measurement. This section was later updated in July 2018 and finalized in December 2018 with criteria for analyzing transportation impacts.

Per the guidance from OPR, a lead agency may elect to be governed by the provisions of the new CEQA Guidelines immediately; however, the new guidelines shall be applied statewide no later than July 1, 2020. While other local jurisdictions are still determining their impact methodologies and processes based on the updated CEQA Guidelines, UC Riverside is now utilizing the guidelines to assess Project impacts as they provide the most current direction from the State and reflect the most defensible guidance available.

While changes to driver delay no longer constitute a CEQA impact, UC Riverside can still conduct a traffic operations study to assess the need for any potential improvements to roadways or intersections in the vicinity of campus. The purpose of this transportation operations study is to analyze the changes to vehicle travel flows in the study area with the construction of Parking Structure 1.

2.2 Project Description

The UC Riverside Parking Structure 1 is located on the UC Riverside campus, three miles east of downtown Riverside and just west of the Box Springs Mountains. The campus is generally bounded by University Avenue and Blaine Street on the north, Watkins Drive and Valencia Hill Drive on the east, and Iowa Avenue on the west. The campus is bisected diagonally by the I-215/SR-60 freeway. The area to the east of I-215/SR-60 is referred to as the East Campus.

Parking Structure 1 is proposed to be located in the current Parking Lot 13 which is south of Big Springs Road, west of Watkins Drive, and east of E. Campus Drive. The construction of Parking Structure 1 will reconfigure Parking Lot 13 to include both structured parking and some remaining surface parking. Parking Structure 1 will have a total of 1,079 spaces, the eastern portions of Lot 13 will have a total of 212 surface spaces and the western portion of Lot 13 will have 217 spaces. Since Lot 13 currently has 683 parking spaces, the Project results in an increase of 825 parking spaces. Given that final design is still underway, this report analyzes the potential addition of up to 850 net new spaces with the Project.

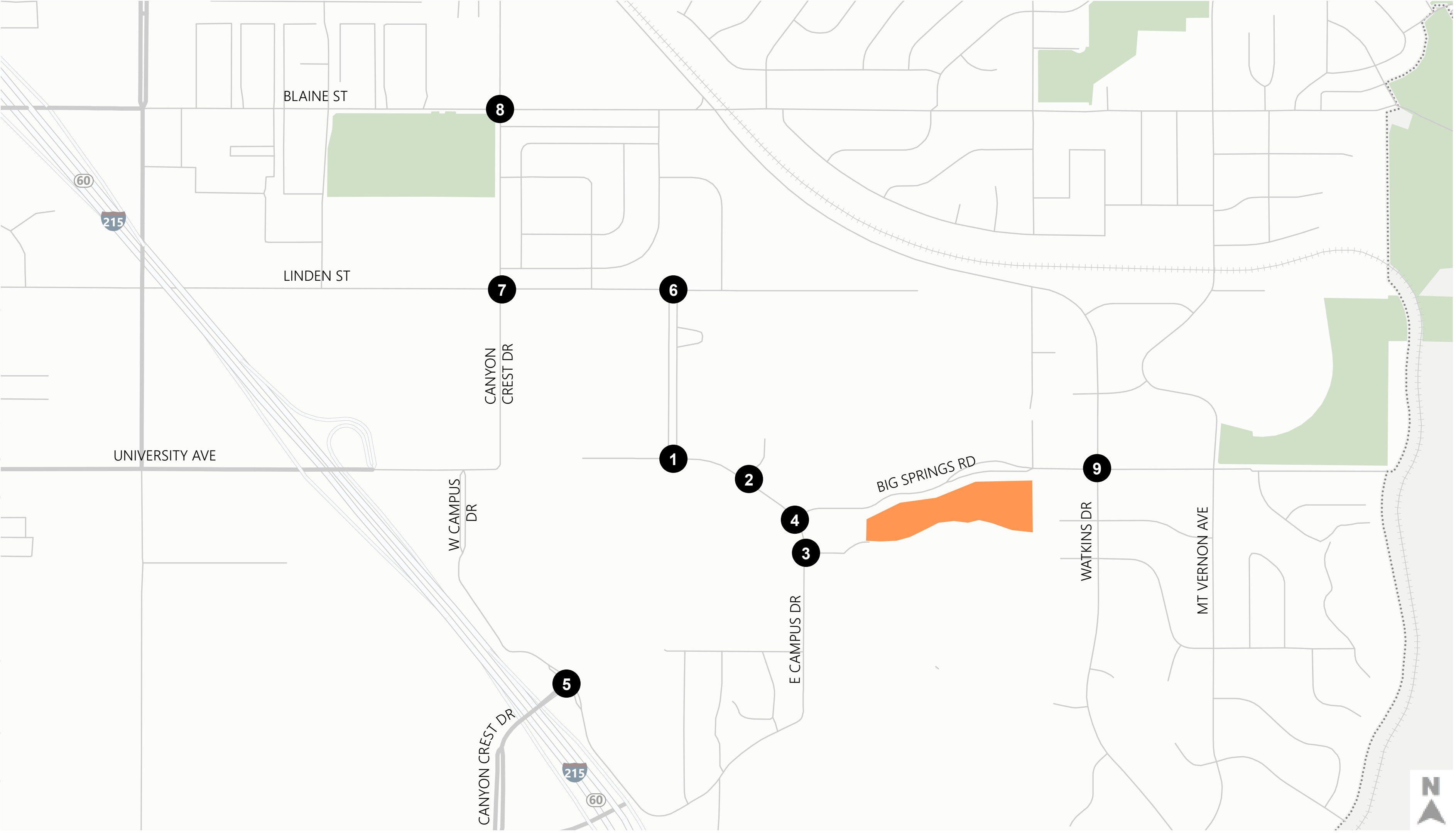
Driveways from Big Springs Road and UCR Botanic Gardens Road will provide vehicle access to the site. Multiple access options on Big Springs Road were analyzed as a part of this study, and the preferred access plan will be determined as part of the Project design.

2.3 Study Area

The study area and analyzed intersections were determined based on review of the previously prepared *UC Riverside Campus Traffic Study* (*Campus Traffic Study*), prepared by Kimley-Horn in April 2019. The following nine study intersections were also previously analyzed in the *Campus Traffic Study*:

1) North Campus Drive & Aberdeen Drive
2) North Campus Drive & Lot 15 Driveway
3) East Campus Drive & Lot 10 Driveway / Botanic Gardens Road
4) North Campus Drive & Big Springs Road
5) West Campus Drive & Canyon Crest Drive
6) Aberdeen Drive & Linden Street
7) Canyon Crest Drive & Linden Street
8) Canyon Crest Drive & Blaine Street
9) Watkins Drive & Big Springs Road

The study area and analyzed intersections are shown on **Figure 1**. Intersections 1 through 6 are within the control of the UC Riverside. The remaining intersections, Intersections 7 through 9. are within the jurisdiction of the City of Riverside.



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● Study Intersections

🟧 Project Site

Figure 1

Project Site & Study Intersections

2.4 Analysis Scenarios

To identify the effects of the Project on surrounding intersection operations, the following four scenarios were analyzed:

- Existing Conditions: Analysis based on traffic volumes and lane geometries collected in November of 2018.
- Existing Plus Project Conditions: Analysis based on the addition of Project trips to the Existing traffic volumes and lane geometries.
- Cumulative Conditions: Analysis based on traffic forecasts developed using the Riverside Traffic Analysis Model (RivTAM) with growth anticipated by Year 2025.
- Cumulative Plus Project Conditions: Analysis based on the addition of Project trips to the forecasted Year 2025 traffic volumes.

The transportation analysis was performed during typical weekday AM and PM peak hour conditions.

3. Analysis Methodology

This chapter discusses the analysis methodology and assumptions used to quantify traffic operations in the study area.

3.1 Level of Service Criteria

3.1.1 Intersection Analysis

Intersection operations analysis was performed using information from *Campus Traffic Study*, and data collected in the field. The analysis was completed using the Trafficware Synchro 10 software package. Synchro calculates vehicle delay and level of service (LOS) based on procedures identified in Chapter 19 Section 3 Approach A of the Highway Capacity Manual, 6th Edition (HCM) (Transportation Research Board, 2016), which is considered the state-of-the-practice methodology for evaluating intersection operations.

LOS is a measure of traffic operating conditions, which varies from LOS A (indicating free-flow traffic conditions with little or no delay) to LOS F (representing over-saturated conditions where traffic flows exceed design capacity resulting in long queues and delays). These ratings represent the perspective of drivers and indicate the comfort and convenience associated with driving. Peak hour traffic volumes, lane configurations, and signal timing plans were used as inputs for the LOS calculations.

Table 1 summarizes the relationship between the average control delay per vehicle and LOS for signalized and unsignalized intersections. Results from Synchro were used to determine delay and LOS at all study intersections. For signalized and all-way stop-controlled intersections, intersection LOS is determined based on average delay per the standard HCM 6th edition methodology. For two-way stop-controlled intersections, level of service is determined based on the worst-approach delay.

The following factors were applied in the intersection analysis:

- Peak Hour Factor (PHF) was based on traffic counts collected in the field for all analysis scenarios
- Heavy vehicle percentage was to set to 2% for all analysis scenarios

Table 1: Intersection Level of Service Criteria

Level of Service	Description	Signalized Delay (Seconds)	Unsignalized Delay (Seconds)
A	Operations with very low delay occurring with favorable progression and/or short cycle length.	< 10.0	< 10.0
B	Operations with low delay occurring with good progression and/or short cycle lengths.	> 10.0 to 20.0	> 10.0 to 15.0
C	Operations with average delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures begin to appear.	> 20.0 to 35.0	> 15.0 to 25.0
D	Operations with longer delays due to a combination of unfavorable progression, long cycle lengths, or high V/C ratios. Many vehicles stop and individual cycle failures are noticeable.	> 35.0 to 55.0	> 25.0 to 35.0
E	Operations with high delay values indicating poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent occurrences.	> 55.0 to 80.0	> 35.0 to 50.0
F	Operation with delays unacceptable to most drivers occurring due to over saturation, poor progression, or very long cycle lengths.	> 80.0	> 50.0

Source: Highway Capacity Manual (Transportation Research Board, 2010).

3.2 Riverside Traffic Analysis Model (RIVTAM)

For this study, the growth forecasts developed as part of the UC Riverside North District Development project using the Riverside Traffic Analysis Model (RivTAM) were applied to the study intersections. The North District Development traffic forecasts included anticipated student and faculty/staff growth at UC Riverside by Year 2025, anticipated growth in the City of Riverside based on pending and approved development projects, and buildout of the North District Development site.

The current RivTAM uses a 2008 base year, a 2035 future year, and Socioeconomic Data (SED) consistent with the Southern California Associated Governments (SCAG) 2008 Regional Transportation Plan (RTP) model. As the current version of RIVTAM is not consistent with the 2016 SCAG Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS), the roadway networks and SED were reviewed for consistency with the 2016 RTP/SCS in the study area.

The methodology used to forecast Year 2025 traffic volumes is known as the difference method. This method is a state-of-the-practice approach consistent with NCHRP Report 765: Analytical Travel Forecasting Approaches for Project Level Planning and Design (Transportation Research Board, 2014) methodologies. Using this method, growth between the future year (2040) and base year (2012) model was determined. For the Cumulative analysis, interpolation was then used to develop growth forecasts for

Year 2025. This growth was then applied to existing peak hour traffic counts collected in 2018 to develop Cumulative (2025) traffic volumes.

3.3 Project Traffic Volumes

The methodology used to estimate changes in traffic flows in the study area with the construction of the Project is described below.

3.3.1 Project Trip Generation

The estimated project trips were obtained by utilizing the data collected as part of the *Campus Traffic Study*, which included a custom process to estimate the trip generation of Parking Structure 1. The trip generation estimate reflects the following:

- While the Project itself would not generate new vehicle trips, the trip generation estimates and operations analysis assumes a worst-case scenario in which 95% occupancy is reached upon opening.
- Parking utilization and traffic count data collected for similar parking facilities on campus was used to determine the inbound and outbound travel flows between 7:00 AM and 8:00 PM.
- An average vehicle occupancy of 1.2 persons per vehicle was used to estimate the number of pedestrians that would walk to/from the Project site.

This trip generation methodology was applied to the number of net new parking spaces anticipated with the Project. As described previously, Parking Structure 1 will have a total of 1,079 spaces, the eastern portions of Lot 13 will have a total of 212 surface spaces and the western portion of Lot 13 will have 217 spaces. Since Lot 13 currently has 683 parking spaces, the Project results in an increase of 825 parking spaces. Given that final design is still underway, the trip generation estimates reflect the potential addition of up to 850 net new spaces with the Project. The trip generation estimates are summarized in **Table 2** below.

As shown, approximately 330 vehicles are expected to access the Project site to utilize the additional parking available during the AM peak hour and approximately 300 vehicles are expected to access the site during the PM peak hour. While the Project itself would not generate new vehicle trips, the vehicles accessing the project site during the AM and PM peak hours were assigned to the nearby intersections assuming they were all new trips. In reality, these vehicles reflect student and faculty/staff growth expected to occur overtime and existing vehicle trips rerouting to Parking Structure 1 as a result of surface parking being displaced by new campus buildings.

Table 2: Net New Project Trip Generation

Land Use	AM Peak Hour				PM Peak Hour			
	In	Out	Total	Pedestrian Volume[1]	In	Out	Total	Pedestrian Volume[1]
Parking Garage (East Portion of Lot 13) - 804 Net New Spaces	*200*	*108*	*308*	*370*	*113*	*169*	*282*	*339*
Parking Lot (West Portion of Lot 13) - 46 Net New Spaces[2]	*12*	*7*	*19*	*23*	*7*	*10*	*17*	*21*
Net New Total	***212***	***115***	***327***	***393***	***120***	***179***	***299***	***360***

Notes: [1] An average vehicle occupancy rate of 1.2 persons per vehicle was used.
[2] 21 new stalls are anticipated for surface parking. However, the analysis assumes that up to 850 new parking spaces may be added. Therefore, 804 new spaces were assumed in PS 1 and 46 new spaces were assumed in the adjacent surface lot.
Source: Fehr & Peers.

3.3.2 Project Trip Distribution

The Project trip distribution reflects the regional distribution of trips traveling to and from the Project site. To determine where trips traveling to and from the Project site would originate and end, the trip distribution provided in the *Campus Traffic Study* and a review of existing travel patterns along with local knowledge of the area was used. The Project trip distribution is described below and shown on **Figure 2**:

- 25% - In from/out to I-215 north of Blaine Street
- 3% - In from/out to Blaine Street west of I-215
- 3% - In from/out to Linden Street west of I-215
- 5% - In from South I-215 via University Avenue and Linden Street
- 10% - Out to South I-215 via University Avenue and Linden Street
- 10% - In from/Out to North I-215 via University Avenue and Linden Street
- 5% - In from South I-215 via University Avenue and W Campus Drive
- 5% - In from/Out to North I-215 via University Avenue and W Campus Drive
- 10% - In from North I-215 via Canyon Crest Drive
- 5% - Out to North I-215 via Canyon Crest Drive
- 10% - In from South I-215 via Canyon Crest Drive
- 15% - Out to South I-215 via Canyon Crest Drive
- 4% - In from/out to Big Springs Road east of Watkins Drive
- 20% - In from/out to Watkins Drive south of Big Springs Road

The Project trips at each study intersection are shown on **Figure 3.**

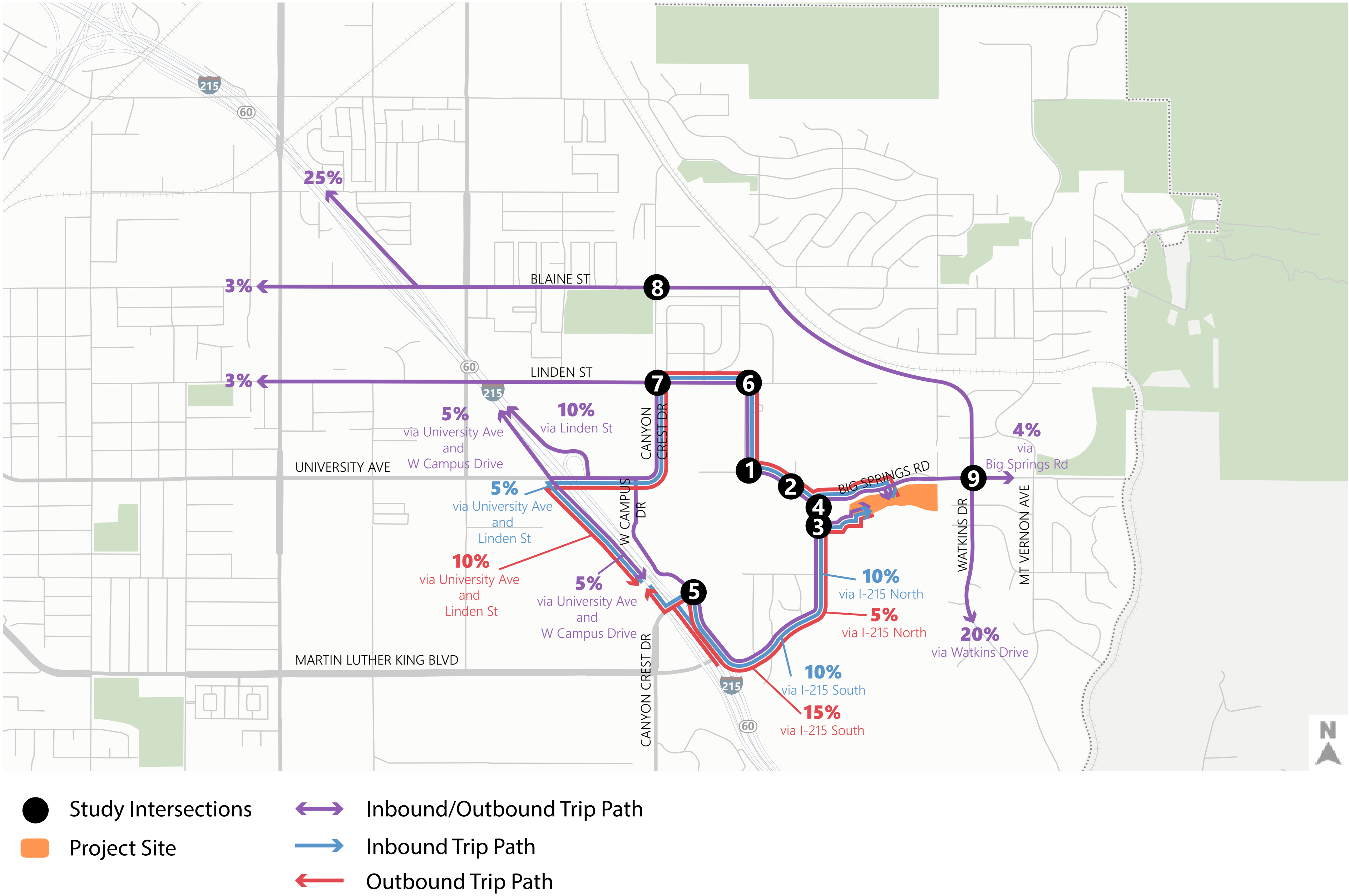
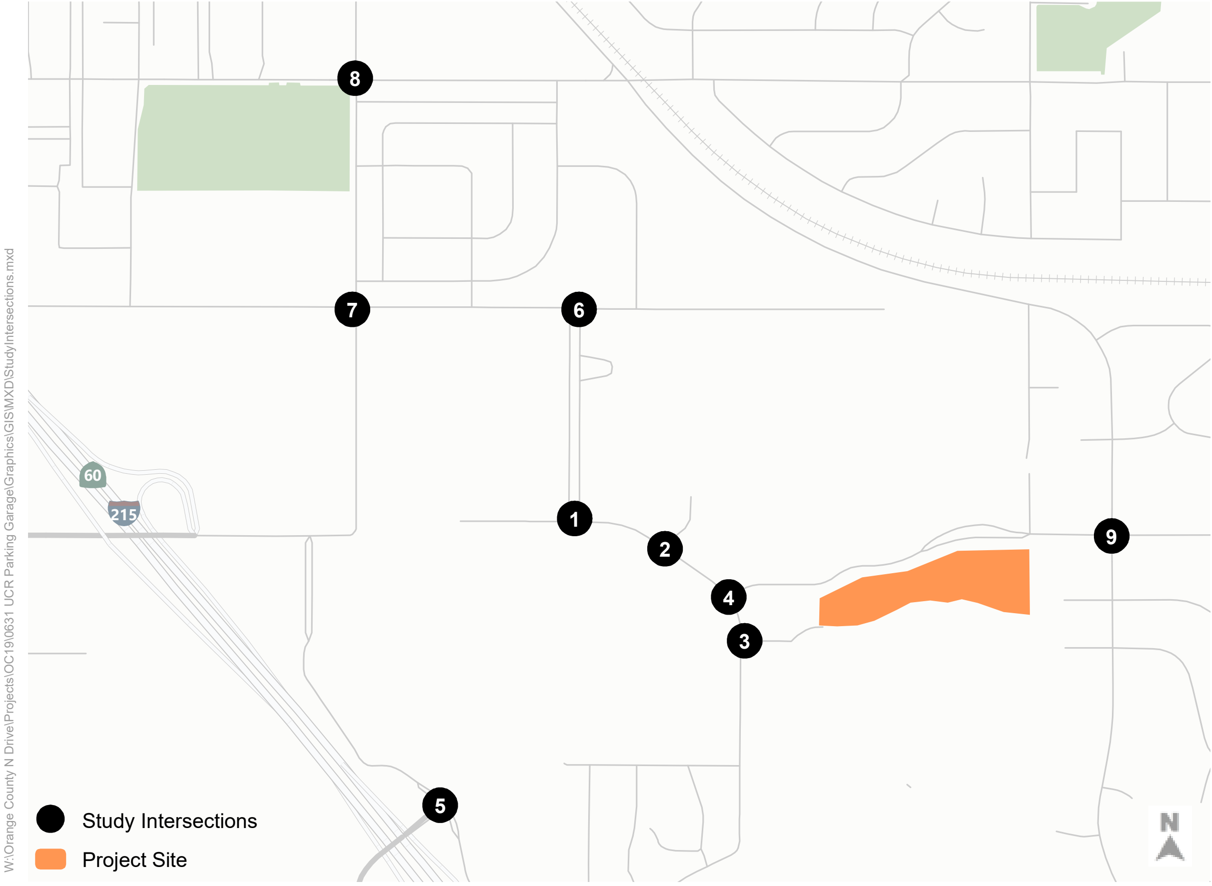


Figure 2

Project Trip Distribution



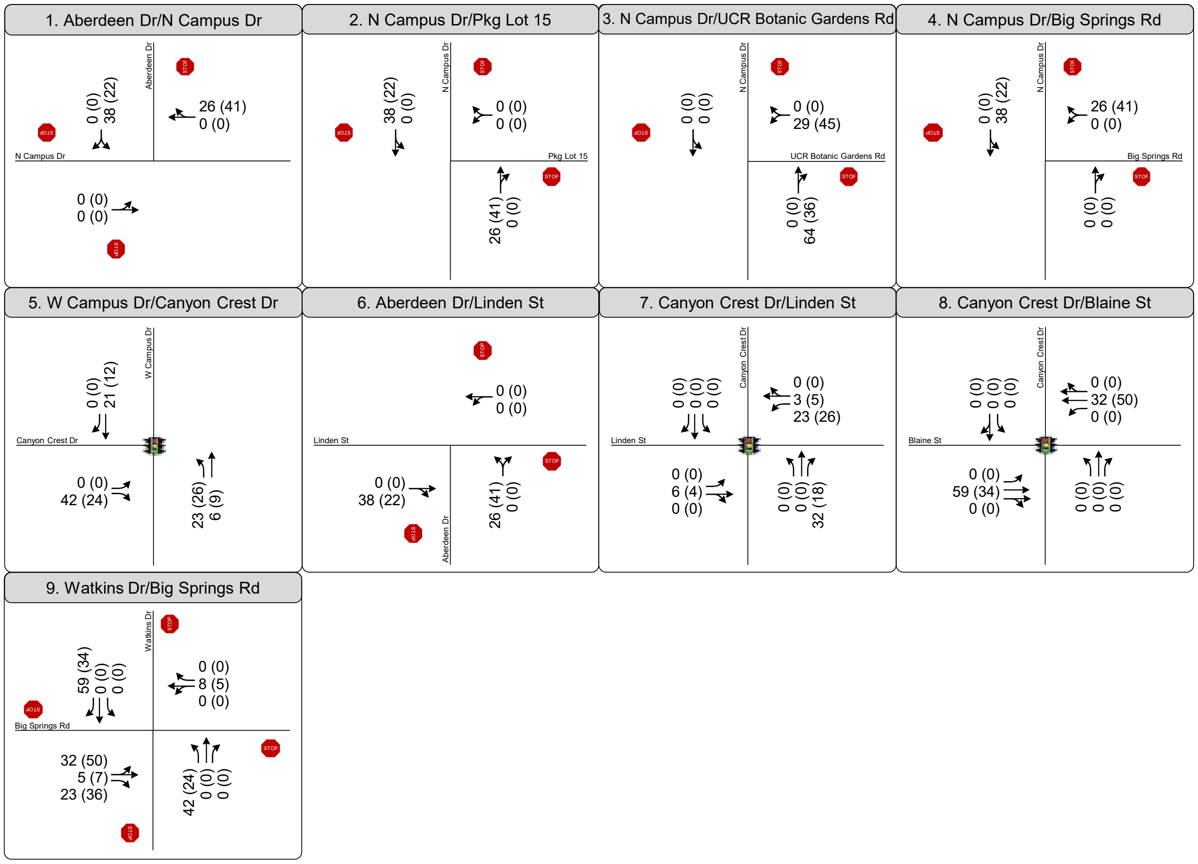


Figure 3

Project Trip Assignment

4. Existing Conditions

This chapter summarizes the Existing conditions in the Project study area including the roadway, transit, bicycle, and pedestrian networks to document the current travel conditions.

4.1 Existing Roadway Facilities

4.1.1 Regional Roads

Regional roads in the Project vicinity include:

- Interstate 215 Freeway (I-215): I-215 is an interstate highway in the Inland Empire region of Southern California. It runs as an auxiliary route of I-215 in the north/south direction from Murrieta to northern San Bernardino. I-215 is located west of the Project site. Near the Project study area, it is generally an eight-lane facility (four lanes in each direction). Access to I-215 near the Project study area is provided at Blaine/3rd Street, University Avenue, and Martin Luther King Boulevard.

4.1.2 Local Access Roads

Local access roads in the Project vicinity include:

- Canyon Crest Drive: Canyon Crest is a north-south 66-ft two-lane collector that widens into an 88 ft four-lane Arterial. It has a variable speed limit ranging between 25 and 40 miles per hour (mph).
- University Avenue: University Avenue is an east-west four-lane facility. It is designated as a parkway in the City of Riverside General Plan. Access to the Project is provided by this roadway. It has a speed limit of 35 mph.
- Linden Street: Linden Street is an east-west roadway facility. It is designated as a two-lane 80 ft collector in the City of Riverside General Plan. It has a speed limit of 40 mph.
- Blaine Street: Blaine Street is an east-west four-lane road. It is designated as a four-lane 88 ft arterial in the City of Riverside General Plan. It has a speed limit of 35 mph.
- Big Springs Road: Big Springs Road is east-west two-lane road. It is under the jurisdiction of the University of California Riverside west of Valencia Hill Drive. Access to the Project is provide by this roadway. It has a speed limit of 25 mph on campus.
- Watkins Drive: Watkins Drive is a north-south four-lane road. It is designated as a four-lane 88 ft arterial in the City of Riverside General Plan. It has a speed limit of 35 mph.

4.2 Bicycle Facilities

Bicycle facilities are classified as follows:

- Class I: Class I bicycle facilities are bicycle trails or paths that are off-street and separated from automobiles. They are a minimum of eight feet in width for two-way travel and include bike lane signage and designated street crossings where needed. A Class I Bike Path may parallel a roadway (within the parkway) or may be a completely separate right-of-way that meanders through a neighborhood or along a flood control channel or utility right-of-way.
- Class II: Class II bicycle facilities are striped lanes that provide bike travel and can be either located next to a curb or parking lane. If located next to a curb, a minimum width of five feet is recommended. However, a bike lane adjacent to a parking lane can be four feet in width. Bike lanes are exclusively for the use of bicycles and include bike lane signage, special lane lines, and pavement markings.
- Class III: Class III Bikeways are streets providing for shared use by motor vehicles and bicyclists. While bicyclists have no exclusive use or priority, signage both by the side of the street and stenciled on the roadway surface alerts motorists to bicyclists sharing the roadway space and denotes that the street is an official bike route.
- Class IV: Class IV bicycle facilities, sometimes called cycle tracks or separated bikeways, provide a right-of-way designated exclusively for bicycle travel adjacent to a roadway and are protected from vehicular traffic via separations (e.g. grade separation, flexible posts, inflexible physical barriers, on-street parking). California Assembly Bill 1193 (AB 1193) legalized and established design standards for Class IV bikeways in 2015.

4.2.1 Existing Facilities

The existing bikeway network is comprised primarily of Class II bike lanes along many major streets.

Within the study area, the following Class II bike lanes are provided:

- Blaine/3rd Street: Bike lanes are provided on Blaine/3rd street. These occur on both sides of the roadway.
- Linden Street: Bike lanes are provided on Linden street between Chicago Drive and Canyon Crest Drive. In the eastbound direction bike lanes are provided for the entire segment; however, in the westbound direction the dedicated striping ends at Niki Way.
- University Avenue: Bike lanes are provided on University Avenue on both sides of the roadway.
- Watkins Drive: Bike lanes are provided on Watkins Drive on both sides of the roadway.
- Big Springs Road: Bike lanes are provided on Big Springs Road on both sides of the roadway.
- Canyon Crest Drive: Bike lanes are provided on Canyon Crest between Blaine and University Drive on both sides of the road.
- N, E, and S Campus Drive: There are bike lanes on both sides of the road on North Campus Drive, East Campus Drive, and South Campus Drive between Aberdeen Drive and Canyon Crest Drive.

4.3 Pedestrian Facilities

Interconnectivity of land uses, coupled with the provision of adequate pedestrian and bicycle facilities, is an important component of the circulation network. Within the Project study area, sidewalks are provided generally adequately provided on the following streets:

- Blaine/3rd Street
- Linden Street
- University Drive
- Watkins Drive
- Big Springs Road
- Iowa Avenue
- Canyon Crest
- Campus Drive
- UCR Botanic Gardens Road

The major streets that provide access to the Project include Big Springs Road, Campus Drive, and UCR Botanic Gardens Road. These roadways have well-connected and maintained sidewalk networks near the Project. These streets also provide pedestrian access to the bus stops nearby.

4.4 Transit Facilities

The transit facilities in the study area are described below.

4.4.1 Regional Rail

Commuter train service in the City of Riverside is provided by Metrolink, which operates seven commuter rail lines throughout Southern California. The UC Riverside /Riverside Hunter Park Metrolink Station is located north-west of the intersection between Malborough Avenue and Rustin Avenue, 3 miles north of the UC Riverside campus. UC Riverside is served by the 91/Perris Valley Line, which links Perris-South to LA Union Station on weekdays, and on weekends from downtown Riverside to LA Union Station.

4.4.2 Bus Transit

Riverside Transit Agency (RTA) provides fixed route, commuter and dial-a-ride bus service within western Riverside County, including the Cities of Riverside, Corona, Norco, Jurupa, Grand Terrace, Loma Linda, Moreno Valley, Perris, San Jacinto, Hemet, Lake Elsinore and Temecula. ADA services within the City of Riverside are provided by the City's Riverside Special Services. All buses on fixed-routes are equipped with bike racks that hold two bicycles.

RTA routes that serve areas closest to the UC Riverside campus include the following: Route 10, 14, 51, and 204. The local transit routes in the study area are shown on **Figure 4**.

Route 10 (Big Springs & Watkins – Downtown Riverside – Galleria at Tyler): This route runs from Galleria at Tyler to the intersection between Big Springs and Watkins. It operates Monday thru Friday from 5:25 AM to 9:06 PM with 45- and 60-minute headways and on weekends from 8:00 AM to 7:40 PM. A bus stop is located near the project at the corner of Big Springs Road and Watkins Drive.

Route 14 (Galleria at Tyler – Downtown Riverside – Loma Linda VA hospital): This route runs from Galleria at Tyler to the VA Hospital at Loma Linda. It operates Monday thru Friday from 5:50 AM to 7:40 PM with headways of about an hour and on weekends from 7:00 AM to 6:20 PM, with some exceptions for Sundays where trips do not run until about 9 AM. A bus stop is located near the project at the corner of Chicago Iowa Avenue and Blaine Street.

Route 51 (UC Riverside – Canyon Crest Town Center): This route runs from the University Village and Village Tower Apartments to the intersection between Chicago and Central. It operates Monday thru Friday from approximately 7:00 AM to 6:00 PM with 40-minute headways. A bus stop is located near the project at the corner of Blaine Street and Canyon Crest Drive.

Route 204 (UCR – Downtown Riverside – Ontario Mills Mall – Montclair Transit Center): This route runs from UCR Bannockburn to the Montclair Transit Center. It operates Monday thru Friday from 4:20 AM to 7:20 PM with headways of about an hour. A bus stop is located near the project at the corner of Linden Street and Canyon Crest Drive.

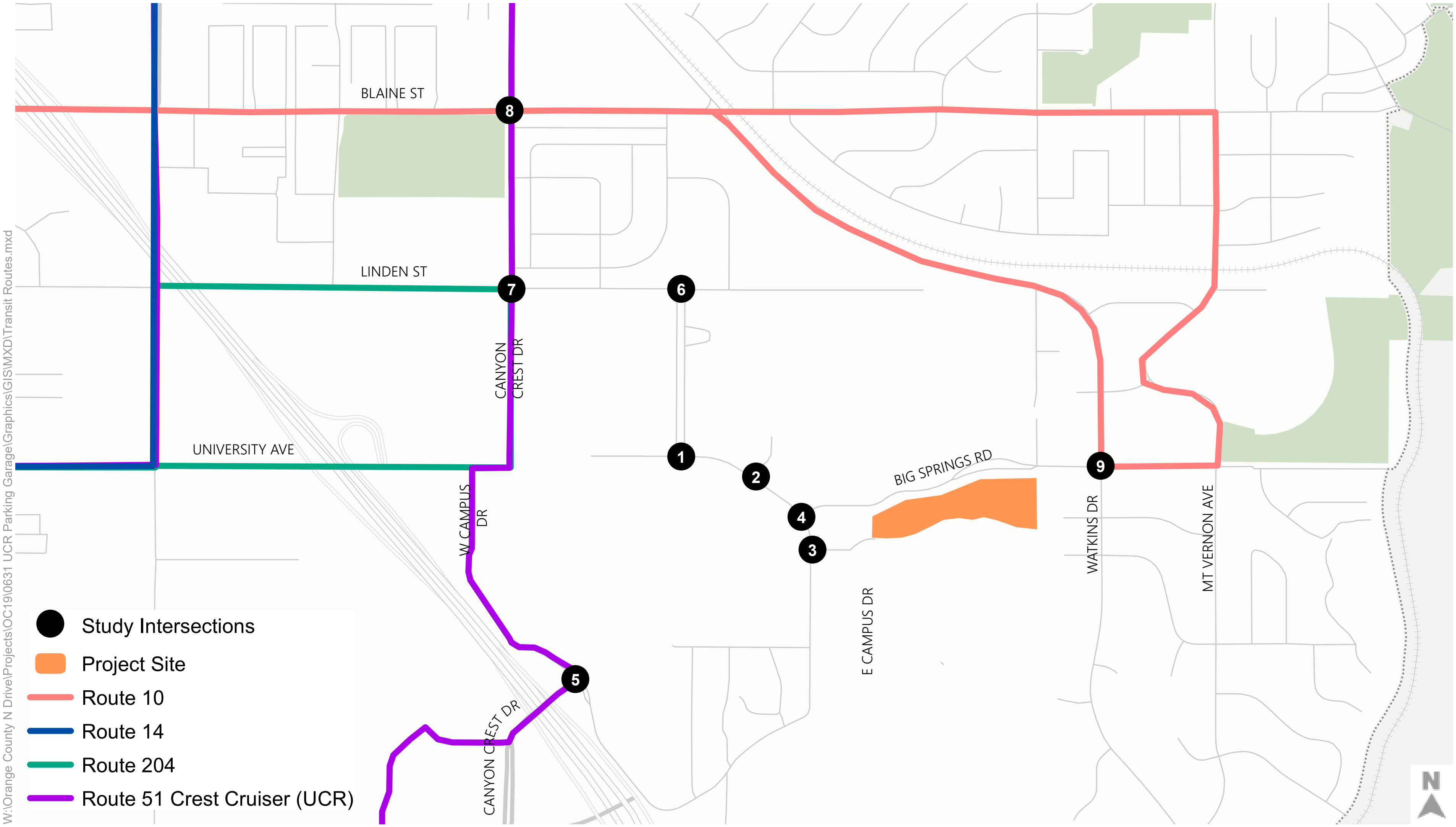


Figure 4

Transit Routes

4.5 Traffic Volumes and Configurations

Existing AM peak period (7:00 to 10:00 AM) and PM peak period (2:00 to 10:00 PM) intersection counts were collected at the nine study intersections on November 14, 2018. Existing peak hour traffic volumes for the study intersections reflect the highest hourly count during the data collection period and are shown on **Figure 5**. Existing traffic counts are provided in **Appendix A**.

4.6 Intersection Operations

Existing traffic volumes, lane configurations, and signal timings were used to evaluate operations at the study intersections for Existing AM and PM peak hour conditions. The results are summarized in **Table 3**, showing LOS and delay at the study intersections.

With the exception of Watkins Drive and Big Springs Road (Intersection 9), which operates at LOS F in the AM peak hour and LOS E in the PM peak hour, all intersections operate at LOS D or better. LOS worksheets are provided in **Appendix B**.

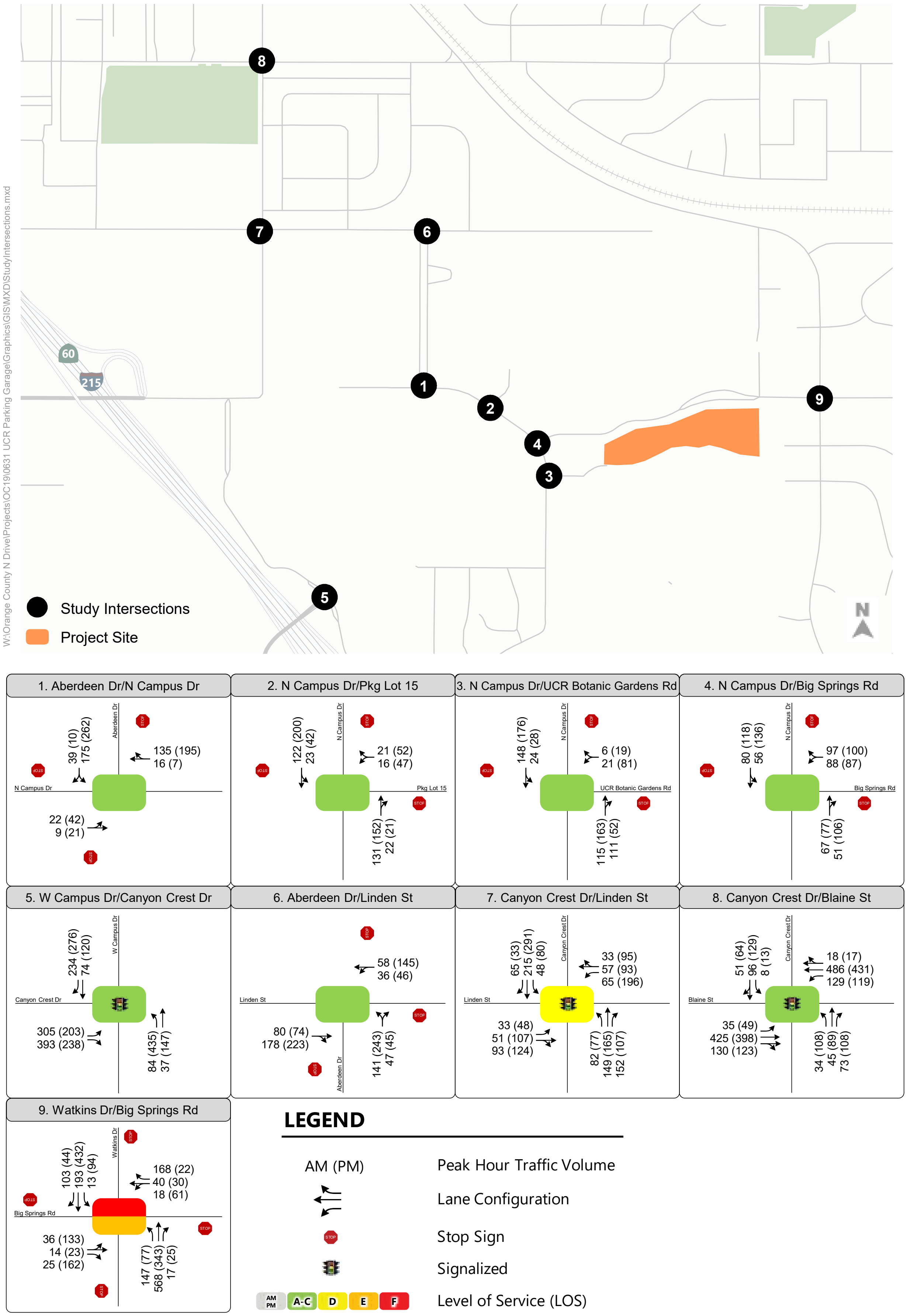


Figure 5

Peak Hour Traffic Volumes and Lane Configurations - Existing (2018) Conditions

Table 3: Existing (2018) Conditions Intersection Operations

Intersection	Control	Peak Hour	Existing (2018) Conditions	
			Delay (sec/veh)[1]	LOS[2,3]
1. N Campus Rd / Aberdeen Dr	AWSC	AM	9.0	A
		PM	10.2	B
2. N Campus Rd / Parking Lot 15	AWSC	AM	8.2	A
		PM	9.2	A
3. N Campus Rd / UCR Botanic Gardens Rd	AWSC	AM	8.7	A
		PM	9.7	A
4. N Campus Rd / Big Springs Rd	AWSC	AM	8.9	A
		PM	10.2	B
5. W Campus Dr / Canyon Crest Dr	Signalized	AM	17.5	B
		PM	24.6	C
6. Linden St / Aberdeen Dr	AWSC	AM	9.8	A
		PM	13.4	B
7. Canyon Crest Dr / Linden St[4]	Signalized	AM	33.3	C
		PM	46.4	D
8. Canyon Crest Dr / Blaine St	Signalized	AM	11.0	B
		PM	17.2	B
9. Watkins Dr / Big Springs Rd	AWSC	AM	58.5	**F**
		PM	46.7	**E**

Notes:
1 Whole intersection weighted average stopped delay expressed in seconds per vehicle for signalized intersections.
2 LOS calculations performed using the Highway Capacity Manual (HCM) 6th Edition method.
3 Unacceptable seconds of delay per vehicle and LOS highlighted in bold.
4 Intersection was analyzed using HCM 2000 due to an all pedestrian phase.
Source: Fehr & Peers, 2019.

5. Existing Plus Project Conditions

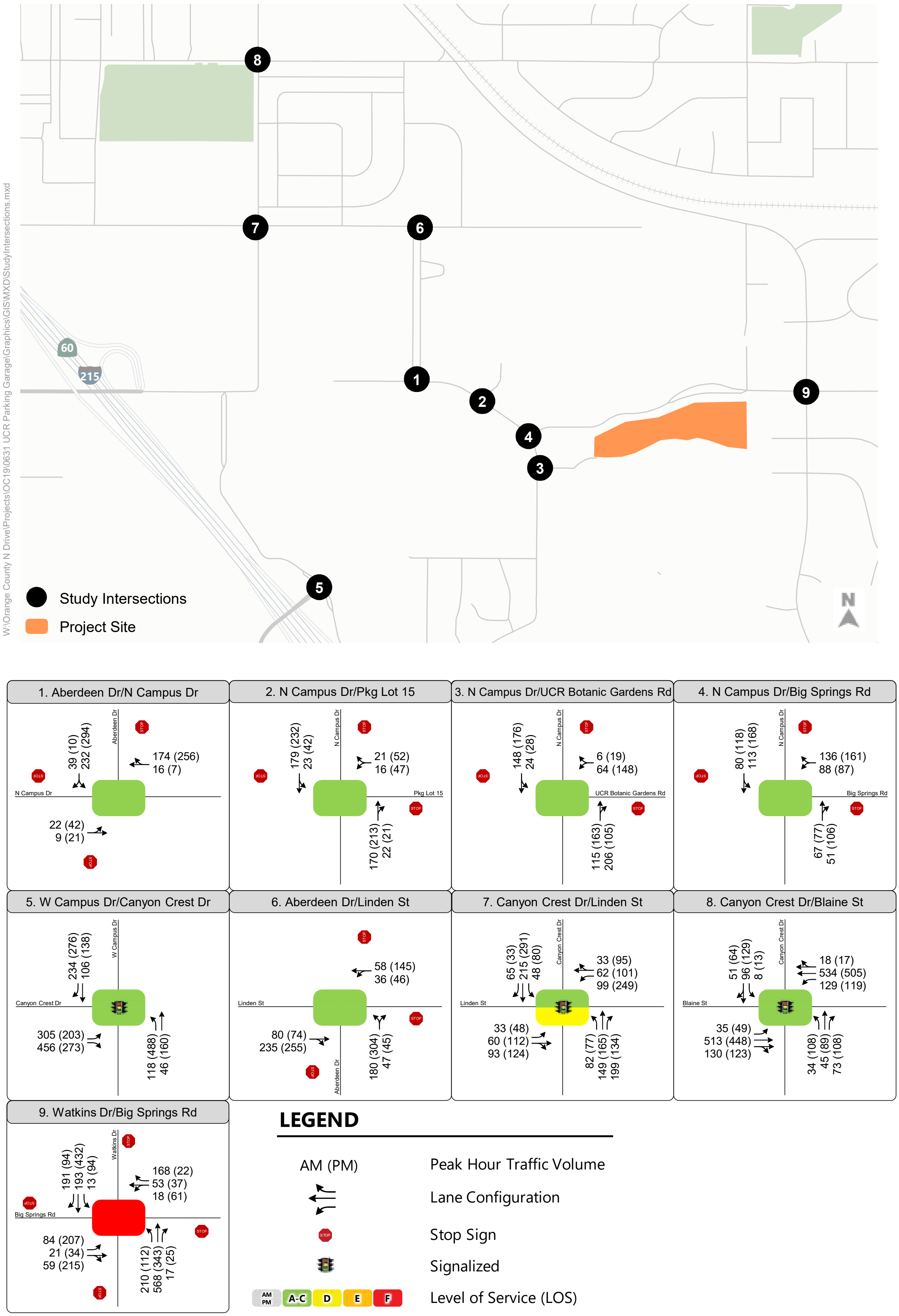
This chapter summarizes the Existing Plus Project conditions within the study area.

5.1 Traffic Volumes

Traffic volumes for the Existing Plus Project conditions scenario consist of volumes from the Existing conditions plus volumes generated by the Project as described in **Chapter 3**. The Existing Plus Project traffic volumes are shown in **Figure 6.**

5.2 Intersection Operations

The intersection LOS results are summarized in **Table 4** for Existing Plus Project conditions. Under Existing conditions all intersections operate acceptably at LOS D or better except for Intersection 9: Watkins Drive & Big Springs Road during the AM and PM peak hours. The Watkins Drive & Big Springs Road intersection currently operates at LOS F during the AM peak hour and LOS E during the PM peak hour. With the Project, additional vehicles are expected to travel through this intersection to access the new parking that will be provided with Structure 1. Assuming that the new parking reaches 95% occupancy upon opening, the delay at the Watkins Drive & Big Springs Road intersection is expected to increase by approximately 15 seconds during the AM peak hour and 10 seconds during the PM peak hour. Technical calculations for the Existing Plus Project conditions are provided in **Appendix B**.



W:\Orange County N Drive\Projects\OC19\0631 UCR Parking Garage\Graphics\GIS\MXD\StudyIntersections.mxd

Figure 6

Peak Hour Traffic Volumes and Lane Configurations - Existing (2018) Plus Project Conditions

Table 4: Existing (2018) Plus Project Conditions Intersection Operations

Intersection	Control	Peak Hour	Existing Conditions		Existing Plus Project Conditions		∆ Delay
			Delay (sec/veh)[1]	LOS[2,3]	Delay (sec/veh)[1]	LOS[2,3]	
1. N Campus Rd / Aberdeen Dr	AWSC	AM	9.0	A	9.8	A	0.8
		PM	10.2	B	11.0	B	0.8
2. N Campus Rd / Parking Lot 15	AWSC	AM	8.2	A	8.6	A	0.4
		PM	9.2	A	9.7	A	0.5
3. N Campus Rd / UCR Botanic Gardens Rd	AWSC	AM	8.7	A	9.5	A	0.8
		PM	9.7	A	10.5	B	0.8
4. N Campus Rd / Big Springs Rd	AWSC	AM	8.9	A	9.4	A	0.5
		PM	10.2	B	10.9	B	0.7
5. W Campus Dr / Canyon Crest Dr	Signalized	AM	17.5	B	16.3	B	-1.2
		PM	24.6	C	25.1	C	0.5
6. Linden St / Aberdeen Dr	AWSC	AM	9.8	A	10.6	B	0.8
		PM	13.4	B	15.5	C	2.1
7. Canyon Crest Dr / Linden St[4]	Signalized	AM	33.3	C	33.5	C	0.2
		PM	46.4	D	49.5	D	3.1
8. Canyon Crest Dr / Blaine St	Signalized	AM	11.0	B	11.3	B	0.3
		PM	17.2	B	17.4	B	0.2
9. Watkins Dr / Big Springs Rd	AWSC	AM	58.5	F	74.1	F	15.6
		PM	46.7	E	56.6	F	9.9

Notes:
1 Whole intersection weighted average stopped delay expressed in seconds per vehicle for signalized intersections.
2 LOS calculations performed using the Highway Capacity Manual (HCM) 6th Edition method.
3 Unacceptable seconds of delay per vehicle and LOS highlighted in bold.
4 Intersection was analyzed using HCM 2000 due to an all pedestrian phase.
Source: Fehr & Peers, 2019.

6. Cumulative Conditions

This chapter summarizes the analysis of Cumulative (Year 2025) conditions.

6.1 Traffic Volumes

As discussed previously, the traffic forecasts and operations analysis for this scenario reflect growth derived from RivTAM and the North District Development project. The Cumulative conditions traffic forecasts are shown on **Figure 7**.

6.2 Planned Intersection Improvements

No improvements to the study intersections are assumed to be in place by completion of the Project. Traffic signal timing adjustments are considered standard maintenance for local and state agencies and it is assumed that the owner/operators of the study intersections would regularly optimize the traffic signals depending on the traffic volumes in the study area. Therefore, signal timing was optimized under Cumulative conditions.

6.3 Intersection Operations

The intersection results for Cumulative conditions without the Project are summarized in **Table 5**. As shown, the following three intersections are expected to operate at LOS E or F by 2025:

- Intersection 6: Linden Street & Aberdeen Drive (PM peak hour)
- Intersection 7: Canyon Crest Drive & Linden Street (PM peak hour)
- Intersection 9: Watkins Drive & Big Springs Road (AM and PM peak hours)

The reduction in level of service at Intersections 6 and 7 is primarily due to the amount of growth assumed in the northern portion of the campus by Year 2025. Specifically, buildout of the North District Development site is assumed to occur under the Cumulative conditions analysis presented in this report. The North District Development project explored various improvements that may be needed upon buildout, including potential improvements at all three intersections listed above. For projects with multiple phases of development, UC Riverside monitors conditions overtime to determine the actual need and timing for improvements to nearby intersections that may be required.

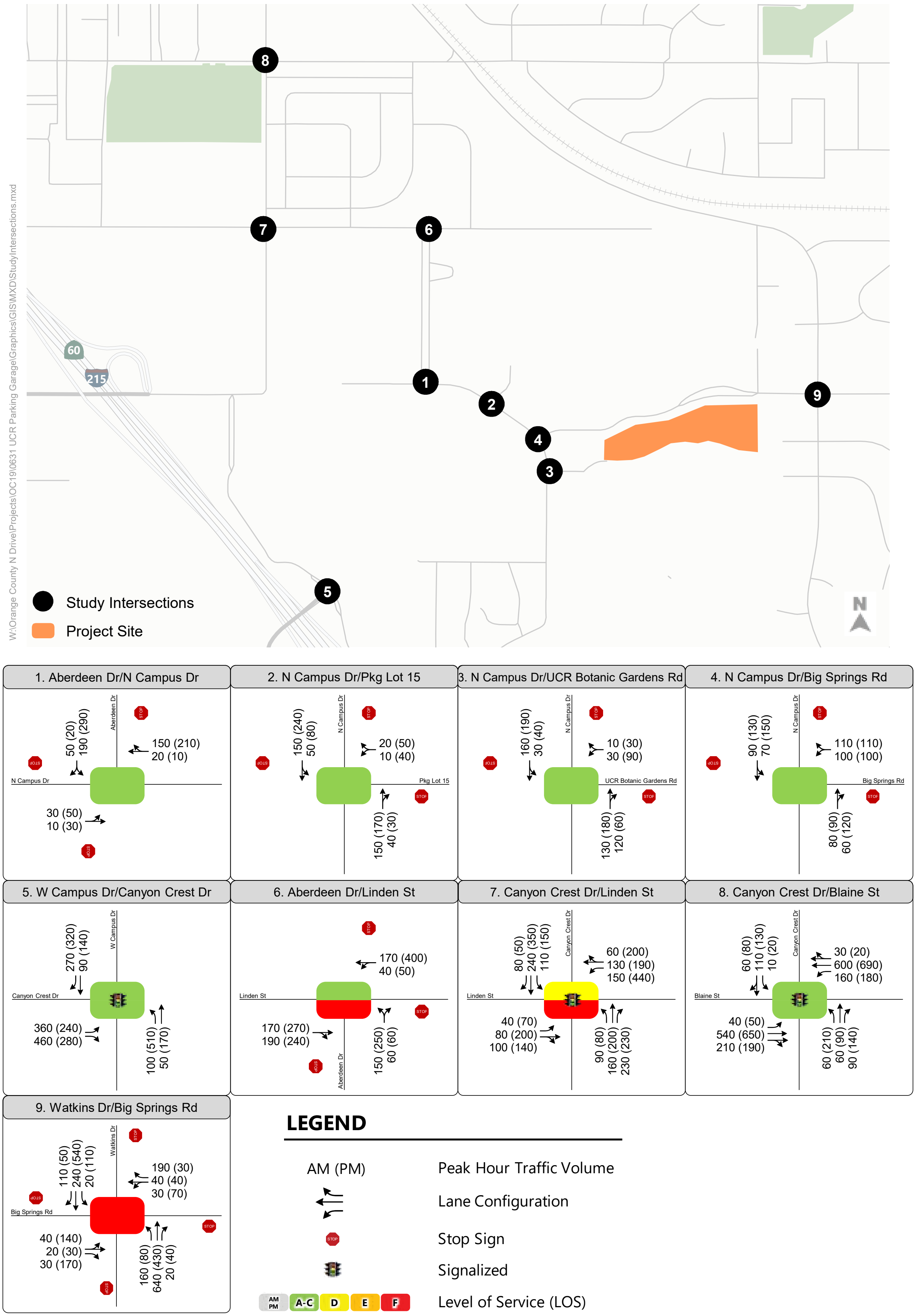


Figure 7

Peak Hour Traffic Volumes and Lane Configurations - Cumulative (2025) Conditions

Table 5: Cumulative (Year 2025) Conditions Intersection Operations

Intersection	Control	Peak Hour	Cumulative Conditions	
			Delay (sec/veh)[1]	LOS[2,3]
1. N Campus Rd / Aberdeen Dr	AWSC	AM	9.6	A
		PM	11.2	B
2. N Campus Rd / Parking Lot 15	AWSC	AM	8.7	A
		PM	10.2	B
3. N Campus Rd / UCR Botanic Gardens Rd	AWSC	AM	9.1	A
		PM	10.4	B
4. N Campus Rd / Big Springs Rd	AWSC	AM	9.4	A
		PM	11.0	B
5. W Campus Dr / Canyon Crest Dr	Signalized	AM	17.5	B
		PM	27.2	C
6. Linden St / Aberdeen Dr	AWSC	AM	13.2	B
		PM	64.8	**F**
7. Canyon Crest Dr / Linden St[4]	Signalized	AM	42.1	D
		PM	130.5	**F**
8. Canyon Crest Dr / Blaine St	Signalized	AM	16.0	B
		PM	30.7	C
9. Watkins Dr / Big Springs Rd	AWSC	AM	103.9	**F**
		PM	111.4	**F**

Notes:
1 Whole intersection weighted average stopped delay expressed in seconds per vehicle for signalized intersections.
2 LOS calculations performed using the Highway Capacity Manual (HCM) 6th Edition method.
3 Unacceptable seconds of delay per vehicle and LOS highlighted in bold.
4 Intersection was analyzed using HCM 2000 due to an all pedestrian phase.
Source: Fehr & Peers, 2019.

7. Cumulative Plus Project Conditions

This chapter summarizes the Cumulative Plus Project conditions within the study area.

7.1 Traffic Volumes

Traffic volumes for the Cumulative Plus Project conditions scenario consist of growth anticipated by Year 2025 under Cumulative conditions plus vehicle-trips generated by the Project as described previously. Traffic volumes and lane configurations for Cumulative Plus Project conditions are shown on **Figure 8**.

7.2 Intersection Operations

Table 6 summarizes the LOS and delay for the study intersections under Cumulative Plus Project conditions. As shown, the same three intersections that operate at LOS E or F under Cumulative conditions would continue to operate at LOS E or F with the Project. The Project would increase vehicle delays at these intersections as follows:

- Intersection 6: Linden Street & Aberdeen Drive – Approximately 18 second increase in delay during PM peak hour
- Intersection 7: Canyon Crest Drive & Linden Street - Approximately 15 second increase in delay during PM peak hour
- Intersection 9: Watkins Drive & Big Springs Road - Approximately 15 second increase in delay during AM peak hour and 13 second increase in delay during PM peak hour

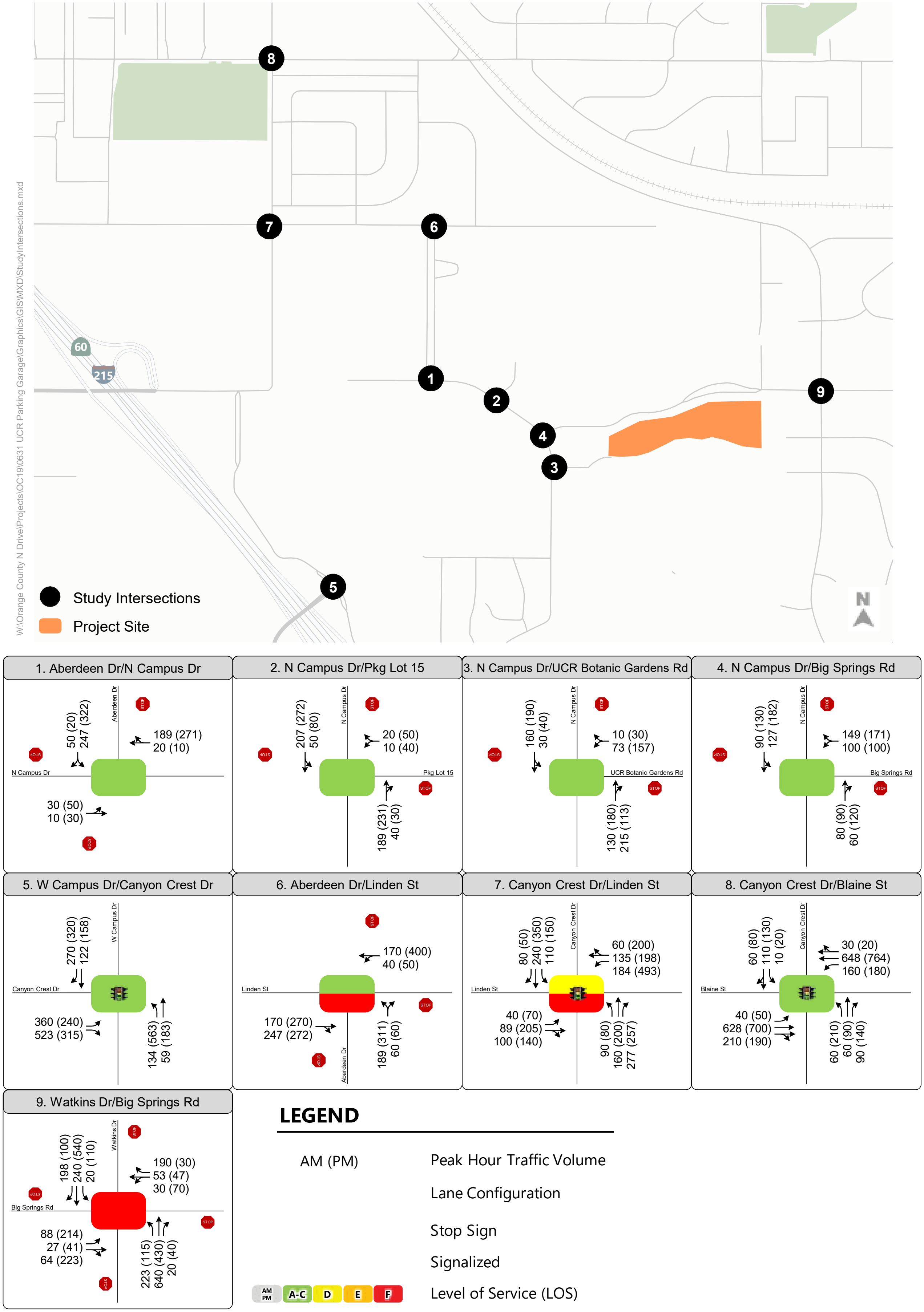


Figure 8

Peak Hour Traffic Volumes and Lane Configurations - Cumulative (2025) Plus Project Conditions

Table 6: Cumulative (LRDP Buildout – 2025) Plus Project Conditions Intersection Operations

Intersection	Control	Peak Hour	Cumulative (2025) Conditions		Cumulative (2025) Plus Project Conditions		∆ Delay
			Delay (sec/veh)[1]	LOS[2,3]	Delay (sec/veh)[1]	LOS[2,3]	
1. N Campus Rd / Aberdeen Dr	AWSC	AM	9.6	A	10.5	B	0.9
		PM	11.2	B	12.2	B	1
2. N Campus Rd / Parking Lot 15	AWSC	AM	8.7	A	9.3	A	0.6
		PM	10.2	B	10.8	B	0.6
3. N Campus Rd / UCR Botanic Gardens Rd	AWSC	AM	9.1	A	10.0	A	0.9
		PM	10.4	B	11.4	B	1
4. N Campus Rd / Big Springs Rd	AWSC	AM	9.4	A	10.0	A	0.6
		PM	11.0	B	12.0	B	1
5. W Campus Dr / Canyon Crest Dr	Signalized	AM	17.5	B	17.3	B	-0.2
		PM	27.2	C	27.5	C	0.3
6. Linden St / Aberdeen Dr	AWSC	AM	13.2	B	15.0	B	1.8
		PM	64.8	**F**	82.6	**F**	17.8
7. Canyon Crest Dr / Linden St[4]	Signalized	AM	42.1	D	43.3	D	1.2
		PM	130.5	**F**	145.7	**F**	15.2
8. Canyon Crest Dr / Blaine St	Signalized	AM	16.0	B	16.9	B	0.9
		PM	30.7	C	31.9	C	1.2
9. Watkins Dr / Big Springs Rd	AWSC	AM	103.9	**F**	118.9	**F**	15.0
		PM	111.4	**F**	124.7	**F**	13.3

Notes:
1 Whole intersection weighted average stopped delay expressed in seconds per vehicle for signalized intersections.
2 LOS calculations performed using the Highway Capacity Manual (HCM) 6th Edition method.
3 Unacceptable seconds of delay per vehicle and LOS highlighted in bold.
4 Intersection was analyzed using HCM 2000 due to an all pedestrian phase.
Source: Fehr & Peers, 2019.

8. Project Access & Potential Improvements

This chapter provides an overview of the three project access options being considered on Big Springs Road and provides LOS and delay analysis for each of the potential access options.

8.1 Access Options

Vehicles currently have three access points to the Project site. Each of the access points along with additional improvements that would be provided with the Project are described below.

1. Access is provided on the western edge of the site to/from UCR Botanic Gardens Road (Portal A). UCR Botanic Gardens Road intersects with E. Campus Drive at an all-way stop controlled intersection. This access point would remain as is with the Project.
2. Access is provided on the northwestern portion of the site to/from Big Springs Road at an all-way stop controlled intersection that also connects with the driveway to the Glenmore dormitories (Portal B). This access point would remain as is with the Project.
3. Access is provided approximately 200 feet east of Portal B on the northern portion of the site to/from Big Springs Road by a driveway that is controlled by a stop sign (Portal C). Right-turns in/out of the driveway and inbound left-turns are permitted at this location. With the Project, a left-turn lane would be provided on westbound Big Springs Road to provide storage for vehicles entering the site at Portal C.

With the construction of Parking Structure 1, an additional access point, referred to as Portal D, is being considered. Portal D would provide access to the project at the northeastern portion of the site and would serve as the southern leg of the intersection at Big Springs Road & Valencia Hill Drive. This chapter analyzes the following access options associated with Portal D:

- No Portal D
- Portal D: Inbound Only (Right-In and Left-In)
- Portal D: Inbound and Outbound (Right-In, Left-In, and Right-Out)

All Portal D access options assume that Portal B will remain an all-way stop controlled intersection and that access at Portal C will consist of left-in, right-in and right-out as exists today.

8.2 Access Options Analysis

Portals A, B, C, and D were analyzed under the three scenarios discussed above. The LOS analysis was conducted using the methodology provided in **Chapter 3**. Cumulative Plus Project conditions volumes and lane configurations were used to evaluate operations at the four access portals in the AM and PM peak hours.

The traffic forecasts are shown on **Figures 9, 10, and 11**. For the traffic volume forecasts, vehicles were generally assigned to the closest access point based on their entry point to the campus. For example, vehicles entering the campus at Watkins Drive would primarily use Portal D (if open as analyzed under Scenario 3) instead of the access points downstream. The purpose of assigning vehicles generally to the nearest access point was to analyze a worst-case condition for traffic operations. The number of vehicles at each access point is expected to be more evenly dispersed than shown in the figures.

The operational results are summarized in **Table 7**, showing LOS and delay at the four access portals. All of the Portals operate acceptably at LOS D or better under all three access scenarios. In addition, minimal vehicle queuing was observed due to the relatively low traffic volumes on Big Springs Road during the peak hours.

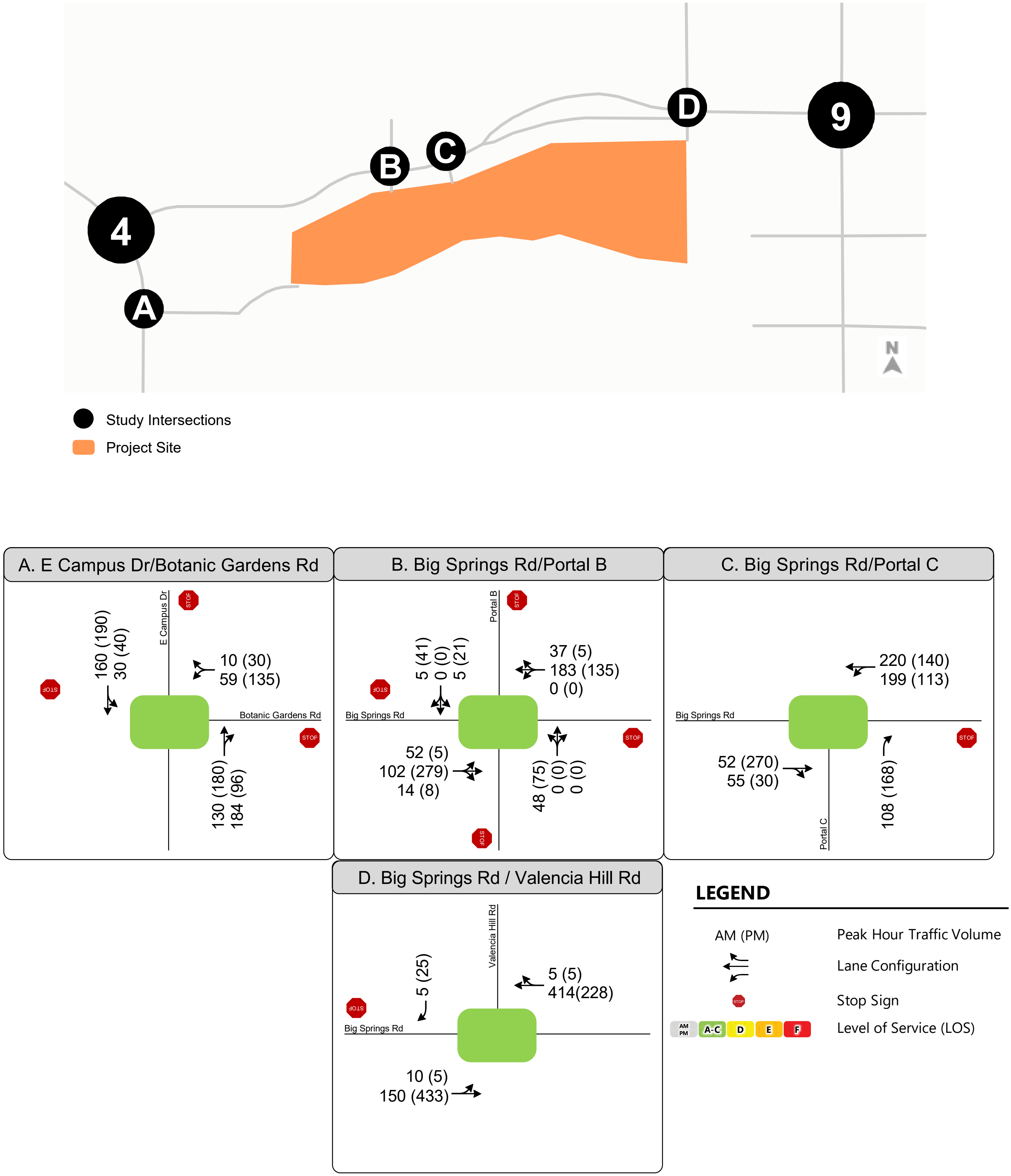


Figure 9

Peak Hour Traffic Volumes and Lane Configurations - Access Scenario 1, No Portal D

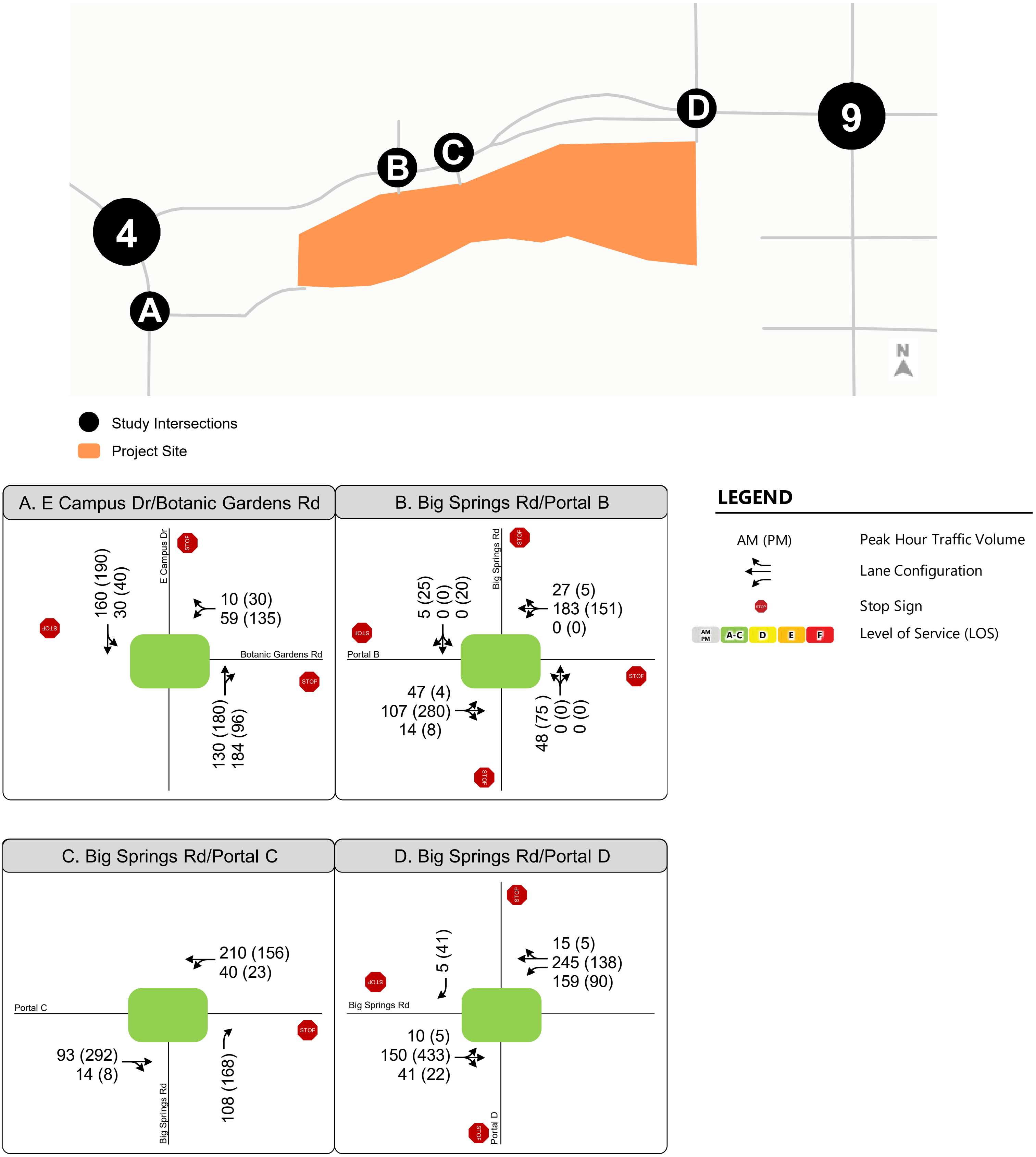


Figure 10

Peak Hour Traffic Volumes and Lane Configurations - Access Scenario 2, Portal D Right In, Left In

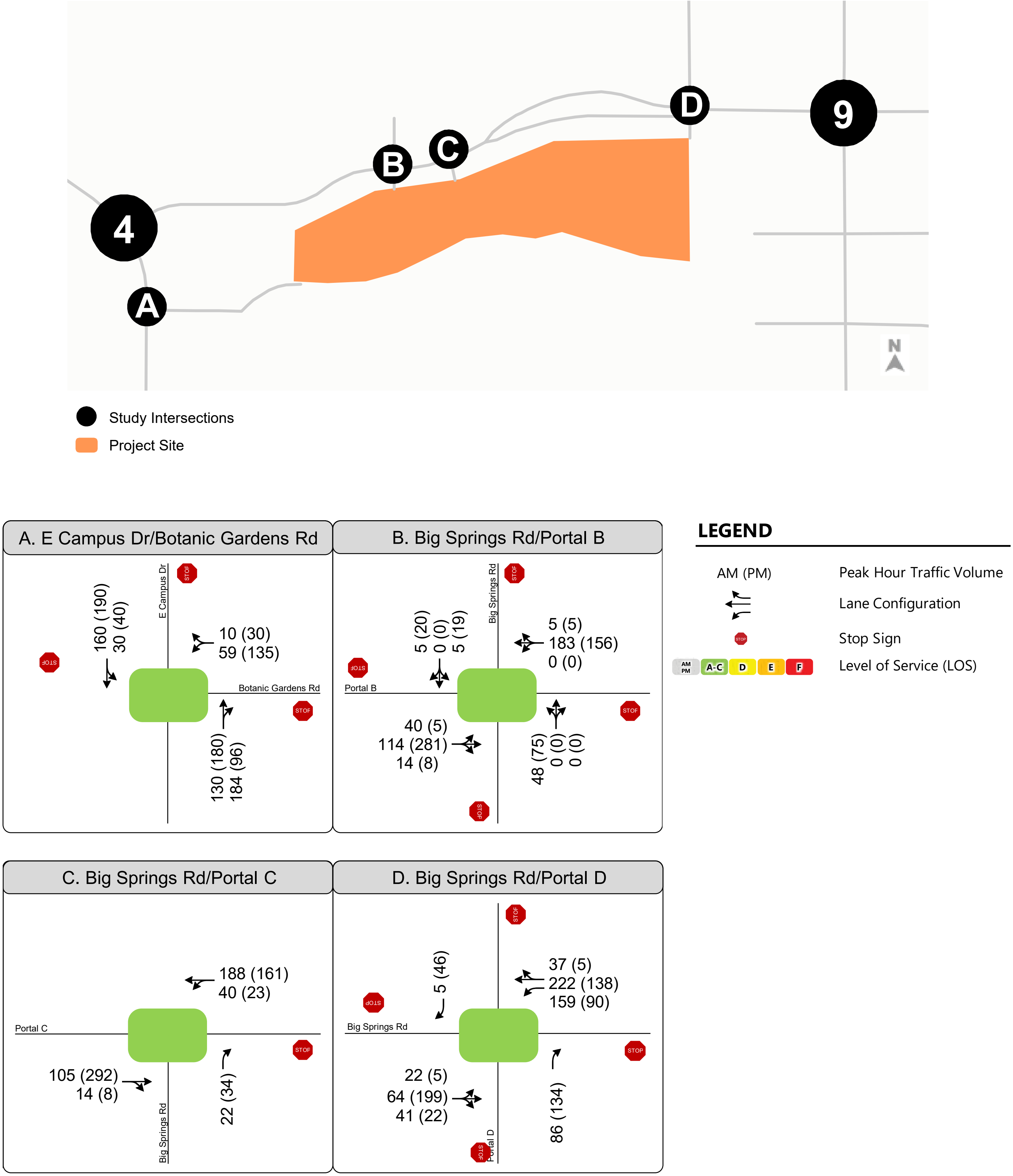


Figure 11

Peak Hour Traffic Volumes and Lane Configurations - Access Scenario 3, Portal D Right In, Left In, Right Out

Table 7: Project Access Options Intersection Operations

Intersection	Control	Peak Hour	Cumulative Plus Project Conditions	
			Delay (sec/veh)[1]	LOS[2,3]
No Portal D				
1. Portal A	AWSC	AM	10.0	A
		PM	11.4	B
2. Portal B	AWSC	AM	8.7	A
		PM	9.6	A
3. Portal C	SSSC	AM	4.3	A
		PM	4.5	A
4. Existing Intersection: Big Springs Rd / Valencia Hill Dr	SSSC	AM	12.3	B
		PM	12.1	B
Portal D: Inbound Only – Right In, Left In				
1. Portal A	AWSC	AM	10.0	A
		PM	11.4	B
2. Portal B	AWSC	AM	8.6	A
		PM	9.6	A
3. Portal C	SSSC	AM	3.1	A
		PM	3.9	A
4. Portal D	AWSC	AM	9.5	A
		PM	12.2	B
Portal D: Right In, Left In, Right Out				
1. Portal A	AWSC	AM	10.0	A
		PM	11.4	B
2. Portal B	AWSC	AM	8.5	A
		PM	9.6	A
3. Portal C	SSSC	AM	1.5	A
		PM	1.1	A
4. Portal D	AWSC	AM	9.6	A
		PM	10.5	B

Notes:
1 Whole intersection weighted average stopped delay expressed in seconds per vehicle for signalized intersections.
2 LOS calculations performed using the Highway Capacity Manual (HCM) 6th Edition method.
3 Unacceptable seconds of delay per vehicle and LOS highlighted in bold.
4 Intersection was analyzed using HCM 2000 due to an all pedestrian phase.
Source: Fehr & Peers, 2019.

8.3 Potential Improvements

The need for potential improvements was determined through the analysis of study intersections under Existing Plus Project and Cumulative Plus Project conditions. In addition, improvements identified in past studies and their relevance to the Project were also considered.

Under Existing conditions, all intersections operate acceptably at LOS D or better except for Intersection 9: Watkins Drive & Big Springs Road during the AM and PM peak hours. The Watkins Drive & Big Springs Road intersection currently operates at LOS F during the AM peak hour and LOS E during the PM peak hour. With the Project, additional vehicles are expected to travel through this intersection to access the new parking that will be provided with Structure 1. Assuming that the new parking reaches 95% occupancy upon opening, the delay at the Watkins Drive & Big Springs Road intersection is expected to increase by approximately 15 seconds during the AM peak hour and 10 seconds during the PM peak hour.

Under Cumulative conditions, three intersections are expected to operate at LOS E or F by 2025. These three intersections would continue to operate at LOS E or F with the Project. The Project would increase vehicle delays at these intersections as follows:

- Intersection 6: Linden Street & Aberdeen Drive – Approximately 18 second increase in delay during PM peak hour
- Intersection 7: Canyon Crest Drive & Linden Street - Approximately 15 second increase in delay during PM peak hour
- Intersection 9: Watkins Drive & Big Springs Road - Approximately 15 second increase in delay during AM peak hour and 13 second increase in delay during PM peak hour

The reduction in level of service at Intersections 6 and 7 under Cumulative conditions is primarily due to the amount of growth assumed in the northern portion of the campus by Year 2025. Specifically, buildout of the North District Development site is assumed to occur under the Cumulative conditions analysis. The North District Development project explored various improvements that may be needed upon buildout, including potential improvements at all three intersections listed above. For projects with multiple phases of development, UC Riverside monitors conditions overtime to determine the actual need and timing for improvements to nearby intersections that may be required.

Given that poor traffic operations at Intersections 6 and 7 only occur under Cumulative conditions due to background growth projections and development of the North District Development, improvements needed with the opening of the Project are not being considered. In addition, these intersections are expected to operate acceptably assuming 95% occupancy of the Project under Existing Plus Project conditions, as shown previously in Table 4.

Operations at Intersection 9: Watkins Drive & Big Springs Road are LOS E/F under Existing conditions and vehicle delay is expected to increase by approximately 15 seconds during the AM peak hour and 10 seconds during the PM peak hour with the Project. Under Cumulative conditions, background traffic growth is expected to worsen operations and the Project would add a similar amount of additional delay as under Existing Plus Project conditions (15 second increase in the AM peak hour and 13 second increase in the PM peak hour). Given that this intersection currently operates unacceptably and that the Project is expected to worsen delay, the following improvement can be considered for implementation:

- Intersection 9: Watkins Drive & Big Springs Road – The installation of a traffic signal would improve operations to LOS C or better during the AM and PM peak hours under both Existing and Cumulative conditions with the Project.

The Watkins Drive & Big Springs Road intersection is under the jurisdiction of the City of Riverside. The City has previously identified the need for a traffic signal at this location and applied for grant funding to implement the signalization; however, the grant funding was not awarded. Therefore, UC Riverside and the City are exploring other funding options. While the signalization of this intersection is not a requirement of the Project, providing a signal will help to minimize driver delays and provide a protected crossing for pedestrians.

Appendix A

Existing Traffic Counts

Prepared by National Data & Surveying Services

Aberdeen Dr & N Campus Dr

Peak Hour Turning Movement Count

ID: 18-06141-001
City: Riverside

Day: Wednesday
Date: 11/14/2018

PEAK HOURS		COUNT PERIODS
AM	09:00 AM - 10:00 AM	07:00 AM - 10:00 AM
NOON	10:30 AM - 11:30 AM	10:00 AM - 02:00 PM
PM	04:30 PM - 05:30 PM	02:00 PM - 10:00 PM

Aberdeen Dr

SOUTHBOUND

	↲	↓	↳	⮌	⇧
AM	39	0	138	37	194
NOON	26	0	135	32	201
PM	10	0	219	43	280
	0	1	0	0	

N Campus Dr

EASTBOUND

	AM	NOON	PM	
⇦	55	46	17	
⮌	0	0	0	0
↱	22	19	42	0
→	9	15	21	1
↴	0	0	0	0

CONTROL

3-Way Stop (SB/EB/WB)

	AM	NOON	PM
TEV	396	399	538
PHF	0.79	0.83	0.84

WESTBOUND

N Campus Dr

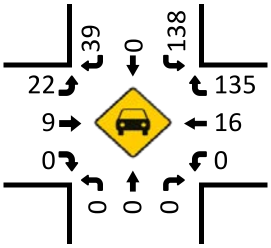
		PM	NOON	AM
0	↰	195	150	135
1	←	7	20	16
0	↲	0	0	0
0	⮌	1	2	0
	⇨	241	152	147

NORTHBOUND

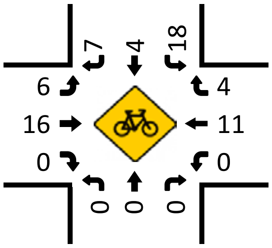
Aberdeen Dr

	⇩	⮌	↰	↑	↱
		0	0	0	0
PM	0	0	0	0	0
NOON	0	0	0	0	0
AM	0	0	0	0	0

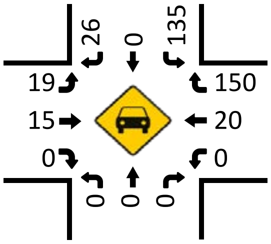
Total Vehicles (AM)



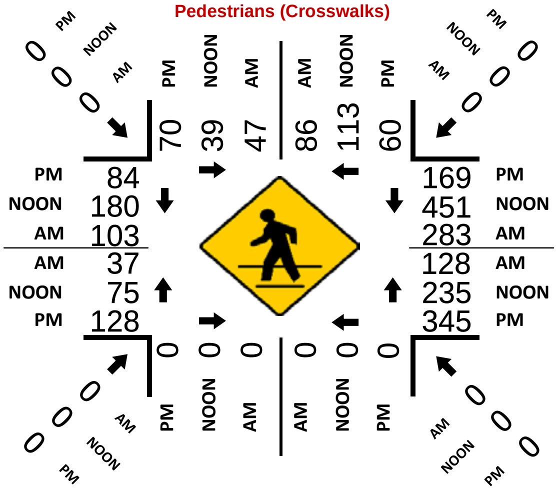
Bikes (AM)



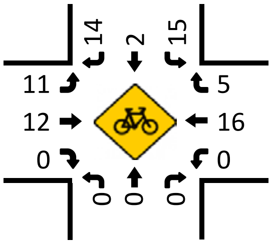
Total Vehicles (Noon)



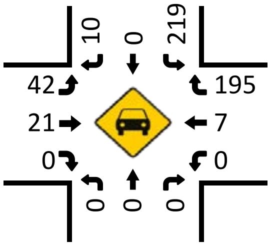
Pedestrians (Crosswalks)



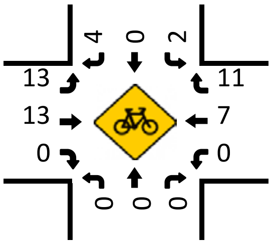
Bikes (NOON)



Total Vehicles (PM)



Bikes (PM)



Prepared by National Data & Surveying Services

Lot 15 Dwy & N Campus Dr

Peak Hour Turning Movement Count

ID: 18-06141-002
City: Riverside

Day: Wednesday
Date: 11/14/2018

PEAK HOURS		COUNT PERIODS
09:00 AM - 10:00 AM	AM	07:00 AM - 10:00 AM
11:00 AM - 12:00 PM	NOON	10:00 AM - 02:00 PM
04:30 PM - 05:30 PM	PM	02:00 PM - 10:00 PM

Lot 15 Dwy

SOUTHBOUND

	↲	↓	↳	↶	⇧
AM	21	0	16	0	45
NOON	20	0	14	0	37
PM	52	0	47	0	63
	0	1	0	0	

N Campus Dr

EASTBOUND

AM	NOON	PM		
153	179	204	⇦	
1	0	0	↶	0
23	20	42	↱	0
122	135	200	→	1
1	0	0	↴	0

CONTROL

3-Way Stop (SB/EB/WB)

	AM	NOON	PM
TEV	338	365	514
PHF	0.82	0.84	0.89

WESTBOUND

N Campus Dr

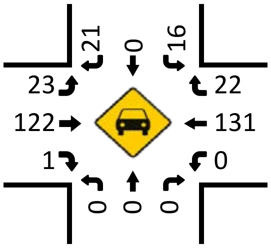
		PM	NOON	AM
0	↰	21	17	22
1	←	152	159	131
0	↲	0	0	0
0	↷	0	0	1
	⇨	247	149	139

NORTHBOUND

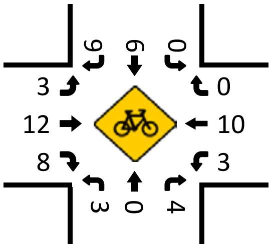
Lot 15 Dwy

	⇩	↶	↰	↑	↱
		0	0	0	0
PM	0	0	0	0	0
NOON	0	0	0	0	0
AM	1	0	0	0	0

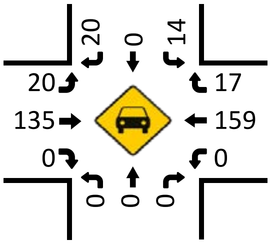
Total Vehicles (AM)



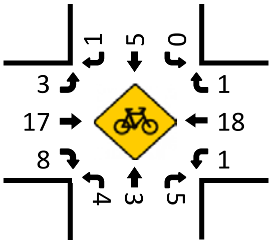
Bikes (AM)



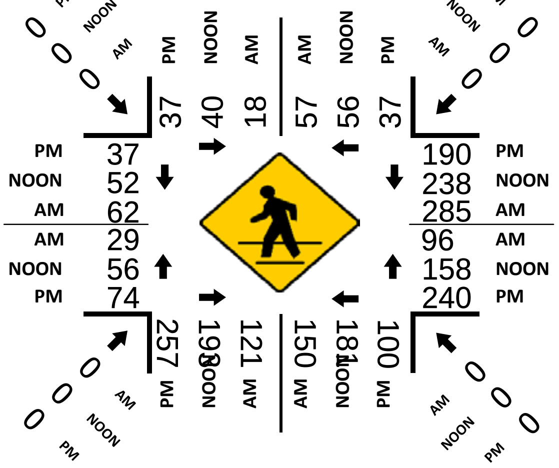
Total Vehicles (Noon)



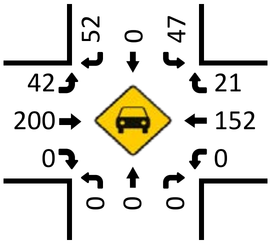
Bikes (NOON)



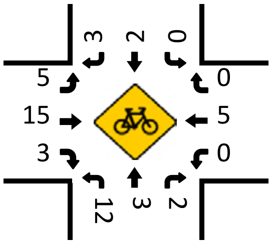
Pedestrians (Crosswalks)



Total Vehicles (PM)



Bikes (PM)



Prepared by National Data & Surveying Services

N Campus Dr & Lot 10 Dwy

Peak Hour Turning Movement Count

ID: 18-06141-003
City: Riverside

Day: Wednesday
Date: 11/14/2018

	PEAK HOURS	COUNT PERIODS
AM	07:45 AM - 08:45 AM	07:00 AM - 10:00 AM
NOON	11:15 AM - 12:15 PM	10:00 AM - 02:00 PM
PM	04:30 PM - 05:30 PM	02:00 PM - 10:00 PM

N Campus Dr

SOUTHBOUND

	↲	↓	↳	↶	⇧
AM	0	148	24	0	121
NOON	0	117	17	1	137
PM	0	176	28	0	182
	0	1	0	0	

Lot 10 Dwy

EASTBOUND

		AM	NOON	PM
⇦		0	0	0
↶	0	0	0	0
↱	0	0	0	0
→	0	0	0	0
↴	0	0	0	0

CONTROL

3-Way Stop (NB/SB/WB)

	AM	NOON	PM
TEV	425	362	519
PHF	0.79	0.81	0.79

Lot 10 Dwy

WESTBOUND

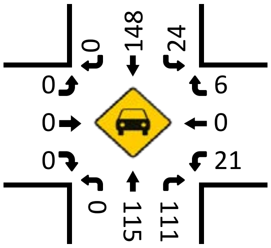
		PM	NOON	AM
↰	0	19	16	6
←	1	0	0	0
↲	0	81	52	21
↷	0	0	0	0
⇨		80	56	135

NORTHBOUND

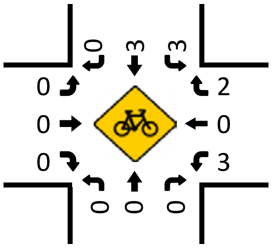
N Campus Dr

	⇩	↶	↰	↑	↱
		0	0	1	0
PM	257	0	0	163	52
NOON	169	0	0	120	39
AM	169	0	0	115	111

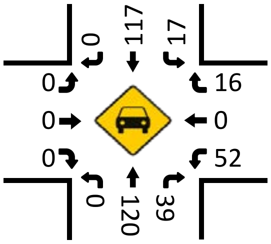
Total Vehicles (AM)



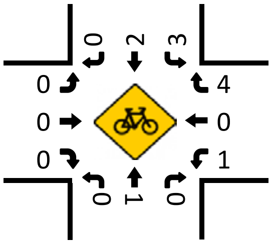
Bikes (AM)



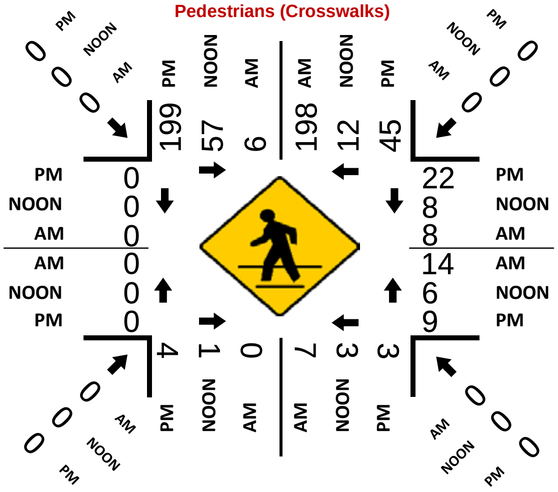
Total Vehicles (Noon)



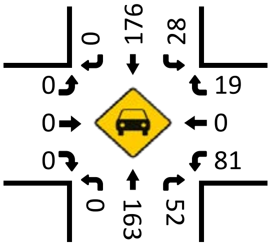
Bikes (NOON)



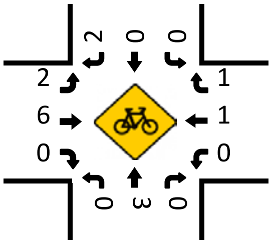
Pedestrians (Crosswalks)



Total Vehicles (PM)



Bikes (PM)



Prepared by National Data & Surveying Services

N Campus Dr & Big Springs Rd

Peak Hour Turning Movement Count

ID: 18-06141-004
City: Riverside

Day: Wednesday
Date: 11/14/2018

	PEAK HOURS		COUNT PERIODS
AM	07:30 AM - 08:30 AM	AM	07:00 AM - 10:00 AM
NOON	11:15 AM - 12:15 PM	NOON	10:00 AM - 02:00 PM
PM	04:30 PM - 05:30 PM	PM	02:00 PM - 10:00 PM

N Campus Dr
SOUTHBOUND

AM	0	80	56	0	164
NOON	0	81	69	1	165
PM	0	118	136	1	178
	0	1	0	0	

Big Springs Rd
EASTBOUND

	AM	NOON	PM
	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
	AM	NOON	PM

Big Springs Rd
WESTBOUND

	PM	NOON	AM
0	100	80	97
1	0	0	0
0	87	54	88
0	0	0	0
	242	122	107
	PM	NOON	AM

CONTROL

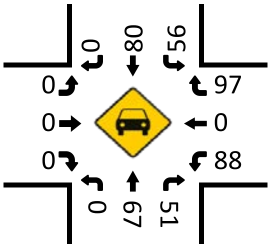
3-Way Stop (NB/SB/WB)

	AM	NOON	PM
TEV	441	422	625
PHF	0.84	0.84	0.86

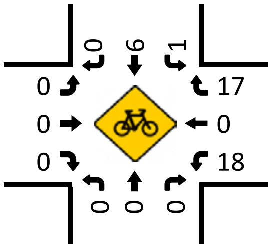
NORTHBOUND
N Campus Dr

		0	0	1	0
PM	205	0	0	77	106
NOON	135	0	0	84	53
AM	170	2	0	67	51

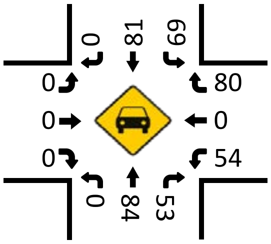
Total Vehicles (AM)



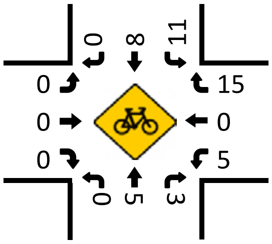
Bikes (AM)



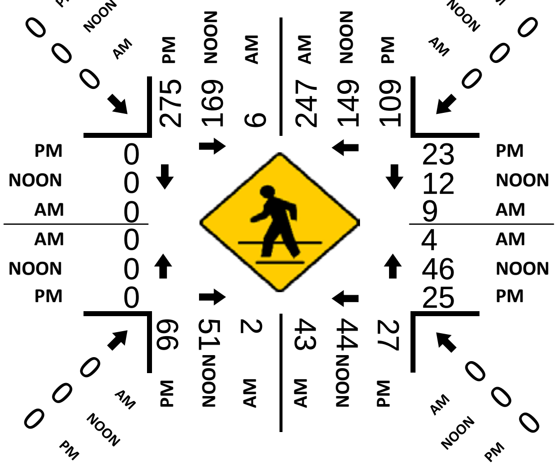
Total Vehicles (Noon)



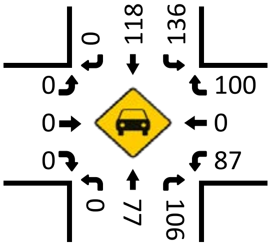
Bikes (NOON)



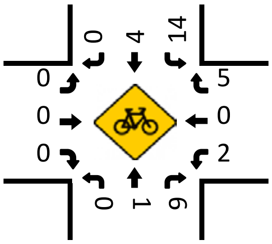
Pedestrians (Crosswalks)



Total Vehicles (PM)



Bikes (PM)



Prepared by National Data & Surveying Services

W Campus Dr & Canyon Crest Dr

Peak Hour Turning Movement Count

ID: 18-06141-005
City: Riverside

Day: Wednesday
Date: 11/14/2018

PEAK HOURS		COUNT PERIODS
07:45 AM - 08:45 AM	AM	07:00 AM - 10:00 AM
11:45 AM - 12:45 PM	NOON	10:00 AM - 02:00 PM
04:30 PM - 05:30 PM	PM	02:00 PM - 10:00 PM

W Campus Dr

SOUTHBOUND

	↲	↓	↳	↶	⇧	
AM	234	74	0	1	343	AM
NOON	181	88	0	0	269	NOON
PM	276	120	0	0	350	PM
	1	1	0	0		

Canyon Crest Dr

EASTBOUND

	AM	NOON	PM	
⇦	318	394	711	
↶	0	0	0	0
↱	305	174	203	1
→	0	0	0	0
↴	393	180	238	1

CONTROL

Signalized

	AM	NOON	PM
TEV	1128	931	1419
PHF	0.83	0.93	0.81

Canyon Crest Dr

WESTBOUND

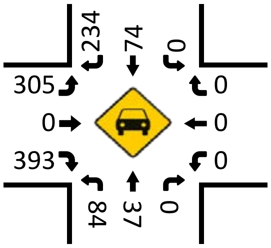
		PM	NOON	AM
0	↰	0	0	0
0	←	0	0	0
0	↲	0	0	0
0	↷	0	0	0
	⇨	0	0	0

NORTHBOUND

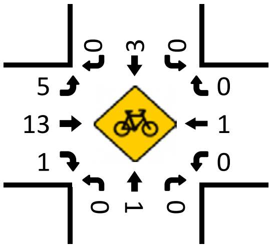
W Campus Dr

		0	1	1	0	
	⇩	↶	↰	↑	↱	
PM	358	0	435	147	0	PM
NOON	268	0	213	95	0	NOON
AM	467	0	84	37	0	AM

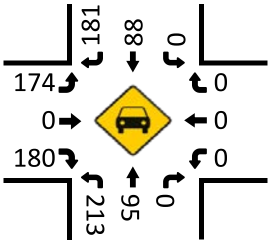
Total Vehicles (AM)



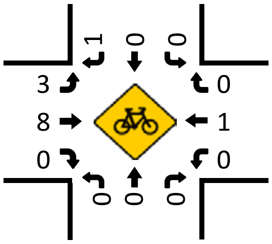
Bikes (AM)



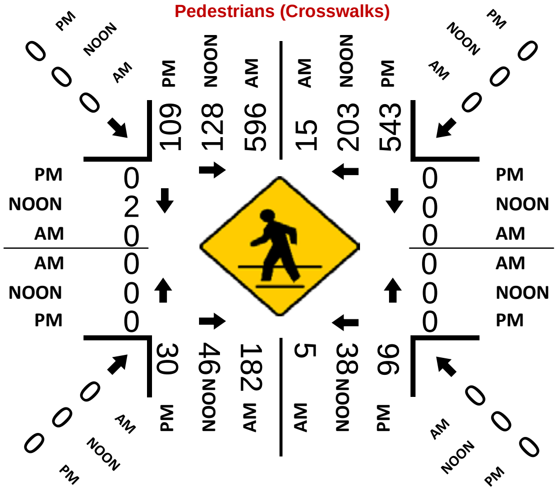
Total Vehicles (Noon)



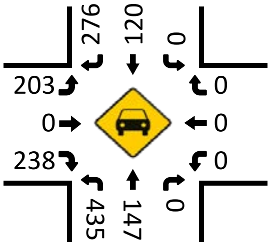
Bikes (NOON)



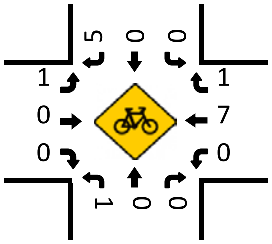
Pedestrians (Crosswalks)



Total Vehicles (PM)



Bikes (PM)



Prepared by National Data & Surveying Services

Aberdeen Dr & W Linden St

Peak Hour Turning Movement Count

ID: 18-06141-006
City: Riverside

Day: Wednesday
Date: 11/14/2018

PEAK HOURS		COUNT PERIODS
AM	09:00 AM - 10:00 AM	07:00 AM - 10:00 AM
NOON	12:45 PM - 01:45 PM	10:00 AM - 02:00 PM
PM	04:15 PM - 05:15 PM	02:00 PM - 10:00 PM

Aberdeen Dr

SOUTHBOUND

	↲	↓	↳	U	⇧
AM	0	0	0	0	0
NOON	0	0	0	0	0
PM	0	0	0	0	0
	0	0	0	0	

W Linden St

EASTBOUND

	AM	NOON	PM	
⇦	199	250	388	
U	0	0	0	0
↱	0	0	0	0
→	80	109	74	1
↴	178	142	223	0

CONTROL

3-Way Stop (NB/EB/WB)

	AM	NOON	PM
TEV	540	596	777
PHF	0.81	0.89	0.86

WESTBOUND

W Linden St

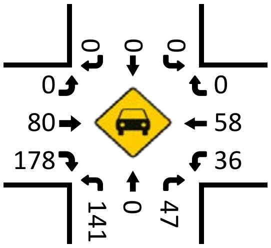
		PM	NOON	AM
0	↰	0	0	0
1	←	145	95	58
0	↲	46	58	36
0	U	0	0	0
	⇨	119	146	127

	⇩	U	↰	↑	↱
		0	0	1	0
PM	270	1	243	0	45
NOON	200	0	155	0	37
AM	214	0	141	0	47

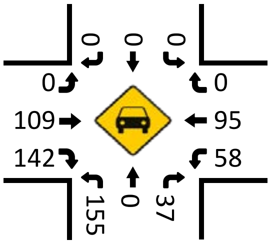
NORTHBOUND

Aberdeen Dr

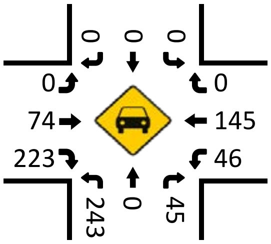
Total Vehicles (AM)



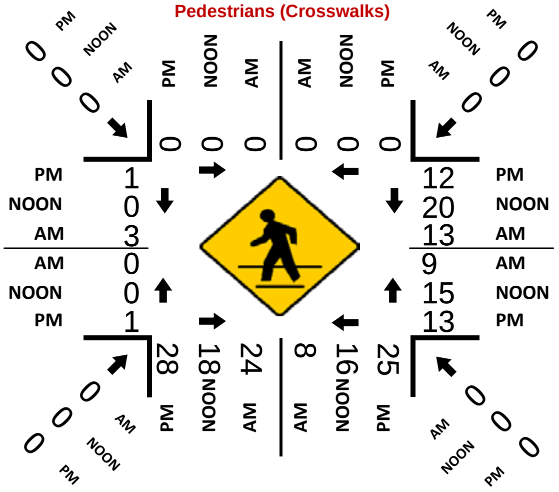
Total Vehicles (Noon)



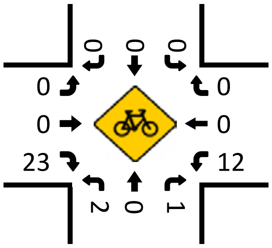
Total Vehicles (PM)



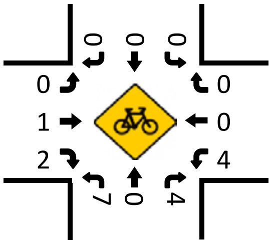
Pedestrians (Crosswalks)



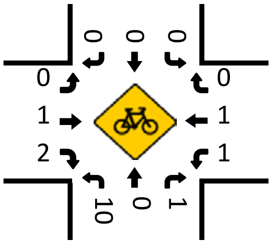
Bikes (AM)



Bikes (NOON)



Bikes (PM)



Prepared by National Data & Surveying Services

Canyon Crest Dr & W Linden St

Peak Hour Turning Movement Count

ID: 18-06141-007
City: Riverside

Day: Wednesday
Date: 11/14/2018

PEAK HOURS	COUNT PERIODS
07:30 AM - 08:30 AM	07:00 AM - 10:00 AM
12:30 PM - 01:30 PM	10:00 AM - 02:00 PM
04:45 PM - 05:45 PM	02:00 PM - 10:00 PM

Canyon Crest Dr

SOUTHBOUND

	↲	↓	↳	↶	⇧
AM	65	215	48	1	216
NOON	64	209	63	0	267
PM	33	291	80	0	308
	1	1	1	0	

W Linden St

EASTBOUND

	AM	NOON	PM		
	204	212	204	⇦	
	0	1	1	↶	0
	33	43	48	↱	1
	51	61	107	→	2
	93	87	124	↴	0
	AM	NOON	PM		

WESTBOUND

W Linden St

		PM	NOON	AM
0	↰	95	53	33
1	←	93	69	57
1	↲	196	128	65
0	↷	0	0	0
	⇨	294	269	251
		PM	NOON	AM

CONTROL

Signalized

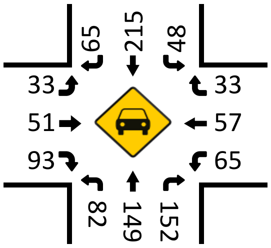
TEV	1045	1172	1418
	AM	NOON	PM
PHF	0.83	0.90	0.88

	⇩	↶	↰	↑	↱	
		0	1	1	1	
PM	612	1	77	165	107	PM
NOON	424	0	78	171	145	NOON
AM	374	1	82	149	152	AM

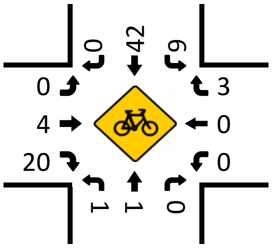
NORTHBOUND

Canyon Crest Dr

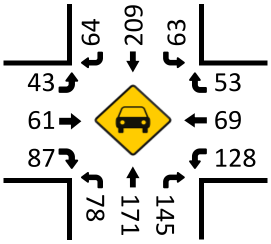
Total Vehicles (AM)



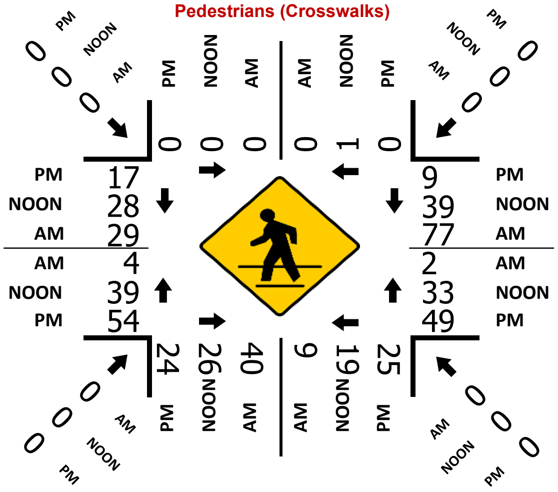
Bikes (AM)



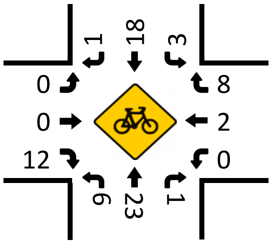
Total Vehicles (Noon)



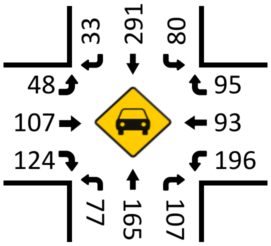
Pedestrians (Crosswalks)



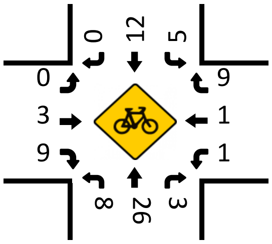
Bikes (NOON)



Total Vehicles (PM)



Bikes (PM)



Prepared by National Data & Surveying Services

Canyon Crest Dr & Blaine St

Peak Hour Turning Movement Count

ID: 18-06141-008
City: Riverside

Day: Wednesday
Date: 11/14/2018

PEAK HOURS		COUNT PERIODS
07:30 AM - 08:30 AM	AM	07:00 AM - 10:00 AM
12:45 PM - 01:45 PM	NOON	10:00 AM - 02:00 PM
05:15 PM - 06:15 PM	PM	02:00 PM - 10:00 PM

Canyon Crest Dr

SOUTHBOUND

AM	51	96	8	0	98	AM
NOON	40	63	10	0	105	NOON
PM	64	129	13	0	155	PM
	↲	↓	↳	↶	⇧	
	0	1	1	0		

Blaine St

EASTBOUND

	AM	NOON	PM		
	571	505	603	⇦	
	0	0	0	↶	0
	35	30	49	↱	1
	425	353	398	→	2
	130	133	123	↴	0
	AM	NOON	PM		

CONTROL

Signalized

TEV	1531	1366	1648
	AM	NOON	PM
PHF	0.87	0.88	0.96

Blaine St

WESTBOUND

		PM	NOON	AM
0	↰	17	16	18
2	←	431	405	486
1	↲	119	99	129
0	↷	0	0	0
	⇨	519	461	506
		PM	NOON	AM

		0	1	1	1	
	⇩	↶	↰	↑	↱	
PM	371	0	108	89	108	PM
NOON	295	0	60	59	98	NOON
AM	356	1	34	45	73	AM

NORTHBOUND

Canyon Crest Dr

Total Vehicles (AM)

	51 ↲	96 ↓	8 ↳
35 ↱			↰ 18
425 →			← 486
130 ↴			↲ 129
	↰ 34	↑ 45	↱ 73

Total Vehicles (Noon)

	40 ↲	63 ↓	10 ↳
30 ↱			↰ 16
353 →			← 405
133 ↴			↲ 99
	↰ 60	↑ 59	↱ 98

Total Vehicles (PM)

	64 ↲	129 ↓	13 ↳
49 ↱			↰ 17
398 →			← 431
123 ↴			↲ 119
	↰ 108	↑ 89	↱ 108

Bikes (AM)

	0 ↲	34 ↓	0 ↳
0 ↱			↰ 0
0 →			← 1
8 ↴			↲ 4
	↰ 1	↑ 2	↱ 1

Bikes (NOON)

	0 ↲	8 ↓	2 ↳
1 ↱			↰ 0
0 →			← 2
3 ↴			↲ 4
	↰ 10	↑ 14	↱ 4

Bikes (PM)

	0 ↲	8 ↓	1 ↳
0 ↱			↰ 0
0 →			← 0
2 ↴			↲ 5
	↰ 11	↑ 18	↱ 4

Pedestrians (Crosswalks)

PM 0 NOON 0 AM 0 ↘	PM	NOON	AM		AM	NOON	PM	PM 0 NOON 0 AM 0 ↙
	8	10	9		8	19	4	
		→				←		
PM 45 NOON 50 AM 106	↓						↓	31 PM 39 NOON 71 AM
AM 11 NOON 51 PM 60	↑						↑	5 AM 32 NOON 47 PM
		→				←		
	3	2	2		4	2	5	
AM 0 NOON 0 PM 0 ↗	PM	NOON	AM		AM	NOON	PM	AM 0 NOON 0 PM 0 ↖

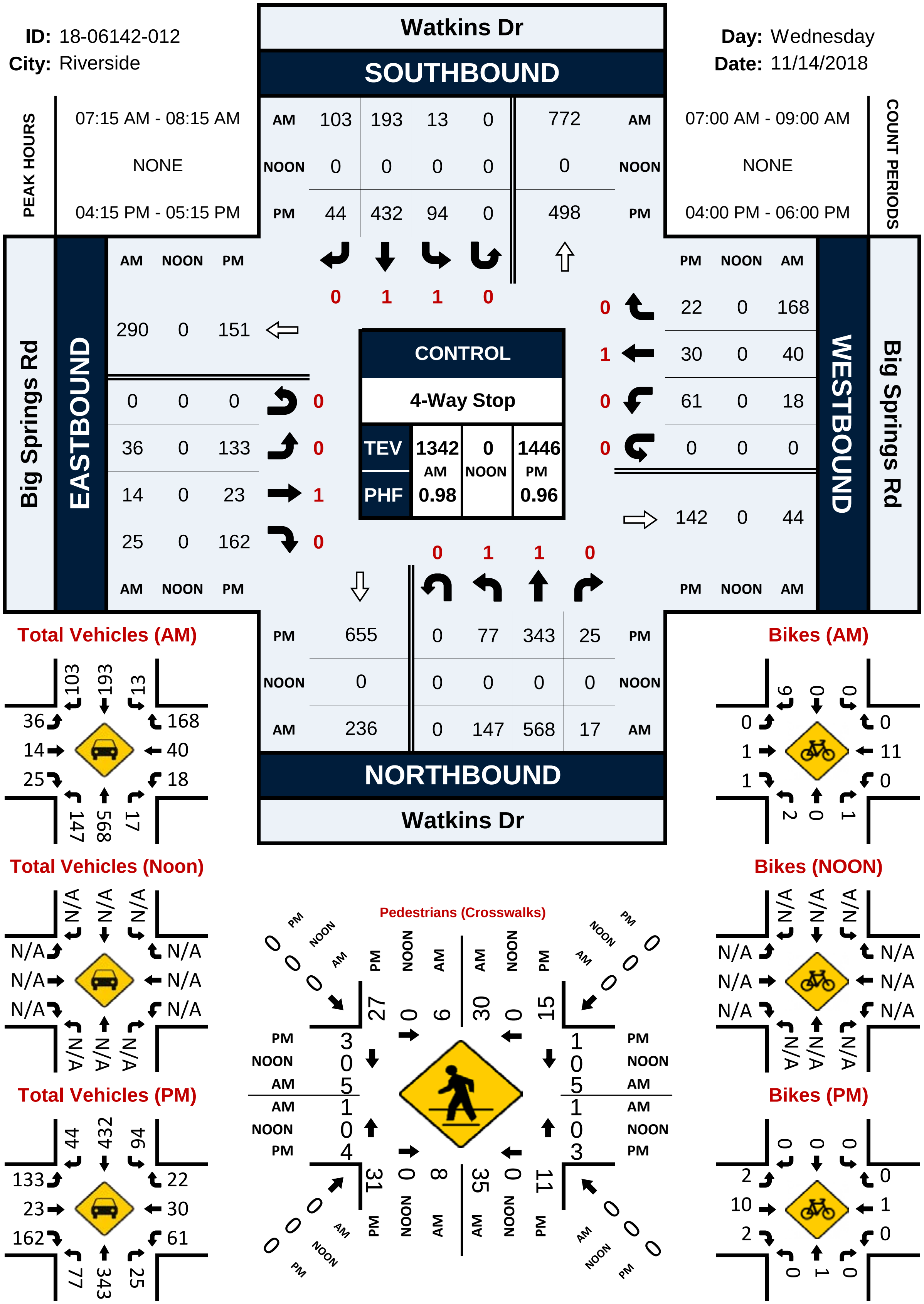
Prepared by National Data & Surveying Services

Watkins Dr & Big Springs Rd

Peak Hour Turning Movement Count

ID: 18-06142-012
City: Riverside

Day: Wednesday
Date: 11/14/2018



PEAK HOURS		COUNT PERIODS
07:15 AM - 08:15 AM	AM	07:00 AM - 09:00 AM
NONE	NOON	NONE
04:15 PM - 05:15 PM	PM	04:00 PM - 06:00 PM

Watkins Dr — SOUTHBOUND

AM	103	193	13	0	772
NOON	0	0	0	0	0
PM	44	432	94	0	498
	0	1	1	0	

Big Springs Rd — EASTBOUND

	AM	NOON	PM	
	290	0	151	
	0	0	0	0
	36	0	133	0
	14	0	23	1
	25	0	162	0

Big Springs Rd — WESTBOUND

	PM	NOON	AM
0	22	0	168
1	30	0	40
0	61	0	18
0	0	0	0
	142	0	44

Watkins Dr — NORTHBOUND

		0	1	1	0
PM	655	0	77	343	25
NOON	0	0	0	0	0
AM	236	0	147	568	17

CONTROL

4-Way Stop

	AM	NOON	PM
TEV	1342	0	1446
PHF	0.98		0.96

Total Vehicles (AM)

Total Vehicles (Noon)

Total Vehicles (PM)

Bikes (AM)

Bikes (NOON)

Bikes (PM)

Pedestrians (Crosswalks)

	PM	NOON	AM	AM	NOON	PM
North	27	0	6	30	0	15
South	31	0	8	35	0	11

	PM	NOON	AM	AM	NOON	PM
West	3	0	5	1	0	4
East	1	0	5	1	0	3

Appendix B

Level of Service (LOS) Worksheets

Intersection	
Intersection Delay, s/veh	9
Intersection LOS	A

Movement	EBL	EBT	WBT	WBR	SBU	SBL	SBR
Lane Configurations		↰	↱			↶	
Traffic Vol, veh/h	22	9	16	135	37	138	39
Future Vol, veh/h	22	9	16	135	37	138	39
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Heavy Vehicles, %	2	2	2	2	2	2	2
Mvmt Flow	28	11	20	171	47	175	49
Number of Lanes	0	1	1	0	0	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	1	1
HCM Control Delay	8.2	8.2	9.7
HCM LOS	A	A	A

Lane	EBLn1	WBLn1	SBLn1
Vol Left, %	71%	0%	78%
Vol Thru, %	29%	11%	0%
Vol Right, %	0%	89%	22%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	31	151	214
LT Vol	22	0	167
Through Vol	9	16	0
RT Vol	0	135	47
Lane Flow Rate	39	191	271
Geometry Grp	1	1	1
Degree of Util (X)	0.054	0.217	0.335
Departure Headway (Hd)	4.926	4.091	4.455
Convergence, Y/N	Yes	Yes	Yes
Cap	728	879	807
Service Time	2.95	2.107	2.479
HCM Lane V/C Ratio	0.054	0.217	0.336
HCM Control Delay	8.2	8.2	9.7
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.2	0.8	1.5

Intersection	
Intersection Delay, s/veh	8.2
Intersection LOS	A

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰↱		↑↱			↰↑
Traffic Vol, veh/h	16	21	131	22	23	122
Future Vol, veh/h	16	21	131	22	23	122
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	20	26	160	27	28	149
Number of Lanes	1	0	1	0	0	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	1	0
HCM Control Delay	7.7	8.2	8.4
HCM LOS	A	A	A

Lane	NBLn1	WBLn1	SBLn1
Vol Left, %	0%	43%	16%
Vol Thru, %	86%	0%	84%
Vol Right, %	14%	57%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	153	37	145
LT Vol	0	16	23
Through Vol	131	0	122
RT Vol	22	21	0
Lane Flow Rate	187	45	177
Geometry Grp	1	1	1
Degree of Util (X)	0.21	0.056	0.206
Departure Headway (Hd)	4.06	4.461	4.186
Convergence, Y/N	Yes	Yes	Yes
Cap	873	808	849
Service Time	2.134	2.461	2.256
HCM Lane V/C Ratio	0.214	0.056	0.208
HCM Control Delay	8.2	7.7	8.4
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.8	0.2	0.8

Intersection	
Intersection Delay, s/veh	8.7
Intersection LOS	A

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		↱			↰
Traffic Vol, veh/h	21	6	115	111	24	148
Future Vol, veh/h	21	6	115	111	24	148
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	27	8	146	141	30	187
Number of Lanes	1	0	1	0	0	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	1	0
HCM Control Delay	8.2	8.7	8.8
HCM LOS	A	A	A

Lane	NBLn1	WBLn1	SBLn1
Vol Left, %	0%	78%	14%
Vol Thru, %	51%	0%	86%
Vol Right, %	49%	22%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	226	27	172
LT Vol	0	21	24
Through Vol	115	0	148
RT Vol	111	6	0
Lane Flow Rate	286	34	218
Geometry Grp	1	1	1
Degree of Util (X)	0.307	0.047	0.256
Departure Headway (Hd)	3.862	5.003	4.236
Convergence, Y/N	Yes	Yes	Yes
Cap	915	720	838
Service Time	1.949	3.003	2.317
HCM Lane V/C Ratio	0.313	0.047	0.26
HCM Control Delay	8.7	8.2	8.8
HCM Lane LOS	A	A	A
HCM 95th-tile Q	1.3	0.1	1

4: N Campus Dr & Big Springs Rd

Intersection	
Intersection Delay, s/veh	8.9
Intersection LOS	A

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰↱		↑↱			↰↑
Traffic Vol, veh/h	88	97	67	51	56	80
Future Vol, veh/h	88	97	67	51	56	80
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	105	115	80	61	67	95
Number of Lanes	1	0	1	0	0	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	1	0
HCM Control Delay	9.1	8.3	9
HCM LOS	A	A	A

Lane	NBLn1	WBLn1	SBLn1
Vol Left, %	0%	48%	41%
Vol Thru, %	57%	0%	59%
Vol Right, %	43%	52%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	118	185	136
LT Vol	0	88	56
Through Vol	67	0	80
RT Vol	51	97	0
Lane Flow Rate	140	220	162
Geometry Grp	1	1	1
Degree of Util (X)	0.171	0.27	0.211
Departure Headway (Hd)	4.375	4.408	4.683
Convergence, Y/N	Yes	Yes	Yes
Cap	819	815	766
Service Time	2.405	2.435	2.712
HCM Lane V/C Ratio	0.171	0.27	0.211
HCM Control Delay	8.3	9.1	9
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.6	1.1	0.8

HCM 6th Signalized Intersection Summary
5: W Campus Dr & Canyon Crest Dr

	↗	↘	↖	↑	↓	↙
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↰	↱	↰	↑	↑	↱
Traffic Volume (veh/h)	305	393	84	37	74	234
Future Volume (veh/h)	305	393	84	37	74	234
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	367	302	101	45	89	90
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	466	534	133	1107	830	1118
Arrive On Green	0.26	0.26	0.07	0.59	0.44	0.44
Sat Flow, veh/h	1781	1585	1781	1870	1870	1585
Grp Volume(v), veh/h	367	302	101	45	89	90
Grp Sat Flow(s),veh/h/ln	1781	1585	1781	1870	1870	1585
Q Serve(g_s), s	10.5	8.5	3.0	0.5	1.5	1.0
Cycle Q Clear(g_c), s	10.5	8.5	3.0	0.5	1.5	1.0
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	466	534	133	1107	830	1118
V/C Ratio(X)	0.79	0.57	0.76	0.04	0.11	0.08
Avail Cap(c_a), veh/h	751	786	587	1107	830	1118
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	18.7	14.8	24.8	4.7	8.9	2.5
Incr Delay (d2), s/veh	3.0	0.9	8.4	0.1	0.3	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.3	7.8	1.5	0.2	0.6	0.6
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	21.7	15.8	33.2	4.7	9.1	2.7
LnGrp LOS	C	B	C	A	A	A
Approach Vol, veh/h	669			146	179	
Approach Delay, s/veh	19.0			24.4	5.9	
Approach LOS	B			C	A	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		36.3		18.3	8.1	28.2
Change Period (Y+Rc), s		4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		32.3		23.0	18.0	10.3
Max Q Clear Time (g_c+I1), s		2.5		12.5	5.0	3.5
Green Ext Time (p_c), s		0.2		1.8	0.2	0.4

Intersection Summary			
HCM 6th Ctrl Delay			17.5
HCM 6th LOS			B

Notes

User approved changes to right turn type.

HCM 6th AWSC
6: Aberdeen Dr & Linden St

09/20/2019

Intersection	
Intersection Delay, s/veh	9.8
Intersection LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱			↰	Y	
Traffic Vol, veh/h	80	178	36	58	141	47
Future Vol, veh/h	80	178	36	58	141	47
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	99	220	44	72	174	58
Number of Lanes	1	0	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	1
HCM Control Delay	9.9	8.9	10.2
HCM LOS	A	A	B

Lane	NBLn1	EBLn1	WBLn1
Vol Left, %	75%	0%	38%
Vol Thru, %	0%	31%	62%
Vol Right, %	25%	69%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	188	258	94
LT Vol	141	0	36
Through Vol	0	80	58
RT Vol	47	178	0
Lane Flow Rate	232	319	116
Geometry Grp	1	1	1
Degree of Util (X)	0.315	0.377	0.159
Departure Headway (Hd)	4.888	4.256	4.947
Convergence, Y/N	Yes	Yes	Yes
Cap	731	844	722
Service Time	2.94	2.292	2.997
HCM Lane V/C Ratio	0.317	0.378	0.161
HCM Control Delay	10.2	9.9	8.9
HCM Lane LOS	B	A	A
HCM 95th-tile Q	1.4	1.8	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱		↰	↑	↱	↰	↑	↱
Traffic Volume (vph)	33	51	93	65	57	33	82	149	152	48	215	65
Future Volume (vph)	33	51	93	65	57	33	82	149	152	48	215	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.98		1.00	1.00		1.00	1.00	0.98	1.00	1.00	0.91
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.90		1.00	0.94		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1648		1770	1760		1770	1863	1549	1770	1863	1437
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1648		1770	1760		1770	1863	1549	1770	1863	1437
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	40	61	112	78	69	40	99	180	183	58	259	78
RTOR Reduction (vph)	0	70	0	0	23	0	0	0	139	0	0	61
Lane Group Flow (vph)	40	103	0	78	86	0	99	180	44	58	259	17
Confl. Bikes (#/hr)			4						1			42
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases									8			4
Actuated Green, G (s)	4.4	10.9		7.4	13.9		6.7	19.9	19.9	4.5	17.7	17.7
Effective Green, g (s)	4.4	10.9		7.4	13.9		6.7	19.9	19.9	4.5	17.7	17.7
Actuated g/C Ratio	0.05	0.13		0.09	0.17		0.08	0.24	0.24	0.05	0.21	0.21
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	94	217		158	295		143	448	372	96	398	307
v/s Ratio Prot	0.02	c0.06		c0.04	c0.05		c0.06	0.10		0.03	c0.14	
v/s Ratio Perm									0.03			0.01
v/c Ratio	0.43	0.47		0.49	0.29		0.69	0.40	0.12	0.60	0.65	0.05
Uniform Delay, d1	37.9	33.2		35.9	30.1		37.0	26.4	24.5	38.2	29.7	25.8
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.1	1.6		2.4	0.5		13.5	0.6	0.1	10.3	3.8	0.1
Delay (s)	41.0	34.9		38.3	30.6		50.5	27.0	24.7	48.5	33.5	25.9
Level of Service	D	C		D	C		D	C	C	D	C	C
Approach Delay (s)		36.0			33.8			31.1			34.2	
Approach LOS		D			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	33.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	82.7	Sum of lost time (s)	22.5
Intersection Capacity Utilization	42.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM 6th Signalized Intersection Summary
8: Canyon Crest Dr & Blaine St

09/20/2019

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱		↰	↑	↱	↰	↱	
Traffic Volume (veh/h)	35	425	130	129	486	18	34	45	73	8	96	51
Future Volume (veh/h)	35	425	130	129	486	18	34	45	73	8	96	51
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.90	1.00		0.87	0.98		0.97	0.98		0.91
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1683	1683	1683	1683	1683	1683	1683	1683	1683	1683	1683	1683
Adj Flow Rate, veh/h	40	489	108	148	559	18	39	52	17	9	110	18
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	72	1019	223	182	1474	47	309	312	380	367	257	42
Arrive On Green	0.04	0.40	0.36	0.11	0.47	0.43	0.19	0.19	0.16	0.19	0.19	0.16
Sat Flow, veh/h	1603	2548	557	1603	3145	101	1115	1683	1380	1171	1389	227
Grp Volume(v), veh/h	40	305	292	148	284	293	39	52	17	9	0	128
Grp Sat Flow(s),veh/h/ln	1603	1599	1506	1603	1599	1647	1115	1683	1380	1171	0	1616
Q Serve(g_s), s	1.0	5.6	5.8	3.6	4.6	4.6	1.3	1.0	0.4	0.3	0.0	2.8
Cycle Q Clear(g_c), s	1.0	5.6	5.8	3.6	4.6	4.6	4.1	1.0	0.4	1.3	0.0	2.8
Prop In Lane	1.00		0.37	1.00		0.06	1.00		1.00	1.00		0.14
Lane Grp Cap(c), veh/h	72	639	602	182	749	772	309	312	380	367	0	299
V/C Ratio(X)	0.56	0.48	0.48	0.81	0.38	0.38	0.13	0.17	0.04	0.02	0.00	0.43
Avail Cap(c_a), veh/h	242	1000	942	282	1040	1071	833	1103	1029	918	0	1059
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	18.6	8.9	9.1	17.2	6.8	6.9	16.2	13.6	10.7	14.2	0.0	14.4
Incr Delay (d2), s/veh	2.5	0.6	0.6	5.1	0.3	0.3	0.2	0.2	0.0	0.0	0.0	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	1.3	1.3	1.3	0.9	1.0	0.3	0.4	0.1	0.1	0.0	0.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.1	9.4	9.7	22.3	7.2	7.2	16.3	13.9	10.8	14.2	0.0	15.4
LnGrp LOS	C	A	A	C	A	A	B	B	B	B	A	B
Approach Vol, veh/h		637			725			108			137	
Approach Delay, s/veh		10.3			10.3			14.3			15.3	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.5	19.9		11.4	5.8	22.7		11.4				
Change Period (Y+Rc), s	4.0	5.4		5.1	4.0	5.4		5.1				
Max Green Setting (Gmax), s	7.0	23.5		25.0	6.0	24.5		25.0				
Max Q Clear Time (g_c+I1), s	5.6	7.8		4.8	3.0	6.6		6.1				
Green Ext Time (p_c), s	0.0	2.2		0.4	0.0	2.1		0.4				

Intersection Summary			
HCM 6th Ctrl Delay			11.0
HCM 6th LOS			B

HCM 6th AWSC
9: Watkins Dr & Big Springs Rd

Intersection	
Intersection Delay, s/veh	58.5
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑	↱		↰↑	↱	↰	↑	↱	↰	↑	↱
Traffic Vol, veh/h	36	14	25	18	40	168	147	568	17	13	193	103
Future Vol, veh/h	36	14	25	18	40	168	147	568	17	13	193	103
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	39	15	27	20	43	183	160	617	18	14	210	112
Number of Lanes	0	1	1	0	1	1	1	1	1	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	3	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	3	2	2
Conflicting Approach Righ	NB	SB	WB	EB
Conflicting Lanes Right	3	3	2	2
HCM Control Delay	12.7	14.2	95.2	14.9
HCM LOS	B	B	F	B

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	0%	72%	0%	31%	0%	100%	0%	0%
Vol Thru, %	0%	100%	0%	28%	0%	69%	0%	0%	100%	0%
Vol Right, %	0%	0%	100%	0%	100%	0%	100%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	147	568	17	50	25	58	168	13	193	103
LT Vol	147	0	0	36	0	18	0	13	0	0
Through Vol	0	568	0	14	0	40	0	0	193	0
RT Vol	0	0	17	0	25	0	168	0	0	103
Lane Flow Rate	160	617	18	54	27	63	183	14	210	112
Geometry Grp	8	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.325	1.169	0.031	0.133	0.059	0.142	0.37	0.032	0.442	0.214
Departure Headway (Hd)	7.326	6.818	6.106	9.232	8.155	8.465	7.602	8.467	7.956	7.24
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	489	531	582	391	442	426	477	425	455	499
Service Time	5.107	4.598	3.886	6.932	5.855	6.165	5.302	6.167	5.656	4.94
HCM Lane V/C Ratio	0.327	1.162	0.031	0.138	0.061	0.148	0.384	0.033	0.462	0.224
HCM Control Delay	13.6	118.9	9.1	13.3	11.4	12.6	14.7	11.4	16.8	11.9
HCM Lane LOS	B	F	A	B	B	B	B	B	C	B
HCM 95th-tile Q	1.4	21.6	0.1	0.5	0.2	0.5	1.7	0.1	2.2	0.8

Intersection	
Intersection Delay, s/veh	10.2
Intersection LOS	B

Movement	EBL	EBT	WBT	WBR	SBU	SBL	SBR
Lane Configurations		↰	↱			Y	
Traffic Vol, veh/h	42	21	7	195	43	219	10
Future Vol, veh/h	42	21	7	195	43	219	10
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Heavy Vehicles, %	2	2	2	2	2	2	2
Mvmt Flow	50	25	8	232	51	261	12
Number of Lanes	0	1	1	0	0	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	1	1
HCM Control Delay	8.8	9	11.5
HCM LOS	A	A	B

Lane	EBLn1	WBLn1	SBLn1
Vol Left, %	67%	0%	96%
Vol Thru, %	33%	3%	0%
Vol Right, %	0%	97%	4%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	63	202	272
LT Vol	42	0	260
Through Vol	21	7	0
RT Vol	0	195	12
Lane Flow Rate	75	240	324
Geometry Grp	1	1	1
Degree of Util (X)	0.108	0.285	0.432
Departure Headway (Hd)	5.16	4.274	4.799
Convergence, Y/N	Yes	Yes	Yes
Cap	692	839	748
Service Time	3.211	2.311	2.847
HCM Lane V/C Ratio	0.108	0.286	0.433
HCM Control Delay	8.8	9	11.5
HCM Lane LOS	A	A	B
HCM 95th-tile Q	0.4	1.2	2.2

Intersection	
Intersection Delay, s/veh	9.2
Intersection LOS	A

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		↱			↰
Traffic Vol, veh/h	47	52	152	21	42	200
Future Vol, veh/h	47	52	152	21	42	200
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	53	58	171	24	47	225
Number of Lanes	1	0	1	0	0	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	1	0
HCM Control Delay	8.6	8.8	9.7
HCM LOS	A	A	A

Lane	NBLn1	WBLn1	SBLn1
Vol Left, %	0%	47%	17%
Vol Thru, %	88%	0%	83%
Vol Right, %	12%	53%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	173	99	242
LT Vol	0	47	42
Through Vol	152	0	200
RT Vol	21	52	0
Lane Flow Rate	194	111	272
Geometry Grp	1	1	1
Degree of Util (X)	0.239	0.147	0.336
Departure Headway (Hd)	4.426	4.747	4.448
Convergence, Y/N	Yes	Yes	Yes
Cap	811	755	808
Service Time	2.452	2.78	2.473
HCM Lane V/C Ratio	0.239	0.147	0.337
HCM Control Delay	8.8	8.6	9.7
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.9	0.5	1.5

Intersection	
Intersection Delay, s/veh	9.7
Intersection LOS	A

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰↱		↱			↰
Traffic Vol, veh/h	81	19	163	52	28	176
Future Vol, veh/h	81	19	163	52	28	176
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	103	24	206	66	35	223
Number of Lanes	1	0	1	0	0	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	1	0
HCM Control Delay	9.3	9.6	9.9
HCM LOS	A	A	A

Lane	NBLn1	WBLn1	SBLn1
Vol Left, %	0%	81%	14%
Vol Thru, %	76%	0%	86%
Vol Right, %	24%	19%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	215	100	204
LT Vol	0	81	28
Through Vol	163	0	176
RT Vol	52	19	0
Lane Flow Rate	272	127	258
Geometry Grp	1	1	1
Degree of Util (X)	0.333	0.181	0.329
Departure Headway (Hd)	4.411	5.152	4.588
Convergence, Y/N	Yes	Yes	Yes
Cap	814	694	782
Service Time	2.444	3.201	2.622
HCM Lane V/C Ratio	0.334	0.183	0.33
HCM Control Delay	9.6	9.3	9.9
HCM Lane LOS	A	A	A
HCM 95th-tile Q	1.5	0.7	1.4

Intersection	
Intersection Delay, s/veh	10.2
Intersection LOS	B

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰↱		↱			↰
Traffic Vol, veh/h	87	100	77	106	136	118
Future Vol, veh/h	87	100	77	106	136	118
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	101	116	90	123	158	137
Number of Lanes	1	0	1	0	0	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	1	0
HCM Control Delay	10	9.2	11
HCM LOS	A	A	B

Lane	NBLn1	WBLn1	SBLn1
Vol Left, %	0%	47%	54%
Vol Thru, %	42%	0%	46%
Vol Right, %	58%	53%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	183	187	254
LT Vol	0	87	136
Through Vol	77	0	118
RT Vol	106	100	0
Lane Flow Rate	213	217	295
Geometry Grp	1	1	1
Degree of Util (X)	0.265	0.294	0.396
Departure Headway (Hd)	4.484	4.863	4.821
Convergence, Y/N	Yes	Yes	Yes
Cap	796	735	741
Service Time	2.543	2.923	2.876
HCM Lane V/C Ratio	0.268	0.295	0.398
HCM Control Delay	9.2	10	11
HCM Lane LOS	A	A	B
HCM 95th-tile Q	1.1	1.2	1.9

HCM 6th Signalized Intersection Summary
5: W Campus Dr & Canyon Crest Dr

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↰	↱	↰	↑	↑	↱
Traffic Volume (veh/h)	203	238	435	147	120	276
Future Volume (veh/h)	203	238	435	147	120	276
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	251	196	537	181	148	153
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	307	801	593	1359	642	818
Arrive On Green	0.17	0.17	0.33	0.73	0.34	0.34
Sat Flow, veh/h	1781	1585	1781	1870	1870	1585
Grp Volume(v), veh/h	251	196	537	181	148	153
Grp Sat Flow(s),veh/h/ln	1781	1585	1781	1870	1870	1585
Q Serve(g_s), s	10.8	5.5	22.9	2.3	4.5	4.1
Cycle Q Clear(g_c), s	10.8	5.5	22.9	2.3	4.5	4.1
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	307	801	593	1359	642	818
V/C Ratio(X)	0.82	0.24	0.91	0.13	0.23	0.19
Avail Cap(c_a), veh/h	449	927	853	1359	642	818
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	31.6	11.1	25.3	3.3	18.6	10.3
Incr Delay (d2), s/veh	7.4	0.2	9.9	0.2	0.8	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.2	0.0	10.9	0.8	2.0	2.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	39.0	11.2	35.2	3.5	19.4	10.8
LnGrp LOS	D	B	D	A	B	B
Approach Vol, veh/h	447			718	301	
Approach Delay, s/veh	26.8			27.2	15.0	
Approach LOS	C			C	B	
Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		61.7		17.7	30.4	31.3
Change Period (Y+Rc), s		4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		57.7		20.0	38.0	15.7
Max Q Clear Time (g_c+I1), s		4.3		12.8	24.9	6.5
Green Ext Time (p_c), s		1.2		0.9	1.6	0.9
Intersection Summary						
HCM 6th Ctrl Delay			24.6			
HCM 6th LOS			C			

Notes

User approved changes to right turn type.

Intersection	
Intersection Delay, s/veh	13.4
Intersection LOS	B

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↱			↰↑	↰↱	
Traffic Vol, veh/h	74	223	46	145	243	45
Future Vol, veh/h	74	223	46	145	243	45
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	91	275	57	179	300	56
Number of Lanes	1	0	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	1
HCM Control Delay	12.8	11.8	15.1
HCM LOS	B	B	C

Lane	NBLn1	EBLn1	WBLn1
Vol Left, %	84%	0%	24%
Vol Thru, %	0%	25%	76%
Vol Right, %	16%	75%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	288	297	191
LT Vol	243	0	46
Through Vol	0	74	145
RT Vol	45	223	0
Lane Flow Rate	356	367	236
Geometry Grp	1	1	1
Degree of Util (X)	0.547	0.5	0.364
Departure Headway (Hd)	5.538	4.905	5.552
Convergence, Y/N	Yes	Yes	Yes
Cap	651	733	646
Service Time	3.574	2.944	3.595
HCM Lane V/C Ratio	0.547	0.501	0.365
HCM Control Delay	15.1	12.8	11.8
HCM Lane LOS	C	B	B
HCM 95th-tile Q	3.3	2.8	1.7

HCM Signalized Intersection Capacity Analysis
7: Canyon Crest Dr & Linden St

09/20/2019

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↑	↱	↰	↑	↱
Traffic Volume (vph)	48	107	124	196	93	95	77	165	107	80	291	65
Future Volume (vph)	48	107	124	196	93	95	77	165	107	80	291	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	3.4		4.5	3.4		4.5	3.1	3.1	4.5	3.9	3.9
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.92		1.00	0.92		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1713		1770	1721		1770	1863	1583	1770	1863	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1713		1770	1721		1770	1863	1583	1770	1863	1583
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	53	119	138	218	103	106	86	183	119	89	323	72
RTOR Reduction (vph)	0	43	0	0	38	0	0	0	96	0	0	57
Lane Group Flow (vph)	53	214	0	218	171	0	86	183	23	89	323	15
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases									8			4
Actuated Green, G (s)	6.2	14.8		14.7	23.3		4.9	16.7	16.7	6.4	18.2	18.2
Effective Green, g (s)	6.2	15.9		14.7	24.4		4.9	18.1	18.1	6.4	18.8	18.8
Actuated g/C Ratio	0.07	0.17		0.16	0.26		0.05	0.20	0.20	0.07	0.20	0.20
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	118	294		281	454		93	364	310	122	379	322
v/s Ratio Prot	0.03	c0.12		c0.12	0.10		0.05	0.10		c0.05	c0.17	
v/s Ratio Perm									0.01			0.01
v/c Ratio	0.45	0.73		0.78	0.38		0.92	0.50	0.08	0.73	0.85	0.05
Uniform Delay, d1	41.5	36.2		37.3	27.8		43.6	33.1	30.3	42.2	35.5	29.6
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.7	8.7		12.6	0.5		68.6	1.1	0.1	19.5	16.6	0.1
Delay (s)	44.2	44.9		49.8	28.3		112.1	34.2	30.4	61.6	52.1	29.6
Level of Service	D	D		D	C		F	C	C	E	D	C
Approach Delay (s)		44.8			39.3			50.3			50.5	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	46.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	92.4	Sum of lost time (s)	20.8
Intersection Capacity Utilization	57.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM 6th Signalized Intersection Summary
8: Canyon Crest Dr & Blaine St

09/20/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱		↰	↑	↱	↰	↱	
Traffic Volume (veh/h)	49	398	123	119	431	17	108	89	108	13	129	64
Future Volume (veh/h)	49	398	123	119	431	17	108	89	108	13	129	64
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.82	1.00		0.88	0.94		0.90	0.93		0.88
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1683	1683	1683	1683	1683	1683	1683	1683	1683	1683	1683	1683
Adj Flow Rate, veh/h	56	457	111	137	495	17	124	102	73	15	148	51
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	80	834	199	173	1252	43	377	600	589	436	411	142
Arrive On Green	0.05	0.34	0.32	0.11	0.40	0.38	0.36	0.36	0.34	0.36	0.36	0.34
Sat Flow, veh/h	1603	2445	584	1603	3138	108	996	1683	1284	1012	1152	397
Grp Volume(v), veh/h	56	296	272	137	252	260	124	102	73	15	0	199
Grp Sat Flow(s),veh/h/ln	1603	1599	1430	1603	1599	1647	996	1683	1284	1012	0	1549
Q Serve(g_s), s	2.1	9.2	9.6	5.1	6.9	7.0	6.5	2.6	2.1	0.6	0.0	5.9
Cycle Q Clear(g_c), s	2.1	9.2	9.6	5.1	6.9	7.0	12.4	2.6	2.1	3.2	0.0	5.9
Prop In Lane	1.00		0.41	1.00		0.07	1.00		1.00	1.00		0.26
Lane Grp Cap(c), veh/h	80	545	488	173	638	657	377	600	589	436	0	553
V/C Ratio(X)	0.70	0.54	0.56	0.79	0.39	0.40	0.33	0.17	0.12	0.03	0.00	0.36
Avail Cap(c_a), veh/h	234	1037	927	598	1400	1442	587	955	859	649	0	879
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	28.8	16.4	16.8	26.8	13.2	13.3	19.2	13.6	10.0	14.7	0.0	14.8
Incr Delay (d2), s/veh	4.1	0.8	1.0	3.1	0.4	0.4	0.5	0.1	0.1	0.0	0.0	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	3.0	2.9	1.9	2.1	2.2	1.5	0.9	0.5	0.1	0.0	1.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	32.9	17.3	17.8	29.9	13.6	13.7	19.7	13.7	10.1	14.7	0.0	15.2
LnGrp LOS	C	B	B	C	B	B	B	B	B	B	A	B
Approach Vol, veh/h		624			649			299			214	
Approach Delay, s/veh		18.9			17.1			15.3			15.1	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	10.6	25.0		26.0	7.1	28.6		26.0				
Change Period (Y+Rc), s	4.0	5.4		5.1	4.0	5.4		5.1				
Max Green Setting (Gmax), s	23.0	38.6		33.9	9.0	52.6		33.9				
Max Q Clear Time (g_c+I1), s	7.1	11.6		7.9	4.1	9.0		14.4				
Green Ext Time (p_c), s	0.2	2.4		0.8	0.0	2.0		1.4				

Intersection Summary			
HCM 6th Ctrl Delay			17.2
HCM 6th LOS			B

Intersection	
Intersection Delay, s/veh	46.7
Intersection LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑	↱		↰↑	↱	↰	↑	↱	↰	↑	↱
Traffic Vol, veh/h	133	23	162	61	30	22	77	343	25	94	432	44
Future Vol, veh/h	133	23	162	61	30	22	77	343	25	94	432	44
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	145	25	176	66	33	24	84	373	27	102	470	48
Number of Lanes	0	1	1	0	1	1	1	1	1	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	3	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	3	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	3	2	2
HCM Control Delay	17.9	16	39.5	74.5
HCM LOS	C	C	E	F

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	0%	85%	0%	67%	0%	100%	0%	0%
Vol Thru, %	0%	100%	0%	15%	0%	33%	0%	0%	100%	0%
Vol Right, %	0%	0%	100%	0%	100%	0%	100%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	77	343	25	156	162	91	22	94	432	44
LT Vol	77	0	0	133	0	61	0	94	0	0
Through Vol	0	343	0	23	0	30	0	0	432	0
RT Vol	0	0	25	0	162	0	22	0	0	44
Lane Flow Rate	84	373	27	170	176	99	24	102	470	48
Geometry Grp	8	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.207	0.869	0.058	0.436	0.399	0.273	0.059	0.249	1.077	0.1
Departure Headway (Hd)	9.188	8.672	7.949	9.509	8.362	10.274	9.211	8.77	8.255	7.534
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	393	421	453	382	433	352	391	410	441	475
Service Time	6.888	6.372	5.649	7.209	6.062	7.974	6.911	6.53	6.014	5.293
HCM Lane V/C Ratio	0.214	0.886	0.06	0.445	0.406	0.281	0.061	0.249	1.066	0.101
HCM Control Delay	14.3	47.2	11.1	19.4	16.5	16.8	12.5	14.4	94.1	11.1
HCM Lane LOS	B	E	B	C	C	C	B	B	F	B
HCM 95th-tile Q	0.8	8.7	0.2	2.1	1.9	1.1	0.2	1	15.5	0.3

Intersection	
Intersection Delay, s/veh	9.8
Intersection LOS	A

Movement	EBL	EBT	WBT	WBR	SBU	SBL	SBR
Lane Configurations		↰	↱			Y	
Traffic Vol, veh/h	22	9	16	161	0	213	39
Future Vol, veh/h	22	9	16	161	0	213	39
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Heavy Vehicles, %	2	2	2	2	2	2	2
Mvmt Flow	28	11	20	204	0	270	49
Number of Lanes	0	1	1	0	0	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	1	1
HCM Control Delay	8.4	8.7	10.8
HCM LOS	A	A	B

Lane	EBLn1	WBLn1	SBLn1
Vol Left, %	71%	0%	85%
Vol Thru, %	29%	9%	0%
Vol Right, %	0%	91%	15%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	31	177	252
LT Vol	22	0	213
Through Vol	9	16	0
RT Vol	0	161	39
Lane Flow Rate	39	224	319
Geometry Grp	1	1	1
Degree of Util (X)	0.056	0.262	0.407
Departure Headway (Hd)	5.105	4.216	4.59
Convergence, Y/N	Yes	Yes	Yes
Cap	700	851	785
Service Time	3.144	2.243	2.622
HCM Lane V/C Ratio	0.056	0.263	0.406
HCM Control Delay	8.4	8.7	10.8
HCM Lane LOS	A	A	B
HCM 95th-tile Q	0.2	1.1	2

Intersection	
Intersection Delay, s/veh	8.6
Intersection LOS	A

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰↱		↑↱			↰↑
Traffic Vol, veh/h	16	21	157	22	23	160
Future Vol, veh/h	16	21	157	22	23	160
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	20	26	191	27	28	195
Number of Lanes	1	0	1	0	0	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	1	0
HCM Control Delay	7.9	8.6	8.8
HCM LOS	A	A	A

Lane	NBLn1	WBLn1	SBLn1
Vol Left, %	0%	43%	13%
Vol Thru, %	88%	0%	87%
Vol Right, %	12%	57%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	179	37	183
LT Vol	0	16	23
Through Vol	157	0	160
RT Vol	22	21	0
Lane Flow Rate	218	45	223
Geometry Grp	1	1	1
Degree of Util (X)	0.249	0.058	0.261
Departure Headway (Hd)	4.107	4.63	4.203
Convergence, Y/N	Yes	Yes	Yes
Cap	860	778	844
Service Time	2.198	2.63	2.287
HCM Lane V/C Ratio	0.253	0.058	0.264
HCM Control Delay	8.6	7.9	8.8
HCM Lane LOS	A	A	A
HCM 95th-tile Q	1	0.2	1

Intersection	
Intersection Delay, s/veh	9.5
Intersection LOS	A

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		↱			↰
Traffic Vol, veh/h	50	6	115	175	24	148
Future Vol, veh/h	50	6	115	175	24	148
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	63	8	146	222	30	187
Number of Lanes	1	0	1	0	0	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	1	0
HCM Control Delay	8.9	9.8	9.2
HCM LOS	A	A	A

Lane	NBLn1	WBLn1	SBLn1
Vol Left, %	0%	89%	14%
Vol Thru, %	40%	0%	86%
Vol Right, %	60%	11%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	290	56	172
LT Vol	0	50	24
Through Vol	115	0	148
RT Vol	175	6	0
Lane Flow Rate	367	71	218
Geometry Grp	1	1	1
Degree of Util (X)	0.408	0.104	0.272
Departure Headway (Hd)	3.997	5.264	4.502
Convergence, Y/N	Yes	Yes	Yes
Cap	903	680	799
Service Time	2.014	3.302	2.525
HCM Lane V/C Ratio	0.406	0.104	0.273
HCM Control Delay	9.8	8.9	9.2
HCM Lane LOS	A	A	A
HCM 95th-tile Q	2	0.3	1.1

Intersection	
Intersection Delay, s/veh	9.4
Intersection LOS	A

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰↱		↑↱			↰↑
Traffic Vol, veh/h	88	123	67	51	94	80
Future Vol, veh/h	88	123	67	51	94	80
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	105	146	80	61	112	95
Number of Lanes	1	0	1	0	0	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	1	0
HCM Control Delay	9.6	8.5	9.7
HCM LOS	A	A	A

Lane	NBLn1	WBLn1	SBLn1
Vol Left, %	0%	42%	54%
Vol Thru, %	57%	0%	46%
Vol Right, %	43%	58%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	118	211	174
LT Vol	0	88	94
Through Vol	67	0	80
RT Vol	51	123	0
Lane Flow Rate	140	251	207
Geometry Grp	1	1	1
Degree of Util (X)	0.176	0.313	0.276
Departure Headway (Hd)	4.513	4.48	4.789
Convergence, Y/N	Yes	Yes	Yes
Cap	792	801	748
Service Time	2.557	2.516	2.83
HCM Lane V/C Ratio	0.177	0.313	0.277
HCM Control Delay	8.5	9.6	9.7
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.6	1.3	1.1

HCM 6th Signalized Intersection Summary
5: W Campus Dr & Canyon Crest Dr

10/01/2019

	↗	↘	↖	↑	↓	↙
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↰	↱	↰	↑	↑	↱
Traffic Volume (veh/h)	305	435	107	43	95	234
Future Volume (veh/h)	305	435	107	43	95	234
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	367	240	129	52	114	152
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	461	562	171	1111	794	1083
Arrive On Green	0.26	0.26	0.10	0.59	0.42	0.42
Sat Flow, veh/h	1781	1585	1781	1870	1870	1585
Grp Volume(v), veh/h	367	240	129	52	114	152
Grp Sat Flow(s),veh/h/ln	1781	1585	1781	1870	1870	1585
Q Serve(g_s), s	10.5	6.3	3.8	0.6	2.0	1.8
Cycle Q Clear(g_c), s	10.5	6.3	3.8	0.6	2.0	1.8
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	461	562	171	1111	794	1083
V/C Ratio(X)	0.80	0.43	0.76	0.05	0.14	0.14
Avail Cap(c_a), veh/h	753	822	590	1111	794	1083
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	18.8	13.3	24.0	4.6	9.6	3.0
Incr Delay (d2), s/veh	3.2	0.5	6.6	0.1	0.4	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.3	6.0	1.8	0.2	0.8	1.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	22.0	13.9	30.6	4.7	10.0	3.3
LnGrp LOS	C	B	C	A	A	A
Approach Vol, veh/h	607			181	266	
Approach Delay, s/veh	18.8			23.2	6.1	
Approach LOS	B			C	A	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		36.3		18.1	9.2	27.1
Change Period (Y+Rc), s		4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		32.3		23.0	18.0	10.3
Max Q Clear Time (g_c+I1), s		2.6		12.5	5.8	4.0
Green Ext Time (p_c), s		0.2		1.6	0.2	0.6

Intersection Summary	
HCM 6th Ctrl Delay	16.3
HCM 6th LOS	B

Notes

User approved changes to right turn type.

Intersection	
Intersection Delay, s/veh	10.6
Intersection LOS	B

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱			↰	Y	
Traffic Vol, veh/h	80	216	36	58	167	47
Future Vol, veh/h	80	216	36	58	167	47
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	99	267	44	72	206	58
Number of Lanes	1	0	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	1
HCM Control Delay	10.8	9.2	11
HCM LOS	B	A	B

Lane	NBLn1	EBLn1	WBLn1
Vol Left, %	78%	0%	38%
Vol Thru, %	0%	27%	62%
Vol Right, %	22%	73%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	214	296	94
LT Vol	167	0	36
Through Vol	0	80	58
RT Vol	47	216	0
Lane Flow Rate	264	365	116
Geometry Grp	1	1	1
Degree of Util (X)	0.368	0.44	0.165
Departure Headway (Hd)	5.019	4.334	5.106
Convergence, Y/N	Yes	Yes	Yes
Cap	711	826	697
Service Time	3.091	2.382	3.173
HCM Lane V/C Ratio	0.371	0.442	0.166
HCM Control Delay	11	10.8	9.2
HCM Lane LOS	B	B	A
HCM 95th-tile Q	1.7	2.3	0.6

HCM Signalized Intersection Capacity Analysis
7: Canyon Crest Dr & Linden St

10/01/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↑	↱	↰	↑	↱
Traffic Volume (vph)	33	57	93	88	60	33	82	149	184	48	215	65
Future Volume (vph)	33	57	93	88	60	33	82	149	184	48	215	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	3.4		4.5	3.4		4.5	3.1	3.1	4.5	3.9	3.9
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.91		1.00	0.95		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1690		1770	1763		1770	1863	1583	1770	1863	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1690		1770	1763		1770	1863	1583	1770	1863	1583
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	40	69	112	106	72	40	99	180	222	58	259	78
RTOR Reduction (vph)	0	61	0	0	22	0	0	0	172	0	0	62
Lane Group Flow (vph)	40	120	0	106	90	0	99	180	50	58	259	16
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases									8			4
Actuated Green, G (s)	4.4	11.4		8.6	15.6		6.7	17.6	17.6	6.0	16.9	16.9
Effective Green, g (s)	4.4	12.5		8.6	16.7		6.7	19.0	19.0	6.0	17.5	17.5
Actuated g/C Ratio	0.05	0.15		0.10	0.20		0.08	0.23	0.23	0.07	0.21	0.21
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	93	252		181	351		141	422	359	126	389	330
v/s Ratio Prot	0.02	c0.07		c0.06	c0.05		c0.06	0.10		0.03	c0.14	
v/s Ratio Perm									0.03			0.01
v/c Ratio	0.43	0.48		0.59	0.26		0.70	0.43	0.14	0.46	0.67	0.05
Uniform Delay, d1	38.4	32.6		35.8	28.3		37.5	27.7	25.8	37.3	30.4	26.5
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.2	1.4		4.8	0.4		14.6	0.7	0.2	2.7	4.3	0.1
Delay (s)	41.6	34.0		40.6	28.7		52.2	28.4	26.0	39.9	34.7	26.5
Level of Service	D	C		D	C		D	C	C	D	C	C
Approach Delay (s)		35.4			34.5			32.0			33.8	
Approach LOS		D			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	33.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	83.7	Sum of lost time (s)	20.8
Intersection Capacity Utilization	43.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM 6th Signalized Intersection Summary
8: Canyon Crest Dr & Blaine St

10/01/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱		↰	↑	↱	↰	↱	
Traffic Volume (veh/h)	35	484	130	129	518	18	34	45	73	8	96	51
Future Volume (veh/h)	35	484	130	129	518	18	34	45	73	8	96	51
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.90	1.00		0.87	0.98		0.97	0.98		0.91
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1683	1683	1683	1683	1683	1683	1683	1683	1683	1683	1683	1683
Adj Flow Rate, veh/h	40	556	115	148	595	18	39	52	24	9	110	18
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	71	1055	217	183	1505	45	305	316	385	363	261	43
Arrive On Green	0.04	0.41	0.37	0.11	0.48	0.44	0.19	0.19	0.16	0.19	0.19	0.16
Sat Flow, veh/h	1603	2585	531	1603	3153	95	1115	1683	1381	1164	1389	227
Grp Volume(v), veh/h	40	343	328	148	301	312	39	52	24	9	0	128
Grp Sat Flow(s),veh/h/ln	1603	1599	1517	1603	1599	1649	1115	1683	1381	1164	0	1617
Q Serve(g_s), s	1.0	6.7	6.8	3.7	5.0	5.0	1.3	1.1	0.5	0.3	0.0	2.9
Cycle Q Clear(g_c), s	1.0	6.7	6.8	3.7	5.0	5.0	4.2	1.1	0.5	1.3	0.0	2.9
Prop In Lane	1.00		0.35	1.00		0.06	1.00		1.00	1.00		0.14
Lane Grp Cap(c), veh/h	71	653	619	183	763	787	305	316	385	363	0	303
V/C Ratio(X)	0.56	0.53	0.53	0.81	0.39	0.40	0.13	0.16	0.06	0.02	0.00	0.42
Avail Cap(c_a), veh/h	233	963	914	272	1002	1033	800	1063	998	879	0	1021
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	19.3	9.2	9.4	17.9	7.0	7.0	16.7	14.1	11.1	14.6	0.0	14.9
Incr Delay (d2), s/veh	2.5	0.7	0.7	6.4	0.3	0.3	0.2	0.2	0.1	0.0	0.0	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	1.6	1.6	1.4	1.0	1.1	0.3	0.4	0.1	0.1	0.0	0.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.9	9.9	10.2	24.3	7.3	7.3	16.9	14.3	11.1	14.7	0.0	15.8
LnGrp LOS	C	A	B	C	A	A	B	B	B	B	A	B
Approach Vol, veh/h		711			761			115			137	
Approach Delay, s/veh		10.7			10.6			14.5			15.7	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.7	20.9		11.8	5.8	23.7		11.8				
Change Period (Y+Rc), s	4.0	5.4		5.1	4.0	5.4		5.1				
Max Green Setting (Gmax), s	7.0	23.5		25.0	6.0	24.5		25.0				
Max Q Clear Time (g_c+I1), s	5.7	8.8		4.9	3.0	7.0		6.2				
Green Ext Time (p_c), s	0.0	2.4		0.4	0.0	2.2		0.4				

Intersection Summary			
HCM 6th Ctrl Delay			11.3
HCM 6th LOS			B

Intersection	
Intersection Delay, s/veh	74.1
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑	↱		↰↑	↱	↰	↑	↱	↰	↑	↱
Traffic Vol, veh/h	68	19	48	18	48	168	189	568	17	13	193	162
Future Vol, veh/h	68	19	48	18	48	168	189	568	17	13	193	162
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	74	21	52	20	52	183	205	617	18	14	210	176
Number of Lanes	0	1	1	0	1	1	1	1	1	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	3	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	3	2	2
Conflicting Approach Righ	NB	SB	WB	EB
Conflicting Lanes Right	3	3	2	2
HCM Control Delay	14.7	15.8	129.1	17.1
HCM LOS	B	C	F	C

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	0%	78%	0%	27%	0%	100%	0%	0%
Vol Thru, %	0%	100%	0%	22%	0%	73%	0%	0%	100%	0%
Vol Right, %	0%	0%	100%	0%	100%	0%	100%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	189	568	17	87	48	66	168	13	193	162
LT Vol	189	0	0	68	0	18	0	13	0	0
Through Vol	0	568	0	19	0	48	0	0	193	0
RT Vol	0	0	17	0	48	0	168	0	0	162
Lane Flow Rate	205	617	18	95	52	72	183	14	210	176
Geometry Grp	8	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.459	1.293	0.035	0.246	0.12	0.175	0.403	0.034	0.477	0.366
Departure Headway (Hd)	8.049	7.537	6.821	9.871	8.759	9.233	8.384	9.18	8.666	7.945
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	448	482	525	366	412	391	433	392	420	456
Service Time	5.784	5.273	4.556	7.571	6.459	6.933	6.084	6.88	6.366	5.645
HCM Lane V/C Ratio	0.458	1.28	0.034	0.26	0.126	0.184	0.423	0.036	0.5	0.386
HCM Control Delay	17.5	169.8	9.8	15.8	12.6	13.9	16.6	12.2	19	15.2
HCM Lane LOS	C	F	A	C	B	B	C	B	C	C
HCM 95th-tile Q	2.4	26.2	0.1	1	0.4	0.6	1.9	0.1	2.5	1.7

HCM 6th Signalized Intersection Summary
9: Watkins Dr & Big Springs Rd

10/01/2019

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱			↰	↱	↰	↑	↱	↰	↑	↱
Traffic Volume (veh/h)	68	19	48	18	48	168	189	568	17	13	193	162
Future Volume (veh/h)	68	19	48	18	48	168	189	568	17	13	193	162
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.94		0.91	0.92		0.91	1.00		0.91	1.00		0.93
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	74	21	52	20	52	183	205	617	18	14	210	176
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	432	119	294	186	388	385	271	793	609	26	535	420
Arrive On Green	0.27	0.27	0.27	0.27	0.27	0.27	0.15	0.42	0.42	0.01	0.29	0.29
Sat Flow, veh/h	1074	444	1098	274	1452	1440	1781	1870	1437	1781	1870	1469
Grp Volume(v), veh/h	74	0	73	72	0	183	205	617	18	14	210	176
Grp Sat Flow(s),veh/h/ln	1074	0	1542	1726	0	1440	1781	1870	1437	1781	1870	1469
Q Serve(g_s), s	2.3	0.0	1.5	0.0	0.0	4.3	4.5	11.6	0.3	0.3	3.7	4.0
Cycle Q Clear(g_c), s	3.5	0.0	1.5	1.2	0.0	4.3	4.5	11.6	0.3	0.3	3.7	4.0
Prop In Lane	1.00		0.71	0.28		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	432	0	412	574	0	385	271	793	609	26	535	420
V/C Ratio(X)	0.17	0.00	0.18	0.13	0.00	0.48	0.76	0.78	0.03	0.55	0.39	0.42
Avail Cap(c_a), veh/h	567	0	605	779	0	565	568	1285	987	175	872	685
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	12.7	0.0	11.5	11.4	0.0	12.5	16.6	10.1	6.9	20.0	11.7	11.8
Incr Delay (d2), s/veh	0.2	0.0	0.2	0.1	0.0	0.9	4.3	1.7	0.0	16.9	0.5	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.0	0.4	0.4	0.0	1.2	1.8	3.5	0.1	0.2	1.2	1.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	12.9	0.0	11.7	11.5	0.0	13.4	20.9	11.8	6.9	36.8	12.2	12.5
LnGrp LOS	B	A	B	B	A	B	C	B	A	D	B	B
Approach Vol, veh/h		147			255			840			400	
Approach Delay, s/veh		12.3			12.9			13.9			13.2	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	4.6	21.3		14.9	10.2	15.7		14.9				
Change Period (Y+Rc), s	4.0	4.0		4.0	4.0	4.0		4.0				
Max Green Setting (Gmax), s	4.0	28.0		16.0	13.0	19.0		16.0				
Max Q Clear Time (g_c+I1), s	2.3	13.6		5.5	6.5	6.0		6.3				
Green Ext Time (p_c), s	0.0	2.5		0.4	0.4	1.3		0.7				

Intersection Summary			
HCM 6th Ctrl Delay			13.4
HCM 6th LOS			B

Intersection	
Intersection Delay, s/veh	11
Intersection LOS	B

Movement	EBL	EBT	WBT	WBR	SBU	SBL	SBR
Lane Configurations		↰	↱			↰↱	
Traffic Vol, veh/h	42	21	7	236	0	284	10
Future Vol, veh/h	42	21	7	236	0	284	10
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Heavy Vehicles, %	2	2	2	2	2	2	2
Mvmt Flow	50	25	8	281	0	338	12
Number of Lanes	0	1	1	0	0	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	1	1
HCM Control Delay	9	9.8	12.5
HCM LOS	A	A	B

Lane	EBLn1	WBLn1	SBLn1
Vol Left, %	67%	0%	97%
Vol Thru, %	33%	3%	0%
Vol Right, %	0%	97%	3%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	63	243	294
LT Vol	42	0	284
Through Vol	21	7	0
RT Vol	0	236	10
Lane Flow Rate	75	289	350
Geometry Grp	1	1	1
Degree of Util (X)	0.111	0.35	0.478
Departure Headway (Hd)	5.31	4.359	4.919
Convergence, Y/N	Yes	Yes	Yes
Cap	671	822	728
Service Time	3.375	2.403	2.982
HCM Lane V/C Ratio	0.112	0.352	0.481
HCM Control Delay	9	9.8	12.5
HCM Lane LOS	A	A	B
HCM 95th-tile Q	0.4	1.6	2.6

Intersection	
Intersection Delay, s/veh	9.7
Intersection LOS	A

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰↱		↑↱			↰↑
Traffic Vol, veh/h	47	52	193	21	42	222
Future Vol, veh/h	47	52	193	21	42	222
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	53	58	217	24	47	249
Number of Lanes	1	0	1	0	0	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	1	0
HCM Control Delay	8.8	9.4	10.2
HCM LOS	A	A	B

Lane	NBLn1	WBLn1	SBLn1
Vol Left, %	0%	47%	16%
Vol Thru, %	90%	0%	84%
Vol Right, %	10%	53%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	214	99	264
LT Vol	0	47	42
Through Vol	193	0	222
RT Vol	21	52	0
Lane Flow Rate	240	111	297
Geometry Grp	1	1	1
Degree of Util (X)	0.299	0.151	0.371
Departure Headway (Hd)	4.475	4.901	4.503
Convergence, Y/N	Yes	Yes	Yes
Cap	803	730	798
Service Time	2.505	2.945	2.532
HCM Lane V/C Ratio	0.299	0.152	0.372
HCM Control Delay	9.4	8.8	10.2
HCM Lane LOS	A	A	B
HCM 95th-tile Q	1.3	0.5	1.7

3: N Campus Dr & UCR Botanic Gardens Rd

Intersection	
Intersection Delay, s/veh	10.5
Intersection LOS	B

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰↱		↑↱			↰↑
Traffic Vol, veh/h	126	19	163	88	28	176
Future Vol, veh/h	126	19	163	88	28	176
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	159	24	206	111	35	223
Number of Lanes	1	0	1	0	0	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	1	0
HCM Control Delay	10.4	10.6	10.4
HCM LOS	B	B	B

Lane	NBLn1	WBLn1	SBLn1
Vol Left, %	0%	87%	14%
Vol Thru, %	65%	0%	86%
Vol Right, %	35%	13%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	251	145	204
LT Vol	0	126	28
Through Vol	163	0	176
RT Vol	88	19	0
Lane Flow Rate	318	184	258
Geometry Grp	1	1	1
Degree of Util (X)	0.4	0.271	0.345
Departure Headway (Hd)	4.53	5.316	4.816
Convergence, Y/N	Yes	Yes	Yes
Cap	791	670	741
Service Time	2.584	3.391	2.876
HCM Lane V/C Ratio	0.402	0.275	0.348
HCM Control Delay	10.6	10.4	10.4
HCM Lane LOS	B	B	B
HCM 95th-tile Q	1.9	1.1	1.5

Intersection	
Intersection Delay, s/veh	10.9
Intersection LOS	B

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		↱			↰
Traffic Vol, veh/h	87	141	77	106	158	118
Future Vol, veh/h	87	141	77	106	158	118
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	101	164	90	123	184	137
Number of Lanes	1	0	1	0	0	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	1	0
HCM Control Delay	10.7	9.5	12
HCM LOS	B	A	B

Lane	NBLn1	WBLn1	SBLn1
Vol Left, %	0%	38%	57%
Vol Thru, %	42%	0%	43%
Vol Right, %	58%	62%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	183	228	276
LT Vol	0	87	158
Through Vol	77	0	118
RT Vol	106	141	0
Lane Flow Rate	213	265	321
Geometry Grp	1	1	1
Degree of Util (X)	0.275	0.359	0.442
Departure Headway (Hd)	4.647	4.878	4.955
Convergence, Y/N	Yes	Yes	Yes
Cap	764	732	722
Service Time	2.727	2.954	3.029
HCM Lane V/C Ratio	0.279	0.362	0.445
HCM Control Delay	9.5	10.7	12
HCM Lane LOS	A	B	B
HCM 95th-tile Q	1.1	1.6	2.3

5: W Campus Dr & Canyon Crest Dr

10/01/2019

	↗	↘	↖	↑	↓	↙
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↰	↱	↰	↑	↑	↱
Traffic Volume (veh/h)	203	262	471	156	132	276
Future Volume (veh/h)	203	262	471	156	132	276
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	251	156	581	193	163	213
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	305	838	636	1361	598	779
Arrive On Green	0.17	0.17	0.36	0.73	0.32	0.32
Sat Flow, veh/h	1781	1585	1781	1870	1870	1585
Grp Volume(v), veh/h	251	156	581	193	163	213
Grp Sat Flow(s),veh/h/ln	1781	1585	1781	1870	1870	1585
Q Serve(g_s), s	10.8	4.1	24.7	2.5	5.1	6.3
Cycle Q Clear(g_c), s	10.8	4.1	24.7	2.5	5.1	6.3
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	305	838	636	1361	598	779
V/C Ratio(X)	0.82	0.19	0.91	0.14	0.27	0.27
Avail Cap(c_a), veh/h	449	966	854	1361	598	779
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	31.7	9.8	24.3	3.3	20.1	11.8
Incr Delay (d2), s/veh	7.6	0.1	11.5	0.2	1.1	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.2	5.1	11.9	0.8	2.4	3.2
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	39.3	9.9	35.8	3.5	21.2	12.7
LnGrp LOS	D	A	D	A	C	B
Approach Vol, veh/h	407			774	376	
Approach Delay, s/veh	28.0			27.7	16.4	
Approach LOS	C			C	B	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		61.7		17.6	32.3	29.4
Change Period (Y+Rc), s		4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		57.7		20.0	38.0	15.7
Max Q Clear Time (g_c+I1), s		4.5		12.8	26.7	8.3
Green Ext Time (p_c), s		1.3		0.8	1.7	1.0

Intersection Summary	
HCM 6th Ctrl Delay	25.1
HCM 6th LOS	C

Notes

User approved changes to right turn type.

Intersection	
Intersection Delay, s/veh	15.5
Intersection LOS	C

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱			↰	Y	
Traffic Vol, veh/h	74	245	46	145	284	45
Future Vol, veh/h	74	245	46	145	284	45
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	91	302	57	179	351	56
Number of Lanes	1	0	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	1
HCM Control Delay	14.4	12.4	18.3
HCM LOS	B	B	C

Lane	NBLn1	EBLn1	WBLn1
Vol Left, %	86%	0%	24%
Vol Thru, %	0%	23%	76%
Vol Right, %	14%	77%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	329	319	191
LT Vol	284	0	46
Through Vol	0	74	145
RT Vol	45	245	0
Lane Flow Rate	406	394	236
Geometry Grp	1	1	1
Degree of Util (X)	0.64	0.557	0.38
Departure Headway (Hd)	5.669	5.096	5.803
Convergence, Y/N	Yes	Yes	Yes
Cap	638	705	618
Service Time	3.712	3.148	3.862
HCM Lane V/C Ratio	0.636	0.559	0.382
HCM Control Delay	18.3	14.4	12.4
HCM Lane LOS	C	B	B
HCM 95th-tile Q	4.6	3.5	1.8

HCM Signalized Intersection Capacity Analysis
7: Canyon Crest Dr & Linden St

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱		↰	↑	↱	↰	↑	↱
Traffic Volume (vph)	48	111	124	232	98	95	77	165	125	80	291	33
Future Volume (vph)	48	111	124	232	98	95	77	165	125	80	291	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	3.4		4.5	3.4		4.5	3.1	3.1	4.5	3.9	3.9
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.92		1.00	0.93		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1715		1770	1725		1770	1863	1583	1770	1863	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1715		1770	1725		1770	1863	1583	1770	1863	1583
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	53	123	138	258	109	106	86	183	139	89	323	37
RTOR Reduction (vph)	0	41	0	0	35	0	0	0	112	0	0	30
Lane Group Flow (vph)	53	220	0	258	180	0	86	183	27	89	323	7
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases									8			4
Actuated Green, G (s)	6.2	14.8		15.7	24.3		4.9	16.7	16.7	6.4	18.2	18.2
Effective Green, g (s)	6.2	15.9		15.7	25.4		4.9	18.1	18.1	6.4	18.8	18.8
Actuated g/C Ratio	0.07	0.17		0.17	0.27		0.05	0.19	0.19	0.07	0.20	0.20
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	117	291		297	469		92	361	306	121	374	318
v/s Ratio Prot	0.03	c0.13		c0.15	0.10		0.05	0.10		c0.05	c0.17	
v/s Ratio Perm									0.02			0.00
v/c Ratio	0.45	0.75		0.87	0.38		0.93	0.51	0.09	0.74	0.86	0.02
Uniform Delay, d1	42.0	36.9		37.8	27.6		44.1	33.7	30.9	42.7	36.1	29.9
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.8	10.6		22.5	0.5		72.1	1.1	0.1	20.5	18.2	0.0
Delay (s)	44.7	47.5		60.4	28.2		116.2	34.8	31.0	63.2	54.3	30.0
Level of Service	D	D		E	C		F	C	C	E	D	C
Approach Delay (s)		47.0			45.7			50.6			54.1	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	49.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	93.4	Sum of lost time (s)	20.8
Intersection Capacity Utilization	59.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM 6th Signalized Intersection Summary
8: Canyon Crest Dr & Blaine St

10/01/2019

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱		↰	↑	↱	↰	↱	
Traffic Volume (veh/h)	49	432	123	119	481	17	108	89	108	13	129	64
Future Volume (veh/h)	49	432	123	119	481	17	108	89	108	13	129	64
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.82	1.00		0.88	0.94		0.90	0.93		0.88
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1683	1683	1683	1683	1683	1683	1683	1683	1683	1683	1683	1683
Adj Flow Rate, veh/h	56	497	115	137	553	17	124	102	75	15	148	54
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	80	852	195	173	1269	39	372	598	587	433	402	147
Arrive On Green	0.05	0.34	0.32	0.11	0.40	0.38	0.36	0.36	0.34	0.36	0.36	0.34
Sat Flow, veh/h	1603	2474	565	1603	3153	97	994	1683	1283	1010	1131	413
Grp Volume(v), veh/h	56	319	293	137	280	290	124	102	75	15	0	202
Grp Sat Flow(s),veh/h/ln	1603	1599	1440	1603	1599	1651	994	1683	1283	1010	0	1544
Q Serve(g_s), s	2.1	10.2	10.5	5.2	7.9	8.0	6.6	2.6	2.1	0.6	0.0	6.1
Cycle Q Clear(g_c), s	2.1	10.2	10.5	5.2	7.9	8.0	12.7	2.6	2.1	3.2	0.0	6.1
Prop In Lane	1.00		0.39	1.00		0.06	1.00		1.00	1.00		0.27
Lane Grp Cap(c), veh/h	80	551	496	173	643	664	372	598	587	433	0	549
V/C Ratio(X)	0.70	0.58	0.59	0.79	0.44	0.44	0.33	0.17	0.13	0.03	0.00	0.37
Avail Cap(c_a), veh/h	231	1026	924	591	1385	1430	577	945	852	641	0	867
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	29.2	16.7	17.1	27.1	13.5	13.5	19.6	13.8	10.2	14.9	0.0	15.0
Incr Delay (d2), s/veh	4.1	1.0	1.1	3.1	0.5	0.5	0.5	0.1	0.1	0.0	0.0	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	3.3	3.1	2.0	2.5	2.6	1.5	0.9	0.6	0.1	0.0	2.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	33.3	17.7	18.2	30.2	14.0	14.0	20.1	13.9	10.3	14.9	0.0	15.4
LnGrp LOS	C	B	B	C	B	B	C	B	B	B	A	B
Approach Vol, veh/h		668			707			301			217	
Approach Delay, s/veh		19.2			17.1			15.6			15.4	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	10.7	25.5		26.2	7.1	29.1		26.2				
Change Period (Y+Rc), s	4.0	5.4		5.1	4.0	5.4		5.1				
Max Green Setting (Gmax), s	23.0	38.6		33.9	9.0	52.6		33.9				
Max Q Clear Time (g_c+I1), s	7.2	12.5		8.1	4.1	10.0		14.7				
Green Ext Time (p_c), s	0.2	2.5		0.9	0.0	2.2		1.4				

Intersection Summary			
HCM 6th Ctrl Delay			17.4
HCM 6th LOS			B

Intersection	
Intersection Delay, s/veh	56.6
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑	↱		↰↑	↱	↰	↑	↱	↰	↑	↱
Traffic Vol, veh/h	183	30	198	61	35	22	101	343	25	94	432	78
Future Vol, veh/h	183	30	198	61	35	22	101	343	25	94	432	78
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	199	33	215	66	38	24	110	373	27	102	470	85
Number of Lanes	0	1	1	0	1	1	1	1	1	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	3	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	3	2	2
Conflicting Approach Righ	NB	SB	WB	EB
Conflicting Lanes Right	3	3	2	2
HCM Control Delay	23.8	17.6	48.3	93
HCM LOS	C	C	E	F

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	0%	86%	0%	64%	0%	100%	0%	0%
Vol Thru, %	0%	100%	0%	14%	0%	36%	0%	0%	100%	0%
Vol Right, %	0%	0%	100%	0%	100%	0%	100%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	101	343	25	213	198	96	22	94	432	78
LT Vol	101	0	0	183	0	61	0	94	0	0
Through Vol	0	343	0	30	0	35	0	0	432	0
RT Vol	0	0	25	0	198	0	22	0	0	78
Lane Flow Rate	110	373	27	232	215	104	24	102	470	85
Geometry Grp	8	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.288	0.927	0.062	0.614	0.505	0.306	0.064	0.267	1.158	0.192
Departure Headway (Hd)	9.904	9.384	8.656	9.949	8.796	11.075	10.024	9.396	8.878	8.153
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	366	388	416	366	413	327	359	381	409	437
Service Time	7.604	7.084	6.356	7.649	6.496	8.775	7.724	7.19	6.672	5.946
HCM Lane V/C Ratio	0.301	0.961	0.065	0.634	0.521	0.318	0.067	0.268	1.149	0.195
HCM Control Delay	16.6	60.3	11.9	27.2	20.1	18.6	13.4	15.6	124.3	12.9
HCM Lane LOS	C	F	B	D	C	C	B	C	F	B
HCM 95th-tile Q	1.2	9.9	0.2	3.9	2.8	1.3	0.2	1.1	17.7	0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱			↰	↱	↰	↑	↱	↰	↑	↱
Traffic Volume (veh/h)	183	30	198	61	35	22	101	343	25	94	432	78
Future Volume (veh/h)	183	30	198	61	35	22	101	343	25	94	432	78
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.95		0.93	0.96		0.93	1.00		0.92	1.00		0.92
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	199	33	215	66	38	24	110	373	27	102	470	85
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	396	71	460	304	149	516	142	610	478	132	599	469
Arrive On Green	0.35	0.35	0.35	0.35	0.35	0.35	0.08	0.33	0.33	0.07	0.32	0.32
Sat Flow, veh/h	1278	202	1315	519	427	1476	1781	1870	1466	1781	1870	1464
Grp Volume(v), veh/h	199	0	248	104	0	24	110	373	27	102	470	85
Grp Sat Flow(s),veh/h/ln	1278	0	1517	946	0	1476	1781	1870	1466	1781	1870	1464
Q Serve(g_s), s	7.1	0.0	6.1	1.5	0.0	0.5	2.9	8.0	0.6	2.7	10.9	2.0
Cycle Q Clear(g_c), s	14.7	0.0	6.1	7.6	0.0	0.5	2.9	8.0	0.6	2.7	10.9	2.0
Prop In Lane	1.00		0.87	0.63		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	396	0	530	453	0	516	142	610	478	132	599	469
V/C Ratio(X)	0.50	0.00	0.47	0.23	0.00	0.05	0.78	0.61	0.06	0.77	0.78	0.18
Avail Cap(c_a), veh/h	402	0	538	460	0	523	260	897	703	297	936	733
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	18.5	0.0	12.1	12.4	0.0	10.3	21.6	13.6	11.1	21.8	14.8	11.8
Incr Delay (d2), s/veh	1.0	0.0	0.6	0.3	0.0	0.0	8.7	1.0	0.0	9.3	2.3	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.9	0.0	1.7	0.6	0.0	0.1	1.4	2.9	0.2	1.3	4.1	0.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	19.5	0.0	12.8	12.6	0.0	10.3	30.4	14.6	11.1	31.1	17.1	11.9
LnGrp LOS	B	A	B	B	A	B	C	B	B	C	B	B
Approach Vol, veh/h		447			128			510			657	
Approach Delay, s/veh		15.8			12.2			17.8			18.6	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	7.5	19.6		20.8	7.8	19.4		20.8
Change Period (Y+Rc), s	4.0	4.0		4.0	4.0	4.0		4.0
Max Green Setting (Gmax), s	8.0	23.0		17.0	7.0	24.0		17.0
Max Q Clear Time (g_c+I1), s	4.7	10.0		16.7	4.9	12.9		9.6
Green Ext Time (p_c), s	0.1	1.3		0.1	0.1	1.8		0.3

Intersection Summary	
HCM 6th Ctrl Delay	17.2
HCM 6th LOS	B

Intersection	
Intersection Delay, s/veh	9.6
Intersection LOS	A

Movement	EBL	EBT	WBT	WBR	SBU	SBL	SBR
Lane Configurations		↰	↱			↲↳	
Traffic Vol, veh/h	30	10	20	150	0	190	50
Future Vol, veh/h	30	10	20	150	0	190	50
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Heavy Vehicles, %	2	2	2	2	2	2	2
Mvmt Flow	38	13	25	190	0	241	63
Number of Lanes	0	1	1	0	0	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	1	1
HCM Control Delay	8.5	8.6	10.4
HCM LOS	A	A	B

Lane	EBLn1	WBLn1	SBLn1
Vol Left, %	75%	0%	79%
Vol Thru, %	25%	12%	0%
Vol Right, %	0%	88%	21%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	40	170	240
LT Vol	30	0	190
Through Vol	10	20	0
RT Vol	0	150	50
Lane Flow Rate	51	215	304
Geometry Grp	1	1	1
Degree of Util (X)	0.071	0.251	0.384
Departure Headway (Hd)	5.057	4.203	4.552
Convergence, Y/N	Yes	Yes	Yes
Cap	708	854	790
Service Time	3.093	2.229	2.584
HCM Lane V/C Ratio	0.072	0.252	0.385
HCM Control Delay	8.5	8.6	10.4
HCM Lane LOS	A	A	B
HCM 95th-tile Q	0.2	1	1.8

Intersection	
Intersection Delay, s/veh	8.7
Intersection LOS	A

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		↱			↰
Traffic Vol, veh/h	10	20	150	40	50	150
Future Vol, veh/h	10	20	150	40	50	150
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	12	24	183	49	61	183
Number of Lanes	1	0	1	0	0	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	1	0
HCM Control Delay	7.8	8.6	9
HCM LOS	A	A	A

Lane	NBLn1	WBLn1	SBLn1
Vol Left, %	0%	33%	25%
Vol Thru, %	79%	0%	75%
Vol Right, %	21%	67%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	190	30	200
LT Vol	0	10	50
Through Vol	150	0	150
RT Vol	40	20	0
Lane Flow Rate	232	37	244
Geometry Grp	1	1	1
Degree of Util (X)	0.261	0.047	0.286
Departure Headway (Hd)	4.056	4.615	4.224
Convergence, Y/N	Yes	Yes	Yes
Cap	871	781	841
Service Time	2.144	2.615	2.299
HCM Lane V/C Ratio	0.266	0.047	0.29
HCM Control Delay	8.6	7.8	9
HCM Lane LOS	A	A	A
HCM 95th-tile Q	1	0.1	1.2

Intersection	
Intersection Delay, s/veh	9.1
Intersection LOS	A

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		↱			↰
Traffic Vol, veh/h	30	10	130	120	30	160
Future Vol, veh/h	30	10	130	120	30	160
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	38	13	165	152	38	203
Number of Lanes	1	0	1	0	0	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	1	0
HCM Control Delay	8.5	9.2	9.2
HCM LOS	A	A	A

Lane	NBLn1	WBLn1	SBLn1
Vol Left, %	0%	75%	16%
Vol Thru, %	52%	0%	84%
Vol Right, %	48%	25%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	250	40	190
LT Vol	0	30	30
Through Vol	130	0	160
RT Vol	120	10	0
Lane Flow Rate	316	51	241
Geometry Grp	1	1	1
Degree of Util (X)	0.354	0.072	0.294
Departure Headway (Hd)	4.026	5.099	4.396
Convergence, Y/N	Yes	Yes	Yes
Cap	896	703	820
Service Time	2.041	3.129	2.413
HCM Lane V/C Ratio	0.353	0.073	0.294
HCM Control Delay	9.2	8.5	9.2
HCM Lane LOS	A	A	A
HCM 95th-tile Q	1.6	0.2	1.2

Intersection	
Intersection Delay, s/veh	9.4
Intersection LOS	A

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰↱		↱			↰
Traffic Vol, veh/h	100	110	80	60	70	90
Future Vol, veh/h	100	110	80	60	70	90
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	119	131	95	71	83	107
Number of Lanes	1	0	1	0	0	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	1	0
HCM Control Delay	9.7	8.7	9.5
HCM LOS	A	A	A

Lane	NBLn1	WBLn1	SBLn1
Vol Left, %	0%	48%	44%
Vol Thru, %	57%	0%	56%
Vol Right, %	43%	52%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	140	210	160
LT Vol	0	100	70
Through Vol	80	0	90
RT Vol	60	110	0
Lane Flow Rate	167	250	190
Geometry Grp	1	1	1
Degree of Util (X)	0.208	0.315	0.254
Departure Headway (Hd)	4.5	4.542	4.804
Convergence, Y/N	Yes	Yes	Yes
Cap	795	790	747
Service Time	2.542	2.58	2.845
HCM Lane V/C Ratio	0.21	0.316	0.254
HCM Control Delay	8.7	9.7	9.5
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.8	1.4	1

HCM 6th Signalized Intersection Summary
5: W Campus Dr & Canyon Crest Dr

09/20/2019

	↗	↘	↖	↑	↓	↙
Movement	**EBL**	**EBR**	**NBL**	**NBT**	**SBT**	**SBR**
Lane Configurations	↰	↱	↰	↑	↑	↱
Traffic Volume (veh/h)	360	460	100	50	90	270
Future Volume (veh/h)	360	460	100	50	90	270
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	434	264	120	60	108	180
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	521	605	159	1061	763	1110
Arrive On Green	0.29	0.29	0.09	0.57	0.41	0.41
Sat Flow, veh/h	1781	1585	1781	1870	1870	1585
Grp Volume(v), veh/h	434	264	120	60	108	180
Grp Sat Flow(s),veh/h/ln	1781	1585	1781	1870	1870	1585
Q Serve(g_s), s	13.0	7.0	3.7	0.8	2.1	2.2
Cycle Q Clear(g_c), s	13.0	7.0	3.7	0.8	2.1	2.2
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	521	605	159	1061	763	1110
V/C Ratio(X)	0.83	0.44	0.76	0.06	0.14	0.16
Avail Cap(c_a), veh/h	719	781	563	1061	763	1110
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	18.9	13.1	25.3	5.5	10.6	2.9
Incr Delay (d2), s/veh	6.0	0.5	7.1	0.1	0.4	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.8	6.8	1.8	0.3	0.9	1.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	24.9	13.6	32.5	5.6	11.0	3.2
LnGrp LOS	C	B	C	A	B	A
Approach Vol, veh/h	698			180	288	
Approach Delay, s/veh	20.6			23.5	6.1	
Approach LOS	C			C	A	

Timer - Assigned Phs		**2**		**4**	**5**	**6**
Phs Duration (G+Y+Rc), s		36.3		20.7	9.1	27.2
Change Period (Y+Rc), s		4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		32.3		23.0	18.0	10.3
Max Q Clear Time (g_c+I1), s		2.8		15.0	5.7	4.2
Green Ext Time (p_c), s		0.3		1.7	0.2	0.6

Intersection Summary			
HCM 6th Ctrl Delay			17.5
HCM 6th LOS			B

Notes

User approved changes to right turn type.

HCM 6th AWSC
6: Aberdeen Dr & Linden St

Intersection	
Intersection Delay, s/veh	13.2
Intersection LOS	B

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱			↰	Y	
Traffic Vol, veh/h	170	190	40	170	150	60
Future Vol, veh/h	170	190	40	170	150	60
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	210	235	49	210	185	74
Number of Lanes	1	0	0	1	1	0

Approach	EB		WB		NB	
Opposing Approach	WB		EB			
Opposing Lanes	1		1		0	
Conflicting Approach Left			NB		EB	
Conflicting Lanes Left	0		1		1	
Conflicting Approach Righ	NB				WB	
Conflicting Lanes Right	1		0		1	
HCM Control Delay	14.5		11.7		12.5	
HCM LOS	B		B		B	

Lane	NBLn1	EBLn1	WBLn1
Vol Left, %	71%	0%	19%
Vol Thru, %	0%	47%	81%
Vol Right, %	29%	53%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	210	360	210
LT Vol	150	0	40
Through Vol	0	170	170
RT Vol	60	190	0
Lane Flow Rate	259	444	259
Geometry Grp	1	1	1
Degree of Util (X)	0.405	0.592	0.384
Departure Headway (Hd)	5.618	4.799	5.33
Convergence, Y/N	Yes	Yes	Yes
Cap	640	756	674
Service Time	3.656	2.799	3.367
HCM Lane V/C Ratio	0.405	0.587	0.384
HCM Control Delay	12.5	14.5	11.7
HCM Lane LOS	B	B	B
HCM 95th-tile Q	2	3.9	1.8

HCM Signalized Intersection Capacity Analysis
7: Canyon Crest Dr & Linden St

09/20/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱		↰	↑	↱	↰	↑	↱
Traffic Volume (vph)	40	80	100	150	130	60	90	160	230	110	240	80
Future Volume (vph)	40	80	100	150	130	60	90	160	230	110	240	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	3.4		4.5	3.4		4.5	3.1	3.1	4.5	3.9	3.9
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.92		1.00	0.95		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1708		1770	1775		1770	1863	1583	1770	1863	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1708		1770	1775		1770	1863	1583	1770	1863	1583
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	48	96	120	181	157	72	108	193	277	133	289	96
RTOR Reduction (vph)	0	47	0	0	17	0	0	0	227	0	0	77
Lane Group Flow (vph)	48	169	0	181	212	0	108	193	50	133	289	19
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases									8			4
Actuated Green, G (s)	4.7	14.3		13.5	23.1		6.6	15.2	15.2	8.6	17.2	17.2
Effective Green, g (s)	4.7	15.4		13.5	24.2		6.6	16.6	16.6	8.6	17.8	17.8
Actuated g/C Ratio	0.05	0.17		0.15	0.27		0.07	0.18	0.18	0.09	0.19	0.19
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	91	288		261	470		127	338	287	166	363	308
v/s Ratio Prot	0.03	c0.10		c0.10	0.12		0.06	0.10		c0.08	c0.16	
v/s Ratio Perm									0.03			0.01
v/c Ratio	0.53	0.59		0.69	0.45		0.85	0.57	0.18	0.80	0.80	0.06
Uniform Delay, d1	42.2	35.0		36.9	28.0		41.9	34.1	31.6	40.5	35.0	29.9
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.4	3.1		7.7	0.7		38.8	2.3	0.3	23.5	11.5	0.1
Delay (s)	47.6	38.1		44.7	28.7		80.7	36.4	31.9	64.0	46.5	30.0
Level of Service	D	D		D	C		F	D	C	E	D	C
Approach Delay (s)		39.8			35.8			42.5			47.9	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	42.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	91.3	Sum of lost time (s)	20.8
Intersection Capacity Utilization	50.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM 6th Signalized Intersection Summary
8: Canyon Crest Dr & Blaine St

09/20/2019

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱		↰	↑	↱	↰	↱	
Traffic Volume (veh/h)	40	540	210	160	600	30	60	60	90	10	110	60
Future Volume (veh/h)	40	540	210	160	600	30	60	60	90	10	110	60
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.90	1.00		0.87	0.99		0.98	0.98		0.93
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1683	1683	1683	1683	1683	1683	1683	1683	1683	1683	1683	1683
Adj Flow Rate, veh/h	46	621	182	184	690	29	69	69	58	11	126	29
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	75	935	273	219	1503	63	308	396	492	367	307	71
Arrive On Green	0.05	0.39	0.37	0.14	0.48	0.46	0.24	0.24	0.21	0.24	0.24	0.21
Sat Flow, veh/h	1603	2371	693	1603	3106	130	1093	1683	1393	1118	1303	300
Grp Volume(v), veh/h	46	418	385	184	355	364	69	69	58	11	0	155
Grp Sat Flow(s),veh/h/ln	1603	1599	1464	1603	1599	1637	1093	1683	1393	1118	0	1603
Q Serve(g_s), s	1.4	11.0	11.2	5.7	7.6	7.6	2.9	1.7	1.4	0.4	0.0	4.2
Cycle Q Clear(g_c), s	1.4	11.0	11.2	5.7	7.6	7.6	7.1	1.7	1.4	2.1	0.0	4.2
Prop In Lane	1.00		0.47	1.00		0.08	1.00		1.00	1.00		0.19
Lane Grp Cap(c), veh/h	75	631	578	219	774	792	308	396	492	367	0	377
V/C Ratio(X)	0.61	0.66	0.67	0.84	0.46	0.46	0.22	0.17	0.12	0.03	0.00	0.41
Avail Cap(c_a), veh/h	187	776	710	219	807	826	606	856	873	672	0	815
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	24.0	12.7	13.1	21.6	8.8	8.8	19.6	15.6	11.3	16.5	0.0	16.7
Incr Delay (d2), s/veh	3.0	1.5	1.7	23.3	0.4	0.4	0.4	0.2	0.1	0.0	0.0	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	3.3	3.1	3.3	1.9	2.0	0.7	0.6	0.4	0.1	0.0	1.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	27.0	14.3	14.8	44.9	9.2	9.2	20.0	15.9	11.4	16.5	0.0	17.4
LnGrp LOS	C	B	B	D	A	A	C	B	B	B	A	B
Approach Vol, veh/h		849			903			196			166	
Approach Delay, s/veh		15.2			16.5			16.0			17.4	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	11.0	24.2		16.1	6.4	28.8		16.1
Change Period (Y+Rc), s	4.0	5.4		5.1	4.0	5.4		5.1
Max Green Setting (Gmax), s	7.0	23.5		25.0	6.0	24.5		25.0
Max Q Clear Time (g_c+I1), s	7.7	13.2		6.2	3.4	9.6		9.1
Green Ext Time (p_c), s	0.0	2.6		0.5	0.0	2.5		0.7

Intersection Summary			
HCM 6th Ctrl Delay			16.0
HCM 6th LOS			B

Intersection	
Intersection Delay, s/veh	103.9
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑	↱		↰↑	↱	↰	↑	↱	↰	↑	↱
Traffic Vol, veh/h	40	20	30	30	40	190	160	640	20	20	240	110
Future Vol, veh/h	40	20	30	30	40	190	160	640	20	20	240	110
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	43	22	33	33	43	207	174	696	22	22	261	120
Number of Lanes	0	1	1	0	1	1	1	1	1	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	3	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	3	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	3	2	2
HCM Control Delay	14	16.4	179.8	19
HCM LOS	B	C	F	C

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	0%	67%	0%	43%	0%	100%	0%	0%
Vol Thru, %	0%	100%	0%	33%	0%	57%	0%	0%	100%	0%
Vol Right, %	0%	0%	100%	0%	100%	0%	100%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	160	640	20	60	30	70	190	20	240	110
LT Vol	160	0	0	40	0	30	0	20	0	0
Through Vol	0	640	0	20	0	40	0	0	240	0
RT Vol	0	0	20	0	30	0	190	0	0	110
Lane Flow Rate	174	696	22	65	33	76	207	22	261	120
Geometry Grp	8	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.382	1.431	0.04	0.169	0.075	0.18	0.437	0.051	0.572	0.239
Departure Headway (Hd)	7.916	7.405	6.69	10.047	8.991	9.238	8.31	9.138	8.624	7.904
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	457	494	538	359	401	391	436	394	423	457
Service Time	5.622	5.111	4.396	7.747	6.691	6.938	6.01	6.838	6.324	5.604
HCM Lane V/C Ratio	0.381	1.409	0.041	0.181	0.082	0.194	0.475	0.056	0.617	0.263
HCM Control Delay	15.4	226.2	9.7	14.8	12.4	14	17.3	12.3	22.2	13.1
HCM Lane LOS	C	F	A	B	B	B	C	B	C	B
HCM 95th-tile Q	1.8	33.9	0.1	0.6	0.2	0.6	2.2	0.2	3.5	0.9

Intersection	
Intersection Delay, s/veh	11.2
Intersection LOS	B

Movement	EBL	EBT	WBT	WBR	SBU	SBL	SBR
Lane Configurations		↰	↱			↲↳	
Traffic Vol, veh/h	50	30	10	210	0	290	20
Future Vol, veh/h	50	30	10	210	0	290	20
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Heavy Vehicles, %	2	2	2	2	2	2	2
Mvmt Flow	60	36	12	250	0	345	24
Number of Lanes	0	1	1	0	0	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	1	1
HCM Control Delay	9.3	9.6	12.9
HCM LOS	A	A	B

Lane	EBLn1	WBLn1	SBLn1
Vol Left, %	62%	0%	94%
Vol Thru, %	38%	5%	0%
Vol Right, %	0%	95%	6%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	80	220	310
LT Vol	50	0	290
Through Vol	30	10	0
RT Vol	0	210	20
Lane Flow Rate	95	262	369
Geometry Grp	1	1	1
Degree of Util (X)	0.141	0.323	0.502
Departure Headway (Hd)	5.318	4.44	4.893
Convergence, Y/N	Yes	Yes	Yes
Cap	670	804	731
Service Time	3.389	2.493	2.959
HCM Lane V/C Ratio	0.142	0.326	0.505
HCM Control Delay	9.3	9.6	12.9
HCM Lane LOS	A	A	B
HCM 95th-tile Q	0.5	1.4	2.8

Intersection	
Intersection Delay, s/veh	10.2
Intersection LOS	B

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰↱		↑↱			↰↑
Traffic Vol, veh/h	40	50	170	30	80	240
Future Vol, veh/h	40	50	170	30	80	240
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	45	56	191	34	90	270
Number of Lanes	1	0	1	0	0	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	1	0
HCM Control Delay	8.8	9.3	11.1
HCM LOS	A	A	B

Lane	NBLn1	WBLn1	SBLn1
Vol Left, %	0%	44%	25%
Vol Thru, %	85%	0%	75%
Vol Right, %	15%	56%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	200	90	320
LT Vol	0	40	80
Through Vol	170	0	240
RT Vol	30	50	0
Lane Flow Rate	225	101	360
Geometry Grp	1	1	1
Degree of Util (X)	0.28	0.14	0.448
Departure Headway (Hd)	4.487	4.977	4.481
Convergence, Y/N	Yes	Yes	Yes
Cap	800	718	805
Service Time	2.519	3.023	2.51
HCM Lane V/C Ratio	0.281	0.141	0.447
HCM Control Delay	9.3	8.8	11.1
HCM Lane LOS	A	A	B
HCM 95th-tile Q	1.1	0.5	2.3

Intersection	
Intersection Delay, s/veh	10.4
Intersection LOS	B

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		↱			↰
Traffic Vol, veh/h	90	30	180	60	40	190
Future Vol, veh/h	90	30	180	60	40	190
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	114	38	228	76	51	241
Number of Lanes	1	0	1	0	0	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	1	0
HCM Control Delay	9.8	10.4	10.7
HCM LOS	A	B	B

Lane	NBLn1	WBLn1	SBLn1
Vol Left, %	0%	75%	17%
Vol Thru, %	75%	0%	83%
Vol Right, %	25%	25%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	240	120	230
LT Vol	0	90	40
Through Vol	180	0	190
RT Vol	60	30	0
Lane Flow Rate	304	152	291
Geometry Grp	1	1	1
Degree of Util (X)	0.382	0.222	0.381
Departure Headway (Hd)	4.527	5.257	4.712
Convergence, Y/N	Yes	Yes	Yes
Cap	793	679	760
Service Time	2.574	3.325	2.761
HCM Lane V/C Ratio	0.383	0.224	0.383
HCM Control Delay	10.4	9.8	10.7
HCM Lane LOS	B	A	B
HCM 95th-tile Q	1.8	0.8	1.8

Intersection	
Intersection Delay, s/veh	11
Intersection LOS	B

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰↱		↱			↰
Traffic Vol, veh/h	100	110	90	120	150	130
Future Vol, veh/h	100	110	90	120	150	130
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	116	128	105	140	174	151
Number of Lanes	1	0	1	0	0	1

Approach	WB		NB		SB
Opposing Approach			SB		NB
Opposing Lanes	0		1		1
Conflicting Approach Left	NB				WB
Conflicting Lanes Left	1		0		1
Conflicting Approach Right	SB		WB		
Conflicting Lanes Right	1		1		0
HCM Control Delay	10.7		9.8		12
HCM LOS	B		A		B

Lane	NBLn1	WBLn1	SBLn1
Vol Left, %	0%	48%	54%
Vol Thru, %	43%	0%	46%
Vol Right, %	57%	52%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	210	210	280
LT Vol	0	100	150
Through Vol	90	0	130
RT Vol	120	110	0
Lane Flow Rate	244	244	326
Geometry Grp	1	1	1
Degree of Util (X)	0.313	0.341	0.447
Departure Headway (Hd)	4.619	5.022	4.947
Convergence, Y/N	Yes	Yes	Yes
Cap	769	711	723
Service Time	2.697	3.101	3.021
HCM Lane V/C Ratio	0.317	0.343	0.451
HCM Control Delay	9.8	10.7	12
HCM Lane LOS	A	B	B
HCM 95th-tile Q	1.3	1.5	2.3

HCM 6th Signalized Intersection Summary
5: W Campus Dr & Canyon Crest Dr

	↗	↘	↖	↑	↓	↙
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↰	↱	↰	↑	↑	↱
Traffic Volume (veh/h)	240	280	510	170	140	320
Future Volume (veh/h)	240	280	510	170	140	320
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	296	193	630	210	173	280
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	347	914	681	1323	516	746
Arrive On Green	0.19	0.19	0.38	0.71	0.28	0.28
Sat Flow, veh/h	1781	1585	1781	1870	1870	1585
Grp Volume(v), veh/h	296	193	630	210	173	280
Grp Sat Flow(s),veh/h/ln	1781	1585	1781	1870	1870	1585
Q Serve(g_s), s	13.1	4.8	27.6	3.0	6.0	9.3
Cycle Q Clear(g_c), s	13.1	4.8	27.6	3.0	6.0	9.3
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	347	914	681	1323	516	746
V/C Ratio(X)	0.85	0.21	0.93	0.16	0.34	0.38
Avail Cap(c_a), veh/h	437	994	830	1323	516	746
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	31.7	8.3	24.1	3.9	23.6	13.9
Incr Delay (d2), s/veh	12.5	0.1	14.3	0.3	1.7	1.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.7	6.2	13.8	1.0	2.9	5.0
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	44.3	8.4	38.4	4.2	25.3	15.3
LnGrp LOS	D	A	D	A	C	B
Approach Vol, veh/h	489			840	453	
Approach Delay, s/veh	30.1			29.9	19.1	
Approach LOS	C			C	B	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		61.7		19.9	35.2	26.5
Change Period (Y+Rc), s		4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		57.7		20.0	38.0	15.7
Max Q Clear Time (g_c+I1), s		5.0		15.1	29.6	11.3
Green Ext Time (p_c), s		1.4		0.8	1.6	0.9

Intersection Summary			
HCM 6th Ctrl Delay			27.2
HCM 6th LOS			C

Notes

User approved changes to right turn type.

Intersection	
Intersection Delay, s/veh	64.8
Intersection LOS	F

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱			↰	↰↱	
Traffic Vol, veh/h	270	240	50	400	250	60
Future Vol, veh/h	270	240	50	400	250	60
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	333	296	62	494	309	74
Number of Lanes	1	0	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	1
Conflicting Approach Righ	NB		WB
Conflicting Lanes Right	1	0	1
HCM Control Delay	89.4	61.8	28.7
HCM LOS	F	F	D

Lane	NBLn1	EBLn1	WBLn1
Vol Left, %	81%	0%	11%
Vol Thru, %	0%	53%	89%
Vol Right, %	19%	47%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	310	510	450
LT Vol	250	0	50
Through Vol	0	270	400
RT Vol	60	240	0
Lane Flow Rate	383	630	556
Geometry Grp	1	1	1
Degree of Util (X)	0.745	1.093	0.989
Departure Headway (Hd)	7.309	6.252	6.685
Convergence, Y/N	Yes	Yes	Yes
Cap	498	586	544
Service Time	5.309	4.252	4.685
HCM Lane V/C Ratio	0.769	1.075	1.022
HCM Control Delay	28.7	89.4	61.8
HCM Lane LOS	D	F	F
HCM 95th-tile Q	6.3	19.1	13.8

HCM Signalized Intersection Capacity Analysis
7: Canyon Crest Dr & Linden St

09/20/2019

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱		↰	↑	↱	↰	↑	↱
Traffic Volume (vph)	70	200	140	440	190	200	80	200	230	150	350	50
Future Volume (vph)	70	200	140	440	190	200	80	200	230	150	350	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	3.4		4.5	3.4		4.5	3.1	3.1	4.5	3.9	3.9
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.94		1.00	0.92		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1747		1770	1719		1770	1863	1583	1770	1863	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1747		1770	1719		1770	1863	1583	1770	1863	1583
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	78	222	156	489	211	222	89	222	256	167	389	56
RTOR Reduction (vph)	0	26	0	0	38	0	0	0	206	0	0	44
Lane Group Flow (vph)	78	352	0	489	395	0	89	222	50	167	389	12
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases									8			4
Actuated Green, G (s)	6.8	15.4		16.5	25.1		6.5	17.5	17.5	8.5	19.5	19.5
Effective Green, g (s)	6.8	16.5		16.5	26.2		6.5	18.9	18.9	8.5	20.1	20.1
Actuated g/C Ratio	0.07	0.17		0.17	0.27		0.07	0.19	0.19	0.09	0.21	0.21
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	123	295		299	462		118	361	307	154	384	326
v/s Ratio Prot	0.04	c0.20		c0.28	0.23		0.05	0.12		c0.09	c0.21	
v/s Ratio Perm									0.03			0.01
v/c Ratio	0.63	1.19		1.64	0.85		0.75	0.61	0.16	1.08	1.01	0.04
Uniform Delay, d1	44.1	40.5		40.5	33.8		44.7	35.9	32.7	44.5	38.7	30.9
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	10.2	115.7		300.7	14.3		23.5	3.1	0.2	96.9	49.2	0.0
Delay (s)	54.3	156.1		341.1	48.1		68.2	39.0	32.9	141.3	87.9	30.9
Level of Service	D	F		F	D		E	D	C	F	F	C
Approach Delay (s)		138.7			203.5			40.8			97.3	
Approach LOS		F			F			D			F	

Intersection Summary			
HCM 2000 Control Delay	130.5	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	97.4	Sum of lost time (s)	20.8
Intersection Capacity Utilization	80.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM 6th Signalized Intersection Summary
8: Canyon Crest Dr & Blaine St

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱		↰	↑	↱	↰	↱	
Traffic Volume (veh/h)	50	650	190	180	690	20	210	90	140	20	130	80
Future Volume (veh/h)	50	650	190	180	690	20	210	90	140	20	130	80
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.83	1.00		0.90	0.95		0.90	0.94		0.89
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1683	1683	1683	1683	1683	1683	1683	1683	1683	1683	1683	1683
Adj Flow Rate, veh/h	57	747	190	207	793	21	241	103	145	23	149	69
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	70	859	219	239	1463	39	338	620	674	390	384	178
Arrive On Green	0.04	0.36	0.34	0.15	0.46	0.45	0.37	0.37	0.36	0.37	0.37	0.36
Sat Flow, veh/h	1603	2414	614	1603	3172	84	997	1683	1291	961	1042	482
Grp Volume(v), veh/h	57	495	442	207	400	414	241	103	145	23	0	218
Grp Sat Flow(s),veh/h/ln	1603	1599	1429	1603	1599	1657	997	1683	1291	961	0	1524
Q Serve(g_s), s	3.3	27.4	27.5	12.0	17.1	17.1	22.3	3.9	5.9	1.6	0.0	10.1
Cycle Q Clear(g_c), s	3.3	27.4	27.5	12.0	17.1	17.1	32.4	3.9	5.9	5.5	0.0	10.1
Prop In Lane	1.00		0.43	1.00		0.05	1.00		1.00	1.00		0.32
Lane Grp Cap(c), veh/h	70	569	509	239	738	764	338	620	674	390	0	562
V/C Ratio(X)	0.81	0.87	0.87	0.86	0.54	0.54	0.71	0.17	0.22	0.06	0.00	0.39
Avail Cap(c_a), veh/h	152	673	602	388	909	942	338	620	674	390	0	562
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	45.0	28.5	28.8	39.5	18.4	18.4	34.1	20.2	13.0	22.0	0.0	22.3
Incr Delay (d2), s/veh	8.0	10.4	11.5	6.2	0.6	0.6	6.9	0.1	0.2	0.1	0.0	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.4	11.4	10.4	5.0	5.9	6.1	6.0	1.6	1.7	0.4	0.0	3.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	53.0	39.0	40.4	45.6	19.0	19.0	41.0	20.3	13.2	22.1	0.0	22.7
LnGrp LOS	D	D	D	D	B	B	D	C	B	C	A	C
Approach Vol, veh/h		994			1021			489			241	
Approach Delay, s/veh		40.4			24.4			28.4			22.6	
Approach LOS		D			C			C			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	18.2	37.8		39.0	8.2	47.8		39.0				
Change Period (Y+Rc), s	4.0	5.4		5.1	4.0	5.4		5.1				
Max Green Setting (Gmax), s	23.0	38.6		33.9	9.0	52.6		33.9				
Max Q Clear Time (g_c+I1), s	14.0	29.5		12.1	5.3	19.1		34.4				
Green Ext Time (p_c), s	0.3	2.9		1.0	0.0	3.4		0.0				
Intersection Summary												
HCM 6th Ctrl Delay			30.7									
HCM 6th LOS			C									

Intersection	
Intersection Delay, s/veh	111.4
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑	↱		↰↑	↱	↰	↑	↱	↰	↑	↱
Traffic Vol, veh/h	140	30	170	70	40	30	80	430	40	110	540	50
Future Vol, veh/h	140	30	170	70	40	30	80	430	40	110	540	50
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	152	33	185	76	43	33	87	467	43	120	587	54
Number of Lanes	0	1	1	0	1	1	1	1	1	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	3	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	3	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	3	2	2
HCM Control Delay	21.8	19.1	100.1	182.2
HCM LOS	C	C	F	F

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	0%	82%	0%	64%	0%	100%	0%	0%
Vol Thru, %	0%	100%	0%	18%	0%	36%	0%	0%	100%	0%
Vol Right, %	0%	0%	100%	0%	100%	0%	100%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	80	430	40	170	170	110	30	110	540	50
LT Vol	80	0	0	140	0	70	0	110	0	0
Through Vol	0	430	0	30	0	40	0	0	540	0
RT Vol	0	0	40	0	170	0	30	0	0	50
Lane Flow Rate	87	467	43	185	185	120	33	120	587	54
Geometry Grp	8	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.226	1.149	0.098	0.505	0.449	0.35	0.086	0.308	1.429	0.122
Departure Headway (Hd)	10.129	9.608	8.879	10.711	9.567	11.556	10.498	9.678	9.158	8.431
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	357	383	406	338	379	313	343	374	399	428
Service Time	7.829	7.308	6.579	8.411	7.267	9.256	8.198	7.378	6.858	6.131
HCM Lane V/C Ratio	0.244	1.219	0.106	0.547	0.488	0.383	0.096	0.321	1.471	0.126
HCM Control Delay	15.8	123.9	12.5	23.8	19.8	20.4	14.2	16.6	231.7	12.3
HCM Lane LOS	C	F	B	C	C	C	B	C	F	B
HCM 95th-tile Q	0.9	16.7	0.3	2.7	2.2	1.5	0.3	1.3	28.5	0.4

Intersection	
Intersection Delay, s/veh	10.5
Intersection LOS	B

Movement	EBL	EBT	WBT	WBR	SBU	SBL	SBR
Lane Configurations		↰	↱			Y	
Traffic Vol, veh/h	30	10	20	176	0	228	50
Future Vol, veh/h	30	10	20	176	0	228	50
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Heavy Vehicles, %	2	2	2	2	2	2	2
Mvmt Flow	38	13	25	223	0	289	63
Number of Lanes	0	1	1	0	0	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	1	1
HCM Control Delay	8.7	9.2	11.6
HCM LOS	A	A	B

Lane	EBLn1	WBLn1	SBLn1
Vol Left, %	75%	0%	82%
Vol Thru, %	25%	10%	0%
Vol Right, %	0%	90%	18%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	40	196	278
LT Vol	30	0	228
Through Vol	10	20	0
RT Vol	0	176	50
Lane Flow Rate	51	248	352
Geometry Grp	1	1	1
Degree of Util (X)	0.074	0.298	0.455
Departure Headway (Hd)	5.239	4.329	4.657
Convergence, Y/N	Yes	Yes	Yes
Cap	682	829	771
Service Time	3.29	2.364	2.702
HCM Lane V/C Ratio	0.075	0.299	0.457
HCM Control Delay	8.7	9.2	11.6
HCM Lane LOS	A	A	B
HCM 95th-tile Q	0.2	1.3	2.4

Intersection	
Intersection Delay, s/veh	9.3
Intersection LOS	A

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰↱		↱			↰
Traffic Vol, veh/h	10	20	176	40	50	188
Future Vol, veh/h	10	20	176	40	50	188
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	12	24	215	49	61	229
Number of Lanes	1	0	1	0	0	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	1	0
HCM Control Delay	8	9.1	9.6
HCM LOS	A	A	A

Lane	NBLn1	WBLn1	SBLn1
Vol Left, %	0%	33%	21%
Vol Thru, %	81%	0%	79%
Vol Right, %	19%	67%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	216	30	238
LT Vol	0	10	50
Through Vol	176	0	188
RT Vol	40	20	0
Lane Flow Rate	263	37	290
Geometry Grp	1	1	1
Degree of Util (X)	0.308	0.049	0.342
Departure Headway (Hd)	4.211	4.781	4.239
Convergence, Y/N	Yes	Yes	Yes
Cap	859	751	836
Service Time	2.211	2.795	2.336
HCM Lane V/C Ratio	0.306	0.049	0.347
HCM Control Delay	9.1	8	9.6
HCM Lane LOS	A	A	A
HCM 95th-tile Q	1.3	0.2	1.5

Intersection	
Intersection Delay, s/veh	10
Intersection LOS	A

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰↱		↑↱			↰↑
Traffic Vol, veh/h	59	10	130	184	30	160
Future Vol, veh/h	59	10	130	184	30	160
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	75	13	165	233	38	203
Number of Lanes	1	0	1	0	0	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	1	0
HCM Control Delay	9.2	10.4	9.7
HCM LOS	A	B	A

Lane	NBLn1	WBLn1	SBLn1
Vol Left, %	0%	86%	16%
Vol Thru, %	41%	0%	84%
Vol Right, %	59%	14%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	314	69	190
LT Vol	0	59	30
Through Vol	130	0	160
RT Vol	184	10	0
Lane Flow Rate	397	87	241
Geometry Grp	1	1	1
Degree of Util (X)	0.451	0.13	0.307
Departure Headway (Hd)	4.085	5.356	4.592
Convergence, Y/N	Yes	Yes	Yes
Cap	882	667	782
Service Time	2.11	3.405	2.623
HCM Lane V/C Ratio	0.45	0.13	0.308
HCM Control Delay	10.4	9.2	9.7
HCM Lane LOS	B	A	A
HCM 95th-tile Q	2.4	0.4	1.3

HCM 6th AWSC
4: N Campus Dr & Big Springs Rd

10/01/2019

Intersection	
Intersection Delay, s/veh	10
Intersection LOS	A

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰↱		↑↱			↰↑
Traffic Vol, veh/h	100	136	80	60	108	90
Future Vol, veh/h	100	136	80	60	108	90
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	119	162	95	71	129	107
Number of Lanes	1	0	1	0	0	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	1	0
HCM Control Delay	10.3	9	10.3
HCM LOS	B	A	B

Lane	NBLn1	WBLn1	SBLn1
Vol Left, %	0%	42%	55%
Vol Thru, %	57%	0%	45%
Vol Right, %	43%	58%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	140	236	198
LT Vol	0	100	108
Through Vol	80	0	90
RT Vol	60	136	0
Lane Flow Rate	167	281	236
Geometry Grp	1	1	1
Degree of Util (X)	0.215	0.361	0.321
Departure Headway (Hd)	4.642	4.621	4.91
Convergence, Y/N	Yes	Yes	Yes
Cap	768	775	728
Service Time	2.703	2.671	2.968
HCM Lane V/C Ratio	0.217	0.363	0.324
HCM Control Delay	9	10.3	10.3
HCM Lane LOS	A	B	B
HCM 95th-tile Q	0.8	1.7	1.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↰	↱	↰	↑	↑	↱
Traffic Volume (veh/h)	360	502	123	56	111	270
Future Volume (veh/h)	360	502	123	56	111	270
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	434	378	148	67	134	173
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	528	643	194	1055	720	1080
Arrive On Green	0.30	0.30	0.11	0.56	0.38	0.38
Sat Flow, veh/h	1781	1585	1781	1870	1870	1585
Grp Volume(v), veh/h	434	378	148	67	134	173
Grp Sat Flow(s),veh/h/ln	1781	1585	1781	1870	1870	1585
Q Serve(g_s), s	13.0	10.7	4.6	0.9	2.7	2.2
Cycle Q Clear(g_c), s	13.0	10.7	4.6	0.9	2.7	2.2
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	528	643	194	1055	720	1080
V/C Ratio(X)	0.82	0.59	0.76	0.06	0.19	0.16
Avail Cap(c_a), veh/h	715	809	560	1055	720	1080
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	18.7	13.3	24.8	5.7	11.7	3.3
Incr Delay (d2), s/veh	5.6	0.9	6.1	0.1	0.6	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.7	9.7	2.2	0.3	1.1	1.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	24.4	14.1	30.8	5.8	12.2	3.6
LnGrp LOS	C	B	C	A	B	A
Approach Vol, veh/h	812			215	307	
Approach Delay, s/veh	19.6			23.0	7.4	
Approach LOS	B			C	A	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		36.3		21.0	10.2	26.1
Change Period (Y+Rc), s		4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		32.3		23.0	18.0	10.3
Max Q Clear Time (g_c+I1), s		2.9		15.0	6.6	4.7
Green Ext Time (p_c), s		0.3		2.0	0.3	0.6

Intersection Summary			
HCM 6th Ctrl Delay			17.3
HCM 6th LOS			B

Notes

User approved changes to right turn type.

Intersection	
Intersection Delay, s/veh	15
Intersection LOS	B

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱			↰	Y	
Traffic Vol, veh/h	170	228	40	170	176	60
Future Vol, veh/h	170	228	40	170	176	60
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	210	281	49	210	217	74
Number of Lanes	1	0	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	1
HCM Control Delay	17.2	12.2	13.9
HCM LOS	C	B	B

Lane	NBLn1	EBLn1	WBLn1
Vol Left, %	75%	0%	19%
Vol Thru, %	0%	43%	81%
Vol Right, %	25%	57%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	236	398	210
LT Vol	176	0	40
Through Vol	0	170	170
RT Vol	60	228	0
Lane Flow Rate	291	491	259
Geometry Grp	1	1	1
Degree of Util (X)	0.468	0.667	0.399
Departure Headway (Hd)	5.788	4.884	5.541
Convergence, Y/N	Yes	Yes	Yes
Cap	621	737	648
Service Time	3.831	2.921	3.585
HCM Lane V/C Ratio	0.469	0.666	0.4
HCM Control Delay	13.9	17.2	12.2
HCM Lane LOS	B	C	B
HCM 95th-tile Q	2.5	5.1	1.9

HCM Signalized Intersection Capacity Analysis
7: Canyon Crest Dr & Linden St

10/01/2019

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↑	↱	↰	↑	↱
Traffic Volume (vph)	40	86	100	173	133	60	90	160	262	110	240	80
Future Volume (vph)	40	86	100	173	133	60	90	160	262	110	240	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	3.4		4.5	3.4		4.5	3.1	3.1	4.5	3.9	3.9
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.92		1.00	0.95		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1713		1770	1776		1770	1863	1583	1770	1863	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1713		1770	1776		1770	1863	1583	1770	1863	1583
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	48	104	120	208	160	72	108	193	316	133	289	96
RTOR Reduction (vph)	0	42	0	0	16	0	0	0	259	0	0	77
Lane Group Flow (vph)	48	182	0	208	216	0	108	193	57	133	289	19
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases									8			4
Actuated Green, G (s)	4.8	14.7		14.4	24.3		6.6	15.3	15.3	8.6	17.3	17.3
Effective Green, g (s)	4.8	15.8		14.4	25.4		6.6	16.7	16.7	8.6	17.9	17.9
Actuated g/C Ratio	0.05	0.17		0.16	0.27		0.07	0.18	0.18	0.09	0.19	0.19
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	91	292		275	487		126	335	285	164	360	306
v/s Ratio Prot	0.03	c0.11		c0.12	0.12		0.06	0.10		c0.08	c0.16	
v/s Ratio Perm									0.04			0.01
v/c Ratio	0.53	0.62		0.76	0.44		0.86	0.58	0.20	0.81	0.80	0.06
Uniform Delay, d1	42.8	35.6		37.4	27.8		42.5	34.7	32.3	41.2	35.7	30.5
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.4	4.1		11.2	0.6		40.1	2.4	0.3	25.3	12.2	0.1
Delay (s)	48.2	39.7		48.7	28.4		82.6	37.1	32.6	66.5	47.8	30.6
Level of Service	D	D		D	C		F	D	C	E	D	C
Approach Delay (s)		41.2			38.0			42.8			49.4	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	43.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	92.6	Sum of lost time (s)	20.8
Intersection Capacity Utilization	52.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM 6th Signalized Intersection Summary
8: Canyon Crest Dr & Blaine St

10/01/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱		↰	↑	↗	↰	↱	
Traffic Volume (veh/h)	40	599	210	160	632	30	60	60	90	10	110	60
Future Volume (veh/h)	40	599	210	160	632	30	60	60	90	10	110	60
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.90	1.00		0.87	0.99		0.98	0.98		0.93
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1683	1683	1683	1683	1683	1683	1683	1683	1683	1683	1683	1683
Adj Flow Rate, veh/h	46	689	190	184	726	29	69	69	69	11	126	29
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	75	971	268	213	1524	61	305	397	489	362	307	71
Arrive On Green	0.05	0.40	0.38	0.13	0.49	0.46	0.24	0.24	0.21	0.24	0.24	0.21
Sat Flow, veh/h	1603	2411	664	1603	3115	124	1093	1683	1393	1107	1303	300
Grp Volume(v), veh/h	46	457	422	184	373	382	69	69	69	11	0	155
Grp Sat Flow(s),veh/h/ln	1603	1599	1476	1603	1599	1640	1093	1683	1393	1107	0	1603
Q Serve(g_s), s	1.5	12.6	12.7	5.9	8.2	8.2	3.0	1.7	1.8	0.4	0.0	4.3
Cycle Q Clear(g_c), s	1.5	12.6	12.7	5.9	8.2	8.2	7.3	1.7	1.8	2.1	0.0	4.3
Prop In Lane	1.00		0.45	1.00		0.08	1.00		1.00	1.00		0.19
Lane Grp Cap(c), veh/h	75	644	594	213	783	802	305	397	489	362	0	378
V/C Ratio(X)	0.62	0.71	0.71	0.86	0.48	0.48	0.23	0.17	0.14	0.03	0.00	0.41
Avail Cap(c_a), veh/h	183	757	699	213	788	808	590	835	852	650	0	796
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	24.6	13.1	13.4	22.3	8.9	9.0	20.1	16.0	11.8	16.9	0.0	17.1
Incr Delay (d2), s/veh	3.1	2.5	2.8	27.3	0.5	0.4	0.4	0.2	0.1	0.0	0.0	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	3.9	3.7	3.6	2.1	2.2	0.7	0.6	0.5	0.1	0.0	1.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	27.7	15.7	16.2	49.7	9.4	9.4	20.5	16.2	11.9	16.9	0.0	17.8
LnGrp LOS	C	B	B	D	A	A	C	B	B	B	A	B
Approach Vol, veh/h		925			939			207			166	
Approach Delay, s/veh		16.5			17.3			16.2			17.7	
Approach LOS		B			B			B			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	11.0	25.2		16.4	6.4	29.7		16.4				
Change Period (Y+Rc), s	4.0	5.4		5.1	4.0	5.4		5.1				
Max Green Setting (Gmax), s	7.0	23.5		25.0	6.0	24.5		25.0				
Max Q Clear Time (g_c+I1), s	7.9	14.7		6.3	3.5	10.2		9.3				
Green Ext Time (p_c), s	0.0	2.6		0.5	0.0	2.7		0.8				
Intersection Summary												
HCM 6th Ctrl Delay			16.9									
HCM 6th LOS			B									

HCM 6th AWSC
9: Watkins Dr & Big Springs Rd

Intersection	
Intersection Delay, s/veh	118.9
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑	↱		↰↑	↱	↰	↑	↱	↰	↑	↱
Traffic Vol, veh/h	72	25	53	30	48	190	202	640	20	20	240	169
Future Vol, veh/h	72	25	53	30	48	190	202	640	20	20	240	169
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	78	27	58	33	52	207	220	696	22	22	261	184
Number of Lanes	0	1	1	0	1	1	1	1	1	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	3	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	3	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	3	2	2
HCM Control Delay	16.4	18.6	216.1	21.9
HCM LOS	C	C	F	C

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	0%	74%	0%	38%	0%	100%	0%	0%
Vol Thru, %	0%	100%	0%	26%	0%	62%	0%	0%	100%	0%
Vol Right, %	0%	0%	100%	0%	100%	0%	100%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	202	640	20	97	53	78	190	20	240	169
LT Vol	202	0	0	72	0	30	0	20	0	0
Through Vol	0	640	0	25	0	48	0	0	240	0
RT Vol	0	0	20	0	53	0	190	0	0	169
Lane Flow Rate	220	696	22	105	58	85	207	22	261	184
Geometry Grp	8	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.524	1.561	0.044	0.287	0.14	0.217	0.478	0.055	0.618	0.4
Departure Headway (Hd)	8.59	8.076	7.356	10.706	9.607	10.028	9.117	9.872	9.354	8.629
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	419	452	486	337	376	360	399	365	389	421
Service Time	6.343	5.829	5.109	8.406	7.307	7.728	6.817	7.572	7.054	6.329
HCM Lane V/C Ratio	0.525	1.54	0.045	0.312	0.154	0.236	0.519	0.06	0.671	0.437
HCM Control Delay	20.5	284.2	10.4	17.7	13.9	15.5	19.9	13.1	26	17
HCM Lane LOS	C	F	B	C	B	C	C	B	D	C
HCM 95th-tile Q	3	37.9	0.1	1.2	0.5	0.8	2.5	0.2	4	1.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱			↰	↱	↰	↑	↱	↰	↑	↱
Traffic Volume (veh/h)	72	25	53	30	48	190	202	640	20	20	240	169
Future Volume (veh/h)	72	25	53	30	48	190	202	640	20	20	240	169
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.94		0.91	0.93		0.91	1.00		0.91	1.00		0.93
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	78	27	58	33	52	207	220	696	22	22	261	184
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	409	132	284	234	316	385	289	819	632	38	555	437
Arrive On Green	0.27	0.27	0.27	0.27	0.27	0.27	0.16	0.44	0.44	0.02	0.30	0.30
Sat Flow, veh/h	1054	493	1060	448	1180	1440	1781	1870	1442	1781	1870	1473
Grp Volume(v), veh/h	78	0	85	85	0	207	220	696	22	22	261	184
Grp Sat Flow(s),veh/h/ln	1054	0	1553	1628	0	1440	1781	1870	1442	1781	1870	1473
Q Serve(g_s), s	2.7	0.0	1.9	0.0	0.0	5.4	5.2	14.6	0.4	0.5	5.0	4.4
Cycle Q Clear(g_c), s	4.2	0.0	1.9	1.5	0.0	5.4	5.2	14.6	0.4	0.5	5.0	4.4
Prop In Lane	1.00		0.68	0.39		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	409	0	416	549	0	385	289	819	632	38	555	437
V/C Ratio(X)	0.19	0.00	0.20	0.15	0.00	0.54	0.76	0.85	0.03	0.58	0.47	0.42
Avail Cap(c_a), veh/h	511	0	565	698	0	524	608	1191	919	162	723	570
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	14.0	0.0	12.5	12.4	0.0	13.8	17.6	11.1	7.0	21.3	12.6	12.4
Incr Delay (d2), s/veh	0.2	0.0	0.2	0.1	0.0	1.2	4.1	4.1	0.0	13.0	0.6	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.0	0.6	0.5	0.0	1.5	2.1	5.1	0.1	0.3	1.8	1.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	14.2	0.0	12.7	12.5	0.0	14.9	21.7	15.1	7.1	34.3	13.2	13.1
LnGrp LOS	B	A	B	B	A	B	C	B	A	C	B	B
Approach Vol, veh/h		163			292			938			467	
Approach Delay, s/veh		13.4			14.2			16.5			14.2	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	4.9	23.3		15.8	11.1	17.1		15.8
Change Period (Y+Rc), s	4.0	4.0		4.0	4.0	4.0		4.0
Max Green Setting (Gmax), s	4.0	28.0		16.0	15.0	17.0		16.0
Max Q Clear Time (g_c+I1), s	2.5	16.6		6.2	7.2	7.0		7.4
Green Ext Time (p_c), s	0.0	2.6		0.4	0.5	1.4		0.8

Intersection Summary	
HCM 6th Ctrl Delay	15.3
HCM 6th LOS	B

Intersection	
Intersection Delay, s/veh	12.2
Intersection LOS	B

Movement	EBL	EBT	WBT	WBR	SBU	SBL	SBR
Lane Configurations		↰	↱			↲↳	
Traffic Vol, veh/h	50	30	10	251	0	312	20
Future Vol, veh/h	50	30	10	251	0	312	20
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Heavy Vehicles, %	2	2	2	2	2	2	2
Mvmt Flow	60	36	12	299	0	371	24
Number of Lanes	0	1	1	0	0	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	1	1
HCM Control Delay	9.5	10.5	14.1
HCM LOS	A	B	B

Lane	EBLn1	WBLn1	SBLn1
Vol Left, %	62%	0%	94%
Vol Thru, %	38%	4%	0%
Vol Right, %	0%	96%	6%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	80	261	332
LT Vol	50	0	312
Through Vol	30	10	0
RT Vol	0	251	20
Lane Flow Rate	95	311	395
Geometry Grp	1	1	1
Degree of Util (X)	0.145	0.391	0.55
Departure Headway (Hd)	5.471	4.525	5.01
Convergence, Y/N	Yes	Yes	Yes
Cap	649	789	711
Service Time	3.563	2.59	3.095
HCM Lane V/C Ratio	0.146	0.394	0.556
HCM Control Delay	9.5	10.5	14.1
HCM Lane LOS	A	B	B
HCM 95th-tile Q	0.5	1.9	3.4

Intersection	
Intersection Delay, s/veh	10.8
Intersection LOS	B

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰↱		↱			↰
Traffic Vol, veh/h	40	50	211	30	80	262
Future Vol, veh/h	40	50	211	30	80	262
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	45	56	237	34	90	294
Number of Lanes	1	0	1	0	0	1

Approach	WB		NB		SB	
Opposing Approach			SB		NB	
Opposing Lanes	0		1		1	
Conflicting Approach Left	NB				WB	
Conflicting Lanes Left	1		0		1	
Conflicting Approach Right	SB		WB			
Conflicting Lanes Right	1		1		0	
HCM Control Delay	9.1		9.9		11.8	
HCM LOS	A		A		B	

Lane	NBLn1	WBLn1	SBLn1
Vol Left, %	0%	44%	23%
Vol Thru, %	88%	0%	77%
Vol Right, %	12%	56%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	241	90	342
LT Vol	0	40	80
Through Vol	211	0	262
RT Vol	30	50	0
Lane Flow Rate	271	101	384
Geometry Grp	1	1	1
Degree of Util (X)	0.341	0.144	0.484
Departure Headway (Hd)	4.538	5.13	4.536
Convergence, Y/N	Yes	Yes	Yes
Cap	791	696	792
Service Time	2.576	3.185	2.57
HCM Lane V/C Ratio	0.343	0.145	0.485
HCM Control Delay	9.9	9.1	11.8
HCM Lane LOS	A	A	B
HCM 95th-tile Q	1.5	0.5	2.7

Intersection	
Intersection Delay, s/veh	11.4
Intersection LOS	B

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		↱			↰
Traffic Vol, veh/h	135	30	180	96	40	190
Future Vol, veh/h	135	30	180	96	40	190
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	171	38	228	122	51	241
Number of Lanes	1	0	1	0	0	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	1	0
HCM Control Delay	11.1	11.6	11.3
HCM LOS	B	B	B

Lane	NBLn1	WBLn1	SBLn1
Vol Left, %	0%	82%	17%
Vol Thru, %	65%	0%	83%
Vol Right, %	35%	18%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	276	165	230
LT Vol	0	135	40
Through Vol	180	0	190
RT Vol	96	30	0
Lane Flow Rate	349	209	291
Geometry Grp	1	1	1
Degree of Util (X)	0.452	0.315	0.4
Departure Headway (Hd)	4.66	5.433	4.949
Convergence, Y/N	Yes	Yes	Yes
Cap	765	654	719
Service Time	2.732	3.53	3.028
HCM Lane V/C Ratio	0.456	0.32	0.405
HCM Control Delay	11.6	11.1	11.3
HCM Lane LOS	B	B	B
HCM 95th-tile Q	2.4	1.3	1.9

Intersection	
Intersection Delay, s/veh	12
Intersection LOS	B

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰↱		↑↱			↰↑
Traffic Vol, veh/h	100	151	90	120	172	130
Future Vol, veh/h	100	151	90	120	172	130
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	116	176	105	140	200	151
Number of Lanes	1	0	1	0	0	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	1	0
HCM Control Delay	11.8	10.4	13.4
HCM LOS	B	B	B

Lane	NBLn1	WBLn1	SBLn1
Vol Left, %	0%	40%	57%
Vol Thru, %	43%	0%	43%
Vol Right, %	57%	60%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	210	251	302
LT Vol	0	100	172
Through Vol	90	0	130
RT Vol	120	151	0
Lane Flow Rate	244	292	351
Geometry Grp	1	1	1
Degree of Util (X)	0.332	0.418	0.506
Departure Headway (Hd)	4.893	5.154	5.191
Convergence, Y/N	Yes	Yes	Yes
Cap	735	700	695
Service Time	2.923	3.171	3.21
HCM Lane V/C Ratio	0.332	0.417	0.505
HCM Control Delay	10.4	11.8	13.4
HCM Lane LOS	B	B	B
HCM 95th-tile Q	1.5	2.1	2.9

HCM 6th Signalized Intersection Summary
5: W Campus Dr & Canyon Crest Dr

10/01/2019

	↗	↘	↖	↑	↓	↙
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↰	↱	↰	↑	↑	↱
Traffic Volume (veh/h)	240	304	546	179	152	320
Future Volume (veh/h)	240	304	546	179	152	320
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	296	243	674	221	188	293
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	349	952	721	1321	472	710
Arrive On Green	0.20	0.20	0.40	0.71	0.25	0.25
Sat Flow, veh/h	1781	1585	1781	1870	1870	1585
Grp Volume(v), veh/h	296	243	674	221	188	293
Grp Sat Flow(s),veh/h/ln	1781	1585	1781	1870	1870	1585
Q Serve(g_s), s	13.1	5.9	29.6	3.2	6.8	10.2
Cycle Q Clear(g_c), s	13.1	5.9	29.6	3.2	6.8	10.2
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	349	952	721	1321	472	710
V/C Ratio(X)	0.85	0.26	0.93	0.17	0.40	0.41
Avail Cap(c_a), veh/h	436	1030	829	1321	472	710
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	31.7	7.7	23.3	4.0	25.4	15.3
Incr Delay (d2), s/veh	12.2	0.1	16.2	0.3	2.5	1.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.7	7.7	15.0	1.1	3.3	5.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	43.9	7.8	39.5	4.3	27.9	17.0
LnGrp LOS	D	A	D	A	C	B
Approach Vol, veh/h	539			895	481	
Approach Delay, s/veh	27.6			30.8	21.3	
Approach LOS	C			C	C	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		61.7		20.0	37.1	24.6
Change Period (Y+Rc), s		4.0		4.0	4.0	4.0
Max Green Setting (Gmax), s		57.7		20.0	38.0	15.7
Max Q Clear Time (g_c+I1), s		5.2		15.1	31.6	12.2
Green Ext Time (p_c), s		1.5		0.9	1.5	0.8

Intersection Summary			
HCM 6th Ctrl Delay			27.5
HCM 6th LOS			C

Notes

User approved changes to right turn type.

Intersection	
Intersection Delay, s/veh	82.6
Intersection LOS	F

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↱			↰↑	↰↱	
Traffic Vol, veh/h	270	262	50	400	291	60
Future Vol, veh/h	270	262	50	400	291	60
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	333	323	62	494	359	74
Number of Lanes	1	0	0	1	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	1
Conflicting Approach Righ	NB		WB
Conflicting Lanes Right	1	0	1
HCM Control Delay	118.2	73.5	40.2
HCM LOS	F	F	E

Lane	NBLn1	EBLn1	WBLn1
Vol Left, %	83%	0%	11%
Vol Thru, %	0%	51%	89%
Vol Right, %	17%	49%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	351	532	450
LT Vol	291	0	50
Through Vol	0	270	400
RT Vol	60	262	0
Lane Flow Rate	433	657	556
Geometry Grp	1	1	1
Degree of Util (X)	0.852	1.171	1.027
Departure Headway (Hd)	7.471	6.54	7.039
Convergence, Y/N	Yes	Yes	Yes
Cap	490	558	522
Service Time	5.471	4.54	5.039
HCM Lane V/C Ratio	0.884	1.177	1.065
HCM Control Delay	40.2	118.2	73.5
HCM Lane LOS	E	F	F
HCM 95th-tile Q	8.7	22.5	14.9

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↑	↱	↰	↑	↱
Traffic Volume (vph)	70	204	140	476	195	200	80	200	248	150	350	50
Future Volume (vph)	70	204	140	476	195	200	80	200	248	150	350	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	3.4		4.5	3.4		4.5	3.1	3.1	4.5	3.9	3.9
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.94		1.00	0.92		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1749		1770	1721		1770	1863	1583	1770	1863	1583
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	1749		1770	1721		1770	1863	1583	1770	1863	1583
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	78	227	156	529	217	222	89	222	276	167	389	56
RTOR Reduction (vph)	0	26	0	0	37	0	0	0	222	0	0	44
Lane Group Flow (vph)	78	357	0	529	402	0	89	222	54	167	389	12
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases									8			4
Actuated Green, G (s)	6.8	15.4		16.5	25.1		6.5	17.5	17.5	8.5	19.5	19.5
Effective Green, g (s)	6.8	16.5		16.5	26.2		6.5	18.9	18.9	8.5	20.1	20.1
Actuated g/C Ratio	0.07	0.17		0.17	0.27		0.07	0.19	0.19	0.09	0.21	0.21
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	123	296		299	462		118	361	307	154	384	326
v/s Ratio Prot	0.04	c0.20		c0.30	0.23		0.05	0.12		c0.09	c0.21	
v/s Ratio Perm									0.03			0.01
v/c Ratio	0.63	1.21		1.77	0.87		0.75	0.61	0.17	1.08	1.01	0.04
Uniform Delay, d1	44.1	40.5		40.5	34.0		44.7	35.9	32.7	44.5	38.7	30.9
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	10.2	120.5		359.5	16.3		23.5	3.1	0.3	96.9	49.2	0.0
Delay (s)	54.3	161.0		399.9	50.3		68.2	39.0	33.0	141.3	87.9	30.9
Level of Service	D	F		F	D		E	D	C	F	F	C
Approach Delay (s)		142.9			241.4			40.6			97.3	
Approach LOS		F			F			D			F	

Intersection Summary			
HCM 2000 Control Delay	145.7	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	97.4	Sum of lost time (s)	20.8
Intersection Capacity Utilization	82.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM 6th Signalized Intersection Summary
8: Canyon Crest Dr & Blaine St

10/01/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱		↰	↑	↱	↰	↱	
Traffic Volume (veh/h)	50	684	190	180	740	20	210	90	140	20	130	80
Future Volume (veh/h)	50	684	190	180	740	20	210	90	140	20	130	80
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.84	1.00		0.90	0.95		0.90	0.94		0.89
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1683	1683	1683	1683	1683	1683	1683	1683	1683	1683	1683	1683
Adj Flow Rate, veh/h	57	786	193	207	851	21	241	103	147	23	149	69
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	71	891	219	239	1495	37	328	609	664	381	377	174
Arrive On Green	0.04	0.37	0.35	0.15	0.47	0.46	0.36	0.36	0.35	0.36	0.36	0.35
Sat Flow, veh/h	1603	2440	599	1603	3180	78	997	1683	1289	959	1041	482
Grp Volume(v), veh/h	57	515	464	207	428	444	241	103	147	23	0	218
Grp Sat Flow(s),veh/h/ln	1603	1599	1440	1603	1599	1659	997	1683	1289	959	0	1523
Q Serve(g_s), s	3.4	29.2	29.2	12.2	18.7	18.7	23.0	4.0	6.2	1.6	0.0	10.4
Cycle Q Clear(g_c), s	3.4	29.2	29.2	12.2	18.7	18.7	33.3	4.0	6.2	5.6	0.0	10.4
Prop In Lane	1.00		0.42	1.00		0.05	1.00		1.00	1.00		0.32
Lane Grp Cap(c), veh/h	71	584	526	239	752	780	328	609	664	381	0	551
V/C Ratio(X)	0.81	0.88	0.88	0.87	0.57	0.57	0.73	0.17	0.22	0.06	0.00	0.40
Avail Cap(c_a), veh/h	149	661	595	381	892	926	328	609	664	381	0	551
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	45.8	28.8	29.0	40.2	18.5	18.6	35.4	21.0	13.7	22.9	0.0	23.1
Incr Delay (d2), s/veh	7.9	12.2	13.4	7.0	0.7	0.7	8.2	0.1	0.2	0.1	0.0	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	12.4	11.4	5.1	6.5	6.7	6.3	1.6	1.8	0.4	0.0	3.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	53.8	41.0	42.4	47.2	19.2	19.2	43.7	21.1	13.9	23.0	0.0	23.6
LnGrp LOS	D	D	D	D	B	B	D	C	B	C	A	C
Approach Vol, veh/h		1036			1079			491			241	
Approach Delay, s/veh		42.3			24.6			30.0			23.5	
Approach LOS		D			C			C			C	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	18.4	39.3		39.0	8.3	49.5		39.0
Change Period (Y+Rc), s	4.0	5.4		5.1	4.0	5.4		5.1
Max Green Setting (Gmax), s	23.0	38.6		33.9	9.0	52.6		33.9
Max Q Clear Time (g_c+I1), s	14.2	31.2		12.4	5.4	20.7		35.3
Green Ext Time (p_c), s	0.3	2.7		1.0	0.0	3.7		0.0

Intersection Summary			
HCM 6th Ctrl Delay			31.9
HCM 6th LOS			C

Intersection	
Intersection Delay, s/veh	124.7
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑	↱		↰↑	↱	↰	↑	↱	↰	↑	↱
Traffic Vol, veh/h	190	37	206	70	45	30	104	430	40	110	540	84
Future Vol, veh/h	190	37	206	70	45	30	104	430	40	110	540	84
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	207	40	224	76	49	33	113	467	43	120	587	91
Number of Lanes	0	1	1	0	1	1	1	1	1	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	3	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	3	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	3	2	2
HCM Control Delay	30.4	21.1	120.1	204.5
HCM LOS	D	C	F	F

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	0%	84%	0%	61%	0%	100%	0%	0%
Vol Thru, %	0%	100%	0%	16%	0%	39%	0%	0%	100%	0%
Vol Right, %	0%	0%	100%	0%	100%	0%	100%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	104	430	40	227	206	115	30	110	540	84
LT Vol	104	0	0	190	0	70	0	110	0	0
Through Vol	0	430	0	37	0	45	0	0	540	0
RT Vol	0	0	40	0	206	0	30	0	0	84
Lane Flow Rate	113	467	43	247	224	125	33	120	587	91
Geometry Grp	8	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.312	1.225	0.105	0.691	0.558	0.385	0.092	0.326	1.519	0.219
Departure Headway (Hd)	10.864	10.34	9.606	11.2	10.046	12.399	11.351	10.368	9.845	9.114
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	333	355	375	326	363	293	318	349	376	396
Service Time	8.564	8.04	7.306	8.9	7.746	10.099	9.051	8.068	7.545	6.814
HCM Lane V/C Ratio	0.339	1.315	0.115	0.758	0.617	0.427	0.104	0.344	1.561	0.23
HCM Control Delay	18.4	154.6	13.4	35.6	24.7	22.7	15.2	18	272	14.4
HCM Lane LOS	C	F	B	E	C	C	C	C	F	B
HCM 95th-tile Q	1.3	18.5	0.3	4.8	3.3	1.7	0.3	1.4	30.5	0.8

HCM 6th Signalized Intersection Summary
9: Watkins Dr & Big Springs Rd

10/01/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱			↰	↱	↰	↑	↱	↰	↑	↱
Traffic Volume (veh/h)	190	37	206	70	45	30	104	430	40	110	540	84
Future Volume (veh/h)	190	37	206	70	45	30	104	430	40	110	540	84
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	0.95		0.92	0.96		0.92	1.00		0.93	1.00		0.93
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	207	40	224	76	49	33	113	467	43	120	587	91
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	291	72	402	245	132	459	145	682	539	154	691	547
Arrive On Green	0.31	0.31	0.31	0.31	0.31	0.31	0.08	0.36	0.36	0.09	0.37	0.37
Sat Flow, veh/h	1254	229	1282	420	421	1464	1781	1870	1479	1781	1870	1480
Grp Volume(v), veh/h	207	0	264	125	0	33	113	467	43	120	587	91
Grp Sat Flow(s),veh/h/ln	1254	0	1511	841	0	1464	1781	1870	1479	1781	1870	1480
Q Serve(g_s), s	6.1	0.0	7.4	2.5	0.0	0.8	3.2	10.8	1.0	3.4	14.7	2.1
Cycle Q Clear(g_c), s	16.0	0.0	7.4	9.9	0.0	0.8	3.2	10.8	1.0	3.4	14.7	2.1
Prop In Lane	1.00		0.85	0.61		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	291	0	474	377	0	459	145	682	539	154	691	547
V/C Ratio(X)	0.71	0.00	0.56	0.33	0.00	0.07	0.78	0.68	0.08	0.78	0.85	0.17
Avail Cap(c_a), veh/h	291	0	474	377	0	459	210	954	754	210	954	755
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	23.3	0.0	14.5	15.6	0.0	12.3	23.0	13.7	10.6	22.8	14.8	10.8
Incr Delay (d2), s/veh	7.8	0.0	1.4	0.5	0.0	0.1	11.0	1.2	0.1	12.2	5.4	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.9	0.0	2.3	1.2	0.0	0.2	1.6	3.9	0.3	1.8	6.0	0.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	31.1	0.0	16.0	16.1	0.0	12.4	34.0	14.9	10.7	35.0	20.2	10.9
LnGrp LOS	C	A	B	B	A	B	C	B	B	D	C	B
Approach Vol, veh/h		471			158			623			798	
Approach Delay, s/veh		22.6			15.4			18.1			21.3	
Approach LOS		C			B			B			C	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.4	22.6		20.0	8.1	22.8		20.0				
Change Period (Y+Rc), s	4.0	4.0		4.0	4.0	4.0		4.0				
Max Green Setting (Gmax), s	6.0	26.0		16.0	6.0	26.0		16.0				
Max Q Clear Time (g_c+I1), s	5.4	12.8		18.0	5.2	16.7		11.9				
Green Ext Time (p_c), s	0.0	1.8		0.0	0.0	2.1		0.2				

Intersection Summary			
HCM 6th Ctrl Delay			20.2
HCM 6th LOS			C

Intersection	
Intersection Delay, s/veh	10
Intersection LOS	A

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰↱		↑↱			↰↑
Traffic Vol, veh/h	59	10	130	184	30	160
Future Vol, veh/h	59	10	130	184	30	160
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	75	13	165	233	38	203
Number of Lanes	1	0	1	0	0	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	1	0
HCM Control Delay	9.2	10.4	9.7
HCM LOS	A	B	A

Lane	NBLn1	WBLn1	SBLn1
Vol Left, %	0%	86%	16%
Vol Thru, %	41%	0%	84%
Vol Right, %	59%	14%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	314	69	190
LT Vol	0	59	30
Through Vol	130	0	160
RT Vol	184	10	0
Lane Flow Rate	397	87	241
Geometry Grp	1	1	1
Degree of Util (X)	0.451	0.13	0.307
Departure Headway (Hd)	4.085	5.356	4.592
Convergence, Y/N	Yes	Yes	Yes
Cap	882	667	782
Service Time	2.11	3.405	2.623
HCM Lane V/C Ratio	0.45	0.13	0.308
HCM Control Delay	10.4	9.2	9.7
HCM Lane LOS	B	A	A
HCM 95th-tile Q	2.4	0.4	1.3

Intersection	
Intersection Delay, s/veh	8.7
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Vol, veh/h	52	102	14	0	183	37	48	0	0	5	0	5
Future Vol, veh/h	52	102	14	0	183	37	48	0	0	5	0	5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	57	111	15	0	199	40	52	0	0	5	0	5
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Righ	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8.6	8.8	8.5	7.8
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	100%	31%	0%	50%
Vol Thru, %	0%	61%	83%	0%
Vol Right, %	0%	8%	17%	50%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	48	168	220	10
LT Vol	48	52	0	5
Through Vol	0	102	183	0
RT Vol	0	14	37	5
Lane Flow Rate	52	183	239	11
Geometry Grp	1	1	1	1
Degree of Util (X)	0.073	0.22	0.278	0.014
Departure Headway (Hd)	5.064	4.346	4.184	4.722
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	709	829	861	759
Service Time	3.085	2.358	2.194	2.747
HCM Lane V/C Ratio	0.073	0.221	0.278	0.014
HCM Control Delay	8.5	8.6	8.8	7.8
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.2	0.8	1.1	0

HCM 6th TWSC
3: Access B & Big Springs Rd

Intersection	
Int Delay, s/veh	4.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↱			↰↑	↰↱	
Traffic Vol, veh/h	52	55	199	220	0	108
Future Vol, veh/h	52	55	199	220	0	108
Conflicting Peds, #/hr	0	50	50	0	50	50
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	57	60	216	239	0	117

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	167	0	858	187
Stage 1	-	-	-	-	137	-
Stage 2	-	-	-	-	721	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1411	-	327	855
Stage 1	-	-	-	-	890	-
Stage 2	-	-	-	-	482	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1352	-	245	785
Mov Cap-2 Maneuver	-	-	-	-	245	-
Stage 1	-	-	-	-	853	-
Stage 2	-	-	-	-	377	-

Approach	EB	WB	NB
HCM Control Delay, s	0	3.9	10.4
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	785	-	-	1352	-
HCM Lane V/C Ratio	0.15	-	-	0.16	-
HCM Control Delay (s)	10.4	-	-	8.2	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.5	-	-	0.6	-

Intersection	
Intersection Delay, s/veh	12.3
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥		↰	↑↱				↱			↱
Traffic Vol, veh/h	10	150	0	0	414	5	0	0	0	0	0	5
Future Vol, veh/h	10	150	0	0	414	5	0	0	0	0	0	5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	11	163	0	0	450	5	0	0	0	0	0	5
Number of Lanes	0	1	0	1	1	0	0	0	1	0	0	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	1
HCM Control Delay	8.8	13.7	0	7.8
HCM LOS	A	B	-	A

Lane	NBLn1	EBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	0%	6%	0%	0%	0%
Vol Thru, %	100%	94%	100%	99%	0%
Vol Right, %	0%	0%	0%	1%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	0	160	0	419	5
LT Vol	0	10	0	0	0
Through Vol	0	150	0	414	0
RT Vol	0	0	0	5	5
Lane Flow Rate	0	174	0	455	5
Geometry Grp	2	5	7	7	2
Degree of Util (X)	0	0.22	0	0.584	0.007
Departure Headway (Hd)	5.418	4.549	4.628	4.62	4.797
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	0	795	0	779	749
Service Time	3.431	2.549	2.367	2.359	2.809
HCM Lane V/C Ratio	0	0.219	0	0.584	0.007
HCM Control Delay	8.4	8.8	7.4	13.7	7.8
HCM Lane LOS	N	A	N	B	A
HCM 95th-tile Q	0	0.8	0	3.8	0

Intersection	
Intersection Delay, s/veh	11.4
Intersection LOS	B

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		↱			↰
Traffic Vol, veh/h	135	30	180	96	40	190
Future Vol, veh/h	135	30	180	96	40	190
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	171	38	228	122	51	241
Number of Lanes	1	0	1	0	0	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	1	0
HCM Control Delay	11.1	11.6	11.3
HCM LOS	B	B	B

Lane	NBLn1	WBLn1	SBLn1
Vol Left, %	0%	82%	17%
Vol Thru, %	65%	0%	83%
Vol Right, %	35%	18%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	276	165	230
LT Vol	0	135	40
Through Vol	180	0	190
RT Vol	96	30	0
Lane Flow Rate	349	209	291
Geometry Grp	1	1	1
Degree of Util (X)	0.452	0.315	0.4
Departure Headway (Hd)	4.66	5.433	4.949
Convergence, Y/N	Yes	Yes	Yes
Cap	765	654	719
Service Time	2.732	3.53	3.028
HCM Lane V/C Ratio	0.456	0.32	0.405
HCM Control Delay	11.6	11.1	11.3
HCM Lane LOS	B	B	B
HCM 95th-tile Q	2.4	1.3	1.9

Intersection	
Intersection Delay, s/veh	9.6
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Vol, veh/h	5	279	8	0	135	5	75	0	0	21	0	41
Future Vol, veh/h	5	279	8	0	135	5	75	0	0	21	0	41
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	303	9	0	147	5	82	0	0	23	0	45
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	10.4	8.8	9.1	8.3
HCM LOS	B	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	100%	2%	0%	34%
Vol Thru, %	0%	96%	96%	0%
Vol Right, %	0%	3%	4%	66%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	75	292	140	62
LT Vol	75	5	0	21
Through Vol	0	279	135	0
RT Vol	0	8	5	41
Lane Flow Rate	82	317	152	67
Geometry Grp	1	1	1	1
Degree of Util (X)	0.12	0.394	0.196	0.09
Departure Headway (Hd)	5.293	4.474	4.644	4.792
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	675	803	770	744
Service Time	3.344	2.508	2.685	2.844
HCM Lane V/C Ratio	0.121	0.395	0.197	0.09
HCM Control Delay	9.1	10.4	8.8	8.3
HCM Lane LOS	A	B	A	A
HCM 95th-tile Q	0.4	1.9	0.7	0.3

Intersection	
Int Delay, s/veh	4.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱			↰	Y	
Traffic Vol, veh/h	270	30	113	140	0	168
Future Vol, veh/h	270	30	113	140	0	168
Conflicting Peds, #/hr	0	50	50	0	50	50
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	293	33	123	152	0	183

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	376	0	808	410
Stage 1	-	-	-	-	360	-
Stage 2	-	-	-	-	448	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1182	-	350	642
Stage 1	-	-	-	-	706	-
Stage 2	-	-	-	-	644	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1133	-	283	590
Mov Cap-2 Maneuver	-	-	-	-	283	-
Stage 1	-	-	-	-	676	-
Stage 2	-	-	-	-	544	-

Approach	EB	WB	NB
HCM Control Delay, s	0	3.8	13.8
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	590	-	-	1133	-
HCM Lane V/C Ratio	0.31	-	-	0.108	-
HCM Control Delay (s)	13.8	-	-	8.6	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	1.3	-	-	0.4	-

HCM 6th AWSC
4: Access D & Big Springs Rd

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Intersection	
Intersection Delay, s/veh	12.1
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥		↰	⮣				↱			↱
Traffic Vol, veh/h	5	433	0	0	228	5	0	0	0	0	0	25
Future Vol, veh/h	5	433	0	0	228	5	0	0	0	0	0	25
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	471	0	0	248	5	0	0	0	0	0	27
Number of Lanes	0	1	0	1	1	0	0	0	1	0	0	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	1
HCM Control Delay	13.3	10.2	0	8.2
HCM LOS	B	B	-	A

Lane	NBLn1	EBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	0%	1%	0%	0%	0%
Vol Thru, %	100%	99%	100%	98%	0%
Vol Right, %	0%	0%	0%	2%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	0	438	0	233	25
LT Vol	0	5	0	0	0
Through Vol	0	433	0	228	0
RT Vol	0	0	0	5	25
Lane Flow Rate	0	476	0	253	27
Geometry Grp	2	5	7	7	2
Degree of Util (X)	0	0.581	0	0.345	0.037
Departure Headway (Hd)	5.621	4.39	4.92	4.904	4.959
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	0	824	0	734	721
Service Time	3.664	2.402	2.636	2.621	2.997
HCM Lane V/C Ratio	0	0.578	0	0.345	0.037
HCM Control Delay	8.7	13.3	7.6	10.2	8.2
HCM Lane LOS	N	B	N	B	A
HCM 95th-tile Q	0	3.8	0	1.5	0.1

Intersection	
Intersection Delay, s/veh	10
Intersection LOS	A

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰↱		↱			↰
Traffic Vol, veh/h	59	10	130	184	30	160
Future Vol, veh/h	59	10	130	184	30	160
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	75	13	165	233	38	203
Number of Lanes	1	0	1	0	0	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	1	0
HCM Control Delay	9.2	10.4	9.7
HCM LOS	A	B	A

Lane	NBLn1	WBLn1	SBLn1
Vol Left, %	0%	86%	16%
Vol Thru, %	41%	0%	84%
Vol Right, %	59%	14%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	314	69	190
LT Vol	0	59	30
Through Vol	130	0	160
RT Vol	184	10	0
Lane Flow Rate	397	87	241
Geometry Grp	1	1	1
Degree of Util (X)	0.451	0.13	0.307
Departure Headway (Hd)	4.085	5.356	4.592
Convergence, Y/N	Yes	Yes	Yes
Cap	882	667	782
Service Time	2.11	3.405	2.623
HCM Lane V/C Ratio	0.45	0.13	0.308
HCM Control Delay	10.4	9.2	9.7
HCM Lane LOS	B	A	A
HCM 95th-tile Q	2.4	0.4	1.3

Intersection	
Intersection Delay, s/veh	8.6
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Vol, veh/h	47	107	14	0	183	27	48	0	0	0	0	5
Future Vol, veh/h	47	107	14	0	183	27	48	0	0	0	0	5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	51	116	15	0	199	29	52	0	0	0	0	5
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8.5	8.7	8.5	7.3
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	100%	28%	0%	0%
Vol Thru, %	0%	64%	87%	0%
Vol Right, %	0%	8%	13%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	48	168	210	5
LT Vol	48	47	0	0
Through Vol	0	107	183	0
RT Vol	0	14	27	5
Lane Flow Rate	52	183	228	5
Geometry Grp	1	1	1	1
Degree of Util (X)	0.073	0.219	0.266	0.006
Departure Headway (Hd)	5.033	4.314	4.201	4.296
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	713	835	861	833
Service Time	3.053	2.325	2.201	2.32
HCM Lane V/C Ratio	0.073	0.219	0.265	0.006
HCM Control Delay	8.5	8.5	8.7	7.3
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.2	0.8	1.1	0

Intersection	
Int Delay, s/veh	3.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱			↰	Y	
Traffic Vol, veh/h	93	14	40	210	0	108
Future Vol, veh/h	93	14	40	210	0	108
Conflicting Peds, #/hr	0	50	50	0	50	50
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	101	15	43	228	0	117

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	166	0	523	209
Stage 1	-	-	-	-	159	-
Stage 2	-	-	-	-	364	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1412	-	514	831
Stage 1	-	-	-	-	870	-
Stage 2	-	-	-	-	703	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1353	-	455	763
Mov Cap-2 Maneuver	-	-	-	-	455	-
Stage 1	-	-	-	-	833	-
Stage 2	-	-	-	-	650	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.2	10.6
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	763	-	-	1353	-
HCM Lane V/C Ratio	0.154	-	-	0.032	-
HCM Control Delay (s)	10.6	-	-	7.7	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.5	-	-	0.1	-

Intersection	
Intersection Delay, s/veh	9.5
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↱		↰	↑↱							↱
Traffic Vol, veh/h	10	150	41	159	245	15	0	0	0	0	0	5
Future Vol, veh/h	10	150	41	159	245	15	0	0	0	0	0	5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	11	163	45	173	266	16	0	0	0	0	0	5
Number of Lanes	0	1	0	1	1	0	0	0	0	0	0	1

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	2	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	1	0	2
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	1	1
HCM Control Delay	8.9	9.8	7.8
HCM LOS	A	A	A

Lane	EBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	5%	100%	0%	0%
Vol Thru, %	75%	0%	94%	0%
Vol Right, %	20%	0%	6%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	201	159	260	5
LT Vol	10	159	0	0
Through Vol	150	0	245	0
RT Vol	41	0	15	5
Lane Flow Rate	218	173	283	5
Geometry Grp	5	7	7	2
Degree of Util (X)	0.265	0.247	0.362	0.007
Departure Headway (Hd)	4.363	5.15	4.609	4.741
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	828	696	777	757
Service Time	2.363	2.893	2.351	2.754
HCM Lane V/C Ratio	0.263	0.249	0.364	0.007
HCM Control Delay	8.9	9.6	10	7.8
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	1.1	1	1.7	0

Intersection	
Intersection Delay, s/veh	11.4
Intersection LOS	B

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		↱			↰
Traffic Vol, veh/h	135	30	180	96	40	190
Future Vol, veh/h	135	30	180	96	40	190
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	171	38	228	122	51	241
Number of Lanes	1	0	1	0	0	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	1	0
HCM Control Delay	11.1	11.6	11.3
HCM LOS	B	B	B

Lane	NBLn1	WBLn1	SBLn1
Vol Left, %	0%	82%	17%
Vol Thru, %	65%	0%	83%
Vol Right, %	35%	18%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	276	165	230
LT Vol	0	135	40
Through Vol	180	0	190
RT Vol	96	30	0
Lane Flow Rate	349	209	291
Geometry Grp	1	1	1
Degree of Util (X)	0.452	0.315	0.4
Departure Headway (Hd)	4.66	5.433	4.949
Convergence, Y/N	Yes	Yes	Yes
Cap	765	654	719
Service Time	2.732	3.53	3.028
HCM Lane V/C Ratio	0.456	0.32	0.405
HCM Control Delay	11.6	11.1	11.3
HCM Lane LOS	B	B	B
HCM 95th-tile Q	2.4	1.3	1.9

Intersection	
Intersection Delay, s/veh	9.6
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Vol, veh/h	4	280	8	0	151	5	75	0	0	20	0	25
Future Vol, veh/h	4	280	8	0	151	5	75	0	0	20	0	25
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	4	304	9	0	164	5	82	0	0	22	0	27
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	10.3	8.9	9.1	8.3
HCM LOS	B	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	100%	1%	0%	44%
Vol Thru, %	0%	96%	97%	0%
Vol Right, %	0%	3%	3%	56%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	75	292	156	45
LT Vol	75	4	0	20
Through Vol	0	280	151	0
RT Vol	0	8	5	25
Lane Flow Rate	82	317	170	49
Geometry Grp	1	1	1	1
Degree of Util (X)	0.12	0.392	0.217	0.067
Departure Headway (Hd)	5.299	4.448	4.598	4.909
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	674	809	778	726
Service Time	3.351	2.481	2.637	2.964
HCM Lane V/C Ratio	0.122	0.392	0.219	0.067
HCM Control Delay	9.1	10.3	8.9	8.3
HCM Lane LOS	A	B	A	A
HCM 95th-tile Q	0.4	1.9	0.8	0.2

Intersection	
Int Delay, s/veh	3.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱			↰	↰↱	
Traffic Vol, veh/h	292	8	23	156	0	168
Future Vol, veh/h	292	8	23	156	0	168
Conflicting Peds, #/hr	0	50	50	0	50	50
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	317	9	25	170	0	183

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	376	0	642	422
Stage 1	-	-	-	-	372	-
Stage 2	-	-	-	-	270	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1182	-	438	632
Stage 1	-	-	-	-	697	-
Stage 2	-	-	-	-	775	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1133	-	392	580
Mov Cap-2 Maneuver	-	-	-	-	392	-
Stage 1	-	-	-	-	668	-
Stage 2	-	-	-	-	725	-

Approach	EB	WB	NB
HCM Control Delay, s	0	1.1	14
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	580	-	-	1133	-
HCM Lane V/C Ratio	0.315	-	-	0.022	-
HCM Control Delay (s)	14	-	-	8.2	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	1.3	-	-	0.1	-

Intersection	
Intersection Delay, s/veh	12.2
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥		↰	↱							↱
Traffic Vol, veh/h	5	433	22	90	138	5	0	0	0	0	0	41
Future Vol, veh/h	5	433	22	90	138	5	0	0	0	0	0	41
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	471	24	98	150	5	0	0	0	0	0	45
Number of Lanes	0	1	0	1	1	0	0	0	0	0	0	1

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	2	1	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	1	0	2
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	1	1
HCM Control Delay	14.1	9.1	8.3
HCM LOS	B	A	A

Lane	EBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	1%	100%	0%	0%
Vol Thru, %	94%	0%	97%	0%
Vol Right, %	5%	0%	3%	100%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	460	90	143	41
LT Vol	5	90	0	0
Through Vol	433	0	138	0
RT Vol	22	0	5	41
Lane Flow Rate	500	98	155	45
Geometry Grp	5	7	7	2
Degree of Util (X)	0.61	0.149	0.214	0.062
Departure Headway (Hd)	4.393	5.491	4.963	4.973
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	825	654	724	719
Service Time	2.411	3.216	2.688	3.014
HCM Lane V/C Ratio	0.606	0.15	0.214	0.063
HCM Control Delay	14.1	9.2	9	8.3
HCM Lane LOS	B	A	A	A
HCM 95th-tile Q	4.2	0.5	0.8	0.2

Intersection	
Intersection Delay, s/veh	10
Intersection LOS	A

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		↱			↰
Traffic Vol, veh/h	59	10	130	184	30	160
Future Vol, veh/h	59	10	130	184	30	160
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	75	13	165	233	38	203
Number of Lanes	1	0	1	0	0	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	1	0
HCM Control Delay	9.2	10.4	9.7
HCM LOS	A	B	A

Lane	NBLn1	WBLn1	SBLn1
Vol Left, %	0%	86%	16%
Vol Thru, %	41%	0%	84%
Vol Right, %	59%	14%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	314	69	190
LT Vol	0	59	30
Through Vol	130	0	160
RT Vol	184	10	0
Lane Flow Rate	397	87	241
Geometry Grp	1	1	1
Degree of Util (X)	0.451	0.13	0.307
Departure Headway (Hd)	4.085	5.356	4.592
Convergence, Y/N	Yes	Yes	Yes
Cap	882	667	782
Service Time	2.11	3.405	2.623
HCM Lane V/C Ratio	0.45	0.13	0.308
HCM Control Delay	10.4	9.2	9.7
HCM Lane LOS	B	A	A
HCM 95th-tile Q	2.4	0.4	1.3

Intersection	
Intersection Delay, s/veh	8.5
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Vol, veh/h	40	114	14	0	183	5	48	0	0	5	0	5
Future Vol, veh/h	40	114	14	0	183	5	48	0	0	5	0	5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	43	124	15	0	199	5	52	0	0	5	0	5
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	8.5	8.6	8.4	7.7
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	100%	24%	0%	50%
Vol Thru, %	0%	68%	97%	0%
Vol Right, %	0%	8%	3%	50%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	48	168	188	10
LT Vol	48	40	0	5
Through Vol	0	114	183	0
RT Vol	0	14	5	5
Lane Flow Rate	52	183	204	11
Geometry Grp	1	1	1	1
Degree of Util (X)	0.072	0.218	0.243	0.014
Departure Headway (Hd)	4.995	4.299	4.276	4.653
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	718	838	844	770
Service Time	3.018	2.311	2.276	2.678
HCM Lane V/C Ratio	0.072	0.218	0.242	0.014
HCM Control Delay	8.4	8.5	8.6	7.7
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.2	0.8	1	0

Intersection	
Int Delay, s/veh	1.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱			↰	Y	
Traffic Vol, veh/h	105	14	40	188	0	22
Future Vol, veh/h	105	14	40	188	0	22
Conflicting Peds, #/hr	0	50	50	0	50	50
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	114	15	43	204	0	24

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	179	0	512	222
Stage 1	-	-	-	-	172	-
Stage 2	-	-	-	-	340	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1397	-	522	818
Stage 1	-	-	-	-	858	-
Stage 2	-	-	-	-	721	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1339	-	462	751
Mov Cap-2 Maneuver	-	-	-	-	462	-
Stage 1	-	-	-	-	822	-
Stage 2	-	-	-	-	666	-

Approach	EB		WB		NB	
HCM Control Delay, s	0		1.4		10	
HCM LOS					B	

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	751	-	-	1339	-
HCM Lane V/C Ratio	0.032	-	-	0.032	-
HCM Control Delay (s)	10	-	-	7.8	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0.1	-

Intersection	
Intersection Delay, s/veh	9.6
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥		↰	↱				↱			↱
Traffic Vol, veh/h	22	64	41	159	223	37	0	0	86	0	0	5
Future Vol, veh/h	22	64	41	159	223	37	0	0	86	0	0	5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	24	70	45	173	242	40	0	0	93	0	0	5
Number of Lanes	0	1	0	1	1	0	0	0	1	0	0	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	1
HCM Control Delay	8.6	10.2	8.3	7.8
HCM LOS	A	B	A	A

Lane	NBLn1	EBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	0%	17%	100%	0%	0%
Vol Thru, %	0%	50%	0%	86%	0%
Vol Right, %	100%	32%	0%	14%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	86	127	159	260	5
LT Vol	0	22	159	0	0
Through Vol	0	64	0	223	0
RT Vol	86	41	0	37	5
Lane Flow Rate	93	138	173	283	5
Geometry Grp	2	5	7	7	2
Degree of Util (X)	0.12	0.175	0.259	0.376	0.007
Departure Headway (Hd)	4.625	4.566	5.396	4.794	4.751
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	775	785	671	755	751
Service Time	2.656	2.596	3.096	2.494	2.795
HCM Lane V/C Ratio	0.12	0.176	0.258	0.375	0.007
HCM Control Delay	8.3	8.6	10	10.4	7.8
HCM Lane LOS	A	A	A	B	A
HCM 95th-tile Q	0.4	0.6	1	1.8	0

Intersection	
Intersection Delay, s/veh	11.4
Intersection LOS	B

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		↱			↰
Traffic Vol, veh/h	135	30	180	96	40	190
Future Vol, veh/h	135	30	180	96	40	190
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	171	38	228	122	51	241
Number of Lanes	1	0	1	0	0	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	1	0
HCM Control Delay	11.1	11.6	11.3
HCM LOS	B	B	B

Lane	NBLn1	WBLn1	SBLn1
Vol Left, %	0%	82%	17%
Vol Thru, %	65%	0%	83%
Vol Right, %	35%	18%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	276	165	230
LT Vol	0	135	40
Through Vol	180	0	190
RT Vol	96	30	0
Lane Flow Rate	349	209	291
Geometry Grp	1	1	1
Degree of Util (X)	0.452	0.315	0.4
Departure Headway (Hd)	4.66	5.433	4.949
Convergence, Y/N	Yes	Yes	Yes
Cap	765	654	719
Service Time	2.732	3.53	3.028
HCM Lane V/C Ratio	0.456	0.32	0.405
HCM Control Delay	11.6	11.1	11.3
HCM Lane LOS	B	B	B
HCM 95th-tile Q	2.4	1.3	1.9

Intersection	
Intersection Delay, s/veh	9.6
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Vol, veh/h	5	281	8	0	156	5	75	0	0	19	0	20
Future Vol, veh/h	5	281	8	0	156	5	75	0	0	19	0	20
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	305	9	0	170	5	82	0	0	21	0	22
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	10.3	8.9	9.1	8.3
HCM LOS	B	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	100%	2%	0%	49%
Vol Thru, %	0%	96%	97%	0%
Vol Right, %	0%	3%	3%	51%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	75	294	161	39
LT Vol	75	5	0	19
Through Vol	0	281	156	0
RT Vol	0	8	5	20
Lane Flow Rate	82	320	175	42
Geometry Grp	1	1	1	1
Degree of Util (X)	0.12	0.394	0.223	0.058
Departure Headway (Hd)	5.305	4.44	4.586	4.958
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	673	812	782	719
Service Time	3.354	2.47	2.621	3.013
HCM Lane V/C Ratio	0.122	0.394	0.224	0.058
HCM Control Delay	9.1	10.3	8.9	8.3
HCM Lane LOS	A	B	A	A
HCM 95th-tile Q	0.4	1.9	0.9	0.2

HCM 6th TWSC
3: Access B & Big Springs Rd

09/30/2019

Intersection	
Int Delay, s/veh	1.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱			↰	↰↱	
Traffic Vol, veh/h	292	8	23	161	0	34
Future Vol, veh/h	292	8	23	161	0	34
Conflicting Peds, #/hr	0	50	50	0	50	50
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	317	9	25	175	0	37

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	376	0	647	422
Stage 1	-	-	-	-	372	-
Stage 2	-	-	-	-	275	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1182	-	436	632
Stage 1	-	-	-	-	697	-
Stage 2	-	-	-	-	771	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1133	-	391	580
Mov Cap-2 Maneuver	-	-	-	-	391	-
Stage 1	-	-	-	-	668	-
Stage 2	-	-	-	-	721	-

Approach	EB		WB		NB
HCM Control Delay, s	0		1		11.6
HCM LOS					B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	580	-	-	1133	-
HCM Lane V/C Ratio	0.064	-	-	0.022	-
HCM Control Delay (s)	11.6	-	-	8.2	0
HCM Lane LOS	B	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0.1	-

HCM 6th AWSC
4: Access D & Big Springs Rd

Intersection	
Intersection Delay, s/veh	10.5
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣		↰	↱				↱			↱
Traffic Vol, veh/h	5	299	22	90	138	5	0	0	134	0	0	46
Future Vol, veh/h	5	299	22	90	138	5	0	0	134	0	0	46
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	5	325	24	98	150	5	0	0	146	0	0	50
Number of Lanes	0	1	0	1	1	0	0	0	1	0	0	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	1
HCM Control Delay	12.1	9.6	9.1	8.4
HCM LOS	B	A	A	A

Lane	NBLn1	EBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	0%	2%	100%	0%	0%
Vol Thru, %	0%	92%	0%	97%	0%
Vol Right, %	100%	7%	0%	3%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	134	326	90	143	46
LT Vol	0	5	90	0	0
Through Vol	0	299	0	138	0
RT Vol	134	22	0	5	46
Lane Flow Rate	146	354	98	155	50
Geometry Grp	2	5	7	7	2
Degree of Util (X)	0.195	0.47	0.158	0.228	0.069
Departure Headway (Hd)	4.828	4.775	5.819	5.29	4.979
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	737	748	612	673	711
Service Time	2.902	2.842	3.595	3.066	3.072
HCM Lane V/C Ratio	0.198	0.473	0.16	0.23	0.07
HCM Control Delay	9.1	12.1	9.7	9.6	8.4
HCM Lane LOS	A	B	A	A	A
HCM 95th-tile Q	0.7	2.5	0.6	0.9	0.2

Appendix F

VMT Memorandum

FEHR PEERS

Memorandum

Date: November 25, 2019

To: Christine Donoghue, Rincon

From: Sarah Brandenberg

Subject: UC Riverside Parking Structure 1 – VMT Overview for MND

OC19-0631

Background

Senate Bill 743 (SB 743) 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. On September 27, 2013, California Governor Jerry Brown signed SB 743 into law and started a process that changes transportation impact analysis as part of CEQA compliance. These changes include elimination of auto delay, level of service (LOS), and other similar measures of vehicular capacity or traffic congestion as a basis for determining significant impacts for projects in California.

In January 2016, OPR updated the CEQA Guidelines "Revised Proposal on Updates to the CEQA Guidelines on Evaluating Transportation Impacts in CEQA". In this update, the evaluation of vehicle miles traveled (VMT) was recognized as "generally the most appropriate measure of transportation impacts." In November 2017, OPR proposed a new section to the CEQA Guidelines, 15064.3, for use in determining the significance of transportation impacts. The purpose of this section is to describe specific elements for considering the transportation impacts of a project given the use of VMT as the primary measurement. This section was later updated in July 2018 and finalized in December 2018 with criteria for analyzing transportation impacts.

Per the guidance from OPR, a lead agency may elect to be governed by the provisions of the new CEQA Guidelines immediately; however, the new guidelines shall be applied statewide no later than July 1, 2020. While other local jurisdictions are still determining their impact methodologies and processes based on the updated CEQA Guidelines, UC Riverside is now utilizing the guidelines to assess Project impacts as they provide the most current direction from the State and reflect the most defensible guidance available.

While changes to driver delay no longer constitute a CEQA impact, UC Riverside can still conduct a traffic operations study to assess the need for any potential improvements to roadways or intersections in the vicinity of campus for informational purposes. The *UC Riverside Parking Structure 1 Transportation Operations Study* prepared by Fehr & Peers in November 2019 provides a focused analysis to analyze the changes to vehicle travel flows in the study area with the construction of Parking Structure 1 (Project).

CEQA Guidelines

In accordance with Appendix G of the CEQA Guidelines, the Project would have a significant impact related to transportation if it would:

1. **Conflict with a program, plan, ordinance or policy** addressing the circulation system, including transit, roadways, bicycle and pedestrian facilities.
2. **Conflict or be inconsistent with CEQA Guidelines Section 15064.3, Subdivision (b) per the following criteria:**
    a. ***Land Use Projects.*** *Vehicle miles traveled exceeding an applicable threshold of significance may indicate a significant impact. 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. Projects that decrease vehicle miles traveled in the project area compared to existing conditions should be presumed to have a less than significant transportation impact.*

    b. ***Transportation Projects.*** *Transportation projects that reduce, or have no impact on, vehicle miles traveled should be presumed to cause a less than significant transportation impact. For roadway capacity projects, agencies have discretion to determine the appropriate measure of transportation impact consistent with CEQA and other applicable requirements. To the extent that such impacts have already been adequately addressed at a programmatic level, such as in a regional transportation plan EIR, a lead agency may tier from that analysis as provided in Section 15152.*

    c. ***Qualitative Analysis.*** *If existing models or methods are not available to estimate the vehicle miles traveled for the particular project being considered, a lead agency may analyze the project's vehicle miles traveled qualitatively. Such a qualitative analysis would evaluate factors such as the availability of transit, proximity to other destinations, etc. For many projects, a qualitative analysis of construction traffic may be appropriate.*

   d. ***Methodology.*** *A lead agency has discretion to choose the most appropriate methodology to evaluate a project's vehicle miles traveled, including whether to express the change in absolute terms, per capita, per household or in any other measure. A lead agency may use models to estimate a project's vehicle miles traveled, and may revise those estimates to reflect professional judgment based on substantial evidence. Any assumptions used to estimate vehicle miles traveled and any revisions to model outputs should be documented and explained in the environmental document prepared for the project. The standard of adequacy in Section 15151 shall apply to the analysis described in this section.*

3. **Substantially increase hazards** due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).
4. **Result in inadequate emergency access.**

VMT Discussion

The Project would construct a parking structure that would accommodate existing and future campus growth from implementation of the 2005 Long Range Development Plan (LRDP) Amendment 2 Environmental Impact Report (EIR) as well as accommodate existing surface parking that would be displaced by development of new campus buildings. The need for additional parking to accommodate growth in students, faculty/staff, and campus visitors was identified in UC Riverside's 2005 LRDP. The 2005 LRDP identified several future sites for new parking facilities, including the Project site.

The preliminary design shows that Parking Structure 1 will have a total of approximately 1,079 spaces, the eastern portions of Lot 13 will have a total of approximately 212 surface spaces and the western portion of Lot 13 will have approximately 217 spaces. Since Lot 13 currently has 683 parking spaces, the Project results in an increase of approximately 825 parking spaces. Given that final design is still underway, the potential addition of up to approximately 850 net new spaces is being considered with the Project.

The Project itself would not generate new vehicle trips. Rather, vehicles that would travel to the Project site reflect student and faculty/staff growth expected to occur overtime from implementation of the 2005 LRDP Amendment 2 EIR and vehicles already traveling to campus that would park in Parking Structure 1 as a result of the removal of surface parking lots on campus. For the purposes of ensuring that adequate access to the Project site was provided, trip generation estimates were developed assuming that the Project reached 95% occupancy upon opening. Based on the number of new parking spaces being provided and traffic counts collected at similar parking facilities on campus, approximately 330 vehicles are expected to access the

Project site to utilize the additional parking available during the AM peak hour and approximately 300 vehicles are expected to access the site during the PM peak hour.

During construction, the Project would temporarily generate vehicle-trips for workers, truck hauling trips, and truck-trips for the delivery of supplies and construction equipment. Parking for students, faculty, and staff that is displaced in Parking Lot 13 during construction would be provided by existing parking lots and structures on campus. Construction workers would park on the eastern side of Parking Lot 13. Construction workers/vendors trips would range from 13 to 230 per day depending on the of construction stage. Construction of the proposed project would occur over approximately 13 months.

Construction access would be allowed through campus from west of Parking Lot 13 on Big Springs Road, and would not be allowed from east of the project site through off-campus residential areas. The primary construction route would be Canyon Crest Drive across SR-215 to West Campus Drive to East Campus Drive to Big Springs Road. Alternatively, access would be allowed from W. Linden Street to Aberdeen Drive to East Campus Drive to Big Springs Road.

Any effects to the transportation network during construction would be temporary. Given the duration of construction and activity levels anticipated, the Project would not have an impact related to VMT during construction.

Given that the Project would not generate new vehicle trips and that vehicle-trips generated during construction would be temporary, no impacts to vehicle miles traveled (VMT) under CEQA Guidelines Section 15064.3, Subdivision (b) would occur with the Project.