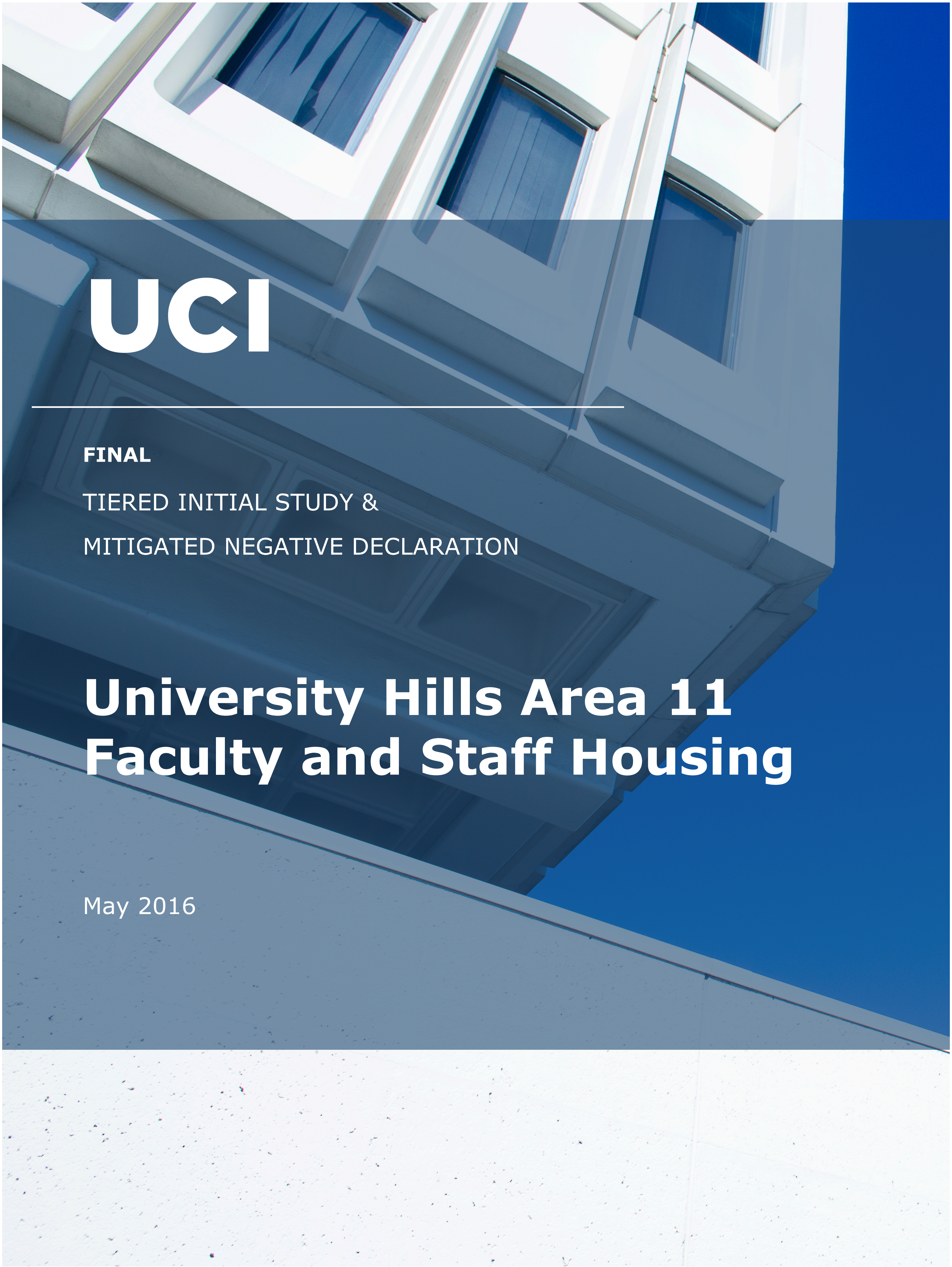

UCI

FINAL

TIERED INITIAL STUDY &

MITIGATED NEGATIVE DECLARATION

University Hills Area 11 Faculty and Staff Housing

May 2016

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1.0 PROJECT INFORMATION

1.1 Project Title

University Hills Area 11 Faculty and Staff Housing

1.2 Lead Agency Name and Address

University of California, Irvine
Office of Environmental Planning and Sustainability
380 University Tower, Irvine, CA 92697-2325

1.3 Contact Person and Phone Number

Richard Demerjian, Director
(949) 824-7058

1.4 Project Location

The University of California, Irvine (UCI) is located in the city of Irvine, Orange County, California approximately four miles inland from the Pacific Ocean (see Exhibit 1). The proposed project site is bound by California Avenue to the north, Anteater Drive to the east, Bonita Canyon Drive to the south, and University Hills Area 10 to the west (see Exhibit 2).

1.5 Custodian of the Administrative Record

University of California, Irvine
Office of Environmental Planning and Sustainability
380 University Tower, Irvine, CA 92697-2325

1.6 Documents Incorporated by Reference

The University of California, Irvine Long Range Development Plan (LRDP, UCI, 2007) is a comprehensive land use plan that guides the growth of the campus through horizon year 2026. It provides policies and guidelines to support key academic and student life goals, identifies development objectives, delineates campus land uses, and estimates new building space needed to support project program expansion.

The Long Range Development Plan Environmental Impact Report (LRDP EIR, PBS&J, 2007) analyzes potential environmental impacts associated with the implementation of the 2007 LRDP pursuant to CEQA Guidelines Sections 15152 and 15168. This document is used to tier subsequent environmental analysis, including this Initial Study/Mitigated Negative Declaration (IS/MND), for campus development.

Exhibit 1-1
Regional Location

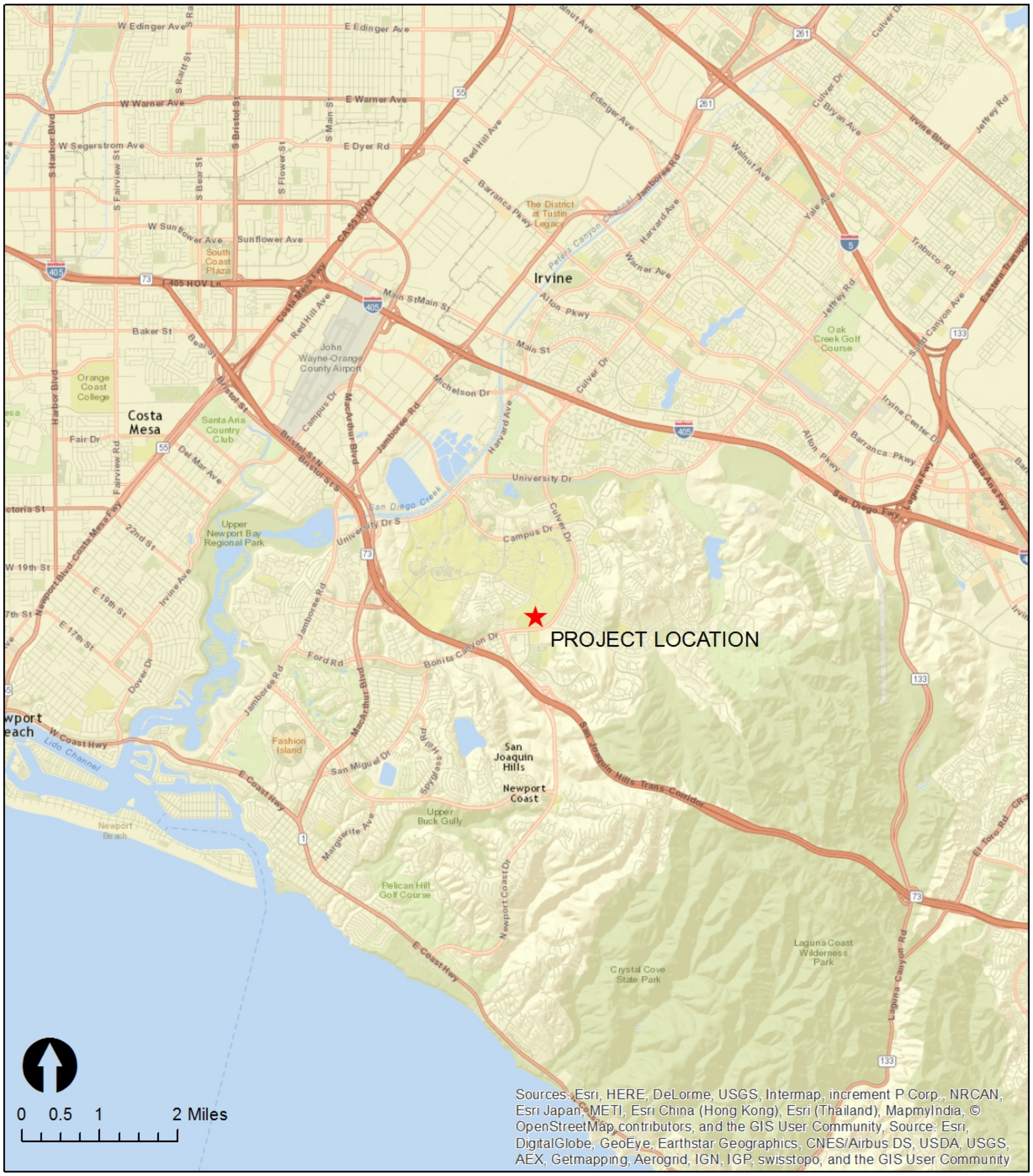


Exhibit 1-2
Project Location

2.0 PROJECT DESCRIPTION

2.1 Description of Project

The University Hills Area 11 Faculty and Staff Housing project (proposed project) would construct 300 housing units to be occupied by University of California, Irvine (UCI) faculty and staff. The proposed project would be developed by the Irvine Campus Housing Authority (ICHA), a non-profit organization created by the University of California Board of Regents (The Regents), to develop affordable faculty and staff housing on the University campus.

The proposed project would consist of 85 for-sale, clustered-detached homes; 75 for-sale, standard lot homes; and up to 140 rental, attached townhomes as shown in Exhibit 3. Because the proposed project is design-build, this exhibit is conceptual and the precise layout and configuration of the homes would be finalized as part of the design process at a later stage.

The project site encompasses approximately 34.2 acres in the University's East Sector on undeveloped land. Development of the project site would include approximately 29.2 acres of neighborhood use and associated infrastructure, including one acre of combined park space at the north and southeast portions of the project site, roadways, sidewalks, and street parking. The remaining acreage consists of landscaped slopes and common areas, including a 50-foot landscape buffer on the southern edge of the project site.

The housing units and landscaping would be analogous with recently constructed neighborhoods located within University Hills, such as the adjoining University Hills Area 10 phase that is in the final stages of construction as of March 2016. Buildings would range from two to three stories with a maximum height of 35 feet. The pad elevation on the southern side of the project site, facing off-campus uses, would be at a similar height as the University Hills Area 10 project. Exterior finishes, colors, and roofing materials would be consistent with the scale, quality, and character of University Hills and the local off-campus community as shown in Exhibit 4.

Per the UC Sustainable Practices Policy, the proposed project would meet or exceed LEED Silver equivalency and the California Green Building Standards Code (Cal Green). Homes and yards would be built with energy saving, waste reducing, and water conserving features. Common areas would have low-to-medium water usage plants using reclaimed water; private yards would be initially planted with low-to-medium water usage plants.

The project site previously contained a small patch of cactus scrub habitat. This vegetation was harvested from the site in 2011 and transplanted into the UCI Ecological Preserve as part of a habitat restoration project sponsored by the Natural Communities Conservation Planning (NCCP) program (California Department of Fish and Wildlife EEMP Grant Cactus Scrub Restoration Project and OCTA Measure M Cactus Scrub Restoration Project). Small remnants of cactus have resprouted on site since 2011. These remnants will be harvested by ICHA prior to ground disturbance and will be planted within campus open space areas to provide additional cactus scrub habitat.

Exhibit 2-1
Site Plan

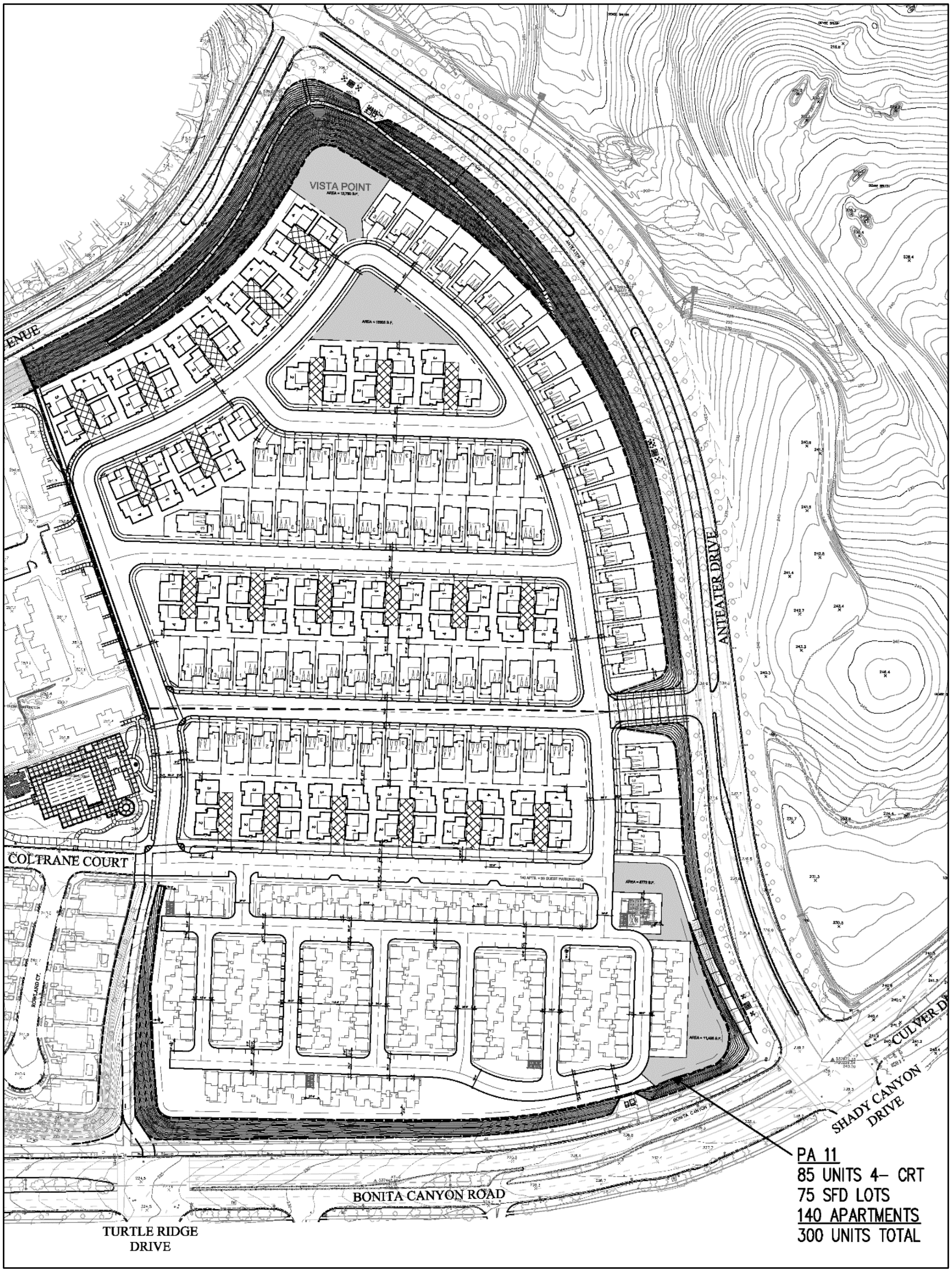


Exhibit 2-2
Elevations

Clustered-detached Homes

FRONT STREETSCENE

Standard Lot Homes

Rental Townhomes

2.2 Project Phasing and Site Development

Project construction is anticipated to begin in July 2016 with the first home delivered by September 2017 and the final by fall of 2020. Site development would include grading and trenching for utility feed lines and large, uncrushable material would be buried in deep fills on-site. Total estimated on-site earth movement would be approximately 600,000 cubic yards, including the movement of the 400,000 cubic yard stockpile on the project site to create level building pads. No demolition or pile driving would occur.

Appropriate acoustical and visual buffers, as determined during the final design stage, would be utilized during construction to minimize potential project related aesthetic and/or noise impacts to existing sensitive receptors.

2.2.1 Access

Vehicle access to the project site would occur from the west via Coltrane Court through University Hills Area 10 and the east via Anteater Drive. An internal circulation network would be established consisting of streets, alleys, driveways, emergency vehicle access routes, and off-street bicycle and pedestrian linkages. Neighborhood streets would be designed with roadways of 36 feet in width. Garages and driveways would be included at each detached, single family unit and sufficient parking would be provided for all attached housing units. A portion of the internal streets would have adequate space for on-street parking.

Site access during construction would occur primarily on Anteater Drive; however, during initial grading, access may occur through Coltrane Court. A final construction staging plan has not been completed at this time; however, construction staging would occur on-site and not within the existing University Hills community. Internal project roadways would be constructed first to allow staging on the project site. After completion of construction for each phase, the roadways would be repaired.

2.2.2 Utilities

A finalized stormwater drainage plan has not been completed at this time because the project is design-build; however, existing hydrology patterns on the site would be maintained to the extent practical as determined during the project's final design stage. Storm drains are anticipated to run along the north, east, and southeast internal streets. Smaller storm drains would be constructed in the courtyards of the clustered single-family homes and between rental units. During construction, catch basins would be constructed at the north and in the southeast corner of the project site in the proposed park space areas. Due to the amount of clay in the soils, permanent underground storage pipes that would convey the two-year storm event would replace the catch basins during project operation.

Electrical, gas, water, and communications lines are anticipated to occur at either existing stubbed streets in the adjacent University Hills Area 10 or from Bonita Canyon Drive.

2.3 Environmental Setting and Surrounding Land Uses

The project site is located on an undeveloped piece of land in the East Sector of the UCI campus characterized by rolling hills and containing no trees, rock outcroppings, water bodies, or other distinctive natural features (see Exhibit 5). California Avenue borders the site to the north, Anteater Drive to the east, Bonita Canyon Drive to the south, and University Hills Area 10 to the west. On-campus residential uses surround the project site to the north and west; on-campus undeveloped piece of land and off-campus residential units to the east; and Mariners Church, Tarbut V'Torah, Merage Jewish Community Center of Orange County, and Vista Verde Elementary School are located on the south side of Bonita Canyon Drive (see Exhibit 6).

2.4 Consistency with the LRDP

As designated in the 2007 LRDP, the north area of the project site is designated housing reserve and the south is mixed use-neighborhood. Both designations allow for residential uses for faculty and staff along with support infrastructure. Therefore, the proposed project's land use is consistent with the 2007 LRDP.

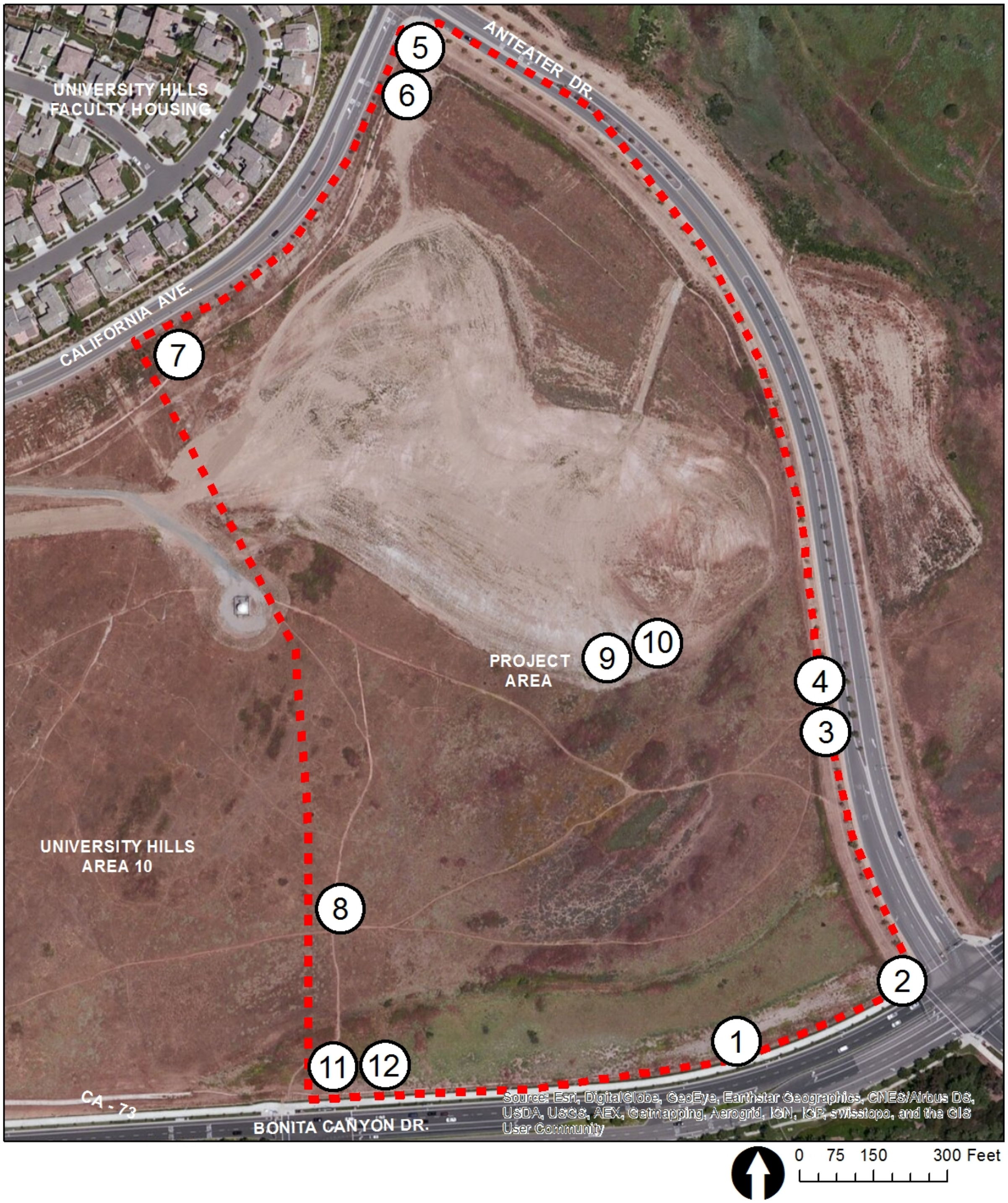
The 2007 Long Range Development Plan Environmental Impact Report (LRDP EIR) analyzes a range of 1,250 to 1,700 faculty/staff housing units and concluded that there was sufficient capacity to support 1,700 units on campus. Including the previous phase still under construction, University Hills Area 10, there are 1,426 for-sale or rental housing units on the campus. A total of 300 housing units would be constructed as part of the proposed project, increasing the total number to 1,726, or 26 above the number analyzed within the LRDP EIR. With the construction of the proposed project, an additional 26 units is an unsubstantial increase of 1.5 percent above the envelope analyzed; therefore, the proposed project is generally consistent with the LRDP EIR. Furthermore, a portion of the proposed project would be constructed on land originally analyzed in the LRDP EIR as approximately 23,000 square feet of commercial space, which would no longer be constructed on this project site. Therefore, although the proposed project is above the number of housing units analyzed in the LRDP EIR, there is enough capacity to support the project as discussed in further detail in this Initial Study/Mitigated Negative Declaration (IS/MND) and no additional environmental impacts beyond those addressed in the LRDP EIR would occur.

2.5 Discretionary Approval Authority and Other Public Agencies Whose Approval Is Required

University of California

To implement the proposed project, The Regents would consider the approval of an amendment to the existing ground lease to ICHA to include the project site. In conjunction with approval of the ground lease amendment, The University of California is the Lead Agency under CEQA and is responsible for reviewing and certifying the adequacy of this environmental document and approving the proposed project.

Exhibit 2-3
Photo Location Map and Views



View 1: South portion of site boundary looking northeast toward project site.

View 2: South portion of site boundary looking southwest toward Bonita Canyon Drive.

View 3: South of Bonita Canyon Drive looking toward the southern boundary of the project site.

View 4: Eastern boundary of project site looking north toward the project site.

View 5: Northeast corner of project site looking north toward Anteater Drive and California Avenue intersection.

View 6: Northeast corner of project site looking southwest toward project site along California Avenue.

View 7: Northwest corner of project site look west toward University Hills Area 10.

View 8: Western portion of project site looking northwest toward University Hills Area 10.

View 9: Center of project site looking south.

View 10: Center of project site looking southwest.

View 11: Southwest corner of project site looking south toward Bonita Canyon Drive and Newport Coast Drive intersection.

View 12: Southwest corner of project site looking east toward the project site.

Exhibit 2-4
Adjacent Land Uses

3.0 DETERMINATION

On the basis of the initial study that follows:

	I find that the proposed project meets the criteria for the Section 15332 In-Fill Development Project Class 32 exemption and is CATEGORICALLY EXEMPT from the provisions of CEQA.
	I find that the proposed project WOULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.
X	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 in the project have been made that will avoid or reduce any potential significant effects to a less than significant level. A MITIGATED NEGATIVE DECLARATION will be prepared.
	I find that the proposed project MAY have a significant effect on the environment. An ENVIRONMENTAL IMPACT REPORT will be prepared.

3·22·16

Signature Date

Printed Name For

4.0 EVALUATION OF ENVIRONMENTAL IMPACTS

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

- **“Potentially Significant Impact”** is appropriate if there is substantial evidence that the project’s effect may be significant. If there are one or more “Potentially Significant Impacts,” a Project EIR will be prepared.

- **“Project Impact Adequately Addressed in LRDP EIR”** applies where the potential impacts of the proposed project were adequately addressed in the LRDP EIR and mitigation measures identified in the LRDP EIR will mitigate any impacts of the proposed project to the extent feasible. All applicable LRDP EIR mitigation measures are incorporated into the project as proposed. The impact analysis in this document summarizes and cross-references (including section/page numbers) the relevant analysis in the LRDP EIR.

- **“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.

- **“Less Than Significant Impact”** applies where the project will not result in any significant effects. The effects may or may not have been discussed in the LRDP EIR. The project impact is less than significant without the incorporation of LRDP or project-level mitigation.

- **“No Impact”** applies where a project would not result in any impact in the category or the category does not apply. Information is provided to 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 may be 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).

4.1 Aesthetics

Issues	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:					
a) Have a substantial adverse effect on a scenic vista?					X
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?					X
c) Substantially degrade the existing visual character or quality of the site and its surroundings?		X			
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?		X			

Discussion

Aesthetics issues are discussed in Section 4.1 of the 2007 LRDP EIR.

a) Scenic Vista: No Impact

There are no identified scenic vistas around the project site or anywhere else on campus (LRDP EIR, page 4.1-6). Development of the project site and its surroundings with faculty and staff housing was assumed and evaluated in the LRDP EIR (page 3-20), and concluded that future development in the East Campus would not result in significant aesthetic impacts (LRDP EIR, pages 4.1-8 through 4.1-9). The proposed project would construct additional housing units adjacent to an existing neighborhood and is consistent with the land use and intensities of the Housing Reserve policies established by the LRDP. Therefore, this project would not affect a scenic vista and no impact would occur. No mitigation is required.

b) Scenic Resources within a State Scenic Highway: No Impact

The California Scenic Highway Mapping System indicated that no Officially Designated State Scenic Highway is located within proximity to the project site. The closest Eligible State Scenic Highway – Not Officially Designated, Pacific Coast Highway, is located approximately 2.5 miles southwest. Therefore, the proposed project would not affect scenic resources within a state highway and no impact would occur. No mitigation is required.

c) Visual Character: Project Impact Adequately Address in the LRDP EIR

Although the proposed project is located within the East Campus, the previous University Hills phases are located within the South Campus. Mitigation measure Aes-1a was adopted as part of the 2007 LRDP EIR to ensure that future development in the South Campus would be architecturally consistent with the surrounding community. Due to the project location's proximity to Bonita Canyon Drive and the South Campus, mitigation measure AES-1a has been incorporated into the project design to minimize potential visual impacts. This includes a minimum 50-foot landscaped buffer along Bonita Canyon Drive; extensive project landscaping; and design character, scale, and massing similar to nearby neighborhoods in University Hills. Therefore, with the incorporation of LRDP EIR mitigation measure Aes-1A, potential impacts to the visual character of the surrounding area would be reduced to a less than significant level.

d) Light or Glare: Project Impact Adequately Addressed in the LRDP EIR

The proposed project includes outdoor lighting fixtures to provide safe levels of illuminations for pedestrians and motorists, such as street lights and building mounted fixtures. This would increase the ambient lighting levels from its previously undeveloped state. However, all outdoor lighting would be designed in accordance with mitigation measure Aes-2A and a lighting plan would be approved during pre-construction in accordance with mitigation measure Aes-2B. Therefore, with implementation of LRDP EIR mitigation measures Aes-2A and Aes-2B, potential impacts due to the creation of light and glare would be reduced to a less than significant level.

Mitigation Measures

Aes-1A: Prior to project design approval for future projects that implement the 2007 LRDP and are located in the South Campus, in the vicinity of Bonita Canyon Drive, UCI shall ensure that the projects include design features to minimize visual impacts from off-campus areas. These design features shall include, but are not limited to, the following:

- A 50-foot wide (minimum) landscaped buffer located along the edge of the campus along the project frontage;
- Building mass and/or proportions and exterior treatments and/or colors that are compatible with the surrounding development and visual character; and
- Project landscape design that reduces visual impacts and integrates the project into the

visual landscape.

Aes-2A: Prior to project design approval for future projects that implement the 2007 LRDP, UCI shall ensure that the projects include design features to minimize glare impacts. These design features shall include use of non-reflective exterior surfaces and low-reflectance glass (e.g., double or triple glazing glass, high technology glass, low-E glass, or equivalent materials with low reflectivity) on all project surfaces that could produce glare.

Aes-2B: Prior to approval of construction documents for future projects that implement the 2007 LRDP, UCI shall approve an exterior lighting plan for each project. In accordance with UCI's Campus Standards and Design Criteria for outdoor lighting, the plan shall include, but not be limited to, the following design features:

- Full-cutoff lighting fixtures to direct lighting to the specific location intended for illumination (e.g., roads, walkways, or recreation fields) and to minimize stray light spillover into adjacent residential areas, sensitive biological habitat, and other light-sensitive receptors;

- Appropriate intensity of lighting to provide campus safety and security while minimizing light pollution and energy consumption; and

- Shielding direct lighting within parking areas, parking structures, or roadways away from adjacent residential areas, sensitive biological habitat, and other light-sensitive receptors through site configuration, grading, lighting design, or barriers such as earthen berms, walls, or landscaping.

4.2 Air Quality

Issues	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant with Project-level Mitigation Incorporated	Less Than Significant Impact	No Impact
Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project:					
a) Conflict with or obstruct implementation of the applicable air quality plan?					X
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?			X		
c) 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 (including releasing emissions which exceed quantitative thresholds for ozone precursors)?			X		
d) Expose sensitive receptors to substantial pollutant concentrations?				X	
e) Create objectionable odors affecting a substantial number of people?				X	

Discussion

Air quality issues are discussed in Section 4.2 of the 2007 LRDP EIR. A project-specific Air

Quality Assessment was prepared by Michael Baker International, Inc. and is included as Appendix A.

a) Air Quality Management Plan Consistency: No Impact

On December 7, 2012, the South Coast Air Quality Management District (SCAQMD) Governing Board approved the 2012 Air Quality Management Plan (AQMP), which outlines its strategies for meeting the National Ambient Air Quality Standards (NAAQS) for $PM_{2.5}$ and ozone. According to the SCAQMD's 2012 AQMP, two main criteria must be addressed.

Criterion 1:

With respect to the first criterion, SCAQMD methodologies require that an air quality analysis for a project include forecasts of project emissions in relation to contributing to air quality violations and delay of attainment.

- Would the project result in an increase in the frequency or severity of existing air quality violations?

Since the consistency criteria identified under the first criterion pertain to pollutant concentrations, rather than to total regional emissions, an analysis of a project's pollutant emissions relative to localized pollutant concentrations is used as the basis for evaluating project consistency. As discussed in 4.2(b) below, localized concentrations of CO, NO_X, PM_{10}, and $PM_{2.5}$ would be less than significant during project operations. Therefore, the proposed project would not result in an increase in the frequency or severity of existing air quality violations. Because reactive organic gases (ROGs) are not a criteria pollutant, there is no ambient standard or localized threshold for ROGs. Due to the role ROG plays in ozone formation, it is classified as a precursor pollutant and only a regional emissions threshold has been established.

- Would the project cause or contribute to new air quality violations?

As discussed in 4.2(b) below, operations of the proposed project would result in emissions that would be below the SCAQMD operational thresholds. Therefore, the proposed project would not have the potential to cause or affect a violation of the ambient air quality standards.

- Would the project delay timely attainment of air quality standards or the interim emissions reductions specified in the AQMP?

The proposed project would result in less than significant impacts with regard to localized concentrations during project operations. Therefore, the proposed project would not delay the timely attainment of air quality standards or 2012 AQMP emissions reductions.

Criterion 2:

With respect to the second criterion for determining consistency with SCAQMD and Southern California Association of Governments (SCAG) air quality policies, it is important to recognize that air quality planning within the South Coast Air Basin (Basin) focuses on attainment of ambient air quality standards at the earliest feasible date. Projections for achieving air quality goals are based on assumptions regarding population, housing, and growth trends. Thus, the SCAQMD's second criterion for determining project consistency focuses on whether or not the proposed project exceeds the assumptions utilized in preparing the forecasts presented in the 2012 AQMP. Determining whether or not a project exceeds the assumptions reflected in the 2012 AQMP involves the evaluation of the three criteria outlined below. The following discussion provides an analysis of each of these criteria.

- Would the project be consistent with the population, housing, and employment growth projections utilized in the preparation of the AQMP?

In the case of the 2012 AQMP, several sources of data form the basis for the projections of air pollutant emissions including: the City of Irvine General Plan (General Plan), UCI's 2007 Long Range Development Plan (LRDP), SCAG's Growth Management Chapter of the Regional Comprehensive Plan (RCP), and SCAG's 2012-2035 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS). The RTP/SCS also provides socioeconomic forecast projections of regional population growth. The LRDP designates the site as Mixed Use – Neighborhood and Housing Reserve. According to the LRDP, the Mixed Use – Neighborhood designation permits residential facilities for UCI students, faculty, and staff; commercial and retail space; conference facilities; office facilities; and academic facilities. The LRDP Housing Reserve designation permits residential facilities for students, faculty, staff, medical residents and interns, post-doctoral researchers, and other University affiliates. The project proposes 160 single-family, and 140 apartment units for UCI faculty and staff, and therefore complies with the site's intended use. Additionally, the project would be consistent with the LRDP and assumed emissions for the project site, since no change in the site's land use designation is proposed. Thus, the project is generally consistent with the types, intensity, and patterns of land use envisioned for the site vicinity in the RCP. The population, housing, and employment forecasts, which are adopted by SCAG's Regional Council, are based on the local plans and policies; these are used by SCAG in all phases of implementation and review. Additionally, as SCAQMD incorporated these same projections into the 2012 AQMP, it can be concluded that the project would be consistent with the projections. Therefore, the project would be consistent with the 2012 AQMP and a less than significant impact would occur.

- Would the project implement all feasible air quality mitigation measures?

Compliance with all feasible emission reduction measures identified by the SCAQMD would be required as identified in Impact Statement AQ-2 and AQ-3. As such, the proposed project would meet this AQMP consistency criterion.

- Would the project be consistent with the land use planning strategies set forth in the AQMP?

The project is consistent with the LRDP land use designations for the site, and would serve to implement various LRDP policies. Compliance with emission reduction measures identified by the SCAQMD would be required as identified in 4.2(b) and 4.2(c) below. As such, the proposed project meets this AQMP consistency criterion.

In conclusion, the determination of 2012 AQMP consistency is primarily concerned with the long-term influence of a project on air quality in the Basin. The proposed project would not result in a long-term impact on the region's ability to meet State and federal air quality standards. Also, the proposed project would be consistent with the goals and policies of the AQMP for control of fugitive dust. Therefore, the proposed project would also be consistent with the 2012 AQMP and no impact would occur. No mitigation is required.

b) Air Quality Standards: Less Than Significant Impact with Project-level Mitigation Incorporated

SHORT-TERM CONSTRUCTION

Short-term air quality impacts are predicted to occur during grading and construction operations associated with implementation of the proposed project. Temporary air emissions would result from the following activities:

- Particulate (fugitive dust) emissions from grading and building construction; and
- Exhaust emissions from the construction equipment and the motor vehicles of the construction crew.

Construction activities would include site preparation, grading, building construction, paving, and architectural coating. Site grading would require approximately 600,000 cubic yards of balanced soil cut and fill on-site. Project construction equipment would include excavators, graders, dozers, scrapers, and tractors/loaders/backhoes during grading; rough terrain forklifts, generators, tractors/loaders/backhoes, and welders during building construction; pavers, paving equipment, and rollers during paving; and air compressors during architectural coating. Emissions for each construction phase have been quantified based upon the phase durations and equipment types. The analysis of daily construction emissions has been prepared utilizing the California Emissions Estimator Model (CalEEMod). Table 4.2-1, Short-Term (Construction) Emissions, presents the anticipated daily short-term construction emissions.

Table 4.2-1
Short-Term (Construction) Emissions

Emissions Source	**Pollutant (pounds/day)** [1, 2]					
	ROG[3]	**NO_X**	**CO**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**
2016						
Unmitigated Emissions	11.55	87.54	137.35	0.08	21.21	12.69
Mitigated Emissions	11.55	87.54	137.35	0.08	9.83	6.44
SCAQMD Thresholds	*75*	*100*	*550*	*150*	*150*	*55*

Is Threshold Exceeded After Mitigation?	***No***	***No***	***No***	***No***	***No***	***No***
2017						
Unmitigated Emissions	39.82	22.96	26.88	0.05	3.50	1.97
Mitigated Emissions	39.82	22.96	26.88	0.05	3.50	1.97
SCAQMD Thresholds	*75*	*100*	*550*	*150*	*150*	*55*
Is Threshold Exceeded After Mitigation?	***No***	***No***	***No***	***No***	***No***	***No***

Notes:
1. Emissions were calculated using CalEEMod, as recommended by the SCAQMD.
2. The reduction/credits for construction emission mitigations are based on mitigation included in CalEEMod and as typically required by the SCAQMD. The mitigation includes the following: properly maintain mobile and other construction equipment; replace ground cover in disturbed areas quickly; water exposed surfaces three times daily; cover stock piles with tarps; water all haul roads twice daily; and limit speeds on unpaved roads to 15 miles per hour.
3. Both ROGs and VOCs are subsets of organic gases that are emitted from the incomplete combustion of hydrocarbons or other carbon-based fuels. Although they represent slightly different subsets of organic gases, they are used interchangeably for the purposes of this analysis.

Refer to Appendix A, Air Quality Emissions Data, for assumptions used in this analysis.

Fugitive Dust Emissions

Construction activities are a source of fugitive dust (PM_{10} and $PM_{2.5}$) emissions that may have a substantial, temporary impact on local air quality. In addition, fugitive dust may be a nuisance to those living and working in the project area. Fugitive dust emissions are associated with land clearing, ground excavation, cut-and-fill, and truck travel on unpaved roadways (including demolition as well as construction activities). Fugitive dust emissions vary substantially from day to day, depending on the level of activity, specific operations, and weather conditions. Fugitive dust from grading and construction is expected to be short-term and would cease upon project completion. Additionally, most of this material is inert silicates, rather than the complex organic particulates released from combustion sources, which are more harmful to health.

Dust (larger than 10 microns) generated by such activities usually becomes more of a local nuisance than a serious health problem. Of particular health concern is the amount of PM_{10} (particulate matter smaller than 10 microns) generated as a part of fugitive dust emissions. PM_{10} poses a serious health hazard alone or in combination with other pollutants. Fine Particulate Matter ($PM_{2.5}$) is mostly produced by mechanical processes.These include automobile tire wear, industrial processes such as cutting and grinding, and re-suspension of particles from the ground or road surfaces by wind and human activities such as construction or agriculture. $PM_{2.5}$ is mostly derived from combustion sources, such as automobiles, trucks, and other vehicle exhaust, as well as from stationary sources. These particles are either directly emitted or are formed in the atmosphere from the combustion of gases such as NO_X and SO_X combining with ammonia. $PM_{2.5}$ components from material in the earth's crust, such as dust, are also present, with the amount varying in different locations.

Mitigation measure AQ-1 would require implementation of Best Management Practices (BMPs) during construction, including, but not limited to, dust control techniques (i.e., daily watering), a traffic management plan, and adherence to SCAQMD Rules 402 and 403 (which require watering of inactive and perimeter areas, track out requirements, etc.), to reduce PM_{10} and $PM_{2.5}$ concentrations. These are standard dust control measures that the SCAQMD requires for all projects. As indicated in Table 4.2-1, total PM_{10} and $PM_{2.5}$ emissions would be below the SCAQMD threshold with the implementation of mitigation measure AQ-1. Therefore, particulate matter impacts during construction would be reduced to a less than significant level.

ROG Emissions[1]

In addition to gaseous and particulate emissions, the application of asphalt and surface coatings creates ROG emissions, which are O_3 precursors. In accordance with the methodology prescribed by the SCAQMD, the ROG emissions associated with paving have been quantified with CalEEMod. Architectural coatings were also quantified with CalEEMod based upon the size of the buildings.

The highest concentration of ROG emissions would be generated during the application of architectural coatings on the building. As required by law, all architectural coatings for the proposed project structures would comply with SCAQMD Regulation XI, Rule 1113 – Architectural Coating. Rule 1113 provides specifications on painting practices as well as regulates the ROG content of paint. As shown in Table 4.2-1, project construction would not result in an exceedance of ROG emissions during any years of construction. Therefore, impacts would be less than significant in this regard.

Construction Equipment and Worker Vehicle Exhaust

Exhaust emissions from construction activities include emissions associated with the transport of machinery and supplies to and from the project site, emissions produced on-site as the equipment is used, and emissions from trucks transporting materials to and from the site. Standard SCAQMD regulations, such as maintaining construction equipment in proper tune, shutting down equipment when not in use for extended periods of time, and implementing SCAQMD Rule 403 would be adhered to. As noted in Table 4.2-1, construction equipment exhaust would not exceed SCAQMD thresholds. Therefore, impacts are less than significant in this regard.

Naturally Occurring Asbestos

Asbestos is a term used for several types of naturally occurring fibrous minerals that are a human health hazard when airborne. The most common type of asbestos is chrysotile, but other types such as tremolite and actinolite are also found in California. Asbestos is classified as a

[1] ROGs and VOCs are subsets of organic gases that are emitted from the incomplete combustion of hydrocarbons or other carbon-based fuels. Although they represent slightly different subsets of organic gases, they are used interchangeably for the purposes of this analysis.

known human carcinogen by State, federal, and international agencies and was identified as a toxic air contaminant by the California Air Resources Board in 1986.

Asbestos can be released from serpentinite and ultramafic rocks when the rock is broken or crushed. At the point of release, the asbestos fibers may become airborne, causing air quality and human health hazards. These rocks have been commonly used for unpaved gravel roads, landscaping, fill projects, and other improvement projects in some localities. Asbestos may be released to the atmosphere due to vehicular traffic on unpaved roads, during grading for development projects, and at quarry operations. All of these activities may have the effect of releasing potentially harmful asbestos into the air. Natural weathering and erosion processes can act on asbestos bearing rock and make it easier for asbestos fibers to become airborne if such rock is disturbed. According to the Department of Conservation Division of Mines and Geology, A General Location Guide for Ultramafic Rocks in California – Areas More Likely to Contain Naturally Occurring Asbestos Report (August 2000), serpentinite and ultramafic rocks are not known to occur within the project area. Thus, there would be no impact in this regard.

Construction Odors

Potential odors could arise from the diesel construction equipment used on-site, as well as from architectural coatings and asphalt off-gassing. Odors generated from the referenced sources are common in the man-made environment and are not known to be substantially offensive to adjacent receptors. Additionally, odors generated during construction activities would be temporary. Therefore, construction odors are not considered to be a significant impact.

Total Daily Construction Emissions

In accordance with the SCAQMD Guidelines, CalEEMod was utilized to model construction emissions for ROG, NO_X, CO, SO_X, PM_{10}, and $PM_{2.5}$. Construction would occur over a six month period with the greatest emissions being generated during the initial stages of construction. Additionally, the greatest amount of ROG emissions would typically occur during the final stages of development due to the application of architectural coatings.

CalEEMod allows the user to input mitigation measures such as watering the construction area to limit fugitive dust. Mitigation measures that were input into CalEEMod allow for certain reduction credits and result in a decrease of pollutant emissions. Reduction credits are based upon studies developed by CARB, SCAQMD, and other air quality management districts throughout California, and were programmed within CalEEMod. As indicated in Table 4.2-1, CalEEMod calculates the reduction associated with recommended mitigation measures.

Therefore, as depicted in Table 4.2-1, construction emissions would be less than significant with implementation of project-level mitigation measure AQ-1.

LONG-TERM OPERATIONAL EMISSIONS

Mobile Source Emissions

Mobile sources are emissions from motor vehicles, including tailpipe and evaporative emissions. Depending upon the pollutant being discussed, the potential air quality impact may be of either regional or local concern. For example, ROG, NO_X, SO_X, PM_{10}, and $PM_{2.5}$ are all pollutants of regional concern (NO_X and ROG react with sunlight to form O_3 [photochemical smog], and wind currents readily transport SO_X, PM_{10}, and $PM_{2.5}$). However, CO tends to be a localized pollutant, dispersing rapidly at the source.

Both existing and project-generated vehicle emissions have been estimated using CalEEMod in order to obtain the net increase. Trip generation rates associated with the project were based on traffic data within the University Hills PA11 Traffic Study (Traffic Study), prepared by Stantec Consulting Services, Inc. (September 22, 2015). The proposed project would result in approximately 2,860 new daily trips. Table 4.2-2, Long-Term Air Emissions, presents the anticipated mobile source emissions. As shown in Table 4.2-2, unmitigated emissions generated by vehicle traffic associated with the proposed project would not exceed established SCAQMD regional thresholds.

Table 4.2-2
Long-Term Air Emissions

Source	**Estimated Emissions (pounds/day)** [1]					
	ROG	**NO_X**	**CO**	**SO_X**	**PM_{10}**	**$PM_{2.5}$**
Area Sources	18.76	1.49	98.56	0.24	12.47	12.47
Energy Sources	0.17	1.47	0.63	0.00	0.12	0.12
Mobile Sources	8.52	20.97	94.10	0.25	19.17	5.30
Total Emissions	***27.45***	***23.93***	***193.29***	***0.49***	***31.76***	***17.89***
SCAQMD Threshold	*55*	*55*	*550*	*150*	*150*	*55*
Is Threshold Exceeded? (Significant Impact)	**No**	**No**	**No**	**No**	**No**	**No**

Notes:
1. Based on CalEEMod modeling results, worst-case seasonal emissions for area and mobile emissions have been modeled.

Source: Refer to Appendix A, *Air Quality Emissions Data*, for assumptions used in this analysis.

Area Source Emissions

Area source emissions would be generated due to an increased demand for natural gas associated with the development of the proposed project. The primary use of natural gas producing area source emissions by the project would be for consumer products, architectural coating, and landscaping. The proposed project would not include wood burning fireplaces or other devices per SCAQMD Rule 445 (Wood Burning Devices). As shown in Table 4.2-2, unmitigated area source emissions from the proposed project would not exceed SCAQMD thresholds for ROG, NO_X, CO, SO_X, PM_{10}, or $PM_{2.5}$.

Energy Source Emissions

Energy source emissions would be generated as a result of electricity and natural gas (non-hearth) usage associated with the proposed project. The primary use of electricity and natural gas by the project would be for space heating and cooling, water heating, ventilation, lighting, appliances, and electronics. As shown in Table 4.2-2, unmitigated energy source emissions from the proposed project would not exceed SCAQMD thresholds for ROG, NO_X, CO, SO_X, PM_{10}, or $PM_{2.5}$.

Conclusion

As indicated in Table 4.2-2, unmitigated operational emissions from the proposed project would not exceed SCAQMD thresholds. If stationary sources, such as backup generators, are installed on-site, they would be required to obtain the applicable permits from SCAQMD for operation of such equipment. The SCAQMD is responsible for issuing permits for the operation of stationary sources in order to reduce air pollution, and to attain and maintain the national and California ambient air quality standards in the Basin. Backup generators would be used only in emergency situations, and would not contribute a substantial amount of emissions capable of exceeding SCAQMD thresholds. Therefore, with implementation of project-level mitigation measure AQ-1, operational air quality impacts would be reduced to a less than significant level.

c) Cumulatively Considerable Net Increase of Any Criteria Pollutants: Less Than Significant Impact with Project-level Mitigation Incorporated

The SCAQMD has developed strategies to reduce criteria pollutant emissions outlined in the 2012 AQMP pursuant to Federal Clean Air Act mandates. As such, the proposed project would comply with SCAQMD Rule 403 requirements, and implement all feasible mitigation measures (see AQ-1). Rule 403 requires that fugitive dust be controlled with the best available control measures in order to reduce dust so that it does not remain visible in the atmosphere beyond the property line of the proposed project. In addition, the proposed project would comply with adopted 2012 AQMP emissions control measures. Per SCAQMD rules and mandates, as well as the CEQA requirement that significant impacts be mitigated to the extent feasible, these same requirements (i.e., Rule 403 compliance, the implementation of all feasible mitigation measures, and compliance with adopted AQMP emissions control measures) would also be imposed on construction projects throughout the Basin.

As discussed previously, the proposed project would not result in long-term air quality impacts, as emissions would not exceed the SCAQMD adopted operational thresholds. Additionally, adherence to SCAQMD rules and regulations would alleviate potential impacts related to cumulative conditions on a project-by-project basis. Emission reduction technology, strategies, and plans are constantly being developed. As a result, the proposed project would not contribute a cumulatively considerable net increase of any nonattainment criteria pollutant. Therefore, with the implementation of project-specific mitigation measure AQ-1, cumulative operational impacts associated with implementation of the proposed project would be less than significant.

d) Sensitive Receptors: Less Than Significant Impact

Sensitive receptors are defined as facilities or land uses that include members of the population that are particularly sensitive to the effects of air pollutants, such as children, the elderly, and people with illnesses. Examples of these sensitive receptors are residences, schools, hospitals, and daycare centers. CARB has identified the following groups of individuals as the most likely to be affected by air pollution: the elderly over 65, children under 14, athletes, and persons with cardiovascular and chronic respiratory diseases such as asthma, emphysema, and bronchitis.

The closest sensitive receptors near the project site are surrounding residences adjacent to the north, southeast, and west of the project site and elementary schools to the south. In order to identify impacts to sensitive receptors, the SCAQMD recommends addressing localized significance thresholds (LSTs) for construction and operations impacts (area sources only). The CO hotspot analysis following the LST analysis addresses localized mobile source impacts.

LOCALIZED SIGNIFICANCE THRESHOLDS (LST)

LSTs were developed in response to SCAQMD Governing Boards' Environmental Justice Enhancement Initiative (I-4). The SCAQMD provided the Final Localized Significance Threshold Methodology (dated June 2003 [revised 2008]) for guidance. The LST methodology assists lead agencies in analyzing localized air quality impacts. The SCAQMD provides the LST screening lookup tables for one, two, and five acre projects emitting CO, NO_X, $PM_{2.5}$, or PM_{10}. The LST methodology and associated mass rates are not designed to evaluate localized impacts from mobile sources traveling over the roadways. The SCAQMD recommends that any project over five acres should perform air quality dispersion modeling to assess impacts to nearby sensitive receptors. The project is located within Source Receptor Area (SRA) 20, Central Orange County Coastal.

Construction

The SCAQMD guidance on applying CalEEMod to LSTs specifies the amount of acres a particular piece of equipment would likely disturb per day. Based on the SCAQMD guidance on applying CalEEMod to LSTs, the project would disturb at most 29.2 acres of land per day. Therefore, the LST thresholds for five acres was conservatively utilized for the construction LST analysis. The closest sensitive receptors to the project site are residential uses located adjacent to the western boundary of the project site. These sensitive land uses may be potentially affected by air pollutant emissions generated during on-site construction activities. LST thresholds are provided for distances to sensitive receptors of 25, 50, 100, 200, and 500 meters. As the nearest sensitive uses are adjacent to the project site, the lowest available LST values for 25 meters were used. Table 4.2-3, Localized Significance of Construction Emissions, shows the localized unmitigated and mitigated construction-related emissions. It is noted that the localized emissions presented in Table 4.2-3 are less than those in Table 4.2-1 because localized emissions include only on-site emissions (i.e., from construction equipment and fugitive dust), and do not include off-site emissions (i.e., from hauling activities). As seen in Table 4.2-3, mitigated on-site emissions would not exceed the LSTs for SRA 20.

Table 4.2-3
Localized Significance of Construction Emissions

Source	Pollutant (pounds/day)[1]			
	NO_X	CO	PM_{10}	$PM_{2.5}$
2016				
Total Unmitigated On-Site Emissions[2,3]	74.81	49.14	21.00	12.63
Total Mitigated On-Site Emissions[2,3]	74.81	49.14	9.63	6.38
Localized Significance Threshold[1]	*197*	*1,711*	*14*	*9*
Thresholds Exceeded?	***No***	***No***	***No***	***No***
2017				
Total Unmitigated On-Site Emissions[4,5]	20.29	15.72	1.48	1.40
Total Mitigated On-Site Emissions[4,5]	20.29	15.72	1.48	1.40
Localized Significance Threshold[1]	*197*	*1,711*	*14*	*9*
Thresholds Exceeded?	***No***	***No***	***No***	***No***

Notes:
1. The Localized Significance Threshold was determined using Appendix C of the SCAQMD Final Localized Significant Threshold Methodology guidance document for pollutants NO_X, CO, PM_{10}, and $PM_{2.5}$. The Localized Significance Threshold was based on the anticipated daily acreage disturbance for construction, the distance to sensitive receptors, and the source receptor area (SRA 8).
2. The Grading Phase represents the worst case scenario for NO_X and CO.
3. The Site Preparation Phase represents the worst case scenario for PM_{10}, and $PM_{2.5}$.
4. The Paving Phase represents the worst case scenario for NO_X.
5. The Building Construction Phase represents the worst case scenario for CO, PM_{10}, and $PM_{2.5}$.

Operations

For project operations, the five-acre threshold was conservatively utilized, as the project site is approximately 29.2 acres. As the nearest sensitive uses are adjacent to the project site, the most conservative LST values for 25 meters were used. As seen in Table 4.2-4, Localized Significance of Operational Emissions, project-related mitigated operational area source emissions would be negligible and would be below the LSTs. The mitigated area source emissions presented in Table 4.2-4 were derived from the CalEEMod, and include the following proposed project features that would reduce operational emissions: accessibility to a job center (approximately 0.3-mile), improve pedestrian network (project site connects to existing off-site pedestrian and bicycle trails), use only natural gas hearths, use of reclaimed water, installation of low-flow faucets, toilets, and showers, energy efficient dishwashers, water efficient landscaping, and water-efficient irrigation systems. As such, operational LST impacts would be less than significant.

Table 4.2-4
Localized Significance of Operational Emissions

Source	Pollutant (pounds/day)			
	NO_X	CO	PM_{10}	$PM_{2.5}$
Total Unmitigated Area Source Emissions	1.49	98.56	12.47	12.47
Total Mitigated Area Source Emissions[1]	0.29	25.03	0.48	0.47
Localized Significance Threshold[2]	*197*	*1,711*	*4*	*2*
Thresholds Exceeded?	***No***	***No***	***No***	***No***

Note:
1. The proposed project does not include hearths.

2. The Localized Significance Threshold was determined using Appendix C of the SCAQMD Final Localized Significant Threshold Methodology guidance document for pollutants NO_X, CO, PM_{10}, and $PM_{2.5}$. The Localized Significance Threshold was based on the total acreage, the distance to sensitive receptors, and the source receptor area (SRA 20).

CARBON MONOXIDE HOTSPOTS

Intersection Hotspots

CO emissions are a function of vehicle idling time, meteorological conditions, and traffic flow. Under certain extreme meteorological conditions, CO concentrations near a congested roadway or intersection may reach unhealthful levels (i.e., adversely affecting residents, school children, hospital patients, the elderly, etc.).

The SCAQMD requires a quantified assessment of CO hotspots when a project increases the volume-to-capacity ratio (also called the intersection capacity utilization) by 0.02 (two percent) for any intersection with an existing level of service LOS D or worse. Because traffic congestion is highest at intersections where vehicles queue and are subject to reduced speeds, these hot spots are typically produced at intersections.

The City of Irvine is located in the South Coast Air Basin, which is designated as an attainment/maintenance area for the federal CO standards and an attainment area for State standards. There has been a decline in CO emissions even though vehicle miles traveled on U.S. urban and rural roads have increased. On-road mobile source CO emissions have declined 24 percent between 1989 and 1998, despite a 23 percent rise in motor vehicle miles traveled over the same 10 years. California trends have been consistent with national trends; CO emissions declined 20 percent in California from 1985 through 1997 while vehicle miles traveled increased 18 percent in the 1990s. Three major control programs have contributed to the reduced per-vehicle CO emissions: exhaust standards, cleaner burning fuels, and motor vehicle inspection/maintenance programs.

A detailed CO analysis was conducted in the Federal Attainment Plan for Carbon Monoxide (CO Plan) for the SCAQMD's 2003 Air Quality Management Plan. The locations selected for microscale modeling in the CO Plan are worst-case intersections in the Basin, and would likely experience the highest CO concentrations. Thus, CO analysis within the CO Plan is utilized in a comparison to the proposed project, since it represents a worst-case scenario with heavy traffic volumes within the Basin.

Of these locations, the Wilshire Boulevard/Veteran Avenue intersection in Los Angeles experienced the highest CO concentration (4.6 parts per million [ppm]), which is well below the 35-ppm 1-hr CO federal standard. The Wilshire Boulevard/Veteran Avenue intersection is one of the most congested intersections in Southern California with an average daily traffic (ADT) volume of approximately 100,000 vehicles per day. As the CO hotspots were not experienced at the Wilshire Boulevard/Veteran Avenue intersection, it can be reasonably inferred that CO hotspots would not be experienced at any intersections within the vicinity of the project site due to the low volume of traffic (2,680 daily trips) that would occur as a result of project implementation. Therefore, impacts sensitive receptors would be less than significant. No mitigation is required.

e) Objectionable Odors: Less than Significant Impact

According to the SCAQMD CEQA Air Quality Handbook, land uses associated with odor complaints typically include agricultural uses, wastewater treatment plants, food processing plants, chemical plants, composting, refineries, landfills, dairies, and fiberglass molding. The proposed project does not include any uses identified by the SCAQMD as being associated with odors.

Construction activities associated with the project may generate detectable odors from heavy-duty equipment exhaust. Construction-related odors would be short-term in nature and cease upon project completion. Therefore, any impacts to existing adjacent land uses would be short-term and are less than significant. No mitigation is required.

Mitigation Measures

AQ-1: Prior to initiating construction, UCI shall ensure that the project construction contract includes a construction emissions mitigation plan, including measures compliant with SCAQMD Rule 403 (Fugitive Dust), to be implemented and supervised by the on-site construction supervisor, which shall include, but not be limited to, the following BMPs:

i. During grading and site preparation activities, exposed soil areas shall be stabilized via frequent watering, non-toxic chemical stabilization, or equivalent measures at a rate to be determined by the on-site construction supervisor.

ii. During windy days when fugitive dust can be observed leaving the construction site, additional applications of water shall be required at a rate to be determined by the onsite construction supervisor.

iii. Disturbed areas designated for landscaping shall be prepared as soon as possible after completion of construction activities.

iv. Areas of the construction site that will remain inactive for three months or longer following clearing, grubbing and/or grading shall receive appropriate BMP treatments (e.g., revegetation, mulching, covering with tarps, etc.) to prevent fugitive dust generation.

v. All exposed soil or material stockpiles that will not be used within 3 days shall be enclosed, covered, or watered twice daily, or shall be stabilized with approved nontoxic chemical soil binders at a rate to be determined by the on-site construction supervisor.

vi. Unpaved access roads shall be stabilized via frequent watering, non-toxic chemical stabilization, temporary paving, or equivalent measures at a rate to be determined by the on-site construction supervisor.

vii. Trucks transporting materials to and from the site shall allow for at least two feet of freeboard (i.e., minimum vertical distance between the top of the load and the top of the trailer). Alternatively, trucks transporting materials shall be covered.

viii. Speed limit signs at 15 mph or less shall be installed on all unpaved roads within construction sites.

ix. Where visible soil material is tracked onto adjacent public paved roads, the paved roads shall be swept and debris shall be returned to the construction site or transported off site for disposal.

x. Wheel washers, dirt knock-off grates/mats, or equivalent measures shall be installed within the construction site where vehicles exit unpaved roads onto paved roads.

xi. Diesel powered construction equipment shall be maintained in accordance with manufacturer's requirements, and shall be retrofitted with diesel particulate filters where available and practicable.

xii. Heavy duty diesel trucks and gasoline powered equipment shall be turned off if idling is anticipated to last for more than 5 minutes.

xiii. Where feasible, the construction contractor shall use alternatively fueled construction equipment, such as electric or natural gas-powered equipment or biofuel.

xiv. Heavy construction equipment shall use low NOx diesel fuel to the extent that it is readily available at the time of construction.

xv. To the extent feasible, construction activities shall rely on the campus's existing electricity infrastructure rather than electrical generators powered by internal combustion engines.

xvi. The construction contractor shall develop a construction traffic management plan that includes the following:

xvii. Scheduling heavy-duty truck deliveries to avoid peak traffic periods Consolidating truck deliveries.

xviii. Where possible, the construction contractor shall provide a lunch shuttle or on-site lunch service for construction workers.

xix. The construction contractor shall, to the extent possible, use pre-coated architectural materials that do not require painting. Water-based or low VOC coatings shall be used that are compliant with SCAQMD Rule 1113. Spray equipment with high transfer efficiency, such as the high volume-low pressure spray method, or manual coatings application shall be used to reduce VOC emissions to the extent possible.

xx. Project constructions plans and specifications will include a requirement to define and implement a work program that would limit the emissions of reactive organic gases

(ROG's) during the application of architectural coatings to the extent necessary to keep total daily ROG's for each project to below 75 pounds per day, or the current SCAQMD threshold, throughout that period of construction activity to the extent feasible. The specific program may include any combination of restrictions on the types of paints and coatings, application methods, and the amount of surface area coated as determined by the contractor.

xxi. The construction contractor shall maintain signage along the construction perimeter with the name and telephone number of the individual in charge of implementing the construction emissions mitigation plan, and with the telephone number of the SCAQMD's complaint line. The contractor's representative shall maintain a log of any public complaints and corrective actions taken to resolve complaints.

4.3 Biological Resources

Issues	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:					
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the CA Department of Fish and Wildlife or U.S. Fish and Wildlife Service?		X			
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Wildlife or US Fish and Wildlife Service?				X	
c) 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?					X

Issues	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) 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?					X
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?					X
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other applicable habitat conservation plan?					X

Discussion

Biological resources issues are discussed in Section 4.3 of the 2007 LRDP EIR.

a) Sensitive Species: Project Impact Adequately Address in LRDP EIR

As described in the LRDP EIR, the project site previously contained a small patch of cactus scrub/coastal sage scrub (page 4.3-14). This vegetation was harvested from the site in 2011 and transplanted into the UCI Ecological Preserve as part of a habitat restoration project sponsored by the Natural Communities Conservation Planning (NCCP) program (California Department of Fish and Wildlife EEMP Grant Cactus Scrub Restoration Project and OCTA Measure M Cactus Scrub Restoration Project). The transplanted cactus was augmented with seeding of native plants to create 12.5 acres of cactus scrub/coastal sage scrub habitat within the UCI Ecological Reserve. Small remnants of cactus have resprouted on site since 2011. These remnants of cactus would be harvested by ICHA prior to ground disturbance and would be planted within campus open space areas to provide additional cactus scrub habitat. Although the existing vegetation would be recovered and transplanted, any loss of habitat would not be considered significant due to UCI participation in the NCCP which allows take of this habitat type in campus areas outside of the NCCP reserve boundary.

The project site is comprised of non-native grassland, ruderal areas, and open ground surfaces. This disturbed open landscape is suitable habitat for the western burrowing owl, a declining raptor species classified as special status by the California Department of Fish and Wildlife (CDFW). No burrowing owls were observed in this area during the biological surveys conducted for the LRDP EIR, and all previously identified burrow sites on campus have been developed. The LRDP EIR determined that it is unlikely that special status species may occur in area west Anteater Drive due to the disturbed condition of the area. California gnatcatcher, grasshopper sparrow, burrowing owl, and rufous-crowned sparrow are not known to occur in on the project site and are not likely to occupy this portion of the campus, although these species could occasionally forage or disperse throughout this area (LRDP EIR, pages 4.3-23 through 24). Although it is considered unlikely that project-related grading would destroy any burrows occupied by burrowing owls, LRDP EIR mitigation measure Bio-2A would ensure that no owls are impacted during the earth-moving activities; therefore, potential impacts would be reduced to a less than significant level.

b) Riparian Habitat: Less than Significant Impact

The remainder of the site is disturbed landscape dominated by non-native grassland, ruderal vegetation, and bare ground surfaces. A remnant piece of ephemeral drainage swale occurs on the southern portion of the project site that is lightly vegetated with scrub elements but does not comprise a riparian community; furthermore, biological surveys conducted for the 2007 LRDP EIR determined that none of the drainage swales in this area of the East Campus Planning Sector exhibit sufficient evidence of flow, such as bed, bank, and ordinary high water mark, to be considered jurisdictional by the California Department of Fish and Wildlife (LRDP EIR, page 4.3-24). No portion of this site is identified as a sensitive natural riparian community. Therefore, impacts to riparian habitat would be less than significant. No impact would occur.

c) Wetlands: No Impact

The remnant drainage swale in the southeastern part of the site, as described in the previous response, only carries surface flows after rainwater drains from upland areas. Biological surveys conducted for the 2007 LRDP EIR (page 4.3-24) determined that none of the drainage swales in this Planning Area exhibit sufficient evidence of flow, such as bed, bank, and ordinary high water mark, to be considered jurisdictional wetlands regulated under Section 404 of the Clean Water Act. Therefore, the proposed project would not adversely affect a federally protected wetland and no impact would occur. No mitigation is required.

d) Wildlife Corridors: No Impact

The 2007 LRDP EIR determined that because the project area is bordered by mixed use, and residential uses, and roadways that limit wildlife movement corridors in the vicinity. The project site is also greater than 0.50 mile from drainage culverts that were placed under the State Route 73 (SR-73) Toll Road to support movement between the Bonita Canyon Wetland areas, San Joaquin Hills, and the Natural Community Conservation Plan Reserve System lands on the campus (LRDP EIR, page 4.3-47). Therefore, the proposed project would not interfere with wildlife corridors and no impact would occur. No mitigation is required.

e) Conflict with Applicable Policies: No Impact

There are no LRDP, State, or federal policies that apply to the East Campus. Therefore, the proposed project would not conflict with policies protecting biological resources and no impact would occur. No mitigation is required.

f) Conflict with a Natural Community Conservation Plan or Habitat Conservation Plan: No Impact

The East Campus is not located within a Habitat Conservation Plan, Natural Community Conservation Plan, or any other habitat conservation plan. Therefore, no impacts would occur. No mitigation is required.

Mitigation Measures

Bio-2A: Prior to initiating on-site construction for future projects in the east campus and west campus that implement the 2007 LRDP and that involve land clearing, grading, or similar land development activities adjacent to suitable habitat for the western burrowing owl (i.e., large open areas of nonnative grassland, ruderal (weedy) areas, and scrub habitat), UCI shall retain a qualified biologist to conduct a burrowing owl survey of the respective habitat areas within 300 feet of the approved limits of disturbance. If occupied burrows are detected from the survey, then they shall not be disturbed during the nesting season (February 1 through August 31) until the biologist verifies through noninvasive methods that either: (1) the birds have not begun egg-laying and incubation; or (2) juveniles from the occupied burrows are foraging independently and are capable of independent survival. If owls must be moved away from the disturbance area, passive relocation is preferable to trapping. A time period of at least one week is recommended to allow the owls to move and acclimate to alternate burrows. When destruction of occupied burrows is unavoidable, relocation burrows shall be created (by installing artificial burrows) at a ratio of 1:1 in suitable foraging habitat. The biologist shall document all findings and results in a report submitted to UCI.

4.4 Cultural Resources

Issues	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:					
a) Cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5?					X
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5?		X			
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?		X			
d) Disturb any human remains, including those interred outside of formal cemeteries?				X	
d) Cause a substantial adverse change in the significance of a tribal cultural resource as defined in Public Resources Code 21074?				X	

Discussion

Cultural resources issues are discussed in Section 4.4 of the 2007 LRDP EIR.

a) Historical Resources: No Impact

No historical resources exist on or adjacent to the project site (LRDP EIR, page 4.4-15). Therefore, impacts to historical resources would not occur. No mitigation is required.

b) Archaeological Resources: Project Impact Adequately Addressed in EIR

Recorded archaeological resources located within the UCI campus are summarized in Table 4.4-1 of the 2007 LRDP EIR. Two archaeological sites have been discovered and recorded in the East Campus. Data and artifacts from both have been recovered and no further archaeological testing is required. To date, there has been no evidence of any archaeological resources within or adjacent to the project limits. There is some possibility, however, that unknown archaeological remains could occur beneath the ground surface (LRDP EIR, page 4.4-4).

Earth moving activities could possibly uncover previously undetected archaeological remains associated with prehistoric cultures. A loss of a significant archaeological resource could result if such materials are not properly identified. Therefore, monitoring during grading by a qualified archaeologist through implementation of LRDP EIR mitigation measure Cul-1C would reduce impacts to archaeological resources to a less than significant level.

c) Paleontological Resources: Project Impact Adequately Addressed in EIR

Paleontological investigations conducted for the 1989 LRDP determined that the Topanga Formation geologic units under the campus are considered to be of high paleontological sensitivity for vertebrate and invertebrate fossils. The assessment noted that one of the most unique features on the campus is the micro-paleontological material found along Bonita Canyon Drive, consisting of microscopic fossils of single-celled animals that inhabited the sea floor. The fossils contained in these exposures are of regional and interregional significance because they provide the basis for comparisons between the depositional histories of various parts of the Los Angeles Basin (LRDP EIR, page 4.4-19).

Given the geological setting and recognized high sensitivity for vertebrate and invertebrate fossils in this area of the campus, excavation operations, such as trenching and/or tunneling that cut into geologic formations, might expose fossil remains. According to the 2007 LRDP EIR, any project involving excavation into either the Topanga Formation or the terrace deposits could have an adverse effect on paleontological resources. Therefore, implementation of LRDP EIR mitigation measures Cul-4A, Cul-4B, and Cul-4C would reduce impacts to paleontological resources to a less than significant level (LRDP EIR, page 4.4-20).

d) Human Remains: Less than Significant Impact

Human remains may be uncovered during earth moving activities associated with construction of the project. In the event that human remains are discovered during construction, UCI would comply with Section 7.50.5 of the California Health and Safety Code, which requires notification of the County Coroner to determine whether the remains are of forensic interest. If the Coroner, with the aid of a supervising archeologist, determines that the remains appear to be of a Native American, s/he would contact the Native American Heritage Commission (NAHC) for further investigation and proper recovery of the remains. Therefore, compliance with the California Health and Safety Code would reduce potential impacts to human remains to a less than significant level. No mitigation is required.

e) Tribal Cultural Resources: Less than Significant Impact

As noted above, there is no evidence of archaeological/tribal resources within or adjacent to the project site, and 60 percent of the site has already been disturbed. For these reasons, UCI does not anticipate encountering tribal resources during construction of the project. Additionally, the implementation of LRDP EIR mitigation measure Cul-1C (hiring a qualified archaeologist to monitor ground-disturbing activities and to ensure the protection of any resources that may be discovered) would reduce any potentially significant impact to a less than significant impact, as described in the LRDP EIR. Therefore, impacts on tribal resources would be less than significant.

In accordance with AB 52, notification letters were mailed to the Gabrieleño Band of Mission Indians – Kizh Nation and Juaneño Band of Mission Indians – Acjachemen Nation on December 22, 2015. UCI received a letter on January 18, 2016 from the Gabrieleño Band of Mission Indians requesting that an affiliated Native American monitor be on-site during ground disturbance activities. Although the CEQA analysis in this IS/MND and in the LRDP EIR demonstrates that the hiring of a tribal monitor is not required to mitigate any potentially significant impact, the University has agreed to retain a Native American monitor during ground disturbance of the 40 percent of the project site that has not been previously disturbed and monitored during earlier University Hills phases. This Native American monitor would provide additional oversight beyond what is required by CEQA and would further diminish an already less than significant impact. No mitigation is required.

Mitigation Measures

Cul-1C: Prior to land clearing, grading, or similar land development activities for future projects that implement the 2007 LRDP in areas of identified archaeological sensitivity, UCI shall retain a qualified archaeologist (and, if necessary, a culturally affiliated Native American) to monitor these activities. In the event of an unexpected archaeological discovery during grading, the on-site construction supervisor shall redirect work away from the location of the archaeological find. A qualified archaeologist shall oversee the evaluation and recovery of archaeological resources, in accordance with the procedures listed below, after which the on-site construction supervisor shall be notified and shall direct work to continue in the location of the archaeological find. A record of monitoring activity shall be submitted to UCI each month and at the end of monitoring. If an archaeological discovery is determined to be significant, the archaeologist shall prepare and implement a data recovery plan. The plan shall include, but not be limited to, the following measures:

a. Perform appropriate technical analyses;

b. File an resulting reports with South Coast Information Center; and

c. Provide the recovered materials to an appropriate repository for curation, in consultation with a culturally-affiliated Native American.

Cul-4A: Prior to grading or excavation for future project that implement the 2007 LRDP and would excavate sedimentary rock material other than topsoil, UCI shall retain a qualified paleontology to monitor these activities. In the event fossils are discovered during grading, the on-site construction supervisor shall be notified and shall redirect work away from the location of the discovery. The recommendations of the paleontologist shall be implemented with respect to the evaluation and recovery of fossils, in accordance with mitigation measures Cul-4B and Cul-4C, after which the on-site construction supervisor shall be notified and shall direct work to continue in the location of the fossil discovery. A record of monitoring activity shall be submitted to UCI each month and ay the end of monitoring.

Cul-4B: If the fossils are determined to be significant, then mitigation measure Cul-4C shall be implemented.

Cul-4C: For significant fossils as determined by mitigation measure Cul-4B, the paleontologist shall prepare and implement a data recovery plan. The plan shall include, but not be limited to, the following measures:

a. The paleontologist shall ensure that all significant fossils collected are cleaned, identified, catalogued, and permanently curated with an appropriate institution with a research interest in the materials (which may include UCI);

b. The paleontologist shall ensure that specialty studies are completed, as appropriate, for any significant fossil collected; and

c. The paleontologist shall ensure that curation of fossils are completed in consultation with UCI. A letter of acceptance from the curation institution shall be submitted to UCI.

4.5 Geology and Soils

Issues	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:					
a) Expose people or structures to 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.				**X**	
ii) Strong seismic ground shaking?				**X**	
iii) Seismic-related ground failure, including liquefaction?				**X**	
iv) Landslides				**X**	
b) Result in substantial soil erosion or the loss of topsoil?				**X**	

Issues	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) 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?				X	
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?				X	
e) 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?					X

Discussion

Geology and soils issues are discussed in Section 4.5 of the 2007 LRDP EIR.

a) Expose People or Structures

i) - iv) Fault Rupture, Seismic Ground Shaking, Liquefaction, Landslides: Less than Significant Impact

No active or potentially active earthquake faults have been identified on the UCI campus through the State Alquist-Priolo Earthquake Fault Zoning Act program. A locally mapped fault trace, known as the "UCI Campus Fault" is located east of Anteater Drive. A Restricted Use Zone (RUZ), extending 50 feet beyond both sides of this fault has been established to protect new development near the fault (LRDP EIR, pages 4.5-8 through 9). The RUZ does not extend west of Anteater Road into the project site.

The entire campus, like most of southern California, is located in a seismically active area, where strong ground shaking could occur during movements along any one of several faults in the region. An earthquake of magnitude 7.5 on the Richter scale could occur along the Newport-Inglewood Fault, the nearest major fault located approximately 4.5 miles southwest of the campus. Earthquakes along the San Andreas Fault, about 35 miles northeast of the campus could generate an 8.0 magnitude level of energy, and movement along the San Jacinto Fault, about 30 miles away, could release ground motion energy estimated at 7.5 on the Richter scale (LRDP EIR, page 4.5-2). The 2007 LRDP FEIR indicates that a majority of soils on the UCI campus are characterized as dense terraced deposits, which are unlikely to be subject to liquefaction. The 1997 and 1998 Seismic Hazard Zones Maps prepared by the California Geological Survey indicate that slopes in the South Campus area are not susceptible to potential earthquake-induced landslides (LRDP EIR, page 4.5-9).

Since the project site is not located within the RUZ or in the immediate vicinity of any known active faults, this project would have no impact involving a fault rupture (LRDP EIR, page 5.5-9). An earthquake along any number of local or regional faults could generate strong ground motions at the subject site that could dislodge objects from walls, ceilings, and shelves or even damage and destroy buildings and other structures. People residing in the proposed residential development could be exposed to these hazards. However, grading, foundation, and building structure elements would be designed to meet or exceed the California Building Code (CBC) seismic safety standards. In addition, UCI has adopted a number of programs and procedures to reduce the hazards from seismic shaking by preparing residents for emergencies including through compliance with the UC Seismic Safety Policy. As such, compliance with these regulatory standards would ensure that hazards associated with seismically induced ground shaking are reduced to a less than significant level (LRDP EIR, page 4.5-9). As noted earlier, the majority of soils on the UCI campus are terraced deposits comprised of dense materials with relatively deep groundwater. Therefore, compliance with the CBC, the UC Seismic Safety Policy, and implementation of recommendations in a site-specific geotechnical investigation would reduce any potential hazards associated with liquefaction or landslides to a less than significant level (LRDP EIR, page 5.5-9). No mitigation is required.

b) Soil Erosion: Less than Significant Impact

As noted in the LRDP EIR, earth disturbing activities associated with the project's installation would be temporary. The project would comply with the CBC, which regulates excavation and grading activities respectively, and the National Pollutant Discharge Elimination System (NPDES) general permit for construction activities, which requires that construction best management practices (BMPs) be implemented to prevent soil erosion. Such BMPs could include silt fences, watering for dust control, straw-bale check dams, and hydroseeding. The LRDP EIR concluded that with implementation of these routine control measures potential construction-related erosion impacts would be less than significant (LRDP EIR, page 4.5-10).

Therefore, impacts involving soil erosion with respect to construction of the project would be reduced to a less than significant level. No mitigation is required.

c) Soil Instability: Less than Significant Impact

The 2007 LRDP EIR indicates there are loose or compressible soils in undeveloped areas with deposits of alluvium or slope wash/colluvium in the South Campus bordering Bonita Canyon Drive. Since the project site is immediately east of the South Campus area, on similar gently sloping grassland, a similar potential for loose or compressible soils is anticipated. Subsidence (settling of surface materials due to weakening of underlying support materials, usually due to withdrawal of ground water, oil or gas) has not been detected anywhere on campus and is not expected to occur within the project site (LRDP EIR, page 4.5.-5). There are several knolls and numerous slopes of varying angles that occur on this site. Slopes steeper than 25 degrees (approximately 2:1 [horizontal to vertical]) are more susceptible to instability (LRDP EIR, page 5.5-12).

If loose or compressible soil materials occur on site, they may be subject to settlement under increased loads, or due to an increase in moisture content from site irrigation or changes in drainage conditions. Typical measures to treat such unstable materials involve removal and replacement with properly compacted fill, compaction grouting, or deep dynamic compaction. The proposed grading plan would reconfigure the topography of the entire site, including removal of existing unstable materials and steep slope areas and recontouring with engineered materials that meet CBC grading standards for stability and safety. As stated previously, a site-specific geotechnical investigation would be conducted and any recommendations therein implemented, in accordance with the CBC. Therefore, impacts associated with unstable materials or steep slopes would be reduced to a less than significant level. No mitigation is required.

d) Expansive Soils: Less than Significant Impact

Expansive topsoils are prevalent on campus and are generally a dark brown sandy clay, clayey sand, or lean clay, which can be detrimental to foundations, concrete slabs, flatwork, and pavement. Topsoil throughout the campus is highly expansive, ranging from 8 to 12% swell with an underlying material generally consisting of non-expansive to moderately expansive terrace deposits with a swell ranging from 0 to 8%.

The CBC includes provisions for construction on expansive soils. Proper fill selection, moisture control, and compaction during construction can prevent these soils from causing significant damage. Expansive soils can be treated by removal (typically the upper three feet below finish grade) and replacement with low expansive soils, lime-treatment, and/or moisture conditioning. Due to its location adjacent Bonita Canyon Drive, as stated in the response to 4.5(c), it is anticipated that the project site also contains loose or compressible soil. The geotechnical investigations and soils testing to be conducted as part of the routine final design process would determine the extent of any expansive or compressible soils that occur on the site. Therefore, adherence to the CBC would reduce impacts due to expansive soils to a less than significant level. No mitigation is required.

e) Septic Tanks or Alternative Waste Disposal Systems: No Impact

All wastewater generated by the proposed project would be conveyed vial local sewers directly into the existing public sanitary sewer system maintained by the Irvine Ranch Water District (IRWD). Therefore, the proposed project would not provide a sanitary waste disposal system and no impact would occur. No mitigation is required.

Mitigation Measures

No mitigation measures required.

4.6 Greenhouse Gas Emissions

Issues	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:					
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?				X	
b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?					X

Discussion

In March 2010, the CEQA Guidelines were revised to require analysis of greenhouse gas (GHG) emissions. Because it was not required at the time the 2007 LRDP EIR was adopted, a GHG analysis was not included. GHG emissions are addressed in this section and uses a project-specific Greenhouse Gas Assessment prepared by Michael Baker International, Inc. (Appendix B).

a) Greenhouse Gas Emissions: Less than Significant Impact

Project-related GHG emissions would include emissions from direct and indirect sources. The proposed project would result in direct and indirect emissions of CO_2, N_2O, and CH_4, and would not result in other GHGs that would facilitate a meaningful analysis. Therefore, this analysis focuses on these three forms of GHG emissions. Direct project-related GHG emissions include emissions from construction activities, area sources, and mobile sources, while indirect sources include emissions from electricity consumption, water demand, and solid waste generation. Operational GHG estimations are based on energy emissions from natural gas usage and automobile emissions. Project GHG emissions were calculated using the California Emissions estimator Model (CalEEMod), which relies on trip generation data, and specific land use information to calculate emissions. Accordingly, the proposed project would generate approximately 2,860 daily trips. Table 1, Estimated Greenhouse Gas Emissions, presents the estimated CO_2, N_2O, and CH_4 emissions of the proposed project.

Table 4.6-1
Estimated Greenhouse Gas Emissions

Source	CO_2	CH_4		N_2O		Total Metric Tons of CO_2eq
	Metric Tons/yr[1]	Metric Tons/ yr[1]	Metric Tons of CO_2eq[2]	Metric Tons/ yr[1]	Metric Tons of CO_2eq[2]	
Direct Emissions						
Construction (amortized over 30 years)	21.22	0.00	0.00	0.00	0.00	21.22
Area Source	66.29	0.01	0.25	0.00	0.00	66.76
Mobile Source	1,567.91	0.07	1.62	0.00	0.00	1,569.28
Total Mitigated Direct Emissions[3]	**1,655.42**	**0.08**	**1.87**	**0.00**	**0.00**	**1,657.26**
Indirect Emissions						
Energy	690.34	0.03	0.75	0.01	2.98	693.58
Water Demand	107.85	0.64	16.00	0.02	5.96	126.28
Solid Waste Generation	25.60	1.51	37.80	0.00	0.00	64.91
Total Mitigated Indirect Emissions[3]	**823.79**	**2.18**	**54.55**	**0.03**	**8.94**	**884.77**
Total Mitigated Project-Related Emissions[3]	**2,542.03 $MTCO_2eq/yr$**					
Mitigated Service Population Emissions[4]	**2.6 $MTCO_2eq/yr$**					
Mitigated GHG Emissions Exceed Threshold?	**No**					

Notes:
1. Emissions calculated using CalEEMod.
2. CO_2 Equivalent values calculated using the EPA Website, Greenhouse Gas Equivalencies Calculator, http://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator, accessed February 2016.
3. Totals may be slightly off due to rounding.
4. Service population emissions are based on a service population of 963 faculty and staff, assuming 3 residents/unit (per the Irvine Campus Housing Authority (http://icha.uci.edu/Living/facts-and-history.php) plus additional maintenance staff).

Refer to Appendix A, Greenhouse Gas Emissions Data, for detailed model input/output data.

Project Design Features

It is noted that the GHG emissions calculated in CalEEMod, as shown Table 4.6-1, include project design features that would reduce project-related GHG emissions. The project consists of an infill development that would place residential uses within approximately 0.3 mile of job opportunities, and specifically provides housing for UCI faculty and staff. The project would also connect to existing pedestrian and bicycle paths in the area. The project would incorporate water conservation measures, such as low-flow faucets, showers, toilets, water-efficient landscaping and irrigation systems, and use of reclaimed water. In addition, the project would meet or exceed the Leadership in Energy and Environmental Design (LEED) Silver rating (or an equivalent rating such as the Build it Green GreenPoint Rated program), and utilize high-efficiency lighting and energy efficient appliances (i.e., Energy Star dishwashers) in compliance with the UC Sustainable Practices Policy.

Reduction measures applied in CalEEMod and accounted for in Table 4.6-1 include the following project design features:

- Increased diversity of land uses;
- Increased density;
- Improved destination accessibility, as the project site is located within 0.30 miles of job center;
- Pedestrian connections to the off-site circulation network;
- Implement Trip Reduction Program;
- Employee Vanpool/Shuttle;
- Provide Ride Sharing Program;
- Natural gas hearths;
- Low VOC paint;
- Water-efficient irrigation systems;
- 20 percent outdoor water usage reduction;
- Reclaimed water used for 100 percent of outdoor water use;
- Low-flow faucets, toilets, and showers;
- Install High-Efficiency Lighting;
- Use energy-efficient appliances (i.e., Energy Star dishwashers); and
- Institute recycling and composting services to reduce solid waste by at least 50 percent.

Direct Project-Related Sources of Greenhouse Gases

- Construction Emissions. Construction GHG emissions are typically summed and amortized over the lifetime of the project (assumed to be 30 years), then added to the operational emissions. As seen in Table 4.6-1, the proposed project would result in 636.72 $MTCO_2eq/yr$, which represents 21.22 $MTCO_2eq/yr$ when amortized over 30 years.
- Area Source. Area source emissions were calculated using CalEEMod and project-specific land use data. As noted in Table 4.6-1, the proposed project would not result in 66.76 $MTCO_2eq/yr$ of area source GHG emissions.

- Mobile Source. The CalEEMod model relies upon ITE trip generation data within and project specific land use data to calculate mobile source emissions. The project would directly result in 1,569.28 $MTCO_2eq$/yr of mobile source-generated GHG emissions.

Indirect Project-Related Sources of Greenhouse Gases

- Energy Consumption. Energy consumption emissions were calculated using the CalEEMod model and project-specific land use data. Electricity would be provided to the project site via Southern California Edison (SCE). The project would indirectly result in 693.58 $MTCO_2eq$/year due to energy consumption.

- Water Demand. The project operations would result in a demand of approximately 29.4 million gallons of water per year. Emissions from indirect energy impacts due to water supply would result in 126.28 $MTCO_2eq$/year.

- Solid Waste. Solid waste associated with operations of the proposed project would result in 64.91 $MTCO_2eq$/year.

Total Project-Related Sources of Greenhouse Gases

As depicted in Table 4.6-1, the project's GHG emissions would be 2,542.03 $MTCO_2eq$/yr. As such, the project would result in GHG emissions of 2.64 $MTCO_2eq$ per service person (SP) per year, which would not exceed the 3.0 $MTCO_2eq$ per SP per year South Coast Air Quality Management District (SCAQMD) threshold. Therefore, the impacts due to GHG emissions would be less than significant. No mitigation is required.

b) Conflict with a Greenhouse Gas Plan, Policy, or Regulation: No Impact

UCI adopted a Climate Action Plan (CAP) in 2007 (updated in 2013) in cooperation with AB 32, and has guided an array of climate action protection strategies and projects to reduce UCI GHG emissions. The purpose of this CAP is to identify UCI's long-term vision and commitment to reduce its GHG emissions in support of UC Sustainable Practices Policy and campus sustainability goals. These commitments include reduction of GHG emissions to 1990 levels by the year 2020 (a reduction of approximately 40 percent from emissions levels or a total of 79,000 annual metric tons), and ultimately achieve climate neutrality (zero net emissions) by 2050. The CAP does not contain GHG thresholds for individual projects. However, as the project-related GHG emissions are below the SCAQMD's 3.0 $MTCO_2eq$ per SP per year threshold (in compliance with AB 32), the proposed project would not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs. Therefore, the proposed project would not conflict with a greenhouse gas plan, policy, or regulation and no impact would occur. No mitigation is required.

Mitigation Measures

No mitigation measures are required.

4.7 Hazards and Hazardous Materials

Issues	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:					
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?				X	
b) 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?				X	
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?				X	
d) 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?					X

Issues	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?				X	
f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?				X	
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?		X			
h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?				X	

Discussion

Hazards and hazardous materials issues are discussed in Section 4.6 of the 2007 LRDP EIR.

a) Transport, Use, Disposal of Hazardous Materials: Less than Significant Impact

b) Release of Hazardous Materials: Less than Significant Impact

Because the proposed project is a residential use, temporary, short-term related hazards would be limited to transport, storage, use and disposal of fuels, solvents, paints and other coating materials used during construction. Long-term hazards would most likely be storage, use and disposal of minor quantities of typical household hazardous materials, such as pesticides, fertilizers, interior and exterior paints, and cleaning supplies.

The contractor ensures responsibility, as part of the contract, that hazardous materials and waste are handled, stored, and disposed of in accordance with all applicable federal, State, and local laws and regulations and routine construction control measures. Significant hazards from materials stored in residential uses is considered unlikely. Furthermore, the energy systems incorporated into the units would not generate hazardous air emissions. Therefore, compliance with federal, State, and local regulation would reduce potential impacts from the release of hazardous materials to a less than significant level. No mitigation is required.

c) Proximity to Schools: Less than Significant Impact

Tarbut v' Torah School and Vista Verde Elementary School are located within one-quarter mile of the project site. As discussed in 4.7(a) and 4.7(b) above, the proposed housing project would not generate hazardous emissions or handle large quantities of hazardous materials. Therefore, the proposed project would not emit large hazardous emissions in proximity to a school and impacts would be less than significant. No mitigation is required.

d) Hazardous Materials Sites: No Impact

The 2007 LRDP EIR concluded that there are no recorded hazardous sites on or within the immediate vicinity of the project site, and according to the UCI Office of Environmental Health and Safety, no other known hazardous materials exist on-site (LRDP EIR, page 4.6-32). Furthermore, review of the State Department of Toxic Substance Control[1] confirms there are no hazardous materials sites located on the project site. Therefore, there are no listed hazardous materials sites and no impact would occur. No mitigation is required.

e) Airport Land Use Plan: Less than Significant Impact

f) Private Airstrip: Less than Significant Impact

The closest airport, John Wayne Airport (JWA), is located three miles northwest of the project site. No private airstrips are located within the vicinity.

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[1] http://geotracker.waterboards.ca.gov/. Accessed February 2, 2016.

The Airport Land Use Commission for Orange County has established Runway Protection Zones (RPZ) for JWA, also called Accident Potential Zones (APZ), which define those surrounding areas that are more likely to be affected if an aircraft-related accident were to occur. Those zones do not extend to the vicinity of the proposed project site. Because most aircraft accidents take place on or immediately adjacent to the runway it is unlikely that aircraft operating at JWA pose a safety threat to the UCI campus. Additionally, as reported in the 2007 LRDP FEIR, no accidents have occurred near the campus within the past 26 years (LRDP EIR, page 4.6-33). Therefore, impacts due to the proximity to an airport or private airstrip would be less than significant. No mitigation is required.

g) Emergency Response: Project Impact Adequately Addressed in the LRDP EIR

Construction-related road closures are not anticipated, although there may be limited work within the right-of-way (ROW) of Bonita Canyon Drive for installation of utility connections. The proposed project would not obstruct access by emergency vehicles to the project site or nearby residential areas; however, if temporary road closures are deemed necessary by the contractor, compliance with LRDP EIR mitigation measure Haz-6A would ensure sufficient notification to the UCI Fire Marshall to allow coordination of emergency services that may be affected (LRDP EIR, page 4.6-34). Furthermore, the proposed project would follow UCI's Emergency Response Plan that addresses roles and responsibilities, communications, training, and procedures in order to respond to emergency situations. Therefore, with implementation of LRDP EIR mitigation measure Haz-6A, potential impacts to emergency response on or surrounding the campus would be reduced to a less than significant impact.

h) Wildland Fires: Less than Significant Impact

The proposed project is surrounded by California Avenue and on-campus residential uses to the north, on-campus residential uses to the west, and Bonita Canyon Drive and off-campus mixed-use development to the south. Although there is an undeveloped piece of land with minimal vegetation owned by UCI to the east of the project site, the roadway, Anteater Drive, lies between. Furthermore, the LRDP EIR indicated residential development must follow Orange County Fire Authority (OCFA) fuel modification zone guidelines, which includes graduated zones of fuel reduction. Therefore, impacts due to wildland fire would be less than significant. No mitigation is required.

Mitigation Measures

Haz-6A: Prior to initiating on-site construction for future projects that implement the 2007 LRDP and would involve a land or roadway closure, the construction contractor and/or UCI Design and Construction Services shall notify the UCI Fire Marshall. If determined necessary by the UCI Fire Marshal, local emergency services shall be notified of the lane or roadway closure by the Fire Marshall.

4.8 Hydrology and Water Quality

Issues	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:					
a) Violate any water quality standards or waste discharge requirements?		X			
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?					X
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?		X			
d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding		X			

Issues	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant with Project-level Mitigation Incorporated	Less Than Significant Impact	No Impact
on- or off-site?					
e) 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?		**X**			
f) Otherwise substantially degrade water quality?				**X**	
g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?					**X**
h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?					**X**
i) Expose 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?				**X**	
j) Inundation by seiche, tsunami, or mudflow?				**X**	

Discussion

Hydrology and water quality issues are discussed in Section 4.7 of the 2007 LRDP EIR.

a) Water Quality Standards: Project Impact Adequately Addressed in LRDP

EIR

The proposed project would potentially generate water quality impacts related to construction and post-construction conditions. Construction of the project could result in additional sources of polluted runoff through site clearing and grading, stockpiling of soils and materials, painting, concrete pouring, and asphalt surfacing (LRDP EIR, page 4.1-21). Site development would generate new sources of urban runoff from the project's streets, driveways, parking areas, roofs, patios and landscaped areas.

Runoff from the residential sites would be directed into a local storm drainage network within the project's internal streets. Ultimately, drainage from the site would be transported via San Diego Creek to Upper Newport Bay, located approximately two miles west of the UCI campus. Runoff from the campus accounts for less than one percent of all flows into the Bay (LRDP EIR, page 4.7-10). Runoff from the manufactured slope that descends to Bonita Canyon Drive on the southern edge of the project would be dissipated through vegetative cover planted on the slope, prior to flowing across the sidewalk adjacent the roadway and into the street drainage system and also eventually reaching the Bay.

Applicable water quality standards developed by the State Water Resources Control Board (SWRCB) or Regional Water Quality Control Board (RWQCB) for storm water are set forth in applicable storm water permits (which also serve as waste discharge requirements), including the General Construction Storm Water Permit applicable to this project, which would control pollutants contained in runoff generated from campus properties (LRDP EIR, page 4.17-19).

Site development, as proposed, would generate new sources of urban runoff from streets, driveways, parking areas, roofs, patios and landscaped slope areas. Runoff from the residential sites would flow into a local storm drainage network within the internal streets, while runoff from the manufactured slope that descends to Bonita Canyon Drive would be dissipated through vegetation cover, before flowing into the storm drainage system.

Potential water quality impacts during the construction phases for this project would be of the same type as those evaluated in the 2007 LRDP FEIR. Stockpiled soils and other construction materials for use during later construction phases would be stored outdoors during construction. Pollutants associated with these construction activities that could result in water quality impacts include soils, debris, other materials generated during site clearing and grading, fuels and other fluids associated with the equipment used for construction, paints, other hazardous materials, concrete slurries, and asphalt materials. These pollutants could impact water quality if they are washed off site by storm water or non-storm water, or are blown or tracked off site to areas susceptible to wash off by storm water or non-storm water. Pollutants could drain to one or more of the receiving waters identified for the UCI campus (LRDP EIR, page 4.7-21).

Landscaping when installed could also result in water quality impacts due to the use of fertilizers. If fertilizers are discharged, they could adversely affect aquatic plants and animals downstream in receiving waters through a reduction in oxygen levels and an increase in eutrophication. Eutrophication is the process of over-enrichment of nutrients in a water body fostering an increase in biotic life that results in a significant loss of dissolved oxygen (LRDP EIR, page 4.7-21).

All construction activities, including the transport and placement of excess soil materials at the off-site soil stockpile site, will be carefully managed to prevent runoff containing soil and vegetation materials and construction wastes. In accordance with a Stormwater Pollution Prevention Plan (SWPPP) prepared to satisfy the conditions of the statewide General Construction Storm Water Permit storm water management practices would mitigate the project's construction related impacts to less than significant (LRDP EIR, page 4.7-22).

This project would not generate any point sources of wastewater or other liquid or solid water contaminants. All of the new residential wastewater that would be generated by the new homes and apartments would be discharged into a local sanitary sewer system that would convey the flows into Irvine Ranch Water District's (IRWD) regional wastewater collection and treatment system.

Implementation of the construction control measures to be specified in the project's SWPPP as required under the General Construction Storm Water Permit program, and installation/maintenance of the post-construction BMPs to be specified in the project's water quality management plan will ensure that runoff from the developed site does not violate any water quality standards. Potential impacts to San Diego Creek related to the project's post-construction activities would be reduced to below a level of significance with implementation of LRDP EIR mitigation measure Hyd-2A and Hyd-2B.

Therefore, in compliance with the storm water permits described above and implementation of LRDP EIR mitigation measures Hyd-2A and Hyd-2B, construction and post construction impacts would be reduced to a less than significant level.

b) Groundwater: No Impact

UCI does use groundwater but instead obtains water provided by IRWD. This issue was adequately addressed in the 2007 LRDP Initial Study and further analysis in the EIR was not required (LRDP EIR, page 4.7-27). Therefore, the proposed project would not affect groundwater tables and no impact would occur. No mitigation is required.

c) Erosion On or Off-site: Project Impact Adequately Address in LRDP EIR

There are no rivers or streams on site. A majority of the undeveloped site slopes southward, and overland flows that are not absorbed into the ground or by surface vegetation end up in the Bonita Canyon Drive storm drain system.

Although the project site's topography would be reconfigured to create building pads, streets, and manufactured slopes, existing drainage patterns would generally be retained. Features that control run-off volumes and durations to minimize or eliminate erosion and siltation would be depicted on final construction plans. All common area slopes would be fully landscaped and include terrace drains that tie into the project's storm drain system. Energy dissipaters and other control devices will be incorporated as needed. Drainage control measures would be implemented during rough grading to ensure that discharge volumes and durations are controlled on newly graded channels. Strategies such as desiltation basins, rip-rap, sandbag chevrons, straw waddles, etc. would be incorporated into the project's SWPPP both during and after grading. Therefore, potential erosion or siltation impacts during and following construction would be reduced to less than significant levels through compliance with the conditions of the General Construction Storm Water Permit and LRDP EIR mitigation measures Hyd-2A and 2B.

d) Substantially Alter Drainage Pattern: Project Impact Adequately Address in LRDP EIR

A substantial portion of the currently undeveloped site would be converted to developed surfaces, including impervious surfaces (rooftops, driveways, streets, etc.) that would increase the rate and amount of runoff. To avoid significant flooding impacts on or off site the proposed storm drainage system would be designed in accordance with the drainage criteria set forth in LRDP EIR mitigation measures Hyd-1A and Hyd-1B. The drainage system would be built to maintain or reduce the peak runoff from 25-year and 100-year storm events. Additional hydrological analysis will be conducted as part of the final design process to specify all primary and secondary drainage control facilities required to satisfy flood control criteria, as well as site design, mechanical, structural and non-structural measures to filter pollutants from site runoff, prior to discharge into the storm drainage networks in California Avenue and Bonita Canyon Drive. Therefore, with implementation of Hyd-1A, impacts to the alteration of the drainage pattern would be reduced to a less than significant level.

e) Drainage System Capacity/Substantial Additional Polluted Runoff: Project Impact Adequately Address in LRDP EIR

There are no storm drainage facilities within the presently undeveloped project site, and site runoff currently travels by overland flow to the California Avenue and Bonita Canyon Drive storm drainage systems. As stated in the project description, construction of the project would include a storm water drainage system in order to address the increase in impermeable surfaces as part of the development of project site. However, the on-site drainage system, as discussed in 4.8(d), would be designed to provide sufficient capacity to manage the level of water runoff anticipated upon completion of construction and a plan would be finalized during the design phase. Therefore, with implementation of Hyd-1A, impacts due to additional polluted runoff would be less than significant. No mitigation is required.

f) Substantially Degrade Water Quality: Less than Significant Impact

Refer to the previous responses to items 7a-7e. There are no other project elements that would affect the water quality of the site or its surroundings. Therefore, in compliance with the NPDES, impacts to water quality would be less than significant. No mitigation is required.

g) Place Housing with a 100-year Flood Hazard Area: No Impact

The campus, including the project site, is located in a FEMA Flood Zone X. This issue was adequately addressed in the 2007 LRDP Initial Study and further analysis in the EIR was not required (LRDP EIR, page 4.7-27). Therefore, the proposed project would not place housing within a 100-year flood hazard area no impact would occur. No mitigation is required.

h) Place Structures within a 100-year Flood Hazard Area: No Impact

Because there are no 100-year flood hazard areas on the UCI campus, the proposed project would not place any structures in a manner that would impede or redirect flood flows. This issue was adequately addressed in the 2007 LRDP Initial Study and further analysis in the EIR was not required (LRDP EIR, page 4.7-27). Therefore, the proposed project would not place structures in a 100-year flood hazard area no impact would occur. No mitigation is required.

i) Expose People or Structures to a Significant Risk Involving Flooding: Less than Significant Impact

Because the project site is not within a levee or dam inundation area, the proposed project would not expose people or structures to risk due to flooding. The LRDP EIR determined that it is unlikely that flooding because of dam or levee failure would have an effect on the campus due to its height above mean sea level (msl). This issue was adequately addressed in the 2007 LRDP Initial Study and further analysis in the EIR was not required (LRDP EIR, page 4.7-27). Therefore, impacts due to exposure of people or structures to flooding would be less than significant. No mitigation is required.

j) Seiche, Tsunami, or Mudflow: Less than Significant Impact

UCI is located approximately three miles from the Pacific Ocean and sufficient evacuation notice would be provided by the West Coast and Alaska Tsunami Warning Center in the occurrence of a tsunami. The site is not located in an area threatened by potential seiche conditions and is relatively flat, which is unconducive to mudflows (LRDP EIR, pages 4.7-24 through 25). Therefore, impacts due to exposure of people or structures to seiche, tsunami, or mudflow would be less than significant. No mitigation is required.

Mitigation Measures

Hyd-1A: As early as possible in the planning process of future projects that implement the 2007 LRDP and would result in land disturbance of 1 acre or greater, and for all development projects occurring on the North Campus in the watershed of the San Joaquin Freshwater Marsh, a qualified engineer shall complete a drainage study. Design features and other recommendations from the drainage study shall be incorporated into project development plans and construction documents. Design features shall be consistent with UCI's Storm Water Management Program, shall be operational at the time of project occupancy, and shall be maintained by UCI. At a minimum, all drainage studies required by this mitigation measure shall include, but not be limited to, the following design features:

Site design that controls runoff discharge volumes and durations shall be utilized, where applicable and feasible, to maintain or reduce the peak runoff for the 10-year, 6-hour storm event in the post-development condition compared to the pre-development condition, or as defined by current water quality regulatory requirements.

Measures that control runoff discharge volumes and durations shall be utilized, where applicable and feasible, on manufactured slopes and newly-graded drainage channels, such as energy dissipaters, revegetation (e.g., hydroseeding and/or plantings), and slope/channel stabilizers.

Hyd-2A: Prior to initiating on-site construction for future projects that implement the 2007 LRDP, UCI shall approve an erosion control plan for project construction. The plan shall include, but not be limited to, the following applicable measures to protect downstream areas from sediment and other pollutants during site grading and construction:

- Proper storage, use, and disposal of construction materials.
- Removal of sediment from surface runoff before it leaves the site through the use of silt fences, gravel bags, fiber rolls or other similar measures around the site perimeter.
- Protection of storm drain inlets on-site or downstream of the construction site through the use of gravel bags, fiber rolls, filtration inserts, or other similar measures.
- Stabilization of cleared or graded slopes through the use of plastic sheeting, geotextile fabric, jute matting, tackifiers, hydro-mulching, revegetation (e.g., hydroseeding and/or plantings), or other similar measures.
- Protection or stabilization of stockpiled soils through the use of tarping, plastic sheeting, tackifiers, or other similar measures.
- Prevention of sediment tracked or otherwise transported onto adjacent roadways through use of gravel strips or wash facilities at exit areas (or equivalent measures).
- Removal of sediment tracked or otherwise transported onto adjacent roadways through periodic street sweeping.
- Maintenance of the above-listed sediment control, storm drain inlet protection, slope/stockpile stabilization measures.

Hyd-2B: Prior to project design approval for future projects that implement the 2007 LRDP and would result in land disturbance of 1 acre or more, the UCI shall ensure that the projects include the design features listed below, or their equivalent, in addition to those listed in mitigation measure Hyd-1A. Equivalent design features may be applied consistent with applicable MS4 permits (UCI's Storm Water Management Plan) at that time. All applicable design features shall be incorporated into project development plans and construction documents; shall be operational at the time of project occupancy; and shall be maintained by UCI.

- All new storm drain inlets and catch basins within the project site shall be marked with prohibitive language and/or graphical icons to discourage illegal dumping per UCI standards.

- Outdoor areas for storage of materials that may contribute pollutants to the storm water conveyance system shall be covered and protected by secondary containment.

- Permanent trash container areas shall be enclosed to prevent off-site transport of trash, or drainage from open trash container areas shall be directed to the sanitary sewer system.

- At least one treatment control is required for new parking areas or structures, or for any other new uses identified by UCI as having the potential to generate substantial pollutants. Treatment controls include, but are not limited to, detention basins, infiltration basins, wet ponds or wetlands, bio-swales, filtration devices/inserts at storm drain inlets, hydrodynamic separator systems, increased use of street sweepers, pervious pavement, native California plants and vegetation to minimize water usage, and climate controlled irrigation systems to minimize overflow. Treatment controls shall incorporate volumetric or flow-based design standards to mitigate (infiltrate, filter, or treat) storm water runoff, as appropriate.

4.9 Land Use and Planning

Issues	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:					
a) Physically divide an established community?					X
b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the LRDP, general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?				X	
c) Conflict with any applicable habitat conservation plan or natural community conservation plan?					X

Discussion

Land use and planning issues are discussed in Section 4.8 of the 2007 LRDP EIR.

a) Divide an Established Community: No Impact

The proposed project site is designated in the 2007 LRDP as Housing Reserve and Mixed Use – Residential and is bordered by the University Hills residential community to the north and west. This area includes existing single and multi-family residential, park space, and residential support facilities. Anteater Road and undeveloped land, designated as Student Housing in the 2007 LRDP, lies to the east and off-campus housing units to the southeast. South of the project site, Mariners Church, Tarbut V'Torah, and Merage Jewish Community Center of Orange County are located on the south side of Bonita Canyon Drive.

The proposed project would have not affect the land use pattern of the surrounding community, either on or off campus. No major streets would be built or removed; only local streets connecting to the existing street network would be constructed. No existing trails connecting to neighboring parts of University Hills would be eliminated. The proposed project would complement the existing community by introducing a consistent and similarly designed residential development within the established University Hills and surrounding community. Therefore, the proposed project would not divide an established community and no impact would occur. No mitigation is required.

b) Conflict with an Applicable Land Use Plan: Less than Significant

The applicable land use plan is the 2007 LRDP and the University of California is the only agency with local land use jurisdiction over projects located on the campus. As stated above, the project site is designated Housing Reserve and Mixed Use – Residential in the 2007 LRDP, which allows for development of residential uses, including faculty and staff housing and related support facilities.

The 2007 LRDP EIR analyzes a range of 1,250 to 1,700 faculty/staff housing units and concluded that there was sufficient capacity to support 1,700 units on campus. Including the previous phase still under construction, University Hills Area 10, there are 1,426 for-sale or rental housing units on the campus. A total of 300 housing units would be constructed as part of the proposed project, increasing the total number to 1,726, or 26 above the number analyzed within the LRDP EIR. With the construction of the proposed project, an additional 26 units is an unsubstantial increase of 1.5 percent above the envelope analyzed. Therefore, the proposed project is generally consistent with the LRDP EIR and impacts to land use would be less than significant. No mitigation is required.

c) Conflict with an Applicable Conservation Plan: No Impact

The East Campus, including the project site, is not located within a Habitat Conservation Plan, Natural Community Conservation Plan, or any other kind of land conservation plan. Therefore, the proposed project would not conflict with an applicable conservation plan and no impact would occur. No mitigation is required.

Mitigation Measures

No mitigation measures are required.

4.10 Noise

Issues	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:					
a) Exposure of persons to or generation of noise levels in excess of standards established in any applicable plan or noise ordinance, or applicable standards of other agencies?			**X**		
b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?				**X**	
c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?			**X**		
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?			**X**		
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 expose people residing or working in the project area to excessive noise					**X**

Issues	Potentially Significant Impact	Project Impact Adequately Addressed in LRDP EIR	Less Than Significant with Project-level Mitigation Incorporated	Less Than Significant Impact	No Impact
levels?					
f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?					X

Discussion

Noise issues are discussed in Section 4.9 of the 2007 LRDP EIR. A project-specific Acoustical Assessment was prepared by Michael Baker International, Inc. and is included as Appendix C.

a) Noise Standards: Less Than Significant Impact with Project-level Mitigation Incorporated

SHORT-TERM CONSTRUCTION

Construction activities would include site preparation, grading, paving, building construction, and architectural coating. Ground-borne noise and other types of construction-related noise impacts would typically occur during excavation activities of the grading phase. This phase of construction has the potential to create the highest levels of noise. Typical noise levels generated by construction equipment are shown in Table 4.10-1, Maximum Noise Levels Generated by Construction Equipment. It should be noted that the noise levels identified in Table 4.10-1 are maximum sound levels (L_{max}), which are the highest individual sound occurring at an individual time period. Operating cycles for these types of construction equipment may involve one or two minutes of full power operation followed by three to four minutes at lower power settings. Other primary sources of acoustical disturbance would be due to random incidents, which would last less than one minute (such as dropping large pieces of equipment or the hydraulic movement of machinery lifts).

Table 4.10-1
Maximum Noise Levels Generated by Construction Equipment

Type of Equipment	Acoustical Use Factor[1]	L_{max} at 50 Feet (dBA)
Concrete Saw	*20*	*90*
Crane	*16*	*81*

Concrete Mixer Truck	*40*	*79*
Backhoe	*40*	*78*
Dozer	*40*	*82*
Excavator	*40*	*81*
Forklift	*40*	*78*
Paver	*50*	*77*
Roller	*20*	*80*
Tractor	*40*	*84*
Water Truck	*40*	*80*
Grader	*40*	*85*
General Industrial Equipment	*50*	*85*

Note:
1. Acoustical Use Factor (percent): Estimates the fraction of time each piece of construction equipment is operating at full power (i.e., its loudest condition) during a construction operation.

Source: Federal Highway Administration, *Roadway Construction Noise Model (FHWA-HEP-05-054)*, January 2006.

Although UCI is not subject to local regulations, the City of Irvine's noise standards are relevant to establish guidelines and evaluating noise impacts. Pursuant to City of Irvine Municipal Code Section 6-8-205(A), construction activities may occur between the hours of 7:00 a.m. and 7:00 p.m. on weekdays, and 9:00 a.m. and 6:00 p.m. on Saturdays. No construction activities shall be permitted outside of these hours or on Sundays and federal holidays. These permitted hours of construction are included in the code in recognition that construction activities undertaken during daytime hours are a typical part of living in an urban environment and do not cause a significant disruption. It should be noted that the noise levels depicted in Table 4.10-1 are maximum noise levels, which would occur sporadically when construction equipment is operated in proximity to sensitive receptors. With implementation of time limits specified in the City's Noise Ordinance, noise impacts would be reduced to a less than significant level. Additionally, to further reduce the potential for nuisance noise impacts, mitigation measure NOI-1 would be implemented to incorporate best management practices during construction and to ensure nuisances do not occur. Implementation of mitigation measure NOI-1 would further minimize impacts from construction noise as it requires construction equipment to be equipped with properly operating and maintained mufflers and other state required noise attenuation devices. Therefore, with implementation of project-specific mitigation measure NOI-1 and adherence to the City of Irvine Noise Ordinance, impacts due to the generation of noise during construction would be reduced to a less than significant level.

LONG-TERM OPERATIONAL IMPACTS

Off-Site Mobile Noise

Existing Plus Project Conditions

Future development generated by the proposed project would result in additional traffic on adjacent roadways, thereby increasing vehicular noise in the vicinity of existing and proposed land uses. Based on the Traffic Study prepared by Stantec (Appendix D), the proposed project would result in approximately 2,860 daily trips. The "Existing Without Project" and "Existing Plus Project" scenarios are compared in Table 4.10-2, Existing Plus Project Traffic Noise Levels. As depicted in Table 4.10-2, under the "Existing Without Project" scenario, noise levels would range from approximately 60.4 dBA to 68.6 dBA, with the highest noise levels occurring along Bonita Canyon Drive (between Shady Canyon Drive and Newport Coast Drive). The "Existing Plus Project" scenario noise levels would range from approximately 61.2 dBA to 69.9 dBA with the highest noise levels also occurring along Bonita Canyon Drive (between Shady Canyon Drive and Newport Coast Drive). The noise levels would result in a maximum increase of 0.8 dBA as a result of the proposed project. This increase would occur along California Avenue (east of Anteater Drive).

Table 4.10-2
Existing Plus Project Traffic Noise Levels

Roadway Segment	Existing Without Project					Existing Plus Project					Difference In dBA @ 100 Feet from Roadway
	ADT	dBA @ 100 Feet from Roadway Centerline	Distance from Roadway Centerline to: (Feet)			ADT	dBA @ 100 Feet from Roadway Centerline	Distance from Roadway Centerline to: (Feet)			
			60 CNEL Noise Contour	65 CNEL Noise Contour	70 CNEL Noise Contour			60 CNEL Noise Contour	65 CNEL Noise Contour	70 CNEL Noise Contour	
Culver Drive											
Campus Drive to Anteater Dive/Shady Canyon Drive	20,600	68.6	832	263	83	20,900	68.7	843	267	84	0.1
Bonita Canyon Drive											
Shady Canyon Drive to Newport Coast Drive	28,600	69.7	1,154	365	115	29,600	69.9	1,194	378	119	0.2
West of Newport Coast Drive	24,500	69.1	989	313	99	25,500	69.2	1,028	325	103	0.1
California Avenue											
East of Anteater Drive	5,200	60.4	122	39	12	6,300	61.2	148	47	15	0.8
Anteater Drive											
North of California Avenue	8,900	62.7	209	66	21	9,300	62.9	218	69	22	0.2
South of California Avenue	6,100	61.1	143	45	14	7,500	62.0	176	56	18	0.9

Notes: ADT = average daily traffic; dBA = A-weighted decibels; CNEL = community noise equivalent level

Source: Noise modeling is based on traffic data within the *University Hills PA11 Traffic Study*, prepared by Stantec Consulting Services, Inc. (September 22, 2015).

It is noted that although traffic noise levels would exceed the State of California "normally acceptable" limit of 65 dBA for multi-family residential land uses along the southern portion of site along Bonita Canyon Drive under Existing Plus Project conditions, traffic noise along this roadway exceeds 65 dBA under existing conditions, and the project's contribution to traffic noise levels would not be perceivable (i.e., increases would be less than 3 dB). Therefore, the proposed project would not significantly increase noise levels along the roadway segments analyzed, and a less than significant impact would occur.

Year 2035 With Project Conditions

The "Year 2035 Without Project" and "Year 2035 With Project" scenarios are compared in Table 4.10-3, Year 2035 Project Traffic Noise Levels. As depicted in Table 4.10-3, under the "Year 2035 Without Project" scenario, noise levels would range from approximately 62.3 dBA to 69.7 dBA, with the highest noise levels occurring along Bonita Canyon Drive (between Shady Canyon Drive and Newport Coast Drive). The "Year 2035 With Project" scenario noise levels would range from approximately 63.6 dBA to 70.0 dBA with the highest noise levels also occurring along Bonita Canyon Drive (between Shady Canyon Drive and Newport Coast Drive). The noise levels would result in a maximum increase of 1.3 dBA as a result of the proposed project. This increase in noise would occur along Anteater Drive (South of California Avenue). Since the proposed project would not significantly increase noise levels along the roadway segments analyzed, a less than significant impact would occur.

Table 4.10-3
Year 2035 Project Traffic Noise Levels

Roadway Segment	Year 2035 Without Project					Year 2035 With Project					Difference In dBA @ 100 Feet from Roadway
	ADT	dBA @ 100 Feet from Roadway Centerline	Distance from Roadway Centerline to: (Feet)			ADT	dBA @ 100 Feet from Roadway Centerline	Distance from Roadway Centerline to: (Feet)			
			60 CNEL Noise Contour	65 CNEL Noise Contour	70 CNEL Noise Contour			60 CNEL Noise Contour	65 CNEL Noise Contour	70 CNEL Noise Contour	
Culver Drive											
Campus Drive to Anteater Dive/Shady Canyon Drive	24,310	69.4	982	310	98	24,600	**69.4**	**993**	**314**	**99**	**0**
Bonita Canyon Drive											
Shady Canyon Drive to Newport Coast Drive	28,290	69.7	1,143	361	114	30,300	**70.0**	**1,222**	**386**	**122**	0.3
West of Newport Coast Drive	22,410	68.7	904	286	90	23,400	**68.9**	**944**	**299**	**94**	0.2
California Avenue											
East of Anteater Drive	9,910	63.2	232	73	23	11,000	**63.7**	**258**	**82**	**26**	0.5
Anteater Drive											
North of California Avenue	13,630	64.5	320	101	32	14,000	**64.6**	**328**	**104**	**33**	0.1
South of California Avenue	8,140	62.3	191	60	19	11,000	**63.6**	**258**	**82**	**26**	1.3

Notes: ADT = average daily traffic; dBA = A-weighted decibels; CNEL = community noise equivalent level

Source: Noise modeling is based on traffic data within the *University Hills PA11 Traffic Study*, prepared by Stantec Consulting Services, Inc. (September 22, 2015).

Cumulative Mobile Source Impacts

A project's contribution to a cumulative traffic noise increase would be considered significant when the combined effect exceeds perception level (i.e., auditory level increase) threshold. The combined effect compares the "cumulative with project" condition to "existing" conditions. This comparison accounts for the traffic noise increase generated by a project combined with the traffic noise increase generated by projects in the cumulative project list. The following criteria have been utilized to evaluate the combined effect of the cumulative noise increase.

Combined Effect. The cumulative with project noise level ("Year 2035 With Project") would cause a significant cumulative impact if a 3.0 dB increase over existing conditions occurs and the resulting noise level exceeds the applicable exterior standard at a sensitive use.

Although there may be a significant noise increase due to the proposed project in combination with other related projects (combined effects), it must also be demonstrated that the project has an incremental effect. In other words, a significant portion of the noise increase must be due to the proposed project. The following criteria have been utilized to evaluate the incremental effect of the cumulative noise increase.

Incremental Effects. The "Year 2035 With Project" causes a 1.0 dBA increase in noise over the "Future Without Project" noise level.

A significant impact would result only if both the combined and incremental effects criteria have been exceeded. Noise by definition is a localized phenomenon, and reduces as distance from the source increases. Consequently, only the proposed project and growth due to occur in the project site's general vicinity would contribute to cumulative noise impacts. Table 4.10-4, *Cumulative Noise Scenario*, lists the traffic noise effects along roadway segments in the project vicinity for "Existing," "Year 2035 Without Project," and "Year 2035 With Project," conditions, including incremental and net cumulative impacts.

Table 4.10-4
Cumulative Noise Scenario

Roadway Segment	Existing	Future Without Project	Future With Project	Combined Effects	Incremental Effects	Cumulatively Significant Impact?
	dBA @ 100 Feet from Roadway Centerline	dBA @ 100 Feet from Roadway Centerline	dBA @ 100 Feet from Roadway Centerline	Difference In dBA Between Existing and Future With Project	Difference In dBA Between Future Without Project and Future With Project	
Culver Drive						
Campus Drive to Anteater Dive/Shady Canyon Drive	68.6	69.4	**69.4**	0.8	0	*No*
Bonita Canyon Drive						
Shady Canyon Drive to Newport Coast Drive	69.7	69.7	**70.0**	0.3	0.3	*No*
West of Newport Coast Drive	69.1	68.7	**68.9**	-0.2	0.2	*No*
California Avenue						
East of Anteater Drive	60.4	63.2	**63.7**	3.3	0.5	*No*
Anteater Drive						
North of California Avenue	62.7	64.5	**64.6**	1.9	0.1	*No*
South of California Avenue	61.1	62.3	**63.6**	2.5	1.3	*No*

Roadway Segment	Existing	Future Without Project	Future With Project	Combined Effects	Incremental Effects	Cumulatively Significant Impact?
	dBA @ 100 Feet from Roadway Centerline	dBA @ 100 Feet from Roadway Centerline	dBA @ 100 Feet from Roadway Centerline	Difference In dBA Between Existing and Future With Project	Difference In dBA Between Future Without Project and Future With Project	
Notes: ADT = average daily traffic; dBA = A-weighted decibels; CNEL = community noise equivalent level						
Source: Noise modeling is based on traffic data within the *University Hills PA11 Traffic Study, prepared by Stantec Consulting Services, Inc. (September 22, 2015).*						

As indicated in Table 4.10-4, the Combined Effects are exceeded along California Avenue, east of Anteater Drive, and the Incremental Effects are exceeded along Anteater Drive, south of California Avenue. However, the Combined Effects and Incremental Effects are not jointly exceeded along any roadway segments. As such, none of the roadway segments would exceed both the Incremental Effects and Combined Effects criteria; thus, none of the roadway segments would be significantly impacted. Therefore, the proposed project, in combination with cumulative background traffic noise levels, would result in less than significant impacts.

On-Site Mobile Noise

Residential Uses

The proposed project includes the construction of 160 unit single-family, and 140 multi-family apartment units for UCI faculty and staff. Based on the modeled noise levels in Table 4.10-3, the loudest exterior noise levels would be approximately 70.0 dBA at 100 feet from the centerline of Bonita Canyon Drive (from Shady Canyon Drive to Newport Coast Drive), which would exceed the state's noise standards of 60 dBA CNEL (single-family campus housing), and 65 dBA CNEL (multi-family campus housing, dormitories, lodging). It was previously determined in the UCI *2007 LRDP EIR* that future residents at the project site would be exposed to noise levels above the state noise standards at buildout of the LRDP. Thus, the project would be required to utilize window treatments (minimum Sound Transmission Class rating of 32) to attenuate interior traffic noise levels to below 45 dBA CNEL (refer to NOI-2). It is noted that the closest residential dwelling units would be located approximately 150 feet to the north of the Bonita Canyon Drive roadway centerline. In addition, the residential units to the north of Bonita Canyon Drive would be elevated above Bonita Canyon Drive, and buffered by a 50-foot landscaped buffer to further attenuate traffic roadway noise. A project-specific analysis would be completed during the design phase to determine any further noise attenuation needed to meet the 45 bDBA CNEL standard.

Open Space and Park Areas

The proposed project would include four on-site open space/park areas for its residents (i.e., two in the northern portion near the Anteater Drive/California Avenue intersection, and two in the southern portion of the site near the Bonita Canyon Drive/Anteater drive intersection). The closest open space/park area would be located approximately 80 feet to the north of the Bonita Canyon Drive centerline, would be elevated above Bonita Canyon Drive, and would be buffered by a 50-foot landscaped area and perimeter wall to attenuate traffic roadway noise. The remaining three open space/park areas would be located further from the Bonita Canyon Drive centerline (beyond approximately 300 feet), positioned behind/surrounded by the proposed on-site residential buildings, and would be guarded by a perimeter wall that would attenuate traffic noise.

As discussed above, compliance with project-level mitigation measure NOI-2 would result in a less than significant impact with regard to on-site traffic noise levels at residential receptors. Noise levels at exterior open space/park areas would be sufficiently blocked by the proposed residential buildings, and attenuated by project features. Therefore, traffic noise would not create an impact at the project site.

Stationary Noise Impacts

Mechanical Equipment

The primary stationary noise source associated with the proposed residential development would be heating, ventilation, and air conditioning (HVAC) units. HVAC units would be positioned on the property of each single-family, and multiple-family residential unit. HVAC systems typically result in noise levels that average between 40 and 50 dBA Leq at 50 feet from the equipment. The closest the HVAC units would be positioned to an adjoining residence would be approximately 6 feet. At this distance, noise levels form HVAC units would be approximately 58 dBA, which is below the State of California "normally acceptable" limit of 65 dBA for multi-family residential land uses, and 60 dBA for single-family residential uses. Therefore, noise from the HVAC units would not be perceptible from adjoining residences on the project site and impacts would be less than significant.

b) Groundborne Vibration: Less than Significant Impact

SHORT-TERM CONSTRUCTION

Project construction can generate varying degrees of groundborne vibration, depending on the construction procedure and the construction equipment used. Operation of construction equipment generates vibrations that spread through the ground and diminish in amplitude with distance from the source. The effect on buildings located in the vicinity of the construction site often varies depending on soil type, ground strata, and construction characteristics of the receiver building(s). The results from vibration can range from no perceptible effects at the lowest vibration levels, to low rumbling sounds and perceptible vibration at moderate levels, to slight damage at the highest levels. Groundborne vibrations from construction activities rarely reach levels that damage structures.

The Federal Transit Administration (FTA) has published standard vibration velocities for construction equipment operations. In general, the FTA architectural damage criterion for continuous vibrations (i.e., 0.2 inch/second) appears to be conservative. The types of construction vibration impacts include human annoyance and building damage. Human annoyance occurs when construction vibration rises significantly above the threshold of human perception for extended periods of time. Building damage can be cosmetic or structural. Ordinary buildings that are not particularly fragile would not experience any cosmetic damage (e.g., plaster cracks) at distances beyond 30 feet. This distance can vary substantially depending on the soil composition and underground geological layer between vibration source and receiver. In addition, not all buildings respond similarly to vibration generated by construction equipment. For example, for a building that is constructed with reinforced concrete with no plaster, the FTA guidelines show that a vibration level of up to 0.20 inch per second (in/sec) is considered safe and would not result in any construction vibration damage. The vibration produced by construction equipment, is illustrated in Table 4.10-5, Typical Vibration Levels for Construction Equipment.

Groundborne vibration decreases rapidly with distance. As indicated in Table 4.10-5, based on the Federal Transit Administration (FTA) data, vibration velocities from typical heavy construction equipment operation that would be used during project construction range from 0.003 to 0.089 in/sec peak particle velocity (PPV) at 25 feet from the source of activity. As such, vibration at the nearest sensitive receptor (approximately 25 feet) during construction activities would be a maximum of approximately 0.089 PPV, which would be below the FTA's 0.20 PPV threshold. Therefore, vibration impacts associated with the proposed project would be less than significant.

Table 4.10-5
Typical Vibration Levels for Construction Equipment

Equipment	**Approximate peak particle velocity at 15 feet (inches/second) [1]**	**Approximate peak particle velocity at 25 feet (inches/second) [2]**	**Approximate peak particle velocity at 45 feet (inches/second) [2]**
Large bulldozer	*0.191*	*0.089*	*0.037*
Loaded trucks	*0.164*	*0.076*	*0.031*
Small bulldozer	*0.006*	*0.003*	*0.001*

Notes:
1 – Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Guidelines*, May 2006. Table 12-2.
2 – Calculated using the following formula:

$$PPV_{equip} = PPV_{ref} \times (25/D)^{1.5}$$

where: PPV (equip) = the peak particle velocity in in/sec of the equipment adjusted for the distance
PPV (ref) = the reference vibration level in in/sec from Table 12-2 of the FTA *Transit Noise and Vibration Impact Assessment Guidelines*
D = the distance from the equipment to the receiver

LONG-TERM OPERATIONAL IMPACTS

The project proposes 160 single-family and 140 multi-family residential units that would not involve railroads or substantial heavy truck operations that would generate ground-borne vibration that could be felt at surrounding uses. Therefore, the proposed project would not cause long-term vibration impacts at surrounding uses and no impact would occur. No mitigation is required.

c) Permanent Ambient Noise: Less than Significant Impact with Project-level Mitigation Incorporated

Refer to 4.10(a) above.

d) Temporary Ambient Noise: Less than Significant Impact with Project-level Mitigation Incorporated

Refer to 4.10(a) above.

e) Public Airport Noise: No Impact

As discussed in the 2007 LRDP EIR (page 4.9-33), the nearest airport, John Wayne, 60 CNEL contour does not extend to the UCI campus. Therefore, the proposed project would not be subject to aircraft noise in excess of regulatory limits and no impact would occur. No mitigation is required.

f) Private Airport Noise: No Impact

There are no private airstrips in the vicinity of the campus. Therefore, the proposed project would not be subject to excessive noise levels due to a private airport and no impact would occur. No mitigation is required.

Mitigation Measures

NOI-1: The Project Applicant and/or Contractor shall implement the following noise-attenuating measures during construction of the proposed project:

- Construction contracts specify that all construction equipment, fixed or mobile, shall be equipped with properly operating and maintained mufflers and other state required noise attenuation devices.

- Property owners and occupants located within 200 feet of the project boundary shall be sent a notice, at least 15 days prior to commencement of construction of each phase, regarding the construction schedule of the proposed project. A sign, legible at a distance of 50 feet shall also be posted at the project construction site. All notices and signs shall indicate the dates and duration of construction activities, as well as provide a contact name and a telephone number where residents can inquire about the construction process and register complaints.

- The Contractor shall provide evidence that a construction staff member will be designated as a Noise Disturbance Coordinator and will be present on-site during construction activities. The Noise Disturbance Coordinator shall be responsible for responding to any local complaints about construction noise. When a complaint is received, the Noise Disturbance Coordinator shall implement reasonable measures to resolve the complaint, as deemed acceptable by the Community Development Director (or designee). All notices that are sent to residential units immediately surrounding the construction site and all signs posted at the construction site shall include the contact name and the telephone number for the Noise Disturbance Coordinator.

- Prior to issuance of any Grading or Building Permit, the Project Applicant shall demonstrate to the satisfaction of the Community Development Director (or designee) that construction noise reduction methods shall be used where feasible. These reduction methods include shutting off idling equipment, installing temporary acoustic barriers around stationary construction noise sources, maximizing the distance between construction equipment staging areas and occupied residential areas, and electric air compressors and similar power tools.

- Construction haul routes shall be designed to avoid noise sensitive uses (e.g., residences, convalescent homes, etc.), to the extent feasible.

- During construction, stationary construction equipment shall be placed such that emitted noise is directed away from sensitive noise receivers.

- Construction activities shall not take place outside of the allowable hours specified by the City's *Municipal Code* Section 6-8-205(A) (7:00 a.m. and 7:00 p.m. on weekdays, and 9:00 a.m. and 6:00 p.m. on Saturdays; construction activities are not permitted on Sundays or legal holidays).

NOI-2: During project plan review and prior to construction, UCI shall ensure that the project design includes the following project design features:

- Specific window treatments, such as dual glazing (a minimum Sound Transmission Class rating of 32) and mechanical ventilation shall be utilized at all residential units fronting Bonita Canyon Drive.

4.11 Population and Housing

Issues	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:					
a) 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)?				X	
b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?					X
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?					X

Discussion

Population and housing issues are discussed in Section 4.10 of the 2007 LRDP EIR.

a) Induce Substantial Population Growth: Less than Significant Impact

The proposed project is located on land allotted for residential use on the campus. As discussed in the project description, the LRDP EIR analyzed faculty and staff housing buildout at 1,700 dwelling units. The proposed project would go above the number of dwelling units analyzed in the LRDP EIR by 26 for a total of 1,726 faculty and staff dwelling units.

Historic ICHA demographic numbers show occupation of University Hills units at 3.0 persons per household. If this number is applied, the proposed project would accommodate 900 people (3.0 persons x 300 housing units). However, the housing units would be available to both new and existing faculty and staff. It is assumed that 230 units would go to new faculty and staff (77 percent of the 300 units being constructed); the remaining 70 units would be occupied by faculty or staff already living near the campus (33 percent of the new units being constructed). Therefore, approximately 690 increased additional persons (3.0 persons x 230 housing units) is estimated at full occupancy of the proposed project.

However, 1,700 units have been analyzed in the LRDP EIR and the population growth associated with it was found to not have a significant impact on the environment (LRDP EIR, page 4.10-10). Therefore, with the additional 26 units, an estimated increase in population of 61 persons (3.0 persons x 26 housing units x 77 percent) is anticipated with the proposed project that was not analyzed in the LRDP EIR. This is less than one percent of the total campus population. Furthermore, the proposed project furthers the goal in the City of Irvine's Housing Strategy and Implementation Plan, which discusses the University providing affordable on-campus housing. Therefore, the proposed project would not induce a substantial population growth above what was analyzed in the LRDP EIR, and impacts would be less than significant. No mitigation is required.

b) Displace Existing Housing: No Impact

c) Displace a Substantial Number of People: No Impact

The proposed project would not displace any housing or people because the site is currently a vacant and undeveloped piece of land. Therefore, the proposed project would not displace people or require replacement housing elsewhere and no impact would occur. No mitigation is required.

Mitigation Measures

No mitigation measures are required.

4.12 Public Services

Issues	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?				X	
b) Police protection?				X	
c) Schools?				X	
d) Parks?				X	
e) Other public facilities?				X	

Discussion

Public service issues are discussed in Section 4.11 of the 2007 LRDP EIR.

a) Fire Protection: Less than Significant Impact

Fire protection and emergency response services to University Hills are provided by the Orange County Fire Authority (OCFA). OCFA Fire Station #4, located north of the campus on the corner of California and Harvard Avenues, is the primary responder serving the campus. The station was built in 1966 and there are no plans for its expansion. According to an analysis conducted by OCFA in November 2006, this station has adequate capacity to accommodate existing demand on the main campus. The capacity of service for Station #4, as determined by OCFA, is approximately 3,500 calls per year. During 2005, UCI generated 668 calls or 30 percent of the station's calls. UCI employs a State Fire Marshal whom is responsible for the campus fire prevention practices and provides services such as plan review and construction inspections.

As discussed in the 2007 LRDP EIR, full implementation of the 2007 LRDP would result in an approximately 39 percent increase in the on-campus population of students, faculty, and staff by 2025, compared to the 2005-06 on-campus population. Assuming that the increase in call generation for fire protection services would be equivalent to the increase in campus population, the number of calls for such services can be expected to increase by approximately 39 percent.

Therefore, the projected call volume from UCI would increase by an estimated 259 calls by 2025, for a total of 923 estimated annual UCI calls for fire protection services. Added to the existing call volume, the total projected call volume would be an estimated 3,023 calls, which would be within the determined Station #4 capacity of 3,500 calls for fire protection services. The LRDP FEIR concluded that no new fire stations or expansions to Fire Station #4 would be needed to maintain adequate levels of service to the main campus to serve LRDP development.

As discussed in Section 4.11, Population and Housing, the proposed project includes 26 additional units above the number analyzed within the LRDP EIR and would increase population by approximately 61 persons, which is less than one percent of the campus population. The project site is located within a five travel minute coverage area by OCFA. Fire Station #4 has a reliability of 83 percent where a unit is on-site within seven minutes and 20 seconds.[1] This is within the standard adopted by OCFA, where a unit should on-site within seven minutes and 20 seconds for 80 percent of emergency calls.

Furthermore, the UCI Fire Marshal reviews and approves all development plans or each new campus project in accordance with California building and fire codes (LRDP EIR, page 4.11-7). The project is consistent with the 2007 LRDP land use designation and long-term demand for fire department services would be within the levels projected in the 2007 LRDP EIR. Therefore, impacts to fire service that would result in the need for new facilities would be less than significant. No mitigation is required.

b) Police Protection: Less than Significant Impact

The UCI Police Department (UCIPD) is located in the Public Services building on the East Campus approximately 0.5-mile from the project site. The UCIPD provides all police services (all patrol, investigation, crime prevention education, and related law enforcement duties) for the campus, including University Hills (LRDP EIR, page 4.11-3).

Demands on police protection services for UCI are likely to increase with campus population growth (LRDP EIR, page 4.11-8). Some expansion or renovation of existing facilities or construction of new facilities may be required to maintain adequate service levels; however, no expansion of police facilities is anticipated at this time. Furthermore, any additional facilities would be subject to assessment of environmental impacts and mitigation measures, pursuant to the University's obligations under CEQA, and no significant impacts associated with additional police facilities were anticipated in the LRDP EIR. The proposed project would not result in a significant increase in the amount of housing units addressed in the LRDP EIR nor significantly change the need for police department services. Therefore, impacts due to the construction of new police facilities would be less than significant. No mitigation is required.

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[1] http://www.ocfa.org/Uploads/Orange%20County%20Fire%20Authority%20SOC_FINAL.pdf. Accessed March 2, 2016.

c) Schools: Less than Significant Impact

The Irvine Unified School District (IUSD) provides kindergarten through grade 12 (K-12) public education services for school age children residing on the UCI campus. The demand for grade K-12 public education facilities generated by the UCI on-campus population is associated primarily with married student, faculty/researcher, and staff households. Through IUSD's open enrollment program, UCI-based students may attend various school campuses in the district.

Implementation of the proposed project could result in an increase in the number of school age children on campus. It is likely that some of the proposed homes would be occupied by families with school age children, a majority of who would enroll in IUSD K-12 schools, creating additional demand for school facility capacity. The LRDP EIR however concluded that these new students represent a small percentage of IUSD enrollment, which may not even be perceivable within IUSD's yearly student enrollment fluctuations, even with the estimated additional 61 persons above what was analyzed in the 2007 LRDP EIR (see Section 4.11, Population and Housing). However, to offset its incremental impact on school district facilities, UCI would pay development impact fees to IUSD to support local school construction and operation. Therefore, impacts to schools would be less than significant. No mitigation is required.

d) Parks: Less than Significant Impact

The proposed project includes park amenities as well as pedestrian and bike trail linkages to the campus trail network. A precise plan for the park open space has not been developed; however, it is anticipated that it would be limited to passive landscaped areas, playground equipment, and benches with limited vehicle parking.

As discussed in previous sections, the project site does not contain any significant agricultural, biological, or cultural resources; therefore, the proposed neighborhood park site would not affect such resources. Noise sources in this park amenity would typically consist of passive recreation activities such as picnics, walking, sitting, children at play, walking dogs, etc. Any outdoor lighting fixtures necessary would be at a scale and intensity to provide a safe level of illumination, which would create an insignificant impact outside of the recreation area. Furthermore, due to the small size of the park and the limited vehicular parking, this would not be a convenient site for large group events. Therefore, impacts due to the development and operation of the park space would be less than significant. No mitigation is required.

e) Other Public Facilities: Less than Significant Impact

As discussed above and in Section 4.11, Population and Housing, the proposed project would not substantially increase population above what was already allotted for in the LRDP EIR. Furthermore, public facilities, such as libraries, exist on-campus and would not result in the need for the construction of new facilities within the surrounding community. Therefore, impacts to other public facilities would be less than significant. No mitigation is required.

Mitigation Measures

No mitigation measures are required.

4.13 Recreation

Issues	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:					
a) Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?				X	
b) Include recreational facilities or require the construction or expansion of recreational facilities, which might have an adverse physical effect on the environment?				X	

Discussion

Recreation issues are discussed in Section 4.12 of the 2007 LRDP EIR.

a) Physically Deteriorate Existing Facilities: Less than Significant Impact

The proposed project would include approximately one acre of open space and walking and bicycling trail linkages to the campus trail network. Although a precise plan has not been developed, the park would include passive landscaped areas, playground and barbeque equipment, and benches. Residents of the proposed project would also have access to community parks located throughout University Hills, including the newly built one-acre University Hills Area 10 pool and park space adjacent to the project site, and the community center located at Gabrielino and California Avenue. Other on-campus recreational facilities are available, including Aldrich Park and the Anteater Recreation Center (ARC). Off-campus recreation opportunities include local parks and private health clubs located in the project vicinity.

As discussed in the LRDP EIR, increased campus population would increase demand for on- and off-campus recreational facilities. The 2007 LRDP assumed that the current level of maintenance of the ARC would continue and that substantial deterioration of the facility would not occur. Furthermore, in addition to more park space being built as part of the project, there is sufficient open space and recreational facilities existing within University Hills. Use of off-campus public recreational facilities in the surrounding area may result as part of the project; however, the impact would be less than significant due to the many recreational opportunities offered on-campus. Therefore, impact to off-campus recreational facilities would be less than significant. No mitigation is required.

b) Construction of Recreational Facilities: Less than Significant

The proposed project would include a neighborhood park and walking and bicycling trail linkages to the existing campus trail network. As discussed in other sections of this document, the project site does not contain any significant agricultural, biological, or cultural resources; therefore, neither the proposed park area nor walking/biking trails would impact these resources. Noise sources within the proposed park would typically consist of passive recreational activities, such as picnics, walking, playing children, etc. Due to the small size and limited parking, the park would not attract larger group events that could produce traffic or noise impacts. Therefore, impacts due to the construction of recreational facilities would be less than significant. No mitigation is required.

Mitigation Measures

No mitigation measures are required.

4.14 Transportation/Traffic

Issues	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:					
a) Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?				X	
b) Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?					X
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?					X

Issues	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) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?				X	
e) Result in inadequate emergency access?				X	
f) Conflict with adopted policies plans or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?					X

Discussion

Transportation and traffic issues are discussed in Section 4.13 of the 2007 LRDP EIR. This analysis is based on the traffic study prepared by Austin-Foust Associates, Inc. (now Stantec Consulting Services, Inc.) in 2007. In addition, a 2016 project-level Traffic Study was prepared by Stantec Consulting Services, Inc. (Appendix D).

a) Performance of the Circulation System: Less than Significant Impact

The proposed project would add 26 dwelling units above the level of faculty/staff housing planned in the LRDP. However, the proposed project would replace 23,000 square feet of planned mixed-use, commercial space. By replacing mixed use-commercial space with dwelling units, the project would add no additional traffic during the AM peak hour, would decrease traffic by 5 trips during the PM peak hour, and would increase daily traffic by a negligible 20 trips. As such, the project would have no measurable increase in traffic over the current LRDP. Graduate student housing, which was also allocated for the project site in the 2007 LRDP, is still anticipated to be built on campus at a new location to be determined in the future. This graduate student housing remains in the traffic model and is reflected in the traffic forecasts utilized for this analysis.

Buildout Traffic Forecast Volumes

Buildout conditions are analyzed since the residential units exceed the total faculty/staff housing in the LRDP. This would represent the buildout of the area, assumed to be 2035 and beyond.

Two arterial links in the City of Irvine would operate at unacceptable LOS E at post 2035. Since Campus Drive west of E. Peltason Drive/Berkeley Avenue and Bonita Canyon Drive west of Anteater Drive/Shady Canyon Drive operate worse than acceptable LOS D based on the daily traffic volume, these mid-block segments are further evaluated using peak hour data. Table 4.14-1 summarizes the peak hour arterial roadway analysis for Campus Drive west of E. Peltason Drive/Berkeley Avenue and for Bonita Canyon Drive west of Anteater Drive/Shady Canyon Drive under 2035 conditions. Although the daily volume exceeds acceptable LOS D, these mid-block segments would operate at LOS A during the peak hours.

Table 4.14-1
2035 Arterial Roadway Peak Hour Analysis Summary

Roadway	Lanes	ADT	Peak Hour Capacity per Direction	Highest Peak Hour Directional Volume	Peak Hour	
					V/C	LOS
Campus Drive (west of E. Peltason/Berkeley)	4	30,700	3,200	1,110 (PM Eastbound)	.35	A
Bonita Canyon (west of Anteater/Shady Canyon)	4	30,300	3,200	1,030 (AM Westbound)	.32	A

Table 4.2-2 summarizes the 2035 ICU and HCM delay values at the study intersections. Under 2035 conditions, all study intersections would operate at acceptable LOS D or better during the AM and PM peak hours based on the LRDP.

Table 4.14-2
2035 No-Project Intersection LOS Summary

Intersection	Jurisdiction	AM Peak Hour		PM Peak Hour	
		ICU/Delay	LOS	ICU/Delay	LOS
ICU Methodology					
1. E Peltason/Berkeley & Campus	Irvine	.40	A	.58	A
2. California & Campus	Irvine	.48	A	.71	C
3. Culver & Campus	Irvine	.60	A	.62	B
4. Anteater & E Peltason	UCI	.45	A	.77	C
7. SR-73 SB & Bonita Canyon	Newport Bch/Caltrans	.56	A	.57	A
8. SR-73 NB & Bonita Canyon	Irvine/Caltrans	.56	A	.58	A
9. Newport Coast & Bonita Canyon	Irvine	.51	A	.57	A
10. Turtle Ridge & Bonita Canyon	Irvine	.54	A	.60	A

11. Anteater/Shady Cyn & Culver/Bonita Cyn	Irvine	.80	C	.84	D
12. Newport Coast & Turtle Ridge	Irvine	.42	A	.47	A
13. Newport Coast & SR-73 NB	Irvine/Caltrans	.47	A	.48	A
HCM Delay Methodology					
5. Gabrielino & California [1]	UCI	8 sec	A	9 sec	A
6. California & Anteater [1]	UCI	12 sec	B	18 sec	C
7. SR-73 SB & Bonita Canyon	Newport Bch/Caltrans	13 sec	B	12 sec	B
8. SR-73 NB & Bonita Canyon	Irvine/Caltrans	13 sec	B	10 sec	A
13. Newport Coast & SR-73 NB	Irvine/Caltrans	5 sec	A	4 sec	A
[1] Stop-controlled intersection					

The proposed project is located in the southern portion of the UCI main campus in the "University Hills" area. The project consists of 160 single family dwelling units and 140 apartment units for UCI faculty and staff located on a parcel bounded by California Avenue, Anteater Drive, Bonita Canyon Drive, and University Hills Area 10 on the southern portion of the UCI main campus. At least one person within each dwelling unit must be employed by UCI. Access to the proposed project would be provided by a new driveway off of Anteater Drive on the east side and a connection to Gabrielino Road through Area 10 to the west. The project site is currently undeveloped.

The site will be served by an extensive trail of pedestrian paths and sidewalks through this area of the campus, and bike trails on each roadway in the area lead to the UCI main campus. It is expected that residents of the proposed project that work at the main campus would take advantage of the opportunities to walk or bike to their destination on campus.

The LRDP contains a total of 1,700 on-campus faculty/staff housing units. There are currently 1,426 dwelling units built or under construction on campus. The development of the proposed project would bring the total number of on-campus faculty/staff housing units to 1,726, exceeding the planned housing total by 26 dwelling units.

The southeast portion of the project site was designated as mixed use-commercial space in the LRDP. With development of the proposed project, the mixed use-commercial space would be removed from the LRDP.

Trip Generation

Trip generation rates for the project were obtained from the UCI Main Campus Traffic Model (MCTM). Table 4.14-3 summarizes the trip generation rates per dwelling unit and the resulting total trip generation for the proposed residential project. As this table shows, the project would generate a total of 2,860 daily trips, of which 152 would occur during the AM peak hour and 181 would occur during the PM peak hour. Impacts from the full project are analyzed under existing conditions.

Table 4.14-3
Proposed Project Trip Generation Summary

Land Use	Amount	AM Peak Hour			PM Peak Hour			ADT
		In	Out	Total	In	Out	Total	
Trip Generation								
Faculty/Staff Apt (3 Bdrm)	140 DU	1	66	67	55	25	80	1,260
Faculty/Staff (SFD)	160 DU	2	83	85	69	32	101	1,600
TOTAL		3	149	152	124	57	181	2,860
Trip Rates (MCTM)								
Faculty/Staff Apt (3 Bdrm) [1]	DU	.01	.47	.48	.39	.18	.57	9.00
Faculty/Staff (SFD)	DU	.01	.52	.53	.43	.20	.63	10.00
LRDP Adjustment								
Added Housing	26 DU	0	14	14	11	5	16	260
Mixed Use-Commercial (removed)	*23.0 TSF*	*-14*	*-0*	*-14*	*-5*	*-16*	*-21*	*-240*
Change to LRDP		-14	14	0	6	-11	-5	20

Source: *UCI Main Campus Traffic Model (MCTM)*
Notes:
[1] Trip rates for 3-bedroom apartments used here for worst-case purposes, actual development may also include 2-bedroom apartments

ADT = average daily trips
DU = dwelling unit
SFD = single family detached

Trip Distribution

The trips generated by the project would use Anteater Drive and Gabrielino Road to access the surrounding circulation system. However, since Gabrielino Road at E. Peltason Drive is restricted to right turns only due to the raised median on E. Peltason Drive, a very small amount of project traffic is expected to use the Gabrielino Road access.

Project trip distribution was determined based on ADT volumes from the City's Irvine Transportation Analysis Model (ITAM). Approximately 48 percent of project trips are oriented toward Culver Drive/Bonita Canyon Drive to the south via Anteater Avenue, 14 percent of project trips are oriented north on Anteater Avenue towards E. Peltason Drive, and 38 percent of project trips are oriented toward the north via California Avenue. From there, project trips will disperse along Campus Drive, Culver Drive, Bonita Canyon Drive, Newport Coast Drive, Shady Canyon Drive, and SR-73. ITAM estimates that approximately 10 percent of project trips are estimated to remain within the UCI main campus; however, that percentage could be significantly higher based on the number of households with multiple UCI faculty/staff.

Impact Analysis

Impacts from the full project are analyzed under existing conditions. Existing-plus-project peak hour volumes were obtained by adding the project-generated peak hour trips to the existing intersection turning movement volumes at the study intersections.

The segment of Bonita Canyon Drive west of Anteater Drive/Shady Canyon Drive would operate at unacceptable LOS E with the project based on daily volumes. Since Bonita Canyon Drive west of Anteater Drive/Shady Canyon Drive operates worse than acceptable LOS D based on the daily traffic volume, this mid-block segment is further evaluated using peak hour data. Table 4.14-4 shows that the mid-block link operates at acceptable LOS A during the peak hour, and the project has no significant impact on the roadway.

Table 4.14-4
Existing-Plus-Project Arterial Roadway Peak Hour Analysis Summary

Roadway	Lanes	ADT	Peak Hour Capacity per Direction	Highest Peak Hour Directional Volume	Peak Hour	
					V/C	LOS
Bonita Canyon (west of Anteater/Shady Canyon)	4	29,600	3,200	1,470 (AM Westbound)	.46	A

The existing and existing-plus-project LOS based on existing lane configurations are summarized in Table 4.14-5.

Table 4.14-5
Existing-Plus-Project Intersection LOS Summary

Intersection	Existing				Existing + Project			
	AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
	ICU/Delay	LOS	ICU/Delay	LOS	ICU/Delay	LOS	ICU/Delay	LOS
ICU Methodology								
1. E Peltason/Berkeley & Campus	.40	A	.50	A	.40	A	.51	A
2. California & Campus	.39	A	.49	A	.40	A	.52	A
3. Culver & Campus	.53	A	.51	A	.53	A	.51	A
4. Anteater & E Peltason	.46	A	.58	A	.46	A	.59	A
7. SR-73 SB & Bonita Canyon	.38	A	.52	A	.39	A	.54	A
8. SR-73 NB & Bonita Canyon	.51	A	.49	A	.51	A	.52	A
9. Newport Coast & Bonita Canyon	.44	A	.50	A	.45	A	.51	A
10. Turtle Ridge & Bonita Canyon	.51	A	.50	A	.51	A	.51	A
11. Anteater/Shady Cyn & Culver/Bonita Cyn	.53	A	.42	A	.56	A	.45	A
12. Newport Coast & Turtle Ridge	.31	A	.32	A	.31	A	.32	A
13. Newport Coast & SR-73 NB	.37	A	.30	A	.37	A	.30	A
HCM Delay Methodology								
5. Gabrielino & California [1]	8 sec	A	8 sec	A	8 sec	A	8 sec	A

6. California & Anteater [1]	11 sec	B	13 sec	B	11 sec	B	14 sec	B
7. SR-73 SB & Bonita Canyon	4 sec	A	7 sec	A	4 sec	A	7 sec	A
8. SR-73 NB & Bonita Canyon	10 sec	B	7 sec	A	10 sec	B	8 sec	A
13. Newport Coast & SR-73 NB	6 sec	A	3 sec	A	6 sec	A	3 sec	A
[1] Stop-controlled intersection								

The signalized intersections operate at LOS A during the AM and PM peak hours with the addition of the proposed project traffic based on the ICU methodology. The project would add up to .03 to the ICU value at the intersections; however, the study intersections operate at acceptable LOS (LOS D or better) during the AM and PM peak hours, and the project has no significant impact.

Based on the HCM signalized delay methodology, the signalized ramp intersections operate at LOS A or B with the addition of project-generated traffic. The project would add 1 second or less to the average delay at these intersections. The intersections would continue to operate at acceptable LOS (LOS D or better) during the AM and PM peak hours, and the project has no significant impact on the ramp intersections based on the HCM delay methodology.

The stop-controlled study intersections operate at LOS B or better with the addition of project-generated traffic during the AM and PM peak hours. The intersections would operate at acceptable LOS (LOS D or better) during the AM and PM peak hours, and the project has no significant impact on the stop-controlled intersections.

The proposed project would add 26 dwelling units above the level of faculty/staff housing planned in the LRDP; however, the project would replace 23,000 square feet of planned mixed use-commercial space on the site. The peak hour trips generated by the project would be equal to or less than the trips generated by the mixed use-commercial space in the LRDP. Therefore, impacts due to traffic would be less than significant. No mitigation is required.

b) Conflict with Congestion Management Program: No Impact

The nearest elements of the Orange County Congestion Management Plan (CMP) highways and arterials network are Jamboree Road and MacArthur Boulevard, located approximately 2.5 miles and 2 miles from the southeast corner of the campus (Culver Drive/Campus Drive intersection). CMP monitoring is conducted at the intersections of Jamboree Road/I-405 northbound and southbound ramps and at Jamboree Road/ MacArthur Boulevard (LRDP FEIR VI page 4.13-23).

The Traffic Study prepared for this project (Appendix D) determined that project-generated traffic would diminish as a share of overall street volume as distance from the campus increases, and that this project would generate insignificant levels of traffic beyond the 13 study area intersections shown in Figure 1-2 of the Traffic Study. Therefore, traffic from the proposed project would not have a significant impact at any of the three nearest CMP intersections, and an assessment of impacts under CMP guidelines is not required. No mitigation is required.

c) Air Traffic Patterns: No Impact

The proposed project site is located approximately 1.5 miles southeast of JWA. The Initial Study prepared for the 2007 LRDP concluded that the campus is not situated under the Preferred Arrival or Departure Tracks associated with the airport and that future campus buildings would not penetrate the 100:1 Imaginary Surface for designated flight patterns (LRDP EIR VII page 25). Therefore, the proposed project would not affect air traffic patterns and no impact would occur. No mitigation is required.

d) Hazards Due to a Design Feature: Less than Significant Impact

All of the project's streets would be designed in accordance with the same street standards applied to other elements of the campus road network and would have no unique aspects not anticipated in the LRDP FEIR.

The project does not require any other alterations to existing streets or highways and the proposed residences would not interfere with sight distance at any intersections or have any other effect on driver visibility corridors or any traffic controls. The 2007 LRDP EIR determined no impacts would occur from hazards due design features or incompatible uses and that the issue was adequately addressed in the aforementioned initial study (LRDP EIR, page 4.13-61). Therefore, impacts due to potential hazards of a design feature would be less than significant. No mitigation is required.

e) Inadequate Emergency Access: Less than Significant Impact

The proposed project does not include any alterations to existing vehicular access or drive approaches and would not remove any existing routes of vehicular access. As stated in the project description, vehicular access would be provided from Anteater Drive and Coltrane Court. Both are designed to collect and distribute local traffic to the campus arterial network and to provide immediate routes for emergency access. Development associated with implementation of the 2007 LRDP is subject to the UCI Fire Marshal who reviews all projects to ensure that adequate emergency access is incorporated (LRDP EIR, page 4.13-61).

Project construction would not require complete closure of any adjacent streets or service drive that provides primary emergency access to other land uses. Emergency access by fire protection crews, ambulances, police crews, or other emergency vehicles would be maintained for the active construction zones and surrounding land uses. Therefore, with review of the proposed project by the UCI Fire Marshal, impacts related to emergency access would be less than significant. No mitigation is required.

f) Public Transit, Bicycle, or Pedestrian Facilities: No Impact

UCI administers an extensive program of Transportation Demand Management (TDM) measures that encourage commuters to use alternate modes of transportation, including walking, bicycling, carpooling, vanpooling, and riding the UCI shuttle, other local shuttle systems, train, or bus. With these measures, UCI has been successful in achieving an average vehicle ridership higher than the AQMD regional goal (LRDP EIR, page 4.13-58). The proposed project would comply with the UC Sustainable Practices Policy, which requires each campus to incorporate alternative means of transportation to, from, and within each campus to improve the quality of life on campus and in the surrounding community. The proposed project would directly implement this policy by expanding the stock of affordable on-campus housing for faculty and staff. This will substantially reduce private automobile-based commuter trips and many trips associated with recreational activities, since residents could walk, ride a bicycle or ride the campus shuttle to academic and recreational areas on campus. The proposed pedestrian and bicycle trail linkages would expand the on-campus trails network and implement planned linkages identified in the 2007 LRDP Circulation Element. Therefore, project effects involving alternative transportation plans, policies and programs would be beneficial and no impact would occur. No mitigation is required.

Mitigation Measures

No mitigation measures are required.

4.15 Utilities and Service Systems

Issues	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:					
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?					X
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?				X	
c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?				X	
d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?				X	

Issues	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) 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?				X	
f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?				X	
g) Comply with applicable federal, state, and local statutes and regulations related to solid waste?					X

Discussion

Utilities and service systems issues are discussed in Section 4.14 of the 2007 LRDP EIR.

a) Regional Water Quality Control Board Wastewater Treatment Requirements: No Impact

Wastewater from the proposed project would be discharged to the campus' sanitary sewer network, which conveys flows to the Irvine Ranch Water District (IRWD) wastewater treatment system. Wastewater from the UCI campus is treated at the Michelson Water Reclamation Plant (MWRP), which provides a tertiary level of treatment, in accordance with the wastewater treatment standards enforced by the Santa Ana Regional Water Quality Control Board (RWQCB).

Wastewater flows from the proposed single family homes and apartments would consist of the same kinds of chemical composition found in toilets, sinks, showers, bathtubs, and washing machine outflows that are typical of residential development throughout the IRWD service area.

No new kinds of wastewater collection or treatment systems or processes would be required to adequately dispose of project wastewater.

Furthermore, in compliance with the General Permit for Waste Discharge Requirements for Storm Water Discharges from Small Municipal Separate Storm Sewer Systems (MS4s), the campus implements a Stormwater Management Plan and all contractors must comply with UCI's Stormwater Pollution Prevention Best Management Practices (BMPs). A project-specific Stormwater Pollution Prevention Plan (SWPPP), in compliance with the RWQCB, would be completed prior to the start of construction.

Therefore, the proposed project would not exceed wastewater treatment requirements of the Regional Water Quality Control Board and no impact would occur. No mitigation is required.

b) Construction of New Water or Wastewater Treatment Facilities or Expansion of Existing Facilities: Less than Significant Impact

Water and wastewater infrastructure would be constructed on-site to serve the proposed residential development. As stated in the project description, the new infrastructure would connect to distribution systems located within adjacent street segments. Potable and reclaimed water service and wastewater collection and treatment service would be provided by the IRWD.

Although 26 units would be constructed above the total allotted in the LRDP EIR, the proposed project would include many water-efficiency features and reclaimed water. Furthermore, the proposed project would replace approximately 23,000 square feet of anticipated commercial space.

Construction impacts would occur as part of the general site development phase while all street and utility improvements are installed. No alterations to existing main line facilities would be required to provide adequate potable or irrigation water flows to this project, or to provide sufficient sanitary sewer service. Therefore, construction of these components would not result in the construction of new or expansion of water or wastewater treatment facilities and impacts would be less than significant. No mitigation is required.

c) Stormwater Drainage Facilities: Less Than Significant Impact

A finalized stormwater drainage plan has not been completed at this time because the project is design-build; however, existing hydrology patterns on the site would be maintained to the extent practical as determined during the project's final design stage while storm drains are anticipated to run along the north, east, and southeast internal streets. Smaller storm drains would be constructed in the courtyards of the clustered single-family homes and between rental units. During construction, catch basins would be constructed at the north and in the southeast corner of the project site in the proposed park space areas. Due to the amount of clay in the soils, permanent underground storage pipes that would convey the two-year storm event would replace the catch basins during project operation. However, the project is not anticipated to require the construction of stormwater drainage facilities off the project site. Furthermore, wastewater runoff and stormwater facilities are regulated by the MS4 requirements, which would be incorporated into the project. Therefore, in compliance with the MS4 permit, impacts due to stormwater drainage facilities would be less than significant. No mitigation is required.

d) Water Supplies: Less than Significant Impact

The IRWD has developed an Urban Water Management Plan (UWMP, 2005) which projects district-wide water supply availability and demand through 2030. IRWD staff in consultation with UCI reviewed projected water service demand related to implementation of the 2007 LRDP for consistency with the UWMP and concluded that water supply reliability would not be compromised (LRDP EIR, page 4.14-17). Because the proposed project is generally consistent with the number of housing units within the LRDP EIR and would replace 23,000 square feet of planned commercial space as discussed in the Project Description, this conclusion presumes that irrigation needs throughout the campus will continue to be fully met through reclaimed water supplies.

Although, implementation of the 2007 LRDP would result in less than significant impacts to water supply, UCI continues to cooperatively and continually work with IRWD to reduce domestic water demand on campus consistent with UCI sustainability goals, as follows:

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

Therefore, because the proposed project's domestic and reclaimed water demand is generally consistent with the projections developed for the 2007 LRDP and anticipated in the UWMP forecasts, impacts would be less than significant. No mitigation is required.

e) Wastewater Capacity: Less than Significant Impact

The MWRP currently treats up to 18 million gallons per day (mgd) of wastewater. An additional upgrade to 33 mgd is scheduled to be completed in 2025. IRWD forecast a total service area demand for wastewater treatment of 26.11 mgd by 2025, including the projected increase associated with full implementation of the 2007 LRDP. Because the proposed project is generally consistent with the LRDP EIR as discussed in the Project Description, with the 33-mgd upgrade, the MWRP would have sufficient capacity to accommodate the anticipated sewage generation, along with wastewater generated throughout the rest of the IRWD service area.

Therefore, the impact to wastewater treatment capacity would be less than significant (LRDP EIR, pages 4.14-12 through 13). No mitigation is required.

f) Landfill Capacity: Less than Significant Impact

As of June 30, 2013, Orange County Waste & Recycling estimated remaining airspace capacity at approximately 52 million tons with an expected closure in the year 2053. The Olinda Landfill and Prima Deshecha Landfill also serve the County of Orange, which are utilized if the Frank R. Bowerman Landfill reaches daily capacity. Olinda Landfill permits 8,000 tons daily with an expected closure in 2030; Prima Deshecha Landfill is scheduled to close in 2067 and permits 4,000 tons daily.

Orange County Waste & Recycling and the three landfills are in compliance with the California Integrated Waste Management Act of 1989 (AB 939), which requires each jurisdiction to maintain 15 years of solid waste disposal capacity. Therefore, based on available landfill capacity, impacts would be less than significant. No mitigation is required.

g) Solid Waste Regulations: No Impact

UC is not subject to Assembly Bill 939 or other local agency regulations pertaining to solid waste management; nonetheless, a the UC Sustainability Policy has been adopted requiring campuses to undertake aggressive programs to reduce solid waste generation and disposal (LRDP EIR, 4.14- 20).

The proposed residences would generate a variety of typical household municipal wastes which may be disposed of at permitted landfills. Each of the single family homes would be provided with containers for trash, recyclable materials, and green wastes and the rental units with containers at a centralized collection. The project would not require any unique waste collection or disposal methods or facilities and would not conflict with or obstruct any federal, State or local programs to reduce solid waste generation. Therefore, the proposed project would not violate solid waste regulations and no impact would occur. No mitigation is required.

Mitigation Measures

No mitigation measures required.

4.16 Mandatory Findings of Significance

Issues	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) 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?				**X**	
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 probably future projects?)				**X**	

c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?			X	

a) Degrade the Environment, Reduce Habitat or Wildlife Populations, Eliminate Examples of California History: Less than Significant Impact

As discussed under Section 4.1 through 4.13, no significant environmental impacts were identified in the responses to questions regarding project effects. The project site does not contain, support, or connect to any sensitive biological resources nor does it adversely affect any such resources. There are no historic resources on this undeveloped site and in the unexpected event that a prehistoric or archaeological resource is discovered during grading, compliance with LRDP EIR mitigation measures Cul-1C, Cul-4A, Cul-4B, and Cul-4C would reduce impacts to a less than significant level.

b) Cumulatively Considerable Impacts: Less Than Significant Impact

Long-term environmental consequences resulting from the cumulative effect of completing development through implementation of the 2007 LRDP were thoroughly evaluated in the 2007 LRDP EIR. As discussed in the project description, the project is consistent with the LRDP land use policies and would result in approximately 26 housing units, or 61 persons, above what was analyzed in the LRDP EIR. No new or increased severity of impacts beyond what was anticipated in the 2007 LRDP EIR have been identified as a result of the analysis completed for this Initial Study. As discussed in Sections 4.1 through 4.13, project level impacts have been determined to be less than significant, no impact, or mitigated to a less than significant level. Furthermore, no other development or capital projects are planned in the South or East Campus Areas during the next few years while this project is built and occupied. Therefore, the proposed project would not result in cumulatively considerable impacts.

c) Direct or Indirect Effects on Humans: Less Than Significant Impact

No significant impacts on human beings have been identified in this Initial Study. Short-term adverse impacts involving construction phase dust, exhaust emissions, and noise would be less than significant with the incorporation and implementation of the identified routine control measures set forth in the LRDP EIR and project-specific mitigation. There is no evidence of site contamination with hazardous wastes or substances and this residential development project would not emit hazardous air emissions or involve consumption, generation, transport or disposal of dangerous quantities of hazardous materials or wastes. Access to neighboring homes by emergency vehicles would be maintained throughout the construction phases and the developed site would not constrain emergency access to any portion of University Hills.

Therefore, impacts due to direct or indirect effects on humans would be less than significant.

5.0 PREPARERS

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APPENDIX A

Air Quality Assessment

Air Quality Assessment
University Hills Area 11

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INTERNATIONAL

This document is designed for double-sided printing to conserve natural resources.

AIR QUALITY ASSESSMENT

for the

University Hills Area 11 Project

University of California, Irvine

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March 4, 2016

JN 150070

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SYMBOLS, ABBREVIATIONS, AND ACRONYMS

AB	Assembly Bill
AQMP	Air Quality Management Plan
Basin	South Coast Air Basin
BAU	business as usual
CAAQS	California Ambient Air Quality Standards
CAFE	corporate average fleet fuel economy
CalGreen	California Green Building Standards
CARB	California Air Resources Board
CCAA	California Clean Air Act
CEQA	California Environmental Quality Act
CFCs	Chlorofluorocarbons
CH_4	Methane
CO	carbon monoxide
CO_2	carbon dioxide
CO_2eq	carbon dioxide equivalent
EAP	Energy Action Plan
EECAP	energy efficiency climate action plans
EPA	U.S. Environmental Protection Agency
FCAA	Federal Clean Air Act
GHG	greenhouse gas
GWP	Global Warming Potential
H_2O	water vapor
HCFCs	Hydrochlorofluorocarbons
HFCs	Hydrofluorocarbons
hp	horsepower
HPLV	high-pressure-low-volume
HVAC	heating, ventilation, and air conditioning
I-4	Environmental Justice Enhancement Initiative
IPCC	International Panel for Climate Change
lbs	pounds
LEED	Leadership in Engineering and Environmental Design
LOS	level of service
LSTs	Localized Significance Thresholds
Metro	Los Angeles County Metropolitan Transportation Authority
MMT	million metric tons
mpg	miles per gallon
MPO	metropolitan planning organization
$MTCO_2eq$	metric tons of carbon dioxide equivalents
MU-T	Mixed-Use Transit
N_2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards

NO_2	nitrogen dioxide
NO_x	nitrogen oxides
OAL	Office of Administrative Law
O_3	ozone
OPR	Office of Planning and Research
PFCs	Perfluorocarbons
PM_{10}	particulate matter less than 10 microns in diameter
$PM_{2.5}$	particulate matter less than 2.5 microns in diameter
ppm	parts per million
PST	Pacific Standard Time
RCP	Regional Comprehensive Plan
RH	relative humidity
ROG	Reactive Organic Gasses
RTP	Regional Transportation Plan
SB	Senate Bill
SCAG	Southern California Association of Governments
SCAQMD	South Coast Air Quality Management District
SCE	Southern California Edison
SCS	Sustainable Community Strategy
SF_6	Sulfur hexafluoride
SGVCOG	San Gabriel Valley Council of Governments
SGVEWP	San Gabriel Valley Energy Wise Partnership
SIP	State Implementation Plan
SO_2	sulfur dioxide
SO_x	sulfur oxides
SRA	Source receptor Area
UNFCCC	United Nations Framework Convention on Climate Change
$\mu g/m^3$	micrograms per cubic meter
UV-B	ultraviolet B rays
VMT	vehicle miles traveled
VOC	Volatile Organic Compound

EXECUTIVE SUMMARY

The purpose of this Air Quality Assessment is to evaluate potential short- and long-term air quality impacts resulting from implementation of the proposed University Hills Area 11 project ("project" or "proposed project").

The proposed project is located at the northwest corner of the Culver Drive and Bonita Canyon Drive intersection, on the University of California, Irvine (UCI) campus. The project site is approximately 2.15 miles south of Interstate 405 (I-405), and 0.42 miles north of State Route 73 (SR-73) in the City of Irvine, California.

The project proposes to construct 160 single family homes, and 140 apartment units for UCI faculty and staff. The site would be served by an extensive trail of pedestrian paths and sidewalks through this area of the campus, and bike trails on each roadway in the area lead to the UCI main campus. It is expected that residents of the proposed project that work at the main campus would take advantage of the opportunities to walk or bike to their destination on campus. Vehicular access to the proposed project would be provided by a new driveway off of Anteater Drive on the east side of the project site and a connection to Gabrielino Road through residential uses to the west.

Temporary Impacts. Mitigated construction emissions from project implementation would not exceed established annual South Coast Air Quality Management District (SCAQMD) thresholds.

Long-Term Impacts. The analysis has demonstrated that project implementation would result in less than significant long-term regional and localized air quality impacts. Carbon monoxide hot-spots impacts would also be less than significant. The proposed project would result in less than significant impacts for all long-term operational emissions.

Cumulative Impacts. The proposed project would not result in long-term air quality impacts, as emissions would not exceed the SCAQMD adopted operational thresholds. Additionally, adherence to SCAQMD rules and regulations would alleviate potential impacts related to cumulative conditions on a project-by-project basis. The project would not result in significant operational emissions of criteria pollutants.

1.0 INTRODUCTION

The purpose of this Air Quality Assessment is to evaluate potential short- and long-term air quality impacts resulting from implementation of the proposed University Hills Area 11 Project ("project" or "proposed project") on the University of California, Irvine (UCI) campus.

1.1 PROJECT LOCATION

The proposed project is located at the northwest corner of the Culver Drive and Bonita Canyon Drive intersection, on UCI campus, in the City of Irvine, California. The project site is located approximately 2.15 miles south of Interstate 405 (I-405), and 0.42 miles north of State Route 73 (SR-73); refer to Exhibit 1, *Regional Vicinity*. Overall, the project site is located within a developed area of the City and consists of vacant land; refer to Exhibit 2, *Site Vicinity*.

1.2 PROJECT DESCRIPTION

The project site is approximately 29 acres, and currently consists of vacant land. The project proposes to construct 160 single family homes, and 140 apartment units for UCI faculty and staff; refer to Exhibit 3, *Conceptual Site Plan*. The site would be served by an extensive trail of pedestrian paths and sidewalks through this area of the campus, and bike trails on each roadway in the area lead to the UCI main campus. It is expected that residents of the proposed project that work at the main campus would take advantage of the opportunities to walk or bike to their destination on campus. Vehicular access to the proposed project would be provided by a new driveway off of Anteater Drive on the east side and a connection to Gabrielino Road through residential uses to the west.

Subject Site

Michael Baker INTERNATIONAL

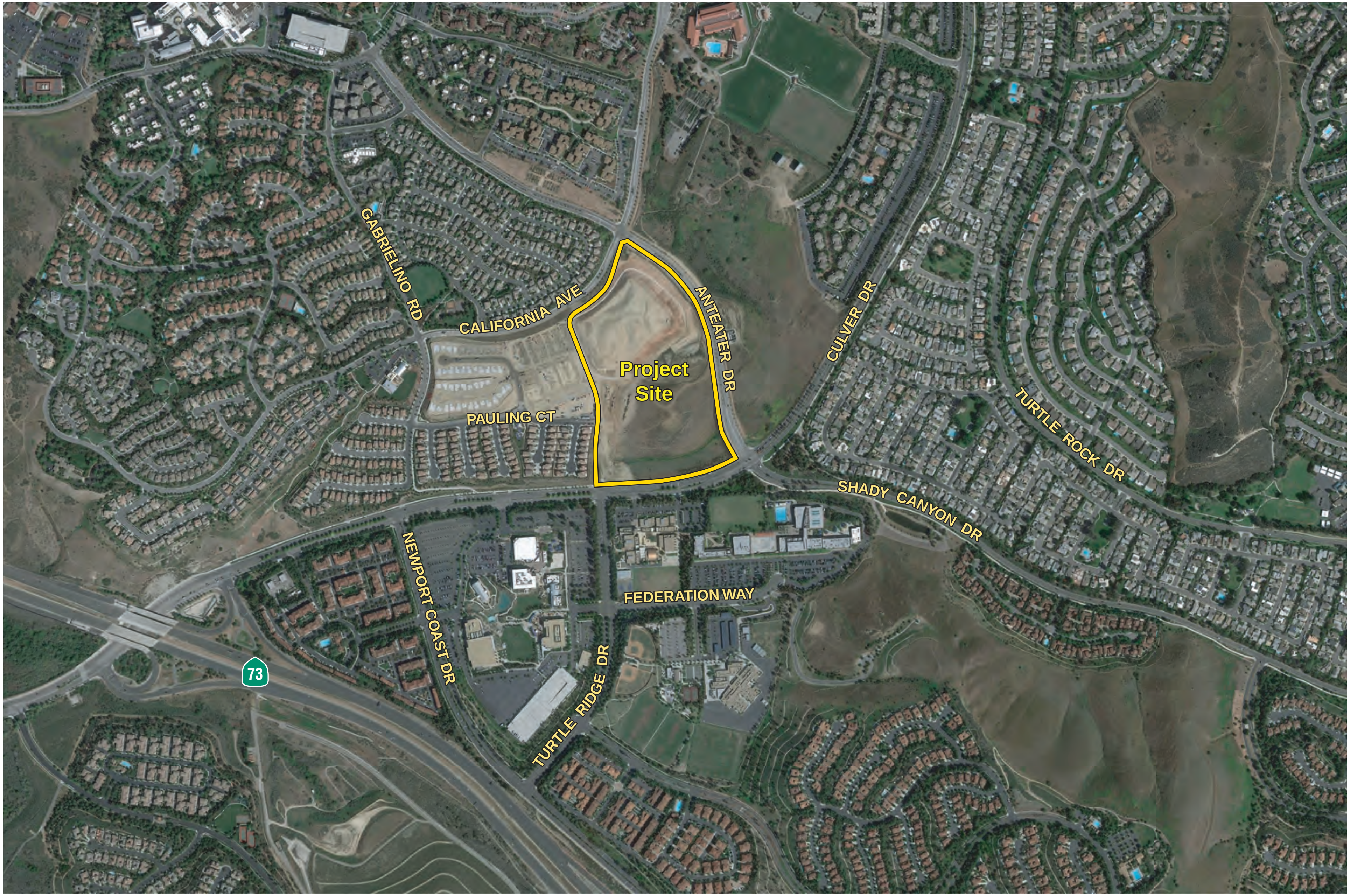
not to scale

02/02/16 JN 150070-21529 MAS

UNIVERSITY HILLS AREA 11 • AIR QUALITY ASSESSMENT

Regional Vicinity

Exhibit 1



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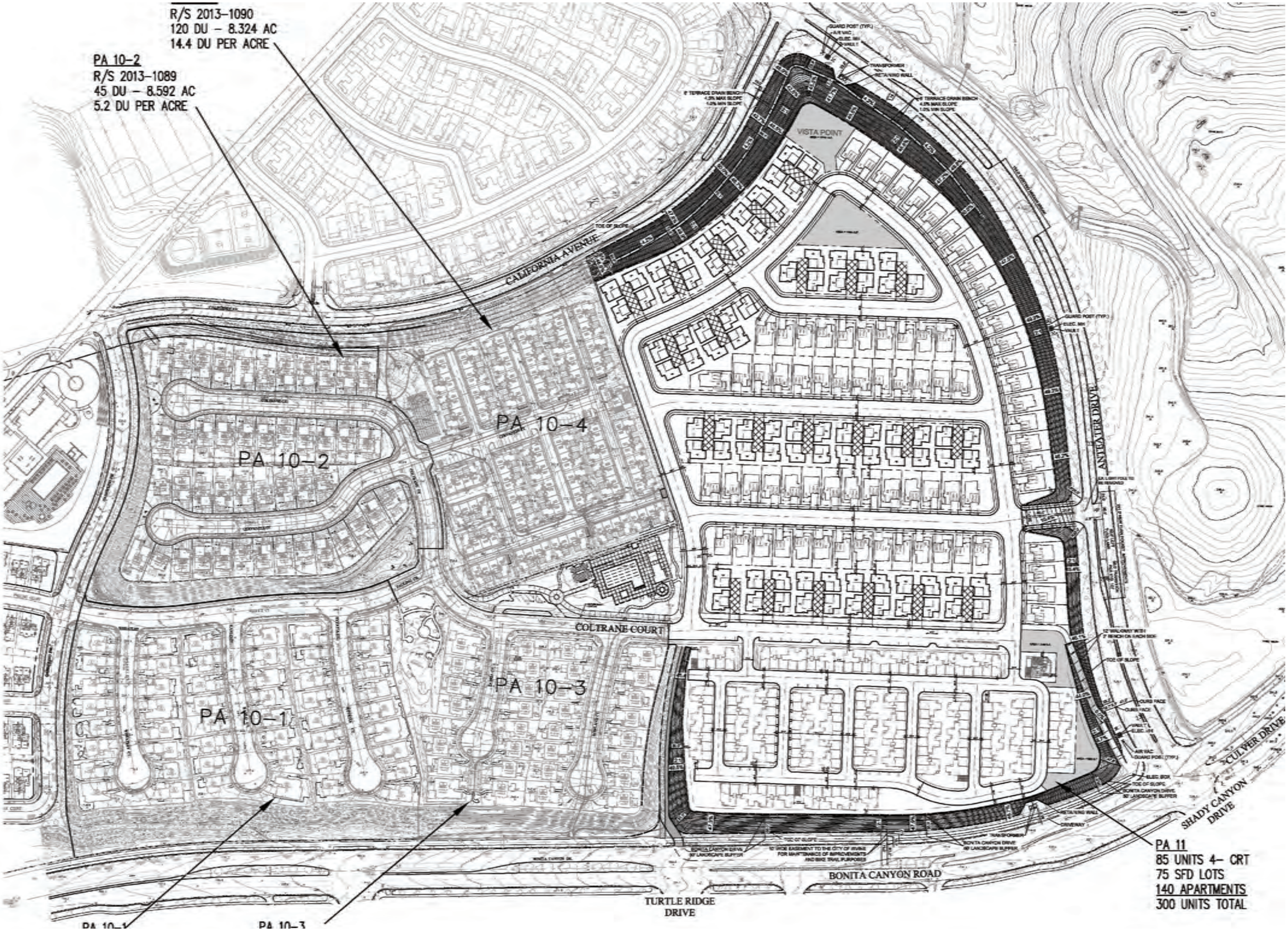
UNIVERSITY HILLS AREA 11 • AIR QUALITY ASSESSMENT

Site Vicinity

Exhibit 2



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UNIVERSITY HILLS AREA 11 • AIR QUALITY ASSESSMENT

Site Plan

Exhibit 3

2.0 ENVIRONMENTAL SETTING

The California Air Resources Board (CARB) divides the State into 15 air basins that share similar meteorological and topographical features. The project site lies within the northwestern portion of the South Coast Air Basin (Basin). The Basin is a 6,600-square mile area bounded by the Pacific Ocean to the west and the San Gabriel, San Bernardino, and San Jacinto Mountains to the north and east. The Basin includes all of Orange County and the non-desert portions of Los Angeles, Riverside, and San Bernardino Counties, in addition to the San Gorgonio Pass area in Riverside County. The Basin's terrain and geographical location (i.e., a coastal plain with connecting broad valleys and low hills) determine its distinctive climate.

The general region lies in the semi-permanent high-pressure zone of the eastern Pacific. The climate is mild and tempered by cool sea breezes. The usually mild climatological pattern is interrupted infrequently by periods of extremely hot weather, winter storms, or Santa Ana winds. The extent and severity of the air pollution problem in the Basin is a function of the area's natural physical characteristics (weather and topography), as well as man-made influences (development patterns and lifestyle). Factors such as wind, sunlight, temperature, humidity, rainfall, and topography all affect the accumulation and/or dispersion of pollutants throughout the Basin.

CLIMATE

The average annual temperature varies little throughout the Basin, averaging 75 degrees Fahrenheit (°F). However, with a less-pronounced oceanic influence, the eastern inland portions of the Basin show greater variability in annual minimum and maximum temperatures. All portions of the Basin have had recorded temperatures over 100°F in recent years.

Although the Basin has a semi-arid climate, the air near the surface is moist due to the presence of a shallow marine layer. Except for infrequent periods when dry, continental air is brought into the Basin by offshore winds, the ocean effect is dominant. Periods with heavy fog are frequent, and low stratus clouds, occasionally referred to as "high fog," are a characteristic climate feature. Annual average relative humidity is 70 percent at the coast and 57 percent in the eastern part of the Basin. Precipitation in the Basin is typically nine to 14 inches annually and is rarely in the form of snow or hail due to typically warm weather. The frequency and amount of rainfall is greater in the coastal areas of the Basin.

The height of the inversion is important in determining pollutant concentration. When the inversion is approximately 2,500 feet above sea level, the sea breezes carry the pollutants inland to escape over the mountain slopes or through the passes. At a height of 1,200 feet, the terrain prevents the pollutants from entering the upper atmosphere, resulting in a settlement in the foothill communities. Below 1,200 feet, the inversion puts a tight lid on pollutants, concentrating them in a shallow layer over the entire coastal basin. Usually, inversions are lower before sunrise than during the day. Mixing heights for inversions are lower in the summer and more persistent, being partly responsible for the high levels of ozone (O_3) observed during summer months in the

Basin. Smog in southern California is generally the result of these temperature inversions combining with coastal day winds and local mountains to contain the pollutants for long periods of time, allowing them to form secondary pollutants by reacting with sunlight. The Basin has a limited ability to disperse these pollutants due to typically low wind speeds.

The area in which the project is located offers clear skies and sunshine, yet is still susceptible to air inversions. These inversions trap a layer of stagnant air near the ground, where it is then further loaded with pollutants. These inversions cause haziness, which is caused by moisture, suspended dust, and a variety of chemical aerosols emitted by trucks, automobiles, furnaces, and other sources.

Irvine experiences average high temperatures of up to 83 degrees (˚) Fahrenheit (F) during the month of August, and average low temperatures of 47 ˚F during the month of December. The City experiences approximately 14.42 inches of precipitation per year, with the most precipitation occurring in the month of February.[1]

[1] U.S. Climate Data, *Climate Irvine - California*, http://www.usclimatedata.com/climate/irvine/california/united-states/usca2494, accessed on March 1, 2016.

3.0 STATE AND FEDERAL AMBIENT AIR QUALITY STANDARDS

3.1 AMBIENT AIR QUALITY STANDARDS

CARB and the U.S. Environmental Protection Agency (EPA) establish ambient air quality standards for major pollutants at thresholds intended to protect public health. The standards for some pollutants are based on other values such as protection of crops or avoidance of nuisance conditions. Table 1, *State and National Ambient Air Quality Standards and Attainment Status*, summarizes the State California Ambient Air Quality Standards (CAAQS) and the Federal National Ambient Air Quality Standards (NAAQS).

CARB designates all areas within the State as either attainment (having air quality better than the CAAQS) or nonattainment (having a pollution concentration that exceeds the CAAQS more than once in three years). Likewise, the EPA designates all areas of the U.S. as either being in attainment of the NAAQS or nonattainment if pollution concentrations exceed the NAAQS. Because attainment/nonattainment is pollutant-specific, an area may be classified as nonattainment for one pollutant and attainment for another. Similarly, because the State and national standards differ, an area could be classified as attainment for the Federal standard of a pollutant while it may be nonattainment for the State standard of the same pollutant. Some areas are unclassified, which means no monitoring data are available. Unclassified areas are considered to be in attainment. The attainment status of SCAQMD for CAAQS and NAAQS for the area where the proposed project is located is shown in Table 1 and is discussed in more detail below under "Ambient Air Monitoring."

3.2 AMBIENT AIR MONITORING

CARB monitors ambient air quality at approximately 250 air monitoring stations across the state. Air quality monitoring stations usually measure pollutant concentrations ten feet aboveground level; therefore, air quality is often referred to in terms of ground-level concentrations. The project site is located within Source Receptor Area (SRA) 20, Central Orange County Coastal. The closest air monitoring station to the project site is the Costa Mesa – Mesa Verde Drive Monitoring Station. Local air quality data from 2012 to 2014 is provided in Table 2, *Summary of Air Quality Data*. This table lists the monitored maximum concentrations and number of exceedances of Federal/State air quality standards for each year.

Ozone. Ozone (O_3) occurs in two layers of the atmosphere. The layer surrounding the earth's surface is the troposphere. The troposphere extends approximately 10 miles above ground level, where it meets the second layer, the stratosphere. The stratospheric (the "good" ozone) layer extends upward from about ten to 30 miles and protects life on earth from the sun's harmful ultraviolet rays (UV-B). "Bad" ozone is a photochemical pollutant, and needs volatile organic compounds (VOCs), Nitrogen Oxides (NO_X) and sunlight to form; therefore, VOCs and NO_X are

Table 1
State and National Ambient Air Quality Standards and Attainment Status

Pollutant	Averaging Time	California[1]		Federal[2]	
		Standard[3]	Attainment Status	Standards[3, 4]	Attainment Status
Ozone (O_3)	1 Hour	0.09 ppm (180 $\mu g/m^3$)	Nonattainment	N/A	N/A
	8 Hours	0.070 ppm (137 $\mu g/m^3$)	N/A	0.070 ppm (137 $\mu g/m^3$)	Extreme Nonattainment
Particulate Matter (PM_{10})	24 Hours	50 $\mu g/m^3$	Nonattainment	150 $\mu g/m^3$	Attainment
	Annual Arithmetic Mean	20 $\mu g/m^3$	Nonattainment	N/A[6]	N/A
Fine Particulate Matter ($PM_{2.5}$)[5]	24 Hours	No Separate State Standard		35 $\mu g/m^3$	Nonattainment
	Annual Arithmetic Mean	12 $\mu g/m^3$	Nonattainment	12.0 $\mu g/m^3$	Nonattainment
Carbon Monoxide (CO)	1 Hour	20 ppm (23 mg/m^3)	Attainment	35 ppm (40 mg/m^3)	Attainment/Maintenance
	8 Hours	9.0 ppm (10 mg/m^3)	Attainment	9 ppm (10 mg/m^3)	Attainment/Maintenance
Nitrogen Dioxide (NO_2)[6]	1 Hour	0.18 ppm (339 $\mu g/m^3$)	Nonattainment	100 ppb (188 $\mu g/m^3$)	Unclassified/Attainment
	Annual Arithmetic Mean	0.030 ppm (57 $\mu g/m^3$)	Nonattainment	0.053 ppm (100 $\mu g/m^3$)	Attainment/Maintenance
Sulfur Dioxide (SO_2)[7]	1 Hour	0.25 ppm (655 $\mu g/m^3$)	Attainment	75 ppb (196 $\mu g/m^3$)	N/A
	3 Hours	N/A	N/A	N/A	N/A
	24 Hours	0.04 ppm (105 $\mu g/m^3$)	Attainment	0.14 ppm	Unclassified/Attainment
	Annual Arithmetic Mean	N/A	N/A	0.030 ppm (for certain areas)	N/A
Lead (Pb) [8, 9]	30 days average	1.5 $\mu g/m^3$	Attainment	N/A	N/A
	Calendar Quarter	N/A	N/A	1.5 $\mu g/m^3$	Attainment
Visibility-Reducing Particles[10]	8 Hours (10 a.m. to 6 p.m., PST)	Extinction coefficient = 0.23 km@<70% RH	Unclassified	No Federal Standards	
Sulfates	24 Hour	25 $\mu g/m^3$	Attainment		
Hydrogen Sulfide	1 Hour	0.03 ppm (42 $\mu g/m^3$)	Unclassified		
Vinyl Chloride[9]	24 Hour	0.01 ppm (26 $\mu g/m^3$)	N/A		

$\mu g/m^3$ = micrograms per cubic meter; ppm = parts per million; ppb = parts per billion; km = kilometer(s); RH = relative humidity; PST = Pacific Standard Time; N/A = Not Applicable

1. California standards for ozone, carbon monoxide (except Lake Tahoe), sulfur dioxide (1- and 24-hour), nitrogen dioxide, suspended particulate matter-PM_{10} and visibility-reducing particles are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.
2. National standards (other than ozone, particulate matter, and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest eight hour concentration in a year, averaged over three years, is equal to or less than the standard. For PM_{10}, the 24 hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 mg/m^3 is equal to or less than one. For $PM_{2.5}$, the 24 hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard.
3. Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.
4. National Primary Standards: The levels of air quality necessary, with an adequate margin of safety, to protect the public health.
5. On December 14, 2012, the national annual $PM_{2.5}$ primary standard was lowered from 15 $\mu g/m^3$ to 12.0 $\mu g/m^3$. The existing national 24-hour $PM_{2.5}$ standards (primary and secondary) were retained at 35 $\mu g/m^3$, as was the annual secondary standard of 15 $\mu g/m^3$. The existing 24-hour PM_{10} standards (primary and secondary) of 150 $\mu g/m^3$ also were retained. The form of the annual primary and secondary standards is the annual mean, averaged over 3 years.
6. To attain this standard, the 3-year average of the 98th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 0.100 ppm (effective January 22, 2010).
7. On June 2, 2010, a new 1-hour SO_2 standard was established and the existing 24-hour and annual primary standards were revoked. To attain the 1-hour national standard, the 3-year average of the annual 99th percentile of the 1-hour daily maximum concentrations at each site must not exceed 75 ppb. The 1971 SO_2 national standards (24-hour and annual) remain in effect until one year after an area is designated for the 2010 standard, except that in areas designated nonattainment for the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved. Note that the 1-hour national standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the 1-hour national standard to the California standard the units can be converted to ppm. In this case, the national standard of 75 ppb is identical to 0.075 ppm.
8. CARB has identified lead and vinyl chloride as "toxic air contaminants" with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.
9. National lead standard, rolling 3-month average: final rule signed October 15, 2008.
10. In 1989, CARB converted both the general statewide 10-mile visibility standard and the Lake Tahoe 30-mile visibility standard to instrumental equivalents, which are "extinction of 0.23 per kilometer" and "extinction of 0.07 per kilometer" for the statewide and Lake Tahoe Air Basin standards, respectively.

Source: California Air Resources Board and U.S. Environmental Protection Agency, October1, 2015.

Table 2
Summary of Air Quality Data

Pollutant	California Standard	Federal Primary Standard	Year	Maximum Concentration[3]	Days (Samples) State/Federal Std. Exceeded
Ozone (O_3)[1] (1-hour)	0.09 ppm for 1 hour	NA[6]	2012 2013 2014	0.090 ppm 0.095 0.096	0/0 1/0 1/0
Ozone (O_3)[1] (8-hour)	0.070 ppm for 8 hours	0.070 ppm for 8 hours	2012 2013 2014	0.076 ppm 0.084 0.080	1/1 2/1 6/4
Carbon Monoxide (CO)[1] (1-hour)	20 ppm for 1 hour	35 ppm for 1 hour	2012 2013 2014	2.09 ppm 2.44 2.68	0/0 0/0 0/0
Carbon Monoxide (CO)[1] (8-hour)	9.0 ppm for 8 hours	9.0 ppm for 8 hours	2012 2013 2014	1.71 ppm NA NA	0/0 NA/NA NA/NA
Nitrogen Dioxide (NO_2)[1]	0.18 ppm for 1 hour	0.100 ppm for 1 hour	2012 2013 2014	0.074 ppm 0.076 0.060	0/0 0/0 0/0
Fine Particulate Matter ($PM_{2.5}$)[2, 4]	No Separate Standard	35 $\mu g/m^3$ for 24 hours	2012 2013 2014	27.6 $\mu g/m^3$ 28.0 25.0	NA/[6] NA/[6] NA/[6]
Particulate Matter (PM_{10})[2, 4, 5]	50 $\mu g/m^3$ for 24 hours	150 $\mu g/m^3$ for 24 hours	2012 2013 2014	37.0 $\mu g/m^3$ 51.0 41.0	0/0 0/0 0/0

Source: Aerometric Data Analysis and Measurement System (ADAM), summaries from 2011 to 2013, http://www.arb.ca.gov/adam.

ppm = parts per million; PM_{10} = particulate matter 10 microns in diameter or less; NM = not measured; $\mu g/m^3$ = micrograms per cubic meter; $PM_{2.5}$ = particulate matter 2.5 microns in diameter or less; NA = not applicable; * = data not available.

Notes:
1. Data collected from the Costa Mesa – Mesa Verde Drive Monitoring Station located at 2850 Mesa Verde Drive, Costa Mesa, California 92626.
2. Data collected from the Mission Viejo – 2601 Via Pera Monitoring Station located at 26081 Via Pera, Mission Viejo, CA 92691.
3. Maximum concentration is measured over the same period as the California Standards.
4. PM_{10} exceedances are based on State thresholds established prior to amendments adopted on June 20, 2002.
5. PM_{10} and $PM_{2.5}$ exceedances are derived from the number of samples exceeded, not days.
6. The Federal standard was revoked in June 2005.

ozone precursors. VOCs and NO_X are emitted from various sources throughout the City. Significant ozone formation generally requires an adequate amount of precursors in the atmosphere and several hours in a stable atmosphere with strong sunlight.

Many respiratory ailments, as well as cardiovascular disease, are aggravated by exposure to high ozone levels. Ozone also damages natural ecosystems (such as forests and foothill plant communities) and damages agricultural crops and some man-made materials (such as rubber, paint, and plastics). Societal costs from ozone damage include increased healthcare costs, the loss of human and animal life, accelerated replacement of industrial equipment and reduced crop yields.

Carbon Monoxide. Carbon monoxide (CO) is an odorless, colorless toxic gas that is emitted by mobile and stationary sources as a result of incomplete combustion of hydrocarbons or other carbon-based fuels. In cities, automobile exhaust can cause as much as 95 percent of all CO emissions. At high concentrations, CO can reduce the oxygen-carrying capacity of the blood and cause headaches, dizziness, and unconsciousness.

Nitrogen Dioxide. Nitrogen oxides (NO_X) are a family of highly reactive gases that are a primary precursor to the formation of ground-level O_3, and react in the atmosphere to form acid rain. NO_2 (often used interchangeably with NO_X) is a reddish-brown gas that can cause breathing difficulties at high levels. Peak readings of NO_2 occur in areas that have a high concentration of combustion sources (e.g., motor vehicle engines, power plants, refineries, and other industrial operations).

NO_2 can irritate and damage the lungs, and lower resistance to respiratory infections such as influenza. The health effects of short-term exposure are still unclear. However, continued or frequent exposure to NO_2 concentrations that are typically much higher than those normally found in the ambient air may increase acute respiratory illnesses in children and increase the incidence of chronic bronchitis and lung irritation. Chronic exposure to NO_2 may aggravate eyes and mucus membranes and cause pulmonary dysfunction.

Coarse Particulate Matter (PM_{10}). PM_{10} refers to suspended particulate matter, which is smaller than ten microns or ten one-millionths of a meter. PM_{10} arises from sources such as road dust, diesel soot, combustion products, construction operations, and dust storms. PM_{10} scatters light and significantly reduces visibility. In addition, these particulates penetrate the lungs and can potentially damage the respiratory tract. On June 19, 2003, CARB adopted amendments to the statewide 24-hour particulate matter standards based upon requirements set forth in the Children's Environmental Health Protection Act (SB 25).

Fine Particulate Matter ($PM_{2.5}$). Due to increased concerns over health impacts related to fine particulate matter (particulate matter 2.5 microns in diameter or less), both State and Federal $PM_{2.5}$ standards have been created. Particulate matter impacts primarily affect infants, children, the elderly, and those with pre-existing cardiopulmonary disease. In 1997, the EPA announced new $PM_{2.5}$ standards. Industry groups challenged the new standard in court and the implementation of the standard was blocked. However, upon appeal by the EPA, the U.S. Supreme Court reversed this decision and upheld the EPA's new standards.

On June 20, 2002, CARB adopted amendments for statewide annual ambient particulate matter air quality standards. These standards were revised/established due to increasing concerns by CARB that previous standards were inadequate, as almost everyone in California is exposed to levels at or above the current State standards during some parts of the year, and the statewide potential for significant health impacts associated with particulate matter exposure was determined to be large and wide-ranging.

Reactive Organic Gases and Volatile Organic Compounds. Hydrocarbons are organic gases that are formed solely of hydrogen and carbon. There are several subsets of organic gases including reactive organic gases (ROGs) and VOCs. Both ROGs and VOCs are emitted from the incomplete combustion of hydrocarbons or other carbon-based fuels. The major sources of hydrocarbons are combustion engine exhaust, oil refineries, and oil-fueled power plants; other common sources are petroleum fuels, solvents, dry cleaning solutions, and paint (via evaporation).

3.3 SENSITIVE RECEPTORS

Sensitive populations are more susceptible to the effects of air pollution than is the general population. Sensitive populations (sensitive receptors) that are in proximity to localized sources of toxics and CO are of particular concern. Land uses considered sensitive receptors include residences, schools, playgrounds, childcare centers, long-term health care facilities, rehabilitation centers, convalescent centers, and retirement homes. Table 3, *Sensitive Receptors*, lists the distances and locations of sensitive receptors within the project vicinity. The distances depicted in Table 3 are based on the distance from the project site to the outdoor activity area of the closest receptor.

Table 3
Sensitive Receptors

Type	Name	Distance from Project Site (feet)[1]	Direction from Project Site	Location
Residential	Residential Uses	Adjacent	North	North of California Avenue/Anteater Drive intersection.
		450 feet	North	North of California Avenue.
		1,000 feet	East	62600 Arroyo Drive.
		560 feet	East	East of the Bonita Canyon Drive/Shady Canyon Drive intersection.
		2,042 feet	South	Along Shady Lane.
		Adjacent	West	Along Paulding Court, northwest of the Bonita Canyon Drive/Turtle Ridge intersection.
Schools	Tarbut V'Torah Community Day School	280 feet	South	5200 Bonita Canyon Drive.
	Vista Verde Elementary School	1,430 feet	South	6 Federation Way.
Institutional	Merage Jewish Community Center of Orange County	470	South	1 Federation Way #200.
Places of Worship	Mariners Church	1,134 feet	Southwest	5001 Newport Coast Drive.
Parks/Recreational Areas	UC Irvine Recreational Sports Fields	1,164 feet	North/Northeast	680 California Avenue.
	Chaparral Park	3,360 feet	East	North of Turtle Rock Drive.

Note:
1. Distances are measured from the exterior project boundary only and not from individual construction areas within the interior of the project site.

4.0 REGULATORY SETTING

4.1 FEDERAL

Air quality is federally protected by the Clean Air Act and its amendments. Under the Federal Clean Air Act (FCAA), the EPA developed the primary and secondary NAAQS for the criteria air pollutants including ozone, NO_2, CO, SO_2, PM_{10}, $PM_{2.5}$, and lead. Proposed projects in or near nonattainment areas could be subject to more stringent air-permitting requirements. The Clean Air Act requires each state to prepare a State Implementation Plan (SIP) to demonstrate how it will attain the NAAQS within the federally imposed deadlines.

The EPA can withhold certain transportation funds from states that fail to comply with the planning requirements of the Clean Air Act. If a state fails to correct these planning deficiencies within two years of Federal notification, the EPA is required to develop a Federal implementation plan for the identified nonattainment area or areas. The provisions of 40 CFR Parts 51 and 93 apply in all nonattainment and maintenance areas for transportation-related criteria pollutants for which the area is designated nonattainment or has a maintenance plan. The EPA has designated enforcement of air pollution control regulations to the individual states.

4.2 STATE

In 1988, the California Clean Air Act (CCAA) was adopted and led to the establishment of CAAQS for the same major pollutants as the NAAQS and standards for visibility reducing particles, sulfates, hydrogen sulfide, and vinyl chloride. There are currently no NAAQS for these latter pollutants. CARB is responsible for enforcing air pollution regulations in California. The CCAA requires all air pollution control districts in California to endeavor to achieve and maintain state ambient air-quality standards by the earliest practicable date and to develop plans and regulations specifying how they will meet this goal.

4.3 REGIONAL

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

The *2012 Air Quality Management Plan* (2012 AQMP), which was adopted in December 2012, proposes policies and measures to achieve federal and state standards for improved air quality in the South Coast Air Basin and those portions of the Salton Sea Air Basin (formerly named the Southeast Desert Air Basin) that are under the South Coast Air Quality Management District's (SCAQMD's) jurisdiction. The AQMP relies on a regional and multi-level partnership of governmental agencies at the federal, state, regional, and local level. These agencies (EPA, CARB, local governments, Southern California Association of Governments [SCAG], and the SCAQMD) are the primary agencies that implement the AQMP programs. The 2012 AQMP incorporates the latest scientific and technical information and planning assumptions, including the 2012 Regional

Transportation Plan/Sustainable Communities Strategy, updated emission inventory methodologies for various source categories, and SCAG's latest growth forecasts.

The 2012 AQMP addresses several state and federal planning requirements, incorporating new scientific information, primarily in the form of updated emissions inventories, ambient measurements, and new meteorological air quality models. The 2012 AQMP highlights the reductions and the interagency planning necessary to identify additional strategies, especially in the area of mobile sources, to meet all federal criteria pollutant standards within the timeframes allowed under the federal Clean Air Act. The primary task of the 2012 AQMP is to bring the Basin into attainment with federal health-based standards. It is noted that the SCAQMD is currently in the process of developing the 2016 AQMP, which is a comprehensive and integrated plan primarily focused on addressing the ozone and $PM_{2.5}$ standards. The 2016 AQMP will incorporate the latest scientific and technical information and planning assumptions, including the latest applicable growth assumptions, Regional Transportation Plan/Sustainable Communities Strategy, and updated emission inventory methodologies for various source categories.

4.4 LOCAL

University of California, Irvine

Environmental Health and Safety Department

UCI's Environmental Health and Safety (EH&S) Department is responsible for implementing UCI's Clean Air Program which assesses and facilitates UCI's compliance with air quality laws and regulations. In addition to the permitting programs required by California law and SCAQMD rules, UCI is required to implement a federal operating permit program, which meets federal EPA regulations adopted pursuant to Title V of the FCAA Amendments. Title V Program activities include assisting with SCAQMD Permit to Operate administration; monitoring, record keeping, and reporting activities; and developing regulatory programs and informational guidelines to ensure the campus remains in compliance with State and federal regulations.

Several different departments at UCI are involved with this program. Academic department chairs and directors are responsible for reporting new air emission sources to EH&S and maintaining records. Facilities Management and Design and Construction Services provide building and renovation plans to EH&S for review and also report new air emission sources to EH&S. Parking and Transportation Services, while not directly involved with the Clean Air Program, reduce air emissions by implementing the Alternative Transportation Program to reduce vehicular traffic and associated emissions.

5.0 POTENTIAL AIR QUALITY IMPACTS

CEQA THRESHOLDS

The environmental analysis in this section is patterned after the Initial Study Checklist recommended by the State *CEQA Guidelines*, as amended. The issues presented in the Initial Study Checklist have been utilized as thresholds of significance in this section. Accordingly, a project may create a significant environmental impact if it causes one or more of the following to occur:

- Conflict with or obstruct implementation of the applicable air quality plan (refer to Impact Statement AQ-1);
- Violate any air quality standard or contribute substantially to an existing or projected air quality violation (refer to Impact Statement AQ-2);
- Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in nonattainment under an applicable Federal or State ambient air quality standard (including releasing emissions that exceed quantitative thresholds for O_3 precursors) (refer to Impact Statement AQ-3);
- Expose sensitive receptors to substantial pollutant concentrations (refer to Impact Statement AQ-4);
- Create objectionable odors affecting a substantial number of people (refer to Impact Statement AQ-5);

Based on these standards and thresholds, the effects of the proposed project have been categorized as either a "less than significant impact" or a "potentially significant impact." Mitigation measures are recommended for potentially significant impacts.

AIR QUALITY THRESHOLDS

Under CEQA, the SCAQMD is an expert commenting agency on air quality within its jurisdiction or impacting its jurisdiction. Under the FCAA, the SCAQMD has adopted Federal attainment plans for O_3 and PM_{10}. The SCAQMD reviews projects to ensure that they would not: (1) cause or contribute to any new violation of any air quality standard; (2) increase the frequency or severity of any existing violation of any air quality standard; or (3) delay timely attainment of any air quality standard or any required interim emission reductions or other milestones of any Federal attainment plan.

The *CEQA Air Quality Handbook* also provides significance thresholds for both construction and operation of projects within the SCAQMD jurisdictional boundaries. If the SCAQMD thresholds are exceeded, a potentially significant impact could result. However, ultimately the lead agency determines the thresholds of significance for impacts. If a project proposes development in excess of the established thresholds, as outlined in Table 4, *South Coast Air Quality Management District Emissions Thresholds*, a significant air quality impact may occur and additional analysis is warranted to fully assess the significance of impacts.

Table 4
South Coast Air Quality Management District Emissions Thresholds

Phase	Pollutant (lbs/day)					
	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
Construction	75	100	550	150	150	55
Operational	55	55	550	150	150	55
Source: South Coast Air Quality Management District, CEQA Air Quality Handbook, November 1993.						

Local Carbon Monoxide Standards

In addition, the significance of localized project impacts depends on whether ambient CO levels in the vicinity of the project are above or below State and Federal CO standards, as follows:

- If the project causes an exceedance of either the State one-hour or eight-hour CO concentrations, the project would be considered to have a significant local impact.

- If ambient levels already exceed a State or Federal standard, then project emissions would be considered significant if they increase one-hour CO concentrations by 1.0 ppm or more, or eight-hour CO concentrations by 0.45 ppm or more.

Localized Significance Thresholds

Localized Significance Thresholds (LSTs) were developed in response to SCAQMD Governing Boards' Environmental Justice Enhancement Initiative (I-4). The SCAQMD provided the *Final Localized Significance Threshold Methodology* (dated July 2008) for guidance. The LST methodology assists lead agencies in analyzing localized impacts associated with project-specific level proposed projects. The SCAQMD provides the LST lookup tables for one-, two-, and five-acre projects emitting CO, NO_X, or PM_{10}. The LST methodology and associated mass rates are not designed to evaluate localized impacts from mobile sources traveling over the roadways. The SCAQMD recommends that any project over five acres should perform air quality dispersion modeling to assess impacts to nearby sensitive receptors.

Cumulative Emissions Thresholds

The SCAQMD's 2012 AQMP was prepared to accommodate growth, meet State and Federal air quality standards, and minimize the fiscal impact that pollution control measures have on the local economy. According to the SCAQMD *CEQA Air Quality Handbook*, project-related emissions that fall below the established construction and operational thresholds should be considered less than significant unless there is pertinent information to the contrary. If a project exceeds these emission thresholds, the SCAQMD *CEQA Air Quality Handbook* states that the significance of a project's contribution to cumulative impacts should be determined based on whether the rate of growth in average daily trips exceeds the rate of growth in population.

AQ-1 CONFLICT WITH OR OBSTRUCT IMPLEMENTATION OF THE APPLICABLE AIR QUALITY PLAN?

Level of Significance Before Mitigation: *Potentially Significant Impact.*

On December 7, 2012, the SCAQMD Governing Board approved the 2012 AQMP, which outlines its strategies for meeting the NAAQS for $PM_{2.5}$ and ozone. The 2012 AQMP was forwarded to CARB for inclusion into the California State Implementation Plan (SIP) in January 2013. Subsequently, the 2012 AQMP was submitted to the EPA as the 24-hour $PM_{2.5}$ SIP addressing the 2006 $PM_{2.5}$ NAAQS and as a limited update to the approved 8-hour ozone SIP. The 1-hour ozone attainment demonstration and vehicle miles traveled (VMT) emissions offset demonstration was submitted through CARB to the EPA. According to the SCAQMD's 2012 AQMP, two main criteria must be addressed.

Criterion 1:

With respect to the first criterion, SCAQMD methodologies require that an air quality analysis for a project include forecasts of project emissions in relation to contributing to air quality violations and delay of attainment.

a) *Would the project result in an increase in the frequency or severity of existing air quality violations?*

   Since the consistency criteria identified under the first criterion pertain to pollutant concentrations, rather than to total regional emissions, an analysis of a project's pollutant emissions relative to localized pollutant concentrations is used as the basis for evaluating project consistency. As discussed in Impact Statement AQ-2, below, localized concentrations of CO, NO_X, PM_{10}, and $PM_{2.5}$ would be less than significant during project operations. Therefore, the proposed project would not result in an increase in the frequency or severity of existing air quality violations. Because reactive organic gases (ROGs) are not a criteria pollutant, there is no ambient standard or localized threshold for ROGs. Due to the role ROG plays in ozone formation, it is classified as a precursor pollutant and only a regional emissions threshold has been established.

b) *Would the project cause or contribute to new air quality violations?*

As discussed in Impact Statement AQ-2, operations of the proposed project would result in emissions that would be below the SCAQMD operational thresholds. Therefore, the proposed project would not have the potential to cause or affect a violation of the ambient air quality standards.

c) *Would the project delay timely attainment of air quality standards or the interim emissions reductions specified in the AQMP?*

The proposed project would result in less than significant impacts with regard to localized concentrations during project operations. As such, the proposed project would not delay the timely attainment of air quality standards or 2012 AQMP emissions reductions.

Criterion 2:

With respect to the second criterion for determining consistency with SCAQMD and SCAG air quality policies, it is important to recognize that air quality planning within the Basin focuses on attainment of ambient air quality standards at the earliest feasible date. Projections for achieving air quality goals are based on assumptions regarding population, housing, and growth trends. Thus, the SCAQMD's second criterion for determining project consistency focuses on whether or not the proposed project exceeds the assumptions utilized in preparing the forecasts presented in the 2012 AQMP. Determining whether or not a project exceeds the assumptions reflected in the 2012 AQMP involves the evaluation of the three criteria outlined below. The following discussion provides an analysis of each of these criteria.

a) *Would the project be consistent with the population, housing, and employment growth projections utilized in the preparation of the AQMP?*

In the case of the 2012 AQMP, several sources of data form the basis for the projections of air pollutant emissions including: the *City of Irvine General Plan* (General Plan), UCI's *2007 Long Range Development Plan* (LRDP), SCAG's *Growth Management* Chapter of the *Regional Comprehensive Plan* (RCP), and SCAG's *2012-2035 Regional Transportation Plan/Sustainable Communities Strategy* (RTP/SCS). The RTP/SCS also provides socioeconomic forecast projections of regional population growth. The General Plan Land Use Map designates the project site as "Educational Facilities", and the LRDP designates the site as Mixed Use – Neighborhood, and Housing Reserve. According to the LRDP, the Mixed Use – Neighborhood designation permits residential facilities for UCI students, faculty, and staff; commercial and retail space; conference facilities; office facilities; and academic facilities. The LRDP Housing Reserve designation permits residential facilities for students, faculty, staff, medical residents and interns, post-doctoral researchers, and other University affiliates. The project proposes 160 single-family, and 140 apartment units for UCI faculty and staff, and therefore complies with the site's intended use. Additionally, the project would be consistent with the City's General Plan and UCI's LRDP and assumed emissions for the project site, since no change in the site's land use designation is proposed. Thus, the project is generally consistent with the types, intensity, and patterns of land use envisioned for the site vicinity in the RCP. The population, housing, and employment forecasts, which are adopted by SCAG's Regional Council, are based on the local plans and policies applicable to the cities; these are used by SCAG in all phases of implementation and review. Additionally, as SCAQMD incorporated these same projections into the 2012 AQMP, it can be concluded that the project would be consistent with the projections. As a result, the project would not exceed growth assumptions within the City's General Plan. Therefore, the project would be consistent with the 2012 AQMP and a less than significant impact would occur.

b) *Would the project implement all feasible air quality mitigation measures?*

Compliance with all feasible emission reduction measures identified by the SCAQMD would be required as identified in Impact Statement AQ-2 and AQ-3. As such, the proposed project would meet this AQMP consistency criterion.

c) *Would the project be consistent with the land use planning strategies set forth in the AQMP?*

The project is consistent with the LRDP land use designations for the site, and would serve to implement various LRDP policies. Compliance with emission reduction measures identified by the SCAQMD would be required as identified in Impact Statement AQ-2 and Impact Statement AQ-3. As such, the proposed project meets this AQMP consistency criterion.

In conclusion, the determination of 2012 AQMP consistency is primarily concerned with the long-term influence of a project on air quality in the Basin. The proposed project would not result in a long-term impact on the region's ability to meet State and Federal air quality standards. Also, the proposed project would be consistent with the goals and policies of the AQMP for control of fugitive dust. As discussed above, the proposed project's long-term influence would also be consistent with the SCAQMD and SCAG's goals and policies and is, therefore, considered consistent with the 2012 AQMP.

Mitigation Measures: Refer to Mitigation Measures AQ-1, below.

Level of Significance After Mitigation. *Less Than Significant Impact.*

AQ-2 VIOLATE ANY AIR QUALITY STANDARDS OR CONTRIBUTE SUBSTANTIALLY TO AN EXISTING OR PROJECTED AIR QUALITY VIOLATION?

Level of Significance Before Mitigation: *Potentially Significant Impact.*

SHORT-TERM CONSTRUCTION

Short-term air quality impacts are predicted to occur during grading and construction operations associated with implementation of the proposed project. Temporary air emissions would result from the following activities:

- Particulate (fugitive dust) emissions from grading and building construction; and
- Exhaust emissions from the construction equipment and the motor vehicles of the construction crew.

Construction activities would include site preparation, grading, building construction, paving, and architectural coating. Site grading would require approximately 600,000 cubic yards of balanced soil cut and fill on-site. Project construction equipment would include excavators, graders, dozers, scrapers, and tractors/loaders/backhoes during grading; rough terrain forklifts, generators, tractors/loaders/backhoes, and welders during building construction; pavers, paving equipment, and rollers during paving; and air compressors during architectural coating. Emissions for each construction phase have been quantified based upon the phase durations and equipment types. The analysis of daily construction emissions has been prepared utilizing the California Emissions Estimator Model (CalEEMod). Refer to Appendix A, *Air Quality Emissions Data*, for the CalEEMod outputs and results. Table 5, *Short-Term (Construction) Emissions*, presents the anticipated daily short-term construction emissions.

Table 5
Short-Term (Construction) Emissions

Emissions Source	Pollutant (pounds/day) [1, 2]					
	ROG[3]	NO_X	CO	SO_2	PM_{10}	$PM_{2.5}$
2016						
Unmitigated Emissions	11.55	87.54	137.35	0.08	21.21	12.69
Mitigated Emissions	11.55	87.54	137.35	0.08	9.83	6.44
SCAQMD Thresholds	*75*	*100*	*550*	*150*	*150*	*55*
Is Threshold Exceeded After Mitigation?	*No*	*No*	*No*	*No*	*No*	*No*
2017						
Unmitigated Emissions	39.82	22.96	26.88	0.05	3.50	1.97
Mitigated Emissions	39.82	22.96	26.88	0.05	3.50	1.97
SCAQMD Thresholds	*75*	*100*	*550*	*150*	*150*	*55*
Is Threshold Exceeded After Mitigation?	*No*	*No*	*No*	*No*	*No*	*No*

Notes:
1. Emissions were calculated using CalEEMod, as recommended by the SCAQMD.
2. The reduction/credits for construction emission mitigations are based on mitigation included in CalEEMod and as typically required by the SCAQMD. The mitigation includes the following: properly maintain mobile and other construction equipment; replace ground cover in disturbed areas quickly; water exposed surfaces three times daily; cover stock piles with tarps; water all haul roads twice daily; and limit speeds on unpaved roads to 15 miles per hour.
3. Both ROGs and VOCs are subsets of organic gases that are emitted from the incomplete combustion of hydrocarbons or other carbon-based fuels. Although they represent slightly different subsets of organic gases, they are used interchangeably for the purposes of this analysis.

Refer to Appendix A, *Air Quality Emissions Data*, for assumptions used in this analysis.

Fugitive Dust Emissions

Construction activities are a source of fugitive dust (PM_{10} and $PM_{2.5}$) emissions that may have a substantial, temporary impact on local air quality. In addition, fugitive dust may be a nuisance to those living and working in the project area. Fugitive dust emissions are associated with land clearing, ground excavation, cut-and-fill, and truck travel on unpaved roadways (including demolition as well as construction activities). Fugitive dust emissions vary substantially from day to day, depending on the level of activity, specific operations, and weather conditions. Fugitive dust from grading and construction is expected to be short-term and would cease upon project completion. Additionally, most of this material is inert silicates, rather than the complex organic particulates released from combustion sources, which are more harmful to health.

Dust (larger than 10 microns) generated by such activities usually becomes more of a local nuisance than a serious health problem. Of particular health concern is the amount of PM_{10} (particulate matter smaller than 10 microns) generated as a part of fugitive dust emissions. PM_{10} poses a serious health hazard alone or in combination with other pollutants. Fine Particulate Matter ($PM_{2.5}$) is mostly produced by mechanical processes. These include automobile tire wear, industrial processes such as cutting and grinding, and re-suspension of particles from the ground or road surfaces by wind and human activities such as construction or agriculture. $PM_{2.5}$ is mostly derived from combustion sources, such as automobiles, trucks, and other vehicle exhaust, as well as from stationary sources. These particles are either directly emitted or are formed in the atmosphere from the combustion of gases such as NO_X and SO_X combining with ammonia. $PM_{2.5}$ components from material in the earth's crust, such as dust, are also present, with the amount varying in different locations.

Mitigation Measure AQ-1 would require the project Applicant and/or Contractor to implement construction emissions Best Management Practices (BMPs) during construction, including, but not limited to, dust control techniques (i.e., daily watering), a traffic management plan, and adherence to SCAQMD Rules 402 and 403 (which require watering of inactive and perimeter areas, track out requirements, etc.), to reduce PM_{10} and $PM_{2.5}$ concentrations. It is noted that the BMPs required in Mitigation Measure AQ-1 are applicable measures from LRDP EIR Mitigation Measure Air-2B. These are standard dust control measures that the SCAQMD requires for all projects. As indicated in Table 5, total PM_{10} and $PM_{2.5}$ emissions would be below the SCAQMD threshold with the implementation of Mitigation Measure AQ-1. Therefore, particulate matter impacts during construction would be less than significant.

ROG Emissions[2]

In addition to gaseous and particulate emissions, the application of asphalt and surface coatings creates ROG emissions, which are O_3 precursors. In accordance with the methodology prescribed

[2] ROGs and VOCs are subsets of organic gases that are emitted from the incomplete combustion of hydrocarbons or other carbon-based fuels. Although they represent slightly different subsets of organic gases, they are used interchangeably for the purposes of this analysis.

by the SCAQMD, the ROG emissions associated with paving have been quantified with CalEEMod. Architectural coatings were also quantified with CalEEMod based upon the size of the buildings.

The highest concentration of ROG emissions would be generated during the application of architectural coatings on the building. As required by law, all architectural coatings for the proposed project structures would comply with SCAQMD Regulation XI, Rule 1113 – Architectural Coating.[3] Rule 1113 provides specifications on painting practices as well as regulates the ROG content of paint. As shown in Table 5, project construction would not result in an exceedance of ROG emissions during any years of construction. Therefore, impacts would be less than significant in this regard.

Construction Equipment and Worker Vehicle Exhaust

Exhaust emissions from construction activities include emissions associated with the transport of machinery and supplies to and from the project site, emissions produced on-site as the equipment is used, and emissions from trucks transporting materials to and from the site. Standard SCAQMD regulations, such as maintaining all construction equipment in proper tune, shutting down equipment when not in use for extended periods of time, and implementing SCAQMD Rule 403 would be adhered to. As noted in Table 5, construction equipment exhaust would not exceed SCAQMD thresholds. Therefore, impacts are less than significant in this regard.

Naturally Occurring Asbestos

Asbestos is a term used for several types of naturally occurring fibrous minerals that are a human health hazard when airborne. The most common type of asbestos is chrysotile, but other types such as tremolite and actinolite are also found in California. Asbestos is classified as a known human carcinogen by State, Federal, and international agencies and was identified as a toxic air contaminant by the California Air Resources Board in 1986.

Asbestos can be released from serpentinite and ultramafic rocks when the rock is broken or crushed. At the point of release, the asbestos fibers may become airborne, causing air quality and human health hazards. These rocks have been commonly used for unpaved gravel roads, landscaping, fill projects, and other improvement projects in some localities. Asbestos may be released to the atmosphere due to vehicular traffic on unpaved roads, during grading for development projects, and at quarry operations. All of these activities may have the effect of releasing potentially harmful asbestos into the air. Natural weathering and erosion processes can act on asbestos bearing rock and make it easier for asbestos fibers to become airborne if such rock is disturbed. According to the Department of Conservation Division of Mines and Geology, *A General Location Guide for Ultramafic Rocks in California – Areas More Likely to Contain Naturally*

[3] South Coast Air Quality Management District, *Regulation XI Source Specific Standards*, http://www.aqmd.gov/docs/default-source/rule-book/reg-xi/r1113.pdf?sfvrsn=15, accessed on February 2, 2016.

Occurring Asbestos Report (August 2000), serpentinite and ultramafic rocks are not known to occur within the project area. Thus, there would be no impact in this regard.

Construction Odors

Potential odors could arise from the diesel construction equipment used on-site, as well as from architectural coatings and asphalt off-gassing. Odors generated from the referenced sources are common in the man-made environment and are not known to be substantially offensive to adjacent receptors. Additionally, odors generated during construction activities would be temporary. Therefore, construction odors are not considered to be a significant impact.

Total Daily Construction Emissions

In accordance with the SCAQMD Guidelines, CalEEMod was utilized to model construction emissions for ROG, NO_X, CO, SO_X, PM_{10}, and $PM_{2.5}$. Construction would occur over a six month period with the greatest emissions being generated during the initial stages of construction. Additionally, the greatest amount of ROG emissions would typically occur during the final stages of development due to the application of architectural coatings.

CalEEMod allows the user to input mitigation measures such as watering the construction area to limit fugitive dust. Mitigation measures that were input into CalEEMod allow for certain reduction credits and result in a decrease of pollutant emissions. Reduction credits are based upon studies developed by CARB, SCAQMD, and other air quality management districts throughout California, and were programmed within CalEEMod. As indicated in Table 5, CalEEMod calculates the reduction associated with recommended mitigation measures.

As depicted in Table 5, construction emissions would be less than significant with implementation of Mitigation Measure AQ-1. Thus, construction related air emissions would be less than significant.

LONG-TERM OPERATIONAL EMISSIONS

Mobile Source Emissions

Mobile sources are emissions from motor vehicles, including tailpipe and evaporative emissions. Depending upon the pollutant being discussed, the potential air quality impact may be of either regional or local concern. For example, ROG, NO_X, SO_X, PM_{10}, and $PM_{2.5}$ are all pollutants of regional concern (NO_X and ROG react with sunlight to form O_3 [photochemical smog], and wind currents readily transport SO_X, PM_{10}, and $PM_{2.5}$). However, CO tends to be a localized pollutant, dispersing rapidly at the source.

Both existing and project-generated vehicle emissions have been estimated using CalEEMod in order to obtain the net increase. Trip generation rates associated with the project were based on traffic data within the *University Hills PA11 Traffic Study* (*Traffic Study*), prepared by Stantec

Consulting Services, Inc. (September 22, 2015). The proposed project would result in approximately 2,860 new daily trips. Table 6, *Long-Term Air Emissions*, presents the anticipated mobile source emissions. As shown in Table 6, unmitigated emissions generated by vehicle traffic associated with the proposed project would not exceed established SCAQMD regional thresholds.

Table 6
Long-Term Air Emissions

Source	Estimated Emissions (pounds/day) [1]					
	ROG	NO_X	CO	SO_X	PM_{10}	$PM_{2.5}$
Area Sources	18.76	1.49	98.56	0.24	12.47	12.47
Energy Sources	0.17	1.47	0.63	0.00	0.12	0.12
Mobile Sources	8.52	20.97	94.10	0.25	19.17	5.30
Total Emissions	*27.45*	*23.93*	*193.29*	*0.49*	*31.76*	*17.89*
SCAQMD Threshold	*55*	*55*	*550*	*150*	*150*	*55*
Is Threshold Exceeded? (Significant Impact)	No	No	No	No	No	No

Notes:
1. Based on CalEEMod modeling results, worst-case seasonal emissions for area and mobile emissions have been modeled.

Source: Refer to Appendix A, *Air Quality Emissions Data*, for assumptions used in this analysis.

Area Source Emissions

Area source emissions would be generated due to an increased demand for natural gas associated with the development of the proposed project. The primary use of natural gas producing area source emissions by the project would be for consumer products, architectural coating, and landscaping. The proposed project would not include wood burning fireplaces or other devices per SCAQMD Rule 445 (Wood Burning Devices). As shown in Table 6, unmitigated area source emissions from the proposed project would not exceed SCAQMD thresholds for ROG, NO_X, CO, SO_X, PM_{10}, or $PM_{2.5}$.

Energy Source Emissions

Energy source emissions would be generated as a result of electricity and natural gas (non-hearth) usage associated with the proposed project. The primary use of electricity and natural gas by the project would be for space heating and cooling, water heating, ventilation, lighting, appliances, and electronics. As shown in Table 6, unmitigated energy source emissions from the proposed project would not exceed SCAQMD thresholds for ROG, NO_X, CO, SO_X, PM_{10}, or $PM_{2.5}$.

Conclusion

As indicated in Table 6, unmitigated operational emissions from the proposed project would not exceed SCAQMD thresholds. If stationary sources, such as backup generators, are installed on-site, they would be required to obtain the applicable permits from SCAQMD for operation of such equipment. The SCAQMD is responsible for issuing permits for the operation of stationary sources in order to reduce air pollution, and to attain and maintain the national and California ambient air quality standards in the Basin. Backup generators would be used only in emergency situations, and would not contribute a substantial amount of emissions capable of exceeding SCAQMD thresholds. Thus, operational air quality impacts would be less than significant.

Mitigation Measures:

AQ-1 Prior to initiating construction, UCI shall ensure that the project construction contract includes a construction emissions mitigation plan, including measures compliant with SCAQMD Rule 403 (Fugitive Dust), to be implemented and supervised by the on-site construction supervisor, which shall include, but not be limited to, the following BMPs:

i. During grading and site preparation activities, exposed soil areas shall be stabilized via frequent watering, non-toxic chemical stabilization, or equivalent measures at a rate to be determined by the on-site construction supervisor.

ii. During windy days when fugitive dust can be observed leaving the construction site, additional applications of water shall be required at a rate to be determined by the onsite construction supervisor.

iii. Disturbed areas designated for landscaping shall be prepared as soon as possible after completion of construction activities.

iv. Areas of the construction site that will remain inactive for three months or longer following clearing, grubbing and/or grading shall receive appropriate BMP treatments (e.g., revegetation, mulching, covering with tarps, etc.) to prevent fugitive dust generation.

v. All exposed soil or material stockpiles that will not be used within 3 days shall be enclosed, covered, or watered twice daily, or shall be stabilized with approved nontoxic chemical soil binders at a rate to be determined by the on-site construction supervisor.

vi. Unpaved access roads shall be stabilized via frequent watering, non-toxic chemical stabilization, temporary paving, or equivalent measures at a rate to be determined by the on-site construction supervisor.

vii. Trucks transporting materials to and from the site shall allow for at least two feet of freeboard (i.e., minimum vertical distance between the top of the load and the top of the trailer). Alternatively, trucks transporting materials shall be covered.

viii. Speed limit signs at 15 mph or less shall be installed on all unpaved roads within construction sites.

ix. Where visible soil material is tracked onto adjacent public paved roads, the paved roads shall be swept and debris shall be returned to the construction site or transported off site for disposal.

x. Wheel washers, dirt knock-off grates/mats, or equivalent measures shall be installed within the construction site where vehicles exit unpaved roads onto paved roads.

xi. Diesel powered construction equipment shall be maintained in accordance with manufacturer's requirements, and shall be retrofitted with diesel particulate filters where available and practicable.

xii. Heavy duty diesel trucks and gasoline powered equipment shall be turned off if idling is anticipated to last for more than 5 minutes.

xiii. Where feasible, the construction contractor shall use alternatively fueled construction equipment, such as electric or natural gas-powered equipment or biofuel.

xiv. Heavy construction equipment shall use low NOx diesel fuel to the extent that it is readily available at the time of construction.

xv. To the extent feasible, construction activities shall rely on the campus's existing electricity infrastructure rather than electrical generators powered by internal combustion engines.

xvi. The construction contractor shall develop a construction traffic management plan that includes the following:

- Scheduling heavy-duty truck deliveries to avoid peak traffic periods Consolidating truck deliveries.

xvii. Where possible, the construction contractor shall provide a lunch shuttle or on-site lunch service for construction workers.

xviii. xviii. The construction contractor shall, to the extent possible, use pre-coated architectural materials that do not require painting. Water-based or low VOC coatings shall be used that are compliant with SCAQMD Rule 1113. Spray equipment with high transfer efficiency, such as the high volume-low pressure spray method, or manual coatings application shall be used to reduce VOC emissions to the extent possible.

xix. Project constructions plans and specifications will include a requirement to define and implement a work program that would limit the emissions of reactive organic gases (ROG's) during the application of architectural coatings to the extent necessary to keep total daily ROG's for each project to below 75 pounds per day, or the current SCAQMD threshold, throughout that period of construction activity to the extent feasible. The specific program may include any combination of restrictions on the types of paints and coatings, application methods, and the amount of surface area coated as determined by the contractor.

xx. The construction contractor shall maintain signage along the construction perimeter with the name and telephone number of the individual in charge of implementing the construction emissions mitigation plan, and with the telephone number of the SCAQMD's complaint line. The contractor's representative shall maintain a log of any public complaints and corrective actions taken to resolve complaints.

(Mitigation Measure AQ-1 correlates with Mitigation Measure Air-2B in the 2007 LRDP EIR).

Level of Significance After Mitigation. *Less than Significant Impact.*

AQ-3 RESULT IN A CUMULATIVELY CONSIDERABLE NET INCREASE OF ANY CRITERIA POLLUTANT FOR WHICH THE REGION IS NONATTAINMENT FOR FEDERAL OR STATE STANDARDS?

Level of Significance Before Mitigation: *Potentially Significant Impact.*

With respect to the proposed project's construction-related air quality emissions and cumulative Basin-wide conditions, the SCAQMD has developed strategies to reduce criteria pollutant emissions outlined in the 2012 AQMP pursuant to Federal Clean Air Act mandates. As such, the proposed project would comply with SCAQMD Rule 403 requirements, and implement all feasible mitigation measures (Mitigation Measure AQ-1). Rule 403 requires that fugitive dust be controlled with the best available control measures in order to reduce dust so that it does not remain visible in the atmosphere beyond the property line of the proposed project. In addition, the proposed project would comply with adopted 2012 AQMP emissions control measures. Per SCAQMD rules and mandates, as well as the CEQA requirement that significant impacts be mitigated to the extent feasible, these same requirements (i.e., Rule 403 compliance, the implementation of all feasible mitigation measures, and compliance with adopted AQMP emissions control measures) would also be imposed on construction projects throughout the Basin, which would include related projects.

As discussed previously, the proposed project would not result in long-term air quality impacts, as emissions would not exceed the SCAQMD adopted operational thresholds. Additionally, adherence to SCAQMD rules and regulations would alleviate potential impacts related to cumulative conditions on a project-by-project basis. Emission reduction technology, strategies, and plans are constantly being developed. As a result, the proposed project would not contribute a cumulatively considerable net increase of any nonattainment criteria pollutant. Therefore, cumulative operational impacts associated with implementation of the proposed project would be less than significant.

Mitigation Measures: Refer to Mitigation Measure AQ-1.

Level of Significance After Mitigation. *Less Than Significant Impact.*

AQ-4 EXPOSE SENSITIVE RECEPTORS TO SUBSTANTIAL POLLUTANT CONCENTRATIONS?

Level of Significance Before Mitigation: *Potentially Significant Impact.*

Sensitive receptors are defined as facilities or land uses that include members of the population that are particularly sensitive to the effects of air pollutants, such as children, the elderly, and people with illnesses. Examples of these sensitive receptors are residences, schools, hospitals, and daycare centers. CARB has identified the following groups of individuals as the most likely to be affected by air pollution: the elderly over 65, children under 14, athletes, and persons with cardiovascular and chronic respiratory diseases such as asthma, emphysema, and bronchitis.

On-campus sensitive receptors near the project site include surrounding residences adjacent to the north, east, southeast, and west of the project site. In order to identify impacts to sensitive receptors, the SCAQMD recommends addressing localized significance thresholds (LSTs) for construction and operations impacts (area sources only). The CO hotspot analysis following the LST analysis addresses localized mobile source impacts.

LOCALIZED SIGNIFICANCE THRESHOLDS (LST)

LSTs were developed in response to SCAQMD Governing Boards' Environmental Justice Enhancement Initiative (I-4). The SCAQMD provided the *Final Localized Significance Threshold Methodology* (dated June 2003 [revised 2008]) for guidance. The LST methodology assists lead agencies in analyzing localized air quality impacts. The SCAQMD provides the LST screening lookup tables for one, two, and five acre projects emitting CO, NO_X, $PM_{2.5}$, or PM_{10}. The LST methodology and associated mass rates are not designed to evaluate localized impacts from mobile sources traveling over the roadways. The SCAQMD recommends that any project over five acres should perform air quality dispersion modeling to assess impacts to nearby sensitive receptors. The project is located within Source Receptor Area (SRA) 20, Central Orange County Coastal.

Construction

The SCAQMD guidance on applying CalEEMod to LSTs specifies the amount of acres a particular piece of equipment would likely disturb per day. Based on the SCAQMD guidance on applying CalEEMod to LSTs, the project would disturb at most 29.2 acres of land per day. Therefore, the LST thresholds for five acres was conservatively utilized for the construction LST analysis. The closest sensitive receptors to the project site are residential uses located adjacent to the western boundary of the project site. These sensitive land uses may be potentially affected by air pollutant emissions generated during on-site construction activities. LST thresholds are provided for distances to sensitive receptors of 25, 50, 100, 200, and 500 meters. As the nearest sensitive uses are adjacent to the project site, the lowest available LST values for 25 meters were used. Table 7, *Localized Significance of Construction Emissions*, shows the localized unmitigated and mitigated construction-related emissions. It is noted that the localized emissions presented in Table 7 are less than those in Table 5 because localized emissions include only on-site emissions (i.e., from construction equipment and fugitive dust), and do not include off-site emissions (i.e., from hauling activities). As seen in Table 7, mitigated on-site emissions would not exceed the LSTs for SRA 20.

Table 7
Localized Significance of Construction Emissions

Source	Pollutant (pounds/day)[1]			
	NO_X	CO	PM_{10}	$PM_{2.5}$
2016				
Total Unmitigated On-Site Emissions[2,3]	74.81	49.14	21.00	12.63
Total Mitigated On-Site Emissions[2,3]	74.81	49.14	9.63	6.38
Localized Significance Threshold[1]	*197*	*1,711*	*14*	*9*
Thresholds Exceeded?	*No*	*No*	*No*	*No*
2017				
Total Unmitigated On-Site Emissions[4,5]	20.29	15.72	1.48	1.40
Total Mitigated On-Site Emissions[4,5]	20.29	15.72	1.48	1.40
Localized Significance Threshold[1]	*197*	*1,711*	*14*	*9*
Thresholds Exceeded?	*No*	*No*	*No*	*No*

Notes:
1. The Localized Significance Threshold was determined using Appendix C of the SCAQMD Final Localized Significant Threshold Methodology guidance document for pollutants NO_X, CO, PM_{10}, and $PM_{2.5}$. The Localized Significance Threshold was based on the anticipated daily acreage disturbance for construction, the distance to sensitive receptors, and the source receptor area (SRA 8).
2. The Grading Phase represents the worst case scenario for NO_X and CO.
3. The Site Preparation Phase represents the worst case scenario for PM_{10}, and $PM_{2.5}$.
4. The Paving Phase represents the worst case scenario for NO_X.
5. The Building Construction Phase represents the worst case scenario for CO, PM_{10}, and $PM_{2.5}$.

Operations

For project operations, the five-acre threshold was conservatively utilized, as the project site is approximately 29.2 acres. As the nearest sensitive uses are adjacent to the project site, the most conservative LST values for 25 meters were used. As seen in Table 8, *Localized Significance of Operational Emissions*, project-related mitigated operational area source emissions would be negligible and would be below the LSTs. The mitigated area source emissions presented in Table 8 were derived from the CalEEMod, and include the following proposed project features that would reduce operational emissions: accessibility to a job center (approximately 0.3-mile), improve pedestrian network (project site connects to existing off-site pedestrian and bicycle trails), use only natural gas hearths, use of reclaimed water, installation of low-flow faucets, toilets, and showers, energy efficient dishwashers, water efficient landscaping, and water-efficient irrigation systems. As such, operational LST impacts would be less than significant in this regard.

Table 8
Localized Significance of Operational Emissions

Source	Pollutant (pounds/day)			
	NO_X	CO	PM_{10}	$PM_{2.5}$
Total Unmitigated Area Source Emissions	1.49	98.56	12.47	12.47
Total Mitigated Area Source Emissions[1]	0.29	25.03	0.48	0.47
Localized Significance Threshold[2]	*197*	*1,711*	*4*	*2*
Thresholds Exceeded?	*No*	*No*	*No*	*No*

Note:
1. The proposed project does not include hearths.
2. The Localized Significance Threshold was determined using Appendix C of the SCAQMD Final Localized Significant Threshold Methodology guidance document for pollutants NO_X, CO, PM_{10}, and $PM_{2.5}$. The Localized Significance Threshold was based on the total acreage, the distance to sensitive receptors, and the source receptor area (SRA 20).

CARBON MONOXIDE HOTSPOTS

Intersection Hotspots

CO emissions are a function of vehicle idling time, meteorological conditions, and traffic flow. Under certain extreme meteorological conditions, CO concentrations near a congested roadway or intersection may reach unhealthful levels (i.e., adversely affecting residents, school children, hospital patients, the elderly, etc.).

The SCAQMD requires a quantified assessment of CO hotspots when a project increases the volume-to-capacity ratio (also called the intersection capacity utilization) by 0.02 (two percent) for any intersection with an existing level of service LOS D or worse. Because traffic congestion is highest at intersections where vehicles queue and are subject to reduced speeds, these hot spots are typically produced at intersections.

The City is located in the South Coast Air Basin (Basin), which is designated as an attainment/maintenance area for the Federal CO standards and an attainment area for State standards. There has been a decline in CO emissions even though vehicle miles traveled on U.S. urban and rural roads have increased. On-road mobile source CO emissions have declined 24 percent between 1989 and 1998, despite a 23 percent rise in motor vehicle miles traveled over the same 10 years. California trends have been consistent with national trends; CO emissions declined 20 percent in California from 1985 through 1997 while vehicle miles traveled increased 18 percent in the 1990s. Three major control programs have contributed to the reduced per-vehicle CO emissions: exhaust standards, cleaner burning fuels, and motor vehicle inspection/maintenance programs.

A detailed CO analysis was conducted in the *Federal Attainment Plan for Carbon Monoxide* (CO Plan) for the SCAQMD's 2003 Air Quality Management Plan. The locations selected for microscale modeling in the CO Plan are worst-case intersections in the Basin, and would likely experience the highest CO concentrations. Thus, CO analysis within the CO Plan is utilized in a comparison to the proposed project, since it represents a worst-case scenario with heavy traffic volumes within the Basin.

Of these locations, the Wilshire Boulevard/Veteran Avenue intersection in Los Angeles experienced the highest CO concentration (4.6 parts per million [ppm]), which is well below the 35-ppm 1-hr CO Federal standard. The Wilshire Boulevard/Veteran Avenue intersection is one of the most congested intersections in Southern California with an average daily traffic (ADT) volume of approximately 100,000 vehicles per day. As the CO hotspots were not experienced at the Wilshire Boulevard/Veteran Avenue intersection, it can be reasonably inferred that CO hotspots would not be experienced at any intersections within the vicinity of the project site due to the low volume of traffic (2,680 daily trips) that would occur as a result of project implementation. Therefore, impacts would be less than significant in this regard.

Mitigation Measures: Refer to Mitigation Measure AQ-1.

Level of Significance After Mitigation. *Less Than Significant Impact.*

AQ-5 CREATE OBJECTIONABLE ODORS AFFECTING A SUBSTANTIAL NUMBER OF PEOPLE?

Level of Significance Before Mitigation: *Less Than Significant Impact.*

According to the SCAQMD *CEQA Air Quality Handbook*, land uses associated with odor complaints typically include agricultural uses, wastewater treatment plants, food processing plants, chemical plants, composting, refineries, landfills, dairies, and fiberglass molding. The proposed project does not include any uses identified by the SCAQMD as being associated with odors.

Construction activities associated with the project may generate detectable odors from heavy-duty equipment exhaust. Construction-related odors would be short-term in nature and cease upon project completion. Any impacts to existing adjacent land uses would be short-term and are less than significant.

Mitigation Measures: No mitigation measures are required.

Level of Significance After Mitigation. *Less Than Significant Impact.*

6.0 REFERENCES

6.1 LIST OF PREPARERS

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14725 Alton Parkway
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949/472-3505

Eddie Torres, INCE, Environmental Sciences Manager
Achilles Malisos, Manager of Air and Noise Studies
Ryan Chiene, Environmental Analyst
Faye Stroud, Graphics

6.2 DOCUMENTS

1. ATKINS, *University of California, Irvine, 2007 Long Range Development Plan Environmental Impact Report*, November 2007.

2. City of Irvine, *City of Irvine General Plan*, Supp. No. 9, July 2015.

3. City of Irvine, *Municipal Code*, codified through Ordinance No. 15-02, adopted April 28, 2015.

4. City of Irvine, *CEQA Manual*, May 2012.

5. South Coast Air Quality Management District, *2012 Air Quality Management Plan*, December 7, 2012.

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7. South Coast Air Quality Management District, *Final Localized Significance Threshold Methodology*, July 2008.

8. South Coast Air Quality Management District, *Regulation XI Source Specific Standards*, http://www.aqmd.gov/docs/default-source/rule-book/reg-xi/r1113.pdf?sfvrsn=15, accessed on February 2, 2016.

9. U.S. Climate Data, *Climate Irvine - California*, http://www.usclimatedata.com/climate/irvine/california/united-states/usca2494, accessed on March 1, 2016.

6.3 WEB SITES/PROGRAMS

California Air Resources Board, *Aerometric Data Analysis and Measurement System (ADAM)*, summaries from 2012 to 2014, http://www.arb.ca.gov/adam.

Environ International Corporation and the South Coast Air Quality Management District, *California Emissions Estimator Model (CalEEMod) Version 2013.2.2*, 2013.

APPENDIX A: AIR QUALITY DATA

Parenthetical CALEEMOD Assumptions
For: University Hills PA11 Project
Date: March 2016

CONSTRUCTION

Site Preparation (2016)

- 20 days.

Equipment:

Quantity	Type	Hours of Daily Operation
3	Rubber Tired Dozers	8
4	Tractors/Loaders/Backhoes	8

Grading (2016)

- 600,000 cubic yards and balanced cut and fill.
- 66 days.

Equipment:

Quantity	Type	Hours of Daily Operation
2	Excavators	8
1	Grader	8
1	Rubber Tired Dozer	8
2	Scrapers	8
2	Tractors/Loaders/Backhoes	4

Paving (2016-2017)

- 22 days.

Equipment:

Quantity	Type	Hours of Daily Operation
2	Pavers	8
2	Paving Equipment	8
2	Rollers	6

Building Construction (2017)

- 154 days

Equipment:

Quantity	Type	Hours of Daily Operation
3	Forklifts	8
1	Generator Sets	8
3	Tractors/Loaders/Backhoes	7
1	Welders	8

Architectural Coating (2017)

- 85 days

Equipment:

Quantity	Type	Hours of Daily Operation
1	Air Compressors	6

University Hills PA11

Orange County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Apartments Mid Rise	140.00	Dwelling Unit	14.20	140,000.00	400
Single Family Housing	160.00	Dwelling Unit	15.00	288,000.00	458

1.2 Other Project Characteristics

Urbanization Urban **Wind Speed (m/s)** 2.2 **Precipitation Freq (Days)** 30

Climate Zone 8 **Operational Year** 2017

Utility Company Southern California Edison

CO2 Intensity (lb/MWhr) 630.89 **CH4 Intensity (lb/MWhr)** 0.029 **N2O Intensity (lb/MWhr)** 0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Site acreage

Construction Phase - Construction timeline

Off-road Equipment -

Off-road Equipment - No cranes used

Trips and VMT - Balanced on-site grading

Grading - Site acreage

Woodstoves - Gas only fireplaces per SCAQMD

Construction Off-road Equipment Mitigation - Per SCAQMD requirements

Mobile Land Use Mitigation -

Area Mitigation -

Water Mitigation -

Mobile Commute Mitigation -

Waste Mitigation -

Energy Mitigation -

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	CleanPavedRoadPercentReduction	0	26
tblConstructionPhase	NumDays	35.00	85.00
tblConstructionPhase	NumDays	440.00	154.00
tblConstructionPhase	NumDays	45.00	66.00
tblConstructionPhase	NumDays	35.00	22.00
tblConstructionPhase	PhaseEndDate	12/29/2017	12/30/2017
tblFireplaces	NumberWood	7.00	0.00
tblFireplaces	NumberWood	8.00	0.00
tblGrading	AcresOfGrading	165.00	29.20
tblGrading	MaterialExported	0.00	300,000.00
tblGrading	MaterialImported	0.00	300,000.00
tblLandUse	LotAcreage	3.68	14.20
tblLandUse	LotAcreage	51.95	15.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblProjectCharacteristics	OperationalYear	2014	2017
tblTripsAndVMT	HaulingTripLength	20.00	0.15

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					
2016	11.5524	87.5416	137.3546	0.0780	18.2675	3.6391	21.2075	9.9840	3.3473	12.6889	0.0000	7,873.9283	7,873.9283	1.9806	0.0000	7,915.5201
2017	39.8224	22.9577	26.8773	0.0490	1.9661	1.5327	3.4988	0.5253	1.4444	1.9697	0.0000	4,443.6982	4,443.6982	0.7063	0.0000	4,458.5313
Total	**51.3748**	**110.4993**	**164.2318**	**0.1270**	**20.2336**	**5.1718**	**24.7064**	**10.5094**	**4.7917**	**14.6587**	**0.0000**	**12,317.6265**	**12,317.6265**	**2.6869**	**0.0000**	**12,374.0514**

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					
2016	11.5524	87.5416	137.3546	0.0780	6.8948	3.6391	9.8348	3.7327	3.3473	6.4376	0.0000	7,873.9283	7,873.9283	1.9806	0.0000	7,915.5201
2017	39.8224	22.9577	26.8773	0.0490	1.9661	1.5327	3.4988	0.5253	1.4444	1.9697	0.0000	4,443.6982	4,443.6982	0.7063	0.0000	4,458.5313
Total	**51.3748**	**110.4993**	**164.2318**	**0.1270**	**8.8609**	**5.1718**	**13.3337**	**4.2580**	**4.7917**	**8.4073**	**0.0000**	**12,317.6265**	**12,317.6265**	**2.6869**	**0.0000**	**12,374.0514**

	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**	**56.21**	**0.00**	**46.03**	**59.48**	**0.00**	**42.65**	**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	18.7617	1.4910	98.5573	0.2412		12.4730	12.4730		12.4694	12.4694	1,770.4915	5,444.5657	7,215.0572	8.4249	0.0990	7,422.6705

Energy	0.1722	1.4713	0.6261	9.3900e-003		0.1190	0.1190		0.1190	0.1190		1,878.2569	1,878.2569	0.0360	0.0344	1,889.6877
Mobile	8.5160	20.9676	94.1064	0.2512	18.8811	0.2863	19.1674	5.0378	0.2637	5.3015		21,159.3822	21,159.3822	0.8337		21,176.8901
Total	**27.4499**	**23.9298**	**193.2898**	**0.5018**	**18.8811**	**12.8782**	**31.7593**	**5.0378**	**12.8520**	**17.8898**	**1,770.4915**	**28,482.2048**	**30,252.6963**	**9.2946**	**0.1334**	**30,489.2482**

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	10.6649	0.2914	25.0267	1.3100e-003		0.4778	0.4778		0.4742	0.4742	0.0000	5,444.5657	5,444.5657	0.1482	0.0990	5,478.3685
Energy	0.1377	1.1769	0.5008	7.5100e-003		0.0952	0.0952		0.0952	0.0952		1,502.4654	1,502.4654	0.0288	0.0276	1,511.6092
Mobile	8.1583	18.4719	84.3333	0.2172	16.2613	0.2494	16.5107	4.3388	0.2297	4.5685		18,295.5163	18,295.5163	0.7275		18,310.7928
Total	**18.9610**	**19.9402**	**109.8608**	**0.2260**	**16.2613**	**0.8223**	**17.0836**	**4.3388**	**0.7990**	**5.1378**	**0.0000**	**25,242.5474**	**25,242.5474**	**0.9045**	**0.1266**	**25,300.7705**

	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	**30.93**	**16.67**	**43.16**	**54.96**	**13.87**	**93.62**	**46.21**	**13.87**	**93.78**	**71.28**	**100.00**	**11.37**	**16.56**	**90.27**	**5.16**	**17.02**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	9/1/2016	9/28/2016	5	20	
2	Grading	Grading	9/29/2016	12/29/2016	5	66	
3	Paving	Paving	12/30/2016	1/30/2017	5	22	
4	Building Construction	Building Construction	1/31/2017	9/1/2017	5	154	

5	Architectural Coating	Architectural Coating	9/2/2017	12/30/2017	5	85	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 29.2

Acres of Paving: 0

Residential Indoor: 866,700; Residential Outdoor: 288,900; Non-Residential Indoor: 0; Non-Residential Outdoor: 0 (Architectural Coating –

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Rubber Tired Dozers	3	8.00	255	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Excavators	2	8.00	162	0.38
Grading	Graders	1	8.00	174	0.41
Grading	Rubber Tired Dozers	1	8.00	255	0.40
Grading	Scrapers	2	8.00	361	0.48
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Paving	Pavers	2	8.00	125	0.42
Paving	Paving Equipment	2	8.00	130	0.36
Paving	Rollers	2	8.00	80	0.38
Building Construction	Cranes	0	7.00	226	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Architectural Coating	Air Compressors	1	6.00	78	0.48

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
Site Preparation	7	18.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

Grading		8	20.00	0.00	37,500.00	14.70	6.90	0.15	LD_Mix	HDT_Mix	HHDT
Paving		6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction		8	158.00	32.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating		1	32.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Replace Ground Cover

Water Exposed Area

Water Unpaved Roads

Reduce Vehicle Speed on Unpaved Roads

3.2 Site Preparation - 2016

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	5.0771	54.6323	41.1053	0.0391		2.9387	2.9387		2.7036	2.7036		4,065.0053	4,065.0053	1.2262		4,090.7544
Total	**5.0771**	**54.6323**	**41.1053**	**0.0391**	**18.0663**	**2.9387**	**21.0049**	**9.9307**	**2.7036**	**12.6343**		**4,065.0053**	**4,065.0053**	**1.2262**		**4,090.7544**

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	0.0657	0.0887	0.9308	2.3100e-003	0.2012	1.4100e-003	0.2026	0.0534	1.3000e-003	0.0547		193.4222	193.4222	9.6000e-003		193.6239
Total	**0.0657**	**0.0887**	**0.9308**	**2.3100e-003**	**0.2012**	**1.4100e-003**	**0.2026**	**0.0534**	**1.3000e-003**	**0.0547**		**193.4222**	**193.4222**	**9.6000e-003**		**193.6239**

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					6.6936	0.0000	6.6936	3.6793	0.0000	3.6793			0.0000			0.0000
Off-Road	5.0771	54.6323	41.1053	0.0391		2.9387	2.9387		2.7036	2.7036	0.0000	4,065.0053	4,065.0053	1.2262		4,090.7544
Total	**5.0771**	**54.6323**	**41.1053**	**0.0391**	**6.6936**	**2.9387**	**9.6322**	**3.6793**	**2.7036**	**6.3829**	**0.0000**	**4,065.0053**	**4,065.0053**	**1.2262**		**4,090.7544**

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	0.0657	0.0887	0.9308	2.3100e-003	0.2012	1.4100e-003	0.2026	0.0534	1.3000e-003	0.0547		193.4222	193.4222	9.6000e-003		193.6239
Total	**0.0657**	**0.0887**	**0.9308**	**2.3100e-003**	**0.2012**	**1.4100e-003**	**0.2026**	**0.0534**	**1.3000e-003**	**0.0547**		**193.4222**	**193.4222**	**9.6000e-003**		**193.6239**

3.3 Grading - 2016

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					7.5194	0.0000	7.5194	3.5166	0.0000	3.5166			0.0000			0.0000
Off-Road	6.4795	74.8137	49.1374	0.0617		3.5842	3.5842		3.2975	3.2975		6,414.9807	6,414.9807	1.9350		6,455.6154
Total	**6.4795**	**74.8137**	**49.1374**	**0.0617**	**7.5194**	**3.5842**	**11.1036**	**3.5166**	**3.2975**	**6.8141**		**6,414.9807**	**6,414.9807**	**1.9350**		**6,455.6154**

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	4.9999	12.6293	87.1829	0.0137	0.0860	0.0533	0.1393	0.0246	0.0484	0.0730		1,244.0340	1,244.0340	0.0349		1,244.7670
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	0.0730	0.0986	1.0342	2.5700e-003	0.2236	1.5600e-003	0.2251	0.0593	1.4400e-003	0.0607		214.9136	214.9136	0.0107		215.1377
Total	**5.0729**	**12.7279**	**88.2172**	**0.0163**	**0.3096**	**0.0549**	**0.3644**	**0.0839**	**0.0498**	**0.1337**		**1,458.9476**	**1,458.9476**	**0.0456**		**1,459.9047**

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					2.7859	0.0000	2.7859	1.3029	0.0000	1.3029			0.0000			0.0000
Off-Road	6.4795	74.8137	49.1374	0.0617		3.5842	3.5842		3.2975	3.2975	0.0000	6,414.9807	6,414.9807	1.9350		6,455.6154
Total	**6.4795**	**74.8137**	**49.1374**	**0.0617**	**2.7859**	**3.5842**	**6.3702**	**1.3029**	**3.2975**	**4.6004**	**0.0000**	**6,414.9807**	**6,414.9807**	**1.9350**		**6,455.6154**

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	4.9999	12.6293	87.1829	0.0137	0.0860	0.0533	0.1393	0.0246	0.0484	0.0730		1,244.0340	1,244.0340	0.0349		1,244.7670
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	0.0730	0.0986	1.0342	2.5700e-003	0.2236	1.5600e-003	0.2251	0.0593	1.4400e-003	0.0607		214.9136	214.9136	0.0107		215.1377
Total	**5.0729**	**12.7279**	**88.2172**	**0.0163**	**0.3096**	**0.0549**	**0.3644**	**0.0839**	**0.0498**	**0.1337**		**1,458.9476**	**1,458.9476**	**0.0456**		**1,459.9047**

3.4 Paving - 2016

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	2.0898	22.3859	14.8176	0.0223		1.2610	1.2610		1.1601	1.1601		2,316.3767	2,316.3767	0.6987		2,331.0495

Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**2.0898**	**22.3859**	**14.8176**	**0.0223**		**1.2610**	**1.2610**		**1.1601**	**1.1601**		**2,316.3767**	**2,316.3767**	**0.6987**		**2,331.0495**

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	0.0548	0.0739	0.7757	1.9300e-003	0.1677	1.1700e-003	0.1688	0.0445	1.0800e-003	0.0455		161.1852	161.1852	8.0000e-003		161.3532
Total	**0.0548**	**0.0739**	**0.7757**	**1.9300e-003**	**0.1677**	**1.1700e-003**	**0.1688**	**0.0445**	**1.0800e-003**	**0.0455**		**161.1852**	**161.1852**	**8.0000e-003**		**161.3532**

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	2.0898	22.3859	14.8176	0.0223		1.2610	1.2610		1.1601	1.1601	0.0000	2,316.3767	2,316.3767	0.6987		2,331.0495
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**2.0898**	**22.3859**	**14.8176**	**0.0223**		**1.2610**	**1.2610**		**1.1601**	**1.1601**	**0.0000**	**2,316.3767**	**2,316.3767**	**0.6987**		**2,331.0495**

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	0.0548	0.0739	0.7757	1.9300e-003	0.1677	1.1700e-003	0.1688	0.0445	1.0800e-003	0.0455		161.1852	161.1852	8.0000e-003		161.3532
Total	**0.0548**	**0.0739**	**0.7757**	**1.9300e-003**	**0.1677**	**1.1700e-003**	**0.1688**	**0.0445**	**1.0800e-003**	**0.0455**		**161.1852**	**161.1852**	**8.0000e-003**		**161.3532**

3.4 Paving - 2017

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	1.9074	20.2964	14.7270	0.0223		1.1384	1.1384		1.0473	1.0473		2,281.0588	2,281.0588	0.6989		2,295.7360
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.9074**	**20.2964**	**14.7270**	**0.0223**		**1.1384**	**1.1384**		**1.0473**	**1.0473**		**2,281.0588**	**2,281.0588**	**0.6989**		**2,295.7360**

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	0.0498	0.0671	0.7054	1.9300e-003	0.1677	1.1500e-003	0.1688	0.0445	1.0600e-003	0.0455		154.9456	154.9456	7.4300e-003		155.1015
Total	**0.0498**	**0.0671**	**0.7054**	**1.9300e-003**	**0.1677**	**1.1500e-003**	**0.1688**	**0.0445**	**1.0600e-003**	**0.0455**		**154.9456**	**154.9456**	**7.4300e-003**		**155.1015**

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	1.9074	20.2964	14.7270	0.0223		1.1384	1.1384		1.0473	1.0473	0.0000	2,281.0588	2,281.0588	0.6989		2,295.7360
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.9074**	**20.2964**	**14.7270**	**0.0223**		**1.1384**	**1.1384**		**1.0473**	**1.0473**	**0.0000**	**2,281.0588**	**2,281.0588**	**0.6989**		**2,295.7360**

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	0.0498	0.0671	0.7054	1.9300e-003	0.1677	1.1500e-003	0.1688	0.0445	1.0600e-003	0.0455		154.9456	154.9456	7.4300e-003		155.1015
Total	**0.0498**	**0.0671**	**0.7054**	**1.9300e-003**	**0.1677**	**1.1500e-003**	**0.1688**	**0.0445**	**1.0600e-003**	**0.0455**		**154.9456**	**154.9456**	**7.4300e-003**		**155.1015**

3.5 Building Construction - 2017

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	2.5354	19.6743	15.7173	0.0219		1.4811	1.4811		1.3969	1.3969		2,134.7221	2,134.7221	0.4949		2,145.1159
Total	**2.5354**	**19.6743**	**15.7173**	**0.0219**		**1.4811**	**1.4811**		**1.3969**	**1.3969**		**2,134.7221**	**2,134.7221**	**0.4949**		**2,145.1159**

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	0.2853	2.5762	3.7294	6.8700e-003	0.2000	0.0396	0.2396	0.0570	0.0364	0.0933		676.8829	676.8829	4.9200e-003		676.9863
Worker	0.5246	0.7072	7.4306	0.0203	1.7661	0.0121	1.7781	0.4684	0.0111	0.4795		1,632.0932	1,632.0932	0.0782		1,633.7360
Total	**0.8099**	**3.2834**	**11.1599**	**0.0272**	**1.9661**	**0.0516**	**2.0177**	**0.5253**	**0.0475**	**0.5729**		**2,308.9761**	**2,308.9761**	**0.0832**		**2,310.7223**

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	2.5354	19.6743	15.7173	0.0219		1.4811	1.4811		1.3969	1.3969	0.0000	2,134.7221	2,134.7221	0.4949		2,145.1159
Total	**2.5354**	**19.6743**	**15.7173**	**0.0219**		**1.4811**	**1.4811**		**1.3969**	**1.3969**	**0.0000**	**2,134.7221**	**2,134.7221**	**0.4949**		**2,145.1159**

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	0.2853	2.5762	3.7294	6.8700e-003	0.2000	0.0396	0.2396	0.0570	0.0364	0.0933		676.8829	676.8829	4.9200e-003		676.9863
Worker	0.5246	0.7072	7.4306	0.0203	1.7661	0.0121	1.7781	0.4684	0.0111	0.4795		1,632.0932	1,632.0932	0.0782		1,633.7360
Total	**0.8099**	**3.2834**	**11.1599**	**0.0272**	**1.9661**	**0.0516**	**2.0177**	**0.5253**	**0.0475**	**0.5729**		**2,308.9761**	**2,308.9761**	**0.0832**		**2,310.7223**

3.6 Architectural Coating - 2017

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	39.3839					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000

Off-Road	0.3323	2.1850	1.8681	2.9700e-003		0.1733	0.1733		0.1733	0.1733		281.4481	281.4481	0.0297		282.0721
Total	**39.7162**	**2.1850**	**1.8681**	**2.9700e-003**		**0.1733**	**0.1733**		**0.1733**	**0.1733**		**281.4481**	**281.4481**	**0.0297**		**282.0721**

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	0.1063	0.1432	1.5049	4.1100e-003	0.3577	2.4400e-003	0.3601	0.0949	2.2600e-003	0.0971		330.5505	330.5505	0.0158		330.8833
Total	**0.1063**	**0.1432**	**1.5049**	**4.1100e-003**	**0.3577**	**2.4400e-003**	**0.3601**	**0.0949**	**2.2600e-003**	**0.0971**		**330.5505**	**330.5505**	**0.0158**		**330.8833**

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	39.3839					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.3323	2.1850	1.8681	2.9700e-003		0.1733	0.1733		0.1733	0.1733	0.0000	281.4481	281.4481	0.0297		282.0721
Total	**39.7162**	**2.1850**	**1.8681**	**2.9700e-003**		**0.1733**	**0.1733**		**0.1733**	**0.1733**	**0.0000**	**281.4481**	**281.4481**	**0.0297**		**282.0721**

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	0.1063	0.1432	1.5049	4.1100e-003	0.3577	2.4400e-003	0.3601	0.0949	2.2600e-003	0.0971		330.5505	330.5505	0.0158		330.8833
Total	**0.1063**	**0.1432**	**1.5049**	**4.1100e-003**	**0.3577**	**2.4400e-003**	**0.3601**	**0.0949**	**2.2600e-003**	**0.0971**		**330.5505**	**330.5505**	**0.0158**		**330.8833**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Increase Density

Improve Destination Accessibility

Improve Pedestrian Network

Implement Trip Reduction Program

Employee Vanpool/Shuttle

Provide Riade Sharing Program

	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	8.1583	18.4719	84.3333	0.2172	16.2613	0.2494	16.5107	4.3388	0.2297	4.5685		18,295.5163	18,295.5163	0.7275		18,310.7928
Unmitigated	8.5160	20.9676	94.1064	0.2512	18.8811	0.2863	19.1674	5.0378	0.2637	5.3015		21,159.3822	21,159.3822	0.8337		21,176.8901

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments Mid Rise	922.60	1,002.40	849.80	3,156,082	2,718,177
Single Family Housing	1,531.20	1,612.80	1403.20	5,209,692	4,486,851
Total	2,453.80	2,615.20	2,253.00	8,365,774	7,205,028

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-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Apartments Mid Rise	14.70	5.90	8.70	40.20	19.20	40.60	86	11	3
Single Family Housing	14.70	5.90	8.70	40.20	19.20	40.60	86	11	3

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.510449	0.057012	0.191854	0.151889	0.041459	0.005887	0.015572	0.014818	0.001440	0.002145	0.004716	0.000509	0.002251

5.0 Energy Detail

4.4 Fleet Mix

Historical Energy Use: N

5.1 Mitigation Measures Energy

Exceed Title 24

Install High Efficiency Lighting

Install Energy Efficient Appliances

	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	0.1377	1.1769	0.5008	7.5100e-003		0.0952	0.0952		0.0952	0.0952		1,502.4654	1,502.4654	0.0288	0.0276	1,511.6092
NaturalGas Unmitigated	0.1722	1.4713	0.6261	9.3900e-003		0.1190	0.1190		0.1190	0.1190		1,878.2569	1,878.2569	0.0360	0.0344	1,889.6877

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					
Single Family Housing	12661.3	0.1365	1.1668	0.4965	7.4500e-003		0.0943	0.0943		0.0943	0.0943		1,489.5600	1,489.5600	0.0286	0.0273	1,498.6253
Apartments Mid Rise	3303.92	0.0356	0.3045	0.1296	1.9400e-003		0.0246	0.0246		0.0246	0.0246		388.6969	388.6969	7.4500e-003	7.1300e-003	391.0624
Total		**0.1722**	**1.4713**	**0.6261**	**9.3900e-003**		**0.1190**	**0.1190**		**0.1190**	**0.1190**		**1,878.2569**	**1,878.2569**	**0.0360**	**0.0344**	**1,889.6877**

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					
Single Family Housing	10.1336	0.1093	0.9339	0.3974	5.9600e-003		0.0755	0.0755		0.0755	0.0755		1,192.1934	1,192.1934	0.0229	0.0219	1,199.4489
Apartments Mid Rise	2.63731	0.0284	0.2431	0.1034	1.5500e-003		0.0197	0.0197		0.0197	0.0197		310.2720	310.2720	5.9500e-003	5.6900e-003	312.1603
Total		**0.1377**	**1.1769**	**0.5008**	**7.5100e-003**		**0.0952**	**0.0952**		**0.0952**	**0.0952**		**1,502.4654**	**1,502.4654**	**0.0288**	**0.0276**	**1,511.6092**

6.0 Area Detail

6.1 Mitigation Measures Area

Use Low VOC Paint - Residential Interior

Use Low VOC Paint - Residential Exterior

Use Low VOC Paint - Non-Residential Interior

Use Low VOC Paint - Non-Residential Exterior

Use only Natural Gas Hearths

Use Low VOC Cleaning Supplies

	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	10.6649	0.2914	25.0267	1.3100e-003		0.4778	0.4778		0.4742	0.4742	0.0000	5,444.5657	5,444.5657	0.1482	0.0990	5,478.3685
Unmitigated	18.7617	1.4910	98.5573	0.2412		12.4730	12.4730		12.4694	12.4694	1,770.4915	5,444.5657	7,215.0572	8.4249	0.0990	7,422.6705

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	0.9172					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	8.4744					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	8.5918	1.1995	73.5576	0.2399		12.3372	12.3372		12.3336	12.3336	1,770.4915	5,400.0000	7,170.4915	8.3802	0.0990	7,377.1655
Landscaping	0.7784	0.2914	24.9997	1.3100e-003		0.1358	0.1358		0.1358	0.1358		44.5657	44.5657	0.0447		45.5050

	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
Total	**18.7617**	**1.4909**	**98.5573**	**0.2412**		**12.4730**	**12.4730**		**12.4694**	**12.4694**	**1,770.4915**	**5,444.5657**	**7,215.0572**	**8.4249**	**0.0990**	**7,422.6705**

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	0.9172					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	8.4744					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.4950	2.0000e-005	0.0270	0.0000		0.3420	0.3420		0.3384	0.3384	0.0000	5,400.0000	5,400.0000	0.1035	0.0990	5,432.8635
Landscaping	0.7784	0.2914	24.9997	1.3100e-003		0.1358	0.1358		0.1358	0.1358		44.5657	44.5657	0.0447		45.5050
Total	**10.6650**	**0.2914**	**25.0267**	**1.3100e-003**		**0.4778**	**0.4778**		**0.4742**	**0.4742**	**0.0000**	**5,444.5657**	**5,444.5657**	**0.1482**	**0.0990**	**5,478.3685**

7.0 Water Detail

7.1 Mitigation Measures Water

Apply Water Conservation Strategy

Use Reclaimed Water

Install Low Flow Bathroom Faucet

Install Low Flow Kitchen Faucet

Install Low Flow Toilet

Install Low Flow Shower

Use Water Efficient Irrigation System

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 Vegetation

University Hills PA11

Orange County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Apartments Mid Rise	140.00	Dwelling Unit	14.20	140,000.00	400
Single Family Housing	160.00	Dwelling Unit	15.00	288,000.00	458

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	30
Climate Zone	8			**Operational Year**	2017
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	630.89	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Site acreage

Construction Phase - Construction timeline

Off-road Equipment -

Off-road Equipment - No cranes used

Trips and VMT - Balanced on-site grading

Grading - Site acreage

Woodstoves - Gas only fireplaces per SCAQMD

Construction Off-road Equipment Mitigation - Per SCAQMD requirements

Mobile Land Use Mitigation -

Area Mitigation -

Water Mitigation -

Mobile Commute Mitigation -

Waste Mitigation -

Energy Mitigation -

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	CleanPavedRoadPercentReduction	0	26
tblConstructionPhase	NumDays	35.00	85.00
tblConstructionPhase	NumDays	440.00	154.00
tblConstructionPhase	NumDays	45.00	66.00
tblConstructionPhase	NumDays	35.00	22.00
tblConstructionPhase	PhaseEndDate	12/29/2017	12/30/2017
tblFireplaces	NumberWood	7.00	0.00
tblFireplaces	NumberWood	8.00	0.00
tblGrading	AcresOfGrading	165.00	29.20
tblGrading	MaterialExported	0.00	300,000.00
tblGrading	MaterialImported	0.00	300,000.00
tblLandUse	LotAcreage	3.68	14.20
tblLandUse	LotAcreage	51.95	15.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblProjectCharacteristics	OperationalYear	2014	2017
tblTripsAndVMT	HaulingTripLength	20.00	0.15

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					
2016	10.8211	87.6911	120.3904	0.0789	18.2675	3.6334	21.2075	9.9840	3.3420	12.6889	0.0000	7,986.3336	7,986.3336	1.9766	0.0000	8,027.8413
2017	39.8173	22.8357	26.7061	0.0502	1.9661	1.5323	3.4984	0.5253	1.4440	1.9694	0.0000	4,540.7275	4,540.7275	0.7063	0.0000	4,555.5607
Total	**50.6384**	**110.5268**	**147.0965**	**0.1291**	**20.2336**	**5.1657**	**24.7060**	**10.5094**	**4.7861**	**14.6583**	**0.0000**	**12,527.0612**	**12,527.0612**	**2.6829**	**0.0000**	**12,583.4020**

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					
2016	10.8211	87.6911	120.3904	0.0789	6.8948	3.6334	9.8348	3.7327	3.3420	6.4376	0.0000	7,986.3336	7,986.3336	1.9766	0.0000	8,027.8413
2017	39.8173	22.8357	26.7061	0.0502	1.9661	1.5323	3.4984	0.5253	1.4440	1.9694	0.0000	4,540.7275	4,540.7275	0.7063	0.0000	4,555.5607
Total	**50.6384**	**110.5268**	**147.0965**	**0.1291**	**8.8609**	**5.1657**	**13.3333**	**4.2580**	**4.7861**	**8.4069**	**0.0000**	**12,527.0611**	**12,527.0611**	**2.6829**	**0.0000**	**12,583.4020**

	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**	**56.21**	**0.00**	**46.03**	**59.48**	**0.00**	**42.65**	**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	18.7617	1.4910	98.5573	0.2412		12.4730	12.4730		12.4694	12.4694	1,770.4915	5,444.5657	7,215.0572	8.4249	0.0990	7,422.6705

Energy	0.1722	1.4713	0.6261	9.3900e-003		0.1190	0.1190		0.1190	0.1190		1,878.2569	1,878.2569	0.0360	0.0344	1,889.6877
Mobile	8.0687	19.8500	95.2906	0.2630	18.8811	0.2853	19.1663	5.0378	0.2627	5.3005		22,125.8127	22,125.8127	0.8333		22,143.3123
Total	**27.0026**	**22.8123**	**194.4739**	**0.5136**	**18.8811**	**12.8772**	**31.7582**	**5.0378**	**12.8510**	**17.8888**	**1,770.4915**	**29,448.6353**	**31,219.1268**	**9.2942**	**0.1334**	**31,455.6705**

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	10.6649	0.2914	25.0267	1.3100e-003		0.4778	0.4778		0.4742	0.4742	0.0000	5,444.5657	5,444.5657	0.1482	0.0990	5,478.3685
Energy	0.1377	1.1769	0.5008	7.5100e-003		0.0952	0.0952		0.0952	0.0952		1,502.4654	1,502.4654	0.0288	0.0276	1,511.6092
Mobile	7.7022	17.5017	84.6214	0.2274	16.2613	0.2483	16.5096	4.3388	0.2287	4.5675		19,129.9697	19,129.9697	0.7271		19,145.2379
Total	**18.5049**	**18.9700**	**110.1489**	**0.2362**	**16.2613**	**0.8212**	**17.0826**	**4.3388**	**0.7980**	**5.1368**	**0.0000**	**26,077.0008**	**26,077.0008**	**0.9041**	**0.1266**	**26,135.2156**

	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	**31.47**	**16.84**	**43.36**	**54.00**	**13.87**	**93.62**	**46.21**	**13.87**	**93.79**	**71.28**	**100.00**	**11.45**	**16.47**	**90.27**	**5.16**	**16.91**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	9/1/2016	9/28/2016	5	20	
2	Grading	Grading	9/29/2016	12/29/2016	5	66	
3	Paving	Paving	12/30/2016	1/30/2017	5	22	
4	Building Construction	Building Construction	1/31/2017	9/1/2017	5	154	

5	Architectural Coating	Architectural Coating	9/2/2017	12/30/2017		5	85	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 29.2

Acres of Paving: 0

Residential Indoor: 866,700; Residential Outdoor: 288,900; Non-Residential Indoor: 0; Non-Residential Outdoor: 0 (Architectural Coating –

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Rubber Tired Dozers	3	8.00	255	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Excavators	2	8.00	162	0.38
Grading	Graders	1	8.00	174	0.41
Grading	Rubber Tired Dozers	1	8.00	255	0.40
Grading	Scrapers	2	8.00	361	0.48
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Paving	Pavers	2	8.00	125	0.42
Paving	Paving Equipment	2	8.00	130	0.36
Paving	Rollers	2	8.00	80	0.38
Building Construction	Cranes	0	7.00	226	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Architectural Coating	Air Compressors	1	6.00	78	0.48

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
Site Preparation	7	18.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

Grading		8	20.00	0.00	37,500.00	14.70	6.90	0.15	LD_Mix	HDT_Mix	HHDT
Paving		6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction		8	158.00	32.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating		1	32.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Replace Ground Cover

Water Exposed Area

Water Unpaved Roads

Reduce Vehicle Speed on Unpaved Roads

3.2 Site Preparation - 2016

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	5.0771	54.6323	41.1053	0.0391		2.9387	2.9387		2.7036	2.7036		4,065.0053	4,065.0053	1.2262		4,090.7544
Total	**5.0771**	**54.6323**	**41.1053**	**0.0391**	**18.0663**	**2.9387**	**21.0049**	**9.9307**	**2.7036**	**12.6343**		**4,065.0053**	**4,065.0053**	**1.2262**		**4,090.7544**

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	0.0625	0.0807	0.9882	2.4400e-003	0.2012	1.4100e-003	0.2026	0.0534	1.3000e-003	0.0547		204.2283	204.2283	9.6000e-003		204.4300
Total	**0.0625**	**0.0807**	**0.9882**	**2.4400e-003**	**0.2012**	**1.4100e-003**	**0.2026**	**0.0534**	**1.3000e-003**	**0.0547**		**204.2283**	**204.2283**	**9.6000e-003**		**204.4300**

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					6.6936	0.0000	6.6936	3.6793	0.0000	3.6793			0.0000			0.0000
Off-Road	5.0771	54.6323	41.1053	0.0391		2.9387	2.9387		2.7036	2.7036	0.0000	4,065.0053	4,065.0053	1.2262		4,090.7544
Total	**5.0771**	**54.6323**	**41.1053**	**0.0391**	**6.6936**	**2.9387**	**9.6322**	**3.6793**	**2.7036**	**6.3829**	**0.0000**	**4,065.0053**	**4,065.0053**	**1.2262**		**4,090.7544**

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	0.0625	0.0807	0.9882	2.4400e-003	0.2012	1.4100e-003	0.2026	0.0534	1.3000e-003	0.0547		204.2283	204.2283	9.6000e-003		204.4300
Total	**0.0625**	**0.0807**	**0.9882**	**2.4400e-003**	**0.2012**	**1.4100e-003**	**0.2026**	**0.0534**	**1.3000e-003**	**0.0547**		**204.2283**	**204.2283**	**9.6000e-003**		**204.4300**

3.3 Grading - 2016

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					7.5194	0.0000	7.5194	3.5166	0.0000	3.5166			0.0000			0.0000
Off-Road	6.4795	74.8137	49.1374	0.0617		3.5842	3.5842		3.2975	3.2975		6,414.9807	6,414.9807	1.9350		6,455.6154
Total	**6.4795**	**74.8137**	**49.1374**	**0.0617**	**7.5194**	**3.5842**	**11.1036**	**3.5166**	**3.2975**	**6.8141**		**6,414.9807**	**6,414.9807**	**1.9350**		**6,455.6154**

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	4.2723	12.7877	70.1550	0.0145	0.0860	0.0475	0.1336	0.0246	0.0431	0.0677		1,344.4326	1,344.4326	0.0309		1,345.0815
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	0.0694	0.0896	1.0980	2.7100e-003	0.2236	1.5600e-003	0.2251	0.0593	1.4400e-003	0.0607		226.9203	226.9203	0.0107		227.1444
Total	**4.3417**	**12.8773**	**71.2529**	**0.0172**	**0.3096**	**0.0491**	**0.3587**	**0.0839**	**0.0445**	**0.1284**		**1,571.3529**	**1,571.3529**	**0.0416**		**1,572.2259**

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					2.7859	0.0000	2.7859	1.3029	0.0000	1.3029			0.0000			0.0000
Off-Road	6.4795	74.8137	49.1374	0.0617		3.5842	3.5842		3.2975	3.2975	0.0000	6,414.9807	6,414.9807	1.9350		6,455.6154
Total	**6.4795**	**74.8137**	**49.1374**	**0.0617**	**2.7859**	**3.5842**	**6.3702**	**1.3029**	**3.2975**	**4.6004**	**0.0000**	**6,414.9807**	**6,414.9807**	**1.9350**		**6,455.6154**

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	4.2723	12.7877	70.1550	0.0145	0.0860	0.0475	0.1336	0.0246	0.0431	0.0677		1,344.4326	1,344.4326	0.0309		1,345.0815
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	0.0694	0.0896	1.0980	2.7100e-003	0.2236	1.5600e-003	0.2251	0.0593	1.4400e-003	0.0607		226.9203	226.9203	0.0107		227.1444
Total	**4.3417**	**12.8773**	**71.2529**	**0.0172**	**0.3096**	**0.0491**	**0.3587**	**0.0839**	**0.0445**	**0.1284**		**1,571.3529**	**1,571.3529**	**0.0416**		**1,572.2259**

3.4 Paving - 2016

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	2.0898	22.3859	14.8176	0.0223		1.2610	1.2610		1.1601	1.1601		2,316.3767	2,316.3767	0.6987		2,331.0495

Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**2.0898**	**22.3859**	**14.8176**	**0.0223**		**1.2610**	**1.2610**		**1.1601**	**1.1601**		**2,316.3767**	**2,316.3767**	**0.6987**		**2,331.0495**

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	0.0520	0.0672	0.8235	2.0400e-003	0.1677	1.1700e-003	0.1688	0.0445	1.0800e-003	0.0455		170.1902	170.1902	8.0000e-003		170.3583
Total	**0.0520**	**0.0672**	**0.8235**	**2.0400e-003**	**0.1677**	**1.1700e-003**	**0.1688**	**0.0445**	**1.0800e-003**	**0.0455**		**170.1902**	**170.1902**	**8.0000e-003**		**170.3583**

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	2.0898	22.3859	14.8176	0.0223		1.2610	1.2610		1.1601	1.1601	0.0000	2,316.3767	2,316.3767	0.6987		2,331.0495
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**2.0898**	**22.3859**	**14.8176**	**0.0223**		**1.2610**	**1.2610**		**1.1601**	**1.1601**	**0.0000**	**2,316.3767**	**2,316.3767**	**0.6987**		**2,331.0495**

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	0.0520	0.0672	0.8235	2.0400e-003	0.1677	1.1700e-003	0.1688	0.0445	1.0800e-003	0.0455		170.1902	170.1902	8.0000e-003		170.3583
Total	**0.0520**	**0.0672**	**0.8235**	**2.0400e-003**	**0.1677**	**1.1700e-003**	**0.1688**	**0.0445**	**1.0800e-003**	**0.0455**		**170.1902**	**170.1902**	**8.0000e-003**		**170.3583**

3.4 Paving - 2017

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	1.9074	20.2964	14.7270	0.0223		1.1384	1.1384		1.0473	1.0473		2,281.0588	2,281.0588	0.6989		2,295.7360
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.9074**	**20.2964**	**14.7270**	**0.0223**		**1.1384**	**1.1384**		**1.0473**	**1.0473**		**2,281.0588**	**2,281.0588**	**0.6989**		**2,295.7360**

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	0.0474	0.0611	0.7511	2.0400e-003	0.1677	1.1500e-003	0.1688	0.0445	1.0600e-003	0.0455		163.6094	163.6094	7.4300e-003		163.7653
Total	**0.0474**	**0.0611**	**0.7511**	**2.0400e-003**	**0.1677**	**1.1500e-003**	**0.1688**	**0.0445**	**1.0600e-003**	**0.0455**		**163.6094**	**163.6094**	**7.4300e-003**		**163.7653**

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	1.9074	20.2964	14.7270	0.0223		1.1384	1.1384		1.0473	1.0473	0.0000	2,281.0588	2,281.0588	0.6989		2,295.7360
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.9074**	**20.2964**	**14.7270**	**0.0223**		**1.1384**	**1.1384**		**1.0473**	**1.0473**	**0.0000**	**2,281.0588**	**2,281.0588**	**0.6989**		**2,295.7360**

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	0.0474	0.0611	0.7511	2.0400e-003	0.1677	1.1500e-003	0.1688	0.0445	1.0600e-003	0.0455		163.6094	163.6094	7.4300e-003		163.7653
Total	**0.0474**	**0.0611**	**0.7511**	**2.0400e-003**	**0.1677**	**1.1500e-003**	**0.1688**	**0.0445**	**1.0600e-003**	**0.0455**		**163.6094**	**163.6094**	**7.4300e-003**		**163.7653**

3.5 Building Construction - 2017

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	2.5354	19.6743	15.7173	0.0219		1.4811	1.4811		1.3969	1.3969		2,134.7221	2,134.7221	0.4949		2,145.1159
Total	**2.5354**	**19.6743**	**15.7173**	**0.0219**		**1.4811**	**1.4811**		**1.3969**	**1.3969**		**2,134.7221**	**2,134.7221**	**0.4949**		**2,145.1159**

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	0.2581	2.5184	3.0771	6.9100e-003	0.2000	0.0392	0.2392	0.0570	0.0360	0.0930		682.6535	682.6535	4.7700e-003		682.7537
Worker	0.4991	0.6431	7.9117	0.0214	1.7661	0.0121	1.7781	0.4684	0.0111	0.4795		1,723.3520	1,723.3520	0.0782		1,724.9949
Total	**0.7572**	**3.1614**	**10.9888**	**0.0284**	**1.9661**	**0.0512**	**2.0173**	**0.5253**	**0.0472**	**0.5725**		**2,406.0055**	**2,406.0055**	**0.0830**		**2,407.7485**

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	2.5354	19.6743	15.7173	0.0219		1.4811	1.4811		1.3969	1.3969	0.0000	2,134.7221	2,134.7221	0.4949		2,145.1159
Total	**2.5354**	**19.6743**	**15.7173**	**0.0219**		**1.4811**	**1.4811**		**1.3969**	**1.3969**	**0.0000**	**2,134.7221**	**2,134.7221**	**0.4949**		**2,145.1159**

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	0.2581	2.5184	3.0771	6.9100e-003	0.2000	0.0392	0.2392	0.0570	0.0360	0.0930		682.6535	682.6535	4.7700e-003		682.7537
Worker	0.4991	0.6431	7.9117	0.0214	1.7661	0.0121	1.7781	0.4684	0.0111	0.4795		1,723.3520	1,723.3520	0.0782		1,724.9949
Total	**0.7572**	**3.1614**	**10.9888**	**0.0284**	**1.9661**	**0.0512**	**2.0173**	**0.5253**	**0.0472**	**0.5725**		**2,406.0055**	**2,406.0055**	**0.0830**		**2,407.7485**

3.6 Architectural Coating - 2017

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	39.3839					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000

	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
Off-Road	0.3323	2.1850	1.8681	2.9700e-003		0.1733	0.1733		0.1733	0.1733		281.4481	281.4481	0.0297		282.0721
Total	**39.7162**	**2.1850**	**1.8681**	**2.9700e-003**		**0.1733**	**0.1733**		**0.1733**	**0.1733**		**281.4481**	**281.4481**	**0.0297**		**282.0721**

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	0.1011	0.1302	1.6024	4.3400e-003	0.3577	2.4400e-003	0.3601	0.0949	2.2600e-003	0.0971		349.0333	349.0333	0.0158		349.3661
Total	**0.1011**	**0.1302**	**1.6024**	**4.3400e-003**	**0.3577**	**2.4400e-003**	**0.3601**	**0.0949**	**2.2600e-003**	**0.0971**		**349.0333**	**349.0333**	**0.0158**		**349.3661**

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	39.3839					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.3323	2.1850	1.8681	2.9700e-003		0.1733	0.1733		0.1733	0.1733	0.0000	281.4481	281.4481	0.0297		282.0721
Total	**39.7162**	**2.1850**	**1.8681**	**2.9700e-003**		**0.1733**	**0.1733**		**0.1733**	**0.1733**	**0.0000**	**281.4481**	**281.4481**	**0.0297**		**282.0721**

Mitigated Construction Off-Site

Category	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
	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	0.1011	0.1302	1.6024	4.3400e-003	0.3577	2.4400e-003	0.3601	0.0949	2.2600e-003	0.0971		349.0333	349.0333	0.0158		349.3661
Total	**0.1011**	**0.1302**	**1.6024**	**4.3400e-003**	**0.3577**	**2.4400e-003**	**0.3601**	**0.0949**	**2.2600e-003**	**0.0971**		**349.0333**	**349.0333**	**0.0158**		**349.3661**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Increase Density

Improve Destination Accessibility

Improve Pedestrian Network

Implement Trip Reduction Program

Employee Vanpool/Shuttle

Provide Riade Sharing Program

Category	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
	lb/day										lb/day					
Mitigated	7.7022	17.5017	84.6214	0.2274	16.2613	0.2483	16.5096	4.3388	0.2287	4.5675		19,129.9697	19,129.9697	0.7271		19,145.2379
Unmitigated	8.0687	19.8500	95.2906	0.2630	18.8811	0.2853	19.1663	5.0378	0.2627	5.3005		22,125.8127	22,125.8127	0.8333		22,143.3123

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments Mid Rise	922.60	1,002.40	849.80	3,156,082	2,718,177
Single Family Housing	1,531.20	1,612.80	1403.20	5,209,692	4,486,851
Total	2,453.80	2,615.20	2,253.00	8,365,774	7,205,028

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-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Apartments Mid Rise	14.70	5.90	8.70	40.20	19.20	40.60	86	11	3
Single Family Housing	14.70	5.90	8.70	40.20	19.20	40.60	86	11	3

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.510449	0.057012	0.191854	0.151889	0.041459	0.005887	0.015572	0.014818	0.001440	0.002145	0.004716	0.000509	0.002251

5.0 Energy Detail

4.4 Fleet Mix

Historical Energy Use: N

5.1 Mitigation Measures Energy

Exceed Title 24

Install High Efficiency Lighting

Install Energy Efficient Appliances

	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					

	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
NaturalGas Mitigated	0.1377	1.1769	0.5008	7.5100e-003		0.0952	0.0952		0.0952	0.0952		1,502.4654	1,502.4654	0.0288	0.0276	1,511.6092
NaturalGas Unmitigated	0.1722	1.4713	0.6261	9.3900e-003		0.1190	0.1190		0.1190	0.1190		1,878.2569	1,878.2569	0.0360	0.0344	1,889.6877

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					
Single Family Housing	12661.3	0.1365	1.1668	0.4965	7.4500e-003		0.0943	0.0943		0.0943	0.0943		1,489.5600	1,489.5600	0.0286	0.0273	1,498.6253
Apartments Mid Rise	3303.92	0.0356	0.3045	0.1296	1.9400e-003		0.0246	0.0246		0.0246	0.0246		388.6969	388.6969	7.4500e-003	7.1300e-003	391.0624
Total		**0.1722**	**1.4713**	**0.6261**	**9.3900e-003**		**0.1190**	**0.1190**		**0.1190**	**0.1190**		**1,878.2569**	**1,878.2569**	**0.0360**	**0.0344**	**1,889.6877**

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					
Apartments Mid Rise	2.63731	0.0284	0.2431	0.1034	1.5500e-003		0.0197	0.0197		0.0197	0.0197		310.2720	310.2720	5.9500e-003	5.6900e-003	312.1603
Single Family Housing	10.1336	0.1093	0.9339	0.3974	5.9600e-003		0.0755	0.0755		0.0755	0.0755		1,192.1934	1,192.1934	0.0229	0.0219	1,199.4489
Total		**0.1377**	**1.1769**	**0.5008**	**7.5100e-003**		**0.0952**	**0.0952**		**0.0952**	**0.0952**		**1,502.4654**	**1,502.4654**	**0.0288**	**0.0276**	**1,511.6092**

6.0 Area Detail

6.1 Mitigation Measures Area

Use Low VOC Paint - Residential Interior

Use Low VOC Paint - Residential Exterior

Use Low VOC Paint - Non-Residential Interior

Use Low VOC Paint - Non-Residential Exterior

Use only Natural Gas Hearths

Use Low VOC Cleaning Supplies

	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	10.6649	0.2914	25.0267	1.3100e-003		0.4778	0.4778		0.4742	0.4742	0.0000	5,444.5657	5,444.5657	0.1482	0.0990	5,478.3685
Unmitigated	18.7617	1.4910	98.5573	0.2412		12.4730	12.4730		12.4694	12.4694	1,770.4915	5,444.5657	7,215.0572	8.4249	0.0990	7,422.6705

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	0.9172					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	8.4744					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	8.5918	1.1995	73.5576	0.2399		12.3372	12.3372		12.3336	12.3336	1,770.4915	5,400.0000	7,170.4915	8.3802	0.0990	7,377.1655
Landscaping	0.7784	0.2914	24.9997	1.3100e-003		0.1358	0.1358		0.1358	0.1358		44.5657	44.5657	0.0447		45.5050

Total	**18.7617**	**1.4909**	**98.5573**	**0.2412**		**12.4730**	**12.4730**		**12.4694**	**12.4694**	**1,770.4915**	**5,444.5657**	**7,215.0572**	**8.4249**	**0.0990**	**7,422.6705**

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	0.9172					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	8.4744					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.4950	2.0000e-005	0.0270	0.0000		0.3420	0.3420		0.3384	0.3384	0.0000	5,400.0000	5,400.0000	0.1035	0.0990	5,432.8635
Landscaping	0.7784	0.2914	24.9997	1.3100e-003		0.1358	0.1358		0.1358	0.1358		44.5657	44.5657	0.0447		45.5050
Total	**10.6650**	**0.2914**	**25.0267**	**1.3100e-003**		**0.4778**	**0.4778**		**0.4742**	**0.4742**	**0.0000**	**5,444.5657**	**5,444.5657**	**0.1482**	**0.0990**	**5,478.3685**

7.0 Water Detail

7.1 Mitigation Measures Water

Apply Water Conservation Strategy

Use Reclaimed Water

Install Low Flow Bathroom Faucet

Install Low Flow Kitchen Faucet

Install Low Flow Toilet

Install Low Flow Shower

Use Water Efficient Irrigation System

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 Vegetation

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APPENDIX B

Greenhouse Gas Assessment

Greenhouse Gas Assessment
University Hills Area 11

CONSULTANT:

Michael Baker International
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Irvine, California 92618

Michael Baker
INTERNATIONAL

GREENHOUSE GAS ASSESSMENT

for the

University Hills Area 11 Project

University of California, Irvine

Consultant:

MICHAEL BAKER INTERNATIONAL, INC.
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March 4, 2016

JN 150070

This document is designed for double-sided printing to conserve natural resources.

EXECUTIVE SUMMARY

The purpose of this Greenhouse Gas Assessment is to evaluate potential short- and long-term greenhouse gas (GHG) impacts resulting from implementation of the proposed University Hills Area 11 project ("project" or "proposed project").

The proposed project is located at the northwest corner of the Culver Drive and Bonita Canyon Drive intersection, on the University of California, Irvine (UCI) campus. The project site is approximately 2.15 miles south of Interstate 405 (I-405), and 0.42 miles north of State Route 73 (SR-73) in the City of Irvine, California.

The project proposes to construct 160 single family homes, and 140 apartment units for UCI faculty and staff. The site would be served by an extensive trail of pedestrian paths and sidewalks through this area of the campus, and bike trails on each roadway in the area lead to the UCI main campus. It is expected that residents of the proposed project that work at the main campus would take advantage of the opportunities to walk or bike to their destination on campus. Vehicular access to the proposed project would be provided by a new driveway off of Anteater Drive on the east side and a connection to Gabrielino Road through residential uses to the west.

Greenhouse Gas Impacts. The proposed project would result in less than significant GHG impacts. Additionally, the project would not conflict with a plan, policy, or regulation adopted for the purposes of reducing GHG emissions.

1.0 INTRODUCTION

The purpose of this Greenhouse Gas Assessment is to evaluate potential short- and long-term greenhouse gas (GHG) impacts resulting from implementation of the proposed University Hills Area 11 Project ("project" or "proposed project") on the University of California, Irvine (UCI) campus.

1.1 PROJECT LOCATION

The proposed project is located at the northwest corner of the Culver Drive and Bonita Canyon Drive intersection, on the UCI campus, in the City of Irvine, California. The project site is located on the approximately 2.15 miles south of Interstate 405 (I-405), and 0.42 miles north of State Route 73 (SR-73); refer to Exhibit 1, *Regional Vicinity*. Overall, the project site is located within a developed area of the City and consists of vacant land; refer to Exhibit 2, *Site Vicinity*.

1.2 PROJECT DESCRIPTION

The project site is approximately 29 acres, and currently consists of vacant land. The project proposes to construct 160 single family homes, and 140 apartment units for UCI faculty and staff; refer to Exhibit 3, *Conceptual Site Plan*. The site would be served by an extensive trail of pedestrian paths and sidewalks through this area of the campus, and bike trails on each roadway in the area lead to the UCI main campus. It is expected that residents of the proposed project that work at the main campus would take advantage of the opportunities to walk or bike to their destination on campus. Vehicular access to the proposed project would be provided by a new driveway off of Anteater Drive on the east side and a connection to Gabrielino Road through residential uses to the west.

Subject Site

Michael Baker INTERNATIONAL

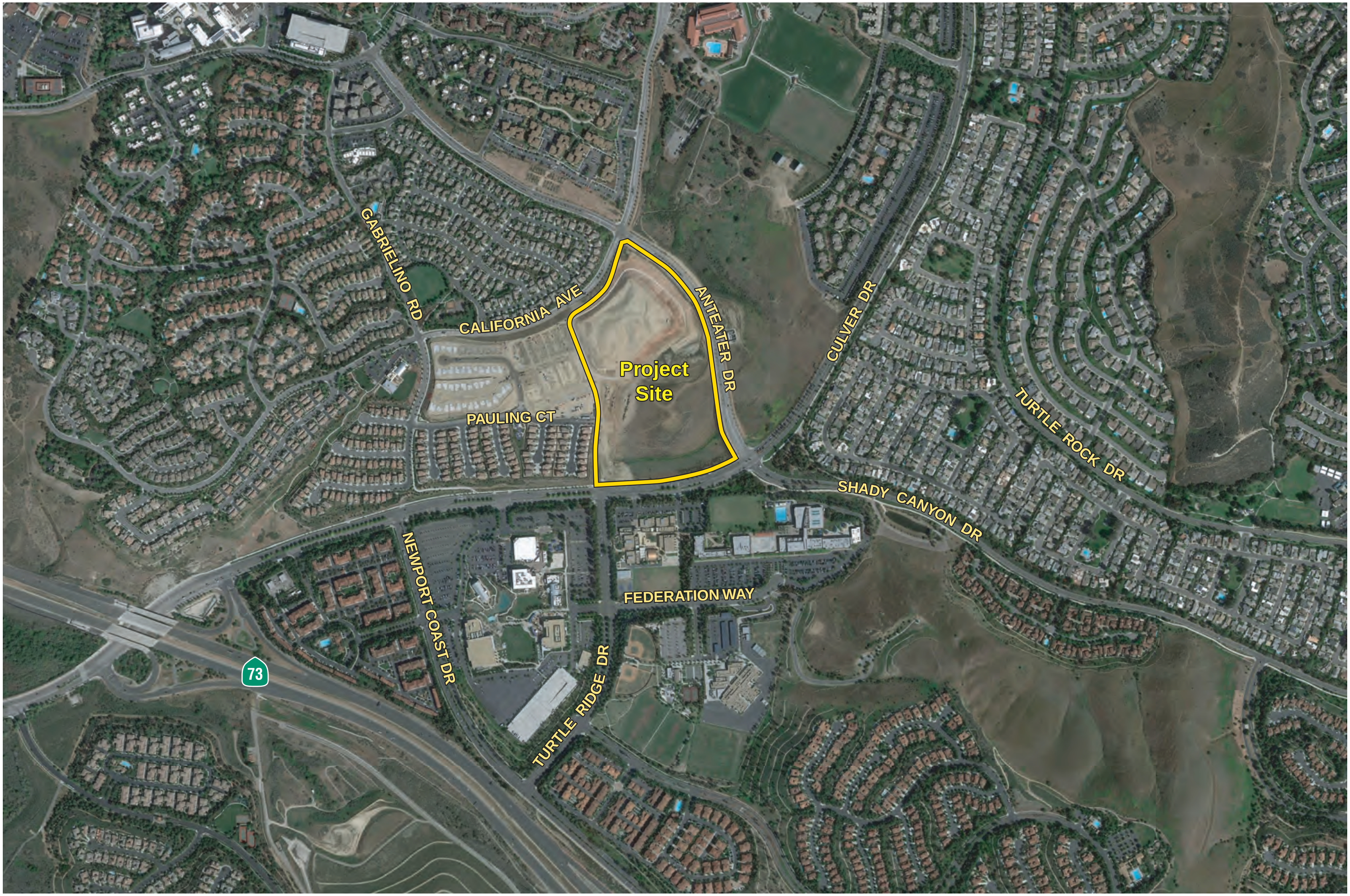
not to scale

02/02/16 JN 150070-21529 MAS

UNIVERSITY HILLS AREA 11 • GREENHOUSE GAS ASSESSMENT

Regional Vicinity

Exhibit 1



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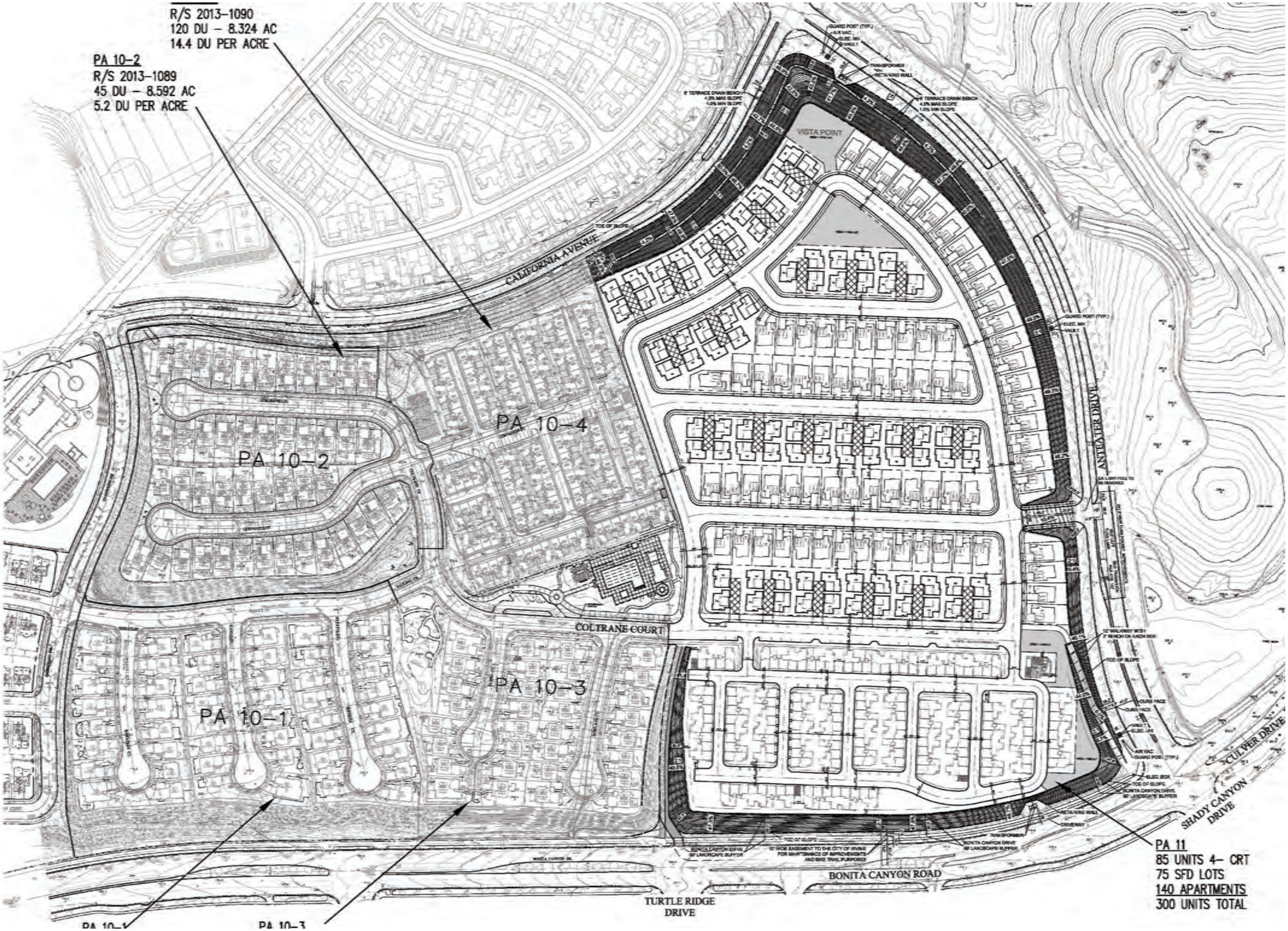
UNIVERSITY HILLS AREA 11 • GREENHOUSE GAS ASSESSMENT

Site Vicinity

Exhibit 2



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not to scale

02/02/16 JN 150070-21529 MAS

UNIVERSITY HILLS AREA 11 • GREENHOUSE GAS ASSESSMENT

Site Plan

Exhibit 3

2.0 ENVIRONMENTAL SETTING

The California Air Resources Board (CARB) divides the State into 15 air basins that share similar meteorological and topographical features. The project site lies within the northwestern portion of the South Coast Air Basin (Basin). The Basin is a 6,600-square mile area bounded by the Pacific Ocean to the west and the San Gabriel, San Bernardino, and San Jacinto Mountains to the north and east. The Basin includes all of Orange County and the non-desert portions of Los Angeles, Riverside, and San Bernardino Counties, in addition to the San Gorgonio Pass area in Riverside County. The Basin's terrain and geographical location (i.e., a coastal plain with connecting broad valleys and low hills) determine its distinctive climate.

The general region lies in the semi-permanent high-pressure zone of the eastern Pacific. The climate is mild and tempered by cool sea breezes. The usually mild climatological pattern is interrupted infrequently by periods of extremely hot weather, winter storms, or Santa Ana winds. The extent and severity of the air pollution problem in the Basin is a function of the area's natural physical characteristics (weather and topography), as well as man-made influences (development patterns and lifestyle). Factors such as wind, sunlight, temperature, humidity, rainfall, and topography all affect the accumulation and/or dispersion of pollutants throughout the Basin.

CLIMATE

The average annual temperature varies little throughout the Basin, averaging 75 degrees Fahrenheit (°F). However, with a less-pronounced oceanic influence, the eastern inland portions of the Basin show greater variability in annual minimum and maximum temperatures. All portions of the Basin have had recorded temperatures over 100°F in recent years.

Although the Basin has a semi-arid climate, the air near the surface is moist due to the presence of a shallow marine layer. Except for infrequent periods when dry, continental air is brought into the Basin by offshore winds, the ocean effect is dominant. Periods with heavy fog are frequent, and low stratus clouds, occasionally referred to as "high fog," are a characteristic climate feature. Annual average relative humidity is 70 percent at the coast and 57 percent in the eastern part of the Basin. Precipitation in the Basin is typically nine to 14 inches annually and is rarely in the form of snow or hail due to typically warm weather. The frequency and amount of rainfall is greater in the coastal areas of the Basin.

The height of the inversion is important in determining pollutant concentration. When the inversion is approximately 2,500 feet above sea level, the sea breezes carry the pollutants inland to escape over the mountain slopes or through the passes. At a height of 1,200 feet, the terrain prevents the pollutants from entering the upper atmosphere, resulting in a settlement in the foothill communities. Below 1,200 feet, the inversion puts a tight lid on pollutants, concentrating them in a shallow layer over the entire coastal basin. Usually, inversions are lower before sunrise than during the day. Mixing heights for inversions are lower in the summer and more persistent, being partly responsible for the high levels of ozone (O_3) observed during summer months in the

Basin. Smog in southern California is generally the result of these temperature inversions combining with coastal day winds and local mountains to contain the pollutants for long periods of time, allowing them to form secondary pollutants by reacting with sunlight. The Basin has a limited ability to disperse these pollutants due to typically low wind speeds.

The area in which the project is located offers clear skies and sunshine, yet is still susceptible to air inversions. These inversions trap a layer of stagnant air near the ground, where it is then further loaded with pollutants. These inversions cause haziness, which is caused by moisture, suspended dust, and a variety of chemical aerosols emitted by trucks, automobiles, furnaces, and other sources.

3.0 STATE AND FEDERAL GREENHOUSE GAS STANDARDS

3.1 GLOBAL CLIMATE CHANGE GASES

The natural process through which heat is retained in the troposphere is called the "greenhouse effect."[1] The greenhouse effect traps heat in the troposphere through a threefold process as follows: Short wave radiation emitted by the Sun is absorbed by the Earth; the Earth emits a portion of this energy in the form of long wave radiation; and GHGs in the upper atmosphere absorb this long wave radiation and emit this long wave radiation into space and toward the Earth. This "trapping" of the long wave (thermal) radiation emitted back toward the Earth is the underlying process of the greenhouse effect.

The most abundant GHGs are water vapor and carbon dioxide (CO_2). Many other trace gases have greater ability to absorb and re-radiate long wave radiation; however, these gases are not as plentiful. For this reason, and to gauge the potency of GHGs, scientists have established a Global Warming Potential (GWP) for each GHG based on its ability to absorb and re-radiate long wave radiation.

GHGs include, but are not limited to, the following:[2]

- <u>*Water Vapor (H_2O)*</u>. Although water vapor has not received the scrutiny of other GHGs, it is the primary contributor to the greenhouse effect. Natural processes, such as evaporation from oceans and rivers, and transpiration from plants, contribute 90 percent and 10 percent of the water vapor in our atmosphere, respectively.

  The primary human related source of water vapor comes from fuel combustion in motor vehicles; however, this is not believed to contribute a significant amount (less than one percent) to atmospheric concentrations of water vapor. The Intergovernmental Panel on Climate Change (IPCC) has not determined a GWP for water vapor.

- <u>*Carbon Dioxide (CO_2)*</u>. Carbon Dioxide is primarily generated by fossil fuel combustion in stationary and mobile sources. Due to the emergence of industrial facilities and mobile sources in the past 250 years, CO_2 emissions from fossil fuel combustion increased by 8.8 percent between 1990 and 2013.[3] Carbon dioxide is the most widely emitted GHG and is the reference gas (GWP of 1) for determining GWPs for other GHGs.

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[1] The troposphere is the bottom layer of the atmosphere, which varies in height from the Earth's surface to 10 to 12 kilometers.

[2] All Global Warming Potentials are given as 100-year Global Warming Potential. Unless noted otherwise, all Global Warming Potentials were obtained from the IPCC. (Intergovernmental Panel on Climate Change, *Climate Change, The Science of Climate Change – Contribution of Working Group I to the Second Assessment Report of the IPCC*, 1996).

[3] U.S. Environmental Protection Agency, *Inventory of United States Greenhouse Gas Emissions and Sinks 1990 to 2013*, April 2015.

- *Methane (CH_4).* Methane is emitted from biogenic sources, incomplete combustion in forest fires, landfills, manure management, and leaks in natural gas pipelines. In the United States, the top three sources of methane are landfills, natural gas systems, and enteric fermentation (the digestive process in animals with a rumen, typically cattle, causing methane gas). Methane is the primary component of natural gas, which is used for space and water heating, steam production, and power generation. The GWP of methane is 25.

- *Nitrous Oxide (N_2O).* Nitrous oxide is produced by both natural and human related sources. Primary human related sources include agricultural soil management, animal manure management, sewage treatment, mobile and stationary combustion of fossil fuel, adipic acid production (for the industrial production of nylon), and nitric acid production (for rocket fuel, woodworking, and as a chemical reagent). The GWP of nitrous oxide is 298.

- *Hydrofluorocarbons (HFCs).* HFCs are typically used as refrigerants, aerosol propellants, solvents and fire retardants. The major emissions source of HFCs is from their use as refrigerants in air conditioning systems in both vehicles and buildings. HFCs were developed as a replacement for chlorofluorocarbons (CFCs) and hydrochlorofluorocarbons (HCFCs). The GWP of HFCs range from 140 for HFC-152a to 11,700 for HFC-23.[4]

- *Perfluorocarbons (PFCs).* PFCs are compounds produced as a by-product of various industrial processes associated with aluminum production and the manufacturing of semiconductors. Like HFCs, PFCs generally have long atmospheric lifetimes and high Global Warming Potentials of approximately 6,500 and 9,200.[5]

- *Sulfur hexafluoride (SF_6).* SF_6 is a colorless, odorless, nontoxic, nonflammable gas. It is most commonly used as an electrical insulator in high voltage equipment that transmits and distributes electricity. Sulfur hexafluoride is the most potent GHG that has been evaluated by the IPCC with a GWP of 23,900. However, its global warming contribution is not as high as the GWP would indicate due to its low mixing ratio compared to carbon dioxide (4 parts per trillion [ppt] in 1990 versus 365 parts per million [ppm], respectively).[6]

In addition to the six major GHGs discussed above (excluding water vapor), many other compounds have the potential to contribute to the greenhouse effect. Some of these substances were previously identified as stratospheric ozone depletors; therefore, their gradual phase out is currently in effect. The following is a listing of these compounds:

[4] U.S. Environmental Protection Agency, *Greenhouse Gas Emissions*, September 9, 2013, http://www.epa.gov/climatechange/ghgemissions/gases/fgases.html#Trends, accessed on January 27, 2016.

[5] Ibid.

[6] Ibid.

- *Hydrochlorofluorocarbons (HCFCs)*. HCFCs are solvents, similar in use and chemical composition to CFCs. The main uses of HCFCs are for refrigerant products and air conditioning systems. As part of the Montreal Protocol, all developed countries that adhere to the Montreal Protocol are subject to a consumption cap and gradual phase out of HCFCs. The United States is scheduled to achieve a 100 percent reduction to the cap by 2030. The GWPs of HCFCs range from 77 for HCFC-123 to 2,310 for HCFC-142b.[7]

- *1,1,1 trichloroethane*. 1,1,1 trichloroethane or methyl chloroform is a solvent and degreasing agent commonly used by manufacturers. The GWP of methyl chloroform is 110 times that of CO_2.[8]

- *Chlorofluorocarbons (CFCs)*. CFCs are used as refrigerants, cleaning solvents, and aerosols spray propellants. CFCs were also part of the EPA's Final Rule (57 FR 3374) for the phase out of O_3 depleting substances. Currently, CFCs have been replaced by HFCs in cooling systems and a variety of alternatives for cleaning solvents. Nevertheless, CFCs remain suspended in the atmosphere contributing to the greenhouse effect. CFCs are potent GHGs with GWPs ranging from 4,750 for CFC 11 to 14,420 for CFC 13.[9]

[7] U.S. Environmental Protection Agency, *Stratospheric Ozone Protection and Climate Change,* http://www.epa.gov/ozone/climate.html, accessed on January 27, 2016.

[8] Ibid.

[9] U.S. Environmental Protection Agency, *Class I Ozone Depleting Substances*, dated August 19, 2010, http://www.epa.gov/ozone/science/ods/classone.html, accessed on January 27, 2016.

4.0 REGULATORY SETTING

4.1 GLOBAL CLIMATE CHANGE REGULATORY PROGRAMS

FEDERAL

The Federal government is extensively engaged in international climate change activities in areas such as science, mitigation, and environmental monitoring. The EPA actively participates in multilateral and bilateral activities by establishing partnerships and providing leadership and technical expertise. Multilaterally, the United States is a strong supporter of activities under the United Nations Framework Convention on Climate Change (UNFCCC) and the IPCC.

In 1988, the United Nations and the World Meteorological Organization established the IPCC to assess the scientific, technical, and socioeconomic information relevant to understanding the scientific basis of human-induced climate change, its potential impacts, and options for adaptation and mitigation. The most recent reports of the IPCC have emphasized the scientific consensus around the evidence that real and measurable changes to the climate are occurring, that they are caused by human activity, and that significant adverse impacts on the environment, the economy, and human health and welfare are unavoidable.

In December 2007, Congress passed the first increase in corporate average fleet fuel economy (CAFE) standards. The new CAFE standards represent an increase to 35 miles per gallon (mpg) by 2020. In March 2009, the Obama Administration announced that for the 2011 model year, the standard for cars and light trucks will be 27.3 mpg, the standard for cars will be 30.2 mpg; and standard for trucks would be 24.1 mpg. Additionally, in May 2009 President Barack Obama announced plans for a national fuel-economy and GHG emissions standard that would significantly increase mileage requirements for cars and trucks by 2016. The new requirements represent an average standard of 39 mpg for cars and 30 mpg for trucks by 2016.

Currently, the EPA is moving forward with two key climate change regulatory proposals, one to establish a mandatory GHG reporting system. Under the Federal Clean Air Act (FCAA), the EPA is now obligated to issue rules regulating global warming pollution from all major sources. In April 2009, the EPA concluded that GHGs are a danger to public health and welfare, establishing the basis for GHG regulation. However, as of the date of this study there are no Federal regulations or policies regarding GHG emissions applicable to the proposed project.

STATE

Various statewide and local initiatives to reduce California's contribution to GHG emissions have raised awareness that, even though the various contributors to and consequences of global climate change are not yet fully understood, global climate change is occurring, and that there is a real potential for severe adverse environmental, social, and economic effects in the long term. Every nation emits GHGs and as a result makes an incremental cumulative contribution to global climate change; therefore, global cooperation will be required to reduce the rate of GHG emissions enough to slow or stop the human-caused increase in average global temperatures and associated changes in climatic conditions.

Executive Order S-1-07. Executive Order S-1-07 proclaims that the transportation sector is the main source of GHG emissions in California, generating more than 40 percent of statewide emissions. It establishes a goal to reduce the carbon intensity of transportation fuels sold in California by at least ten percent by 2020. This order also directs CARB to determine whether this Low Carbon Fuel Standard (LCFS) could be adopted as a discrete early-action measure as part of the effort to meet the mandates in AB 32.

Executive Order S-3-05. Executive Order S-3-05 set forth a series of target dates by which statewide emissions of GHGs would be progressively reduced, as follows:

- By 2010, reduce GHG emissions to 2000 levels;
- By 2020, reduce GHG emissions to 1990 levels; and
- By 2050, reduce GHG emissions to 80 percent below 1990 levels.

The Executive Order directed the secretary of the California Environmental Protection Agency (Cal/EPA) to coordinate a multi-agency effort to reduce GHG emissions to the target levels. The secretary will also submit biannual reports to the governor and California Legislature describing the progress made toward the emissions targets, the impacts of global climate change on California's resources, and mitigation and adaptation plans to combat these impacts. To comply with the executive order, the secretary of Cal/EPA created the California Climate Action Team (CAT), made up of members from various State agencies and commissions. The team released its first report in March 2006. The report proposed to achieve the targets by building on the voluntary actions of California businesses, local governments, and communities and through State incentive and regulatory programs.

Executive Order B-30-15. Executive Order B-30-15 added the interim target to reduce statewide GHG emissions 40 percent below 1990 levels by 2030.

Executive Order S-13-08. Executive Order S-13-08 seeks to enhance the State's management of climate impacts including sea level rise, increased temperatures, shifting precipitation, and extreme weather events by facilitating the development of State's first climate adaptation strategy. This will result in consistent guidance from experts on how to address climate change impacts in the State of California.

Executive Order S-14-08. Executive Order S-14-08 expands the State's Renewable Energy Standard to 33 percent renewable power by 2020. Additionally, Executive Order S-21-09 (signed on September 15, 2009) directs CARB to adopt regulations requiring 33 percent of electricity sold in the State come from renewable energy by 2020. CARB adopted the "Renewable Electricity

Standard" on September 23, 2010, which requires 33 percent renewable energy by 2020 for most publicly owned electricity retailers.

Executive Order S-20-04. Executive Order S-20-04, the California Green Building Initiative, (signed into law on December 14, 2004), establishes a goal of reducing energy use in State-owned buildings by 20 percent from a 2003 baseline by 2015. It also encourages the private commercial sector to set the same goal. The initiative places the California Energy Commission (CEC) in charge of developing a building efficiency benchmarking system, commissioning and retro-commissioning (commissioning for existing commercial buildings) guidelines, and developing and refining building energy efficiency standards under Title 24 to meet this goal.

Executive Order S-21-09. Executive Order S-21-09, 33 percent Renewable Energy for California, directs CARB to adopt regulations to increase California's Renewable Portfolio Standard (RPS) to 33 percent by 2020. This builds upon SB 1078 (2002) which established the California RPS program, requiring 20 percent renewable energy by 2017, and SB 107 (2006) which advanced the 20 percent deadline to 2010, a goal which was expanded to 33 percent by 2020 in the 2005 Energy Action Plan II.

Assembly Bill 32 (California Global Warming Solutions Act of 2006). California passed the California Global Warming Solutions Act of 2006 (AB 32; *California Health and Safety Code* Division 25.5, Sections 38500 - 38599). AB 32 establishes regulatory, reporting, and market mechanisms to achieve quantifiable reductions in GHG emissions and establishes a cap on statewide GHG emissions. AB 32 requires that statewide GHG emissions be reduced to 1990 levels by 2020. AB 32 specifies that regulations adopted in response to AB 1493 should be used to address GHG emissions from vehicles. However, AB 32 also includes language stating that if the AB 1493 regulations cannot be implemented, then CARB should develop new regulations to control vehicle GHG emissions under the authorization of AB 32.

Assembly Bill 1493. AB 1493 (also known as the Pavley Bill) requires that CARB develop and adopt, by January 1, 2005, regulations that achieve "the maximum feasible reduction of GHG emitted by passenger vehicles and light-duty trucks and other vehicles determined by CARB to be vehicles whose primary use is noncommercial personal transportation in the State."

To meet the requirements of AB 1493, CARB approved amendments to the California Code of Regulations (CCR) in 2004 by adding GHG emissions standards to California's existing standards for motor vehicle emissions. Amendments to CCR Title 13, Sections 1900 and 1961 and adoption of 13 CCR Section 1961.1 require automobile manufacturers to meet fleet-average GHG emissions limits for all passenger cars, light-duty trucks within various weight criteria, and medium-duty weight classes for passenger vehicles (i.e., any medium-duty vehicle with a gross vehicle weight rating less than 10,000 pounds that is designed primarily to transport people), beginning with the 2009 model year. Emissions limits are reduced further in each model year through 2016. When fully phased in, the near-term standards will result in a reduction of about 22 percent in GHG emissions compared to the emissions from the 2002 fleet, while the mid-term standards will result in a reduction of about 30 percent.

Assembly Bill 3018. AB 3018 established the Green Collar Jobs Council (GCJC) under the California Workforce Investment Board (CWIB). The GCJC will develop a comprehensive approach to address California's emerging workforce needs associated with the emerging green economy. This bill will ignite the development of job training programs in the clean and green technology sectors.

Senate Bill 97. SB 97, signed in August 2007 (Chapter 185, Statutes of 2007; PRC Sections 21083.05 and 21097), acknowledges that climate change is a prominent environmental issue that requires analysis under CEQA. This bill directs the Governor's Office of Planning and Research (OPR), which is part of the State Natural Resources Agency, to prepare, develop, and transmit to CARB guidelines for the feasible mitigation of GHG emissions (or the effects of GHG emissions), as required by CEQA.

OPR published a technical advisory recommending that CEQA lead agencies make a good-faith effort to estimate the quantity of GHG emissions that would be generated by a proposed project. Specifically, based on available information, CEQA lead agencies should estimate the emissions associated with project-related vehicular traffic, energy consumption, water usage, and construction activities to determine whether project-level or cumulative impacts could occur, and should mitigate the impacts where feasible. OPR requested CARB technical staff to recommend a method for setting CEQA thresholds of significance as described in CEQA Guidelines Section 15064.7 that will encourage consistency and uniformity in the CEQA analysis of GHG emissions throughout the State.

The Natural Resources Agency adopted the CEQA Guidelines Amendments prepared by OPR, as directed by SB 97. On February 16, 2010, the Office of Administration Law approved the CEQA Guidelines Amendments, and filed them with the Secretary of State for inclusion in the California Code of Regulations. The CEQA Guidelines Amendments became effective on March 18, 2010.

Senate Bill 375. SB 375, signed in September 2008 (Chapter 728, Statutes of 2008), aligns regional transportation planning efforts, regional GHG reduction targets, and land use and housing allocation. SB 375 requires Metropolitan Planning Organizations (MPOs) to adopt a sustainable communities strategy (SCS) or alternative planning strategy (APS) that will prescribe land use allocation in that MPOs regional transportation plan. CARB, in consultation with MPOs, will provide each affected region with reduction targets for GHGs emitted by passenger cars and light trucks in the region for the years 2020 and 2035. These reduction targets will be updated every eight years but can be updated every four years if advancements in emissions technologies affect the reduction strategies to achieve the targets. CARB is also charged with reviewing each MPO's SCS or APS for consistency with its assigned targets. If MPOs do not meet the GHG reduction targets, transportation projects may not be eligible for funding programmed after January 1, 2012.

Senate Bills 1078 and 107. SB 1078 (Chapter 516, Statutes of 2002) requires retail sellers of electricity, including investor-owned utilities and community choice aggregators, to provide at least 20 percent of their supply from renewable sources by 2017. SB 107 (Chapter 464, Statutes of 2006) changed the target date to 2010.

Senate Bill 1368. SB 1368 (Chapter 598, Statutes of 2006) is the companion bill of AB 32 and was signed into law in September 2006. SB 1368 required the California Public Utilities Commission (CPUC) to establish a performance standard for baseload generation of GHG emissions by investor-owned utilities by February 1, 2007. SB 1368 also required the California Energy Commission (CEC) to establish a similar standard for local publicly owned utilities by June 30, 2007. These standards could not exceed the GHG emissions rate from a baseload combined-cycle, natural gas fired plant. Furthermore, the legislation states that all electricity provided to California, including imported electricity, must be generated by plants that meet the standards set by CPUC and CEC.

CARB Scoping Plan

On December 11, 2008, CARB adopted its Scoping Plan, which functions as a roadmap to achieve GHG reductions in California required by AB 32 through subsequently enacted regulations. CARB's Scoping Plan contains the main strategies California will implement to reduce CO_2eq[10] emissions by 174 million metric tons (MT), or approximately 30 percent, from the State's projected 2020 emissions level of 596 million MT CO_2eq under a business as usual (BAU)[11] scenario. This is a reduction of 42 million MT CO_2eq, or almost ten percent, from 2002 to 2004 average emissions, but requires the reductions in the face of population and economic growth through 2020.

CARB's Scoping Plan calculates 2020 BAU emissions as the emissions that would be expected to occur in the absence of any GHG reduction measures. The 2020 BAU emissions estimate was derived by projecting emissions from a past baseline year using growth factors specific to each of the different economic sectors (e.g., transportation, electrical power, commercial and residential, industrial, etc.). CARB used three-year average emissions, by sector, for 2002 to 2004 to forecast emissions to 2020. At the time CARB's Scoping Plan process was initiated, 2004 was the most recent year for which actual data was available. The measures described in CARB's Scoping Plan are intended to reduce the projected 2020 BAU to 1990 levels, as required by AB 32.

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[10] Carbon Dioxide Equivalent (CO_2eq) - A metric measure used to compare the emissions from various greenhouse gases based upon their global warming potential.

[11] "Business as Usual" refers to emissions that would be expected to occur in the absence of GHG reductions. See http://www.arb.ca.gov/cc/inventory/data/forecast.htm. Note that there is significant controversy as to what BAU means. In determining the GHG 2020 limit, CARB used the above as the "definition." It is broad enough to allow for design features to be counted as reductions.

University of California, Irvine

UC Irvine Climate Action Plan

The UCI Climate Action Plan (CAP) was initially adopted in 2007 (updated in 2013) and has guided an array of climate action protection strategies and projects to reduce UCI GHG emissions. The CAP provides a roadmap for UCI to achieve its institutional climate protection commitments in support of University of California sustainability policy and campus sustainability goals. These commitments include reduction of GHG emissions to 1990 levels by the year 2020 (a reduction of approximately 40 percent from emissions levels or a total of 79,000 annual metric tons), and achieve climate neutrality (zero net emissions) by 2050. In 2013 the University of California adopted a target year of 2025 for climate neutrality for all UC campus operations.

University of California Sustainable Practices Policy

The University of California Sustainable Practices Policy (Sustainable Practices Policy) establishes goals in nine areas of sustainable practices: green building, clean energy, transportation, climate protection, sustainable operations, waste reduction and recycling, environmentally preferable purchasing, sustainable foodservice, sustainable water systems.

5.0 POTENTIAL GREENHOUSE GAS IMPACTS

CEQA THRESHOLDS

The environmental analysis in this section is patterned after the Initial Study Checklist recommended by the State *CEQA Guidelines*, as amended. The issues presented in the Initial Study Checklist have been utilized as thresholds of significance in this section. Accordingly, a project may create a significant environmental impact if it causes one or more of the following to occur:

- Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment (refer to Impact Statement GHG-1); and

- Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases (refer to Impact Statement GHG-2).

Based on these standards and thresholds, the effects of the proposed project have been categorized as either a "less than significant impact" or a "potentially significant impact." Mitigation measures are recommended for potentially significant impacts.

SCAQMD Greenhouse Gas Emissions Thresholds

At this time, there is no absolute consensus in the State of California among CEQA lead agencies regarding the analysis of global climate change and the selection of significance criteria. In fact, numerous organizations, both public and private, have released advisories and guidance with recommendations designed to assist decision-makers in the evaluation of GHG emissions given the current uncertainty regarding when emissions reach the point of significance. Lead agencies may elect to rely on thresholds of significance recommended or adopted by State or regional agencies with expertise in the field of global climate change. (See C*EQA Guidelines* Section 15064.7[c].)

The SCAQMD has formed a GHG CEQA Significance Threshold Working Group (Working Group) to provide guidance to local lead agencies on determining significance for GHG emissions in their CEQA documents. As of the last Working Group meeting (Meeting No. 15) held in September 2010, the SCAQMD is proposing to adopt a tiered approach for evaluating GHG emissions for development projects where SCAQMD is not the lead agency.[12]

With the tiered approach, the project is compared with the requirements of each tier sequentially and would not result in a significant impact if it complies with any tier. Tier 1 excludes projects that are specifically exempt from SB 97 from resulting in a significant impact. Tier 2 excludes

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[12] The most recent SCAQMD GHG CEQA Significance Threshold Working Group meeting was held on September 2010.

projects that are consistent with a GHG reduction plan that has a certified final CEQA document and complies with AB 32 GHG reduction goals. Tier 3 excludes projects with annual emissions lower than a screening threshold. For all non-industrial projects, the SCAQMD is proposing a screening threshold of 3,000 $MTCO_2eq$ per year. SCAQMD concluded that projects with emissions less than the screening threshold would not result in a significant cumulative impact.

Tier 4 consists of three decision tree options. Under the Tier 4 first option, the project would be excluded if design features and/or mitigation measures resulted in emissions 30 percent lower than business as usual emissions. Under the Tier 4 second option the project would be excluded if it had early compliance with AB 32 through early implementation of CARB's Scoping Plan measures. Under the Tier 4 third option, the project would be excluded if it was below an efficiency-based threshold of 4.8 $MTCO_2eq$ per service population (SP) per year.[13] Tier 5 would exclude projects that implement offsite mitigation (GHG reduction projects) or purchase offsets to reduce GHG emission impacts to less than the proposed screening level.

GHG efficiency metrics are utilized as thresholds to assess the GHG efficiency of a project on a per capita basis or on a "service population" basis (the sum of the number of jobs and the number of residents provided by a project) such that the project would allow for consistency with the goals of AB 32 (i.e., 1990 GHG emissions levels by 2020 and 2035). GHG efficiency thresholds can be determined by dividing the GHG emissions inventory goal of the State, by the estimated 2035 population and employment. This method allows highly efficient projects with higher mass emissions to meet the overall reduction goals of AB 32, and is appropriate, because the threshold can be applied evenly to all project types (residential or commercial/retail only and mixed-use).

As the project involves a residential infill development for UCI faculty and staff, SCAQMD's 2035 3.0 $MTCO_2eq$ per SP per year efficiency-based threshold has been selected as the significance threshold, as it is most applicable to the proposed project.[14] The 3.0 $MTCO_2eq$ per SP per year efficiency-based threshold is obtained by dividing the 2035 statewide reduction target GHG emissions by the 2035 service population/employment, as discussed above. It is noted that this threshold is based on the State's overall population and emissions goals and is supported by substantial evidence provided in the SCAQMD GHG CEQA Significance Threshold Stakeholder Working Group #15 meeting minutes (September 28, 2010). The 3.0 $MTCO_2eq$ per SP per year threshold is used in addition to the qualitative thresholds of significance set forth below from section VII of Appendix G to the CEQA Guidelines.

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13 The project-level efficiency-based threshold of 4.8 $MTCO_2eq$ per SP per year is relative to the 2020 target date. The SCAQMD has also proposed efficiency-based thresholds relative to the 2035 target date to be consistent with the GHG reduction target date of SB 375. GHG reductions by the SB 375 target date of 2035 would be approximately 40 percent. Applying this 40 percent reduction to the 2020 targets results in an efficiency threshold for plans of 4.1 $MTCO_2eq$ per SP per year and an efficiency threshold at the project level of 3.0 $MTCO_2eq$/year.

14 Ibid.

PROJECT RELATED SOURCES OF GREENHOUSE GASES

GHG-1 GENERATE GREENHOUSE GAS EMISSIONS, EITHER DIRECTLY OR INDIRECTLY, THAT MAY HAVE A SIGNIFICANT IMPACT ON THE ENVIRONMENT?

Level of Significance Before Mitigation: *Less Than Significant Impact.*

Project-related GHG emissions would include emissions from direct and indirect sources. The proposed project would result in direct and indirect emissions of CO_2, N_2O, and CH_4, and would not result in other GHGs that would facilitate a meaningful analysis. Therefore, this analysis focuses on these three forms of GHG emissions. Direct project-related GHG emissions include emissions from construction activities, area sources, and mobile sources, while indirect sources include emissions from electricity consumption, water demand, and solid waste generation. Operational GHG estimations are based on energy emissions from natural gas usage and automobile emissions. Project GHG emissions were calculated using the California Emissions estimator Model (CalEEMod), which relies on trip generation data, and specific land use information to calculate emissions. Accordingly, the proposed project would generate approximately 2,860 daily trips. Table 1, *Estimated Greenhouse Gas Emissions*, presents the estimated CO_2, N_2O, and CH_4 emissions of the proposed project. The CalEEMod outputs are contained within the Appendix A, *Greenhouse Gas Emissions Data*.

Project Design Features

It is noted that the GHG emissions calculated in CalEEMod, as shown Table 1, include project design features that would reduce project-related GHG emissions. The project consists of an infill development that would place residential uses less within approximately 0.3-mile of job opportunities (UCI campus, church, elementary school, etc.), and would provide pedestrian connections to external streets and pedestrian/bicycle paths and facilities contiguous with the project site. The project specifically provides housing for UCI faculty and staff. The project would also connect to existing pedestrian and bicycle paths in the area. The project's design features would further reduce operational GHG emissions at the project site. The project would incorporate water conservation measures, such as low-flow faucets, showers, toilets, water-efficient landscaping and irrigation systems, and use of reclaimed water. In addition, the project would meet or exceed the Leadership in Energy and Environmental Design (LEED) Silver rating (or an equivalent rating such as the Build it Green GreenPoint Rated program), and utilize high-efficiency lighting and energy efficient appliances (i.e., Energy Star dishwashers) in compliance with the Sustainable Practices Policy.

Reduction measures applied in CalEEMod and accounted for in Table 1 from project design features include the following:

- Increased diversity of land uses;

Table 1
Estimated Greenhouse Gas Emissions

Source	CO_2	CH_4		N_2O		Total Metric Tons of CO_2eq
	Metric Tons/yr[1]	Metric Tons/yr[1]	Metric Tons of CO_2eq[2]	Metric Tons/yr[1]	Metric Tons of CO_2eq[2]	
Direct Emissions						
• Construction (amortized over 30 years)	21.22	0.00	0.00	0.00	0.00	21.22
• Area Source	66.29	0.01	0.25	0.00	0.00	66.76
• Mobile Source	1,567.91	0.07	1.62	0.00	0.00	1,569.28
Total Mitigated Direct Emissions[3]	*1,655.42*	*0.08*	*1.87*	*0.00*	*0.00*	*1,657.26*
Indirect Emissions						
• Energy	690.34	0.03	0.75	0.01	2.98	693.58
• Water Demand	107.85	0.64	16.00	0.02	5.96	126.28
• Solid Waste Generation	25.60	1.51	37.80	0.00	0.00	64.91
Total Mitigated Indirect Emissions[3]	*823.79*	*2.18*	*54.55*	*0.03*	*8.94*	*884.77*
Total Mitigated Project-Related Emissions[3]	*2,542.03 $MTCO_2eq/yr$*					
Mitigated Service Population Emissions[4]	*2.6 $MTCO_2eq/yr$*					
Mitigated GHG Emissions Exceed Threshold?	*No*					

Notes:
1. Emissions calculated using CalEEMod.
2. CO_2 Equivalent values calculated using the EPA Website, *Greenhouse Gas Equivalencies Calculator*, http://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator, accessed February 2016.
3. Totals may be slightly off due to rounding.
4. Service population emissions are based on a service population of 963 faculty and staff, assuming 3 residents/unit (per the Irvine Campus Housing Authority (http://icha.uci.edu/Living/facts-and-history.php) plus additional maintenance staff).

Refer to Appendix A, *Greenhouse Gas Emissions Data*, for detailed model input/output data.

- Increased density of 10 dwelling units per acre;
- Improved destination accessibility, as the project site is located within 0.30 miles of job center;
- Pedestrian connections to the off-site circulation network;
- Implement Trip Reduction Program;
- Employee Vanpool/Shuttle;
- Provide Ride Sharing Program;
- Natural gas hearths;
- Low VOC paint;
- Water-efficient irrigation systems;
- 20 percent outdoor water usage reduction;
- Reclaimed water used for 100 percent of outdoor water use;
- Low-flow faucets, toilets, and showers;
- Install High-Efficiency Lighting;
- Use energy-efficient appliances (i.e., Energy Star dishwashers); and
- Institute recycling and composting services to reduce solid waste by at least 50 percent.

Direct Project-Related Sources of Greenhouse Gases

- Construction Emissions. Construction GHG emissions are typically summed and amortized over the lifetime of the project (assumed to be 30 years), then added to the operational emissions.[15] As seen in Table 1, the proposed project would result in 636.72 $MTCO_2eq$/yr, which represents 21.22 $MTCO_2eq$/yr when amortized over 30 years.

- Area Source. Area source emissions were calculated using CalEEMod and project-specific land use data. As noted in Table 1, the proposed project would not result in 66.76 $MTCO_2eq$/yr of area source GHG emissions.

- Mobile Source. The CalEEMod model relies upon ITE trip generation data within and project specific land use data to calculate mobile source emissions. The project would directly result in 1,569.28 $MTCO_2eq$/yr of mobile source-generated GHG emissions.

Indirect Project-Related Sources of Greenhouse Gases

- Energy Consumption. Energy consumption emissions were calculated using the CalEEMod model and project-specific land use data. Electricity would be provided to the project site via Southern California Edison (SCE). The project would indirectly result in 693.58 $MTCO_2eq$/year due to energy consumption.

- Water Demand. The project operations would result in a demand of approximately 29.4 million gallons of water per year. Emissions from indirect energy impacts due to water supply would result in 126.28 $MTCO_2eq$/year.

- Solid Waste. Solid waste associated with operations of the proposed project would result in 64.91 $MTCO_2eq$/year.

Total Project-Related Sources of Greenhouse Gases

As depicted in Table 1, the project's GHG emissions would be 2,542.03 $MTCO_2eq$/yr. As such, the project would result in GHG emissions of 2.64 $MTCO_2eq$ per SP per year, which would not exceed the 3.0 $MTCO_2eq$ per SP per year GHG threshold. Impacts in this regard would be less than significant.

Mitigation Measures: No mitigation measures are required.

Level of Significance After Mitigation: *Less Than Significant Impact.*

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[15] The project lifetime is based on the standard 30 year assumption of the South Coast Air Quality Management District, *Draft Guidance Document – Interim CEQA Greenhouse Gas (GHG) Significance Threshold*, October 2008.

GHG PLAN CONSISTENCY

GHG-2 CONFLICT WITH AN APPLICABLE PLAN, POLICY, OR REGULATION ADOPTED FOR THE PURPOSE OF REDUCING THE EMISSIONS OF GREENHOUSE GASES?

Level of Significance Before Mitigation: *Less Than Significant Impact.*

UCI adopted a Climate Action Plan (CAP) in 2007 (updated in 2013) in cooperation with AB 32, and has guided an array of climate action protection strategies and projects to reduce UCI GHG emissions. The purpose of this CAP is to identify UCI's long-term vision and commitment to reduce its GHG emissions in support of University of California Sustainability Practices Policy and campus sustainability goals. These commitments include reduction of GHG emissions to 1990 levels by the year 2020 (a reduction of approximately 40 percent from emissions levels or a total of 79,000 annual metric tons), and ultimately achieve climate neutrality (zero net emissions) by 2050. The CAP does not contain GHG thresholds. However, as the project-related GHG emissions are below the SCAQMD's 3.0 $MTCO_2eq$ per SP per year threshold (in compliance with AB 32), the proposed project would not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs. Thus, a less than significant impact would occur in this regard.

Mitigation Measures: No mitigation measures are required.

Level of Significance After Mitigation: *Less Than Significant Impact.*

6.0 REFERENCES

6.1 LIST OF PREPARERS

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Ryan Chiene, Environmental Analyst
Faye Stroud, Graphics

6.2 DOCUMENTS

1. California Air Resources Board, *Climate Change Proposed Scoping Plan: A Framework for Change*, adopted December 2008.

2. California Office of the Attorney General, *Addressing Global Warming Impacts at the Project Level*, updated January 6, 2008.

3. California Environmental Protection Agency, *Climate Action Team, Climate Action Team Report to Governor Schwarzenegger and the Legislature (Executive Summary)*, March, 2006.

4. California Environmental Protection Agency, *AB 1493 Briefing Package*, 2008.

5. Intergovernmental Panel on Climate Change, *Climate Change, The Science of Climate Change – Contribution of Working Group I to the Second Assessment Report of the IPCC*, 1996.

6. Irvine Campus Housing Authority, *Facts and History*, http://icha.uci.edu/Living/facts-and-history.php, accessed February 10, 2016.

7. U.S. Climate Data, *Climate Irvine - California*, http://www.usclimatedata.com/climate/irvine/california/united-states/usca2494, accessed on January 27, 2016.

8. United States Environmental Protection Agency, *Class I Ozone Depleting Substances*, August 19, 2010, http://www.epa.gov/ozone/science/ods/classone.html accessed on January 27, 2016.

9. United States Environmental Protection Agency, *Greenhouse Gas Emissions*, September 9, 2013, http://www.epa.gov/climatechange/ghgemissions/gases/fgases.html#Trends, accessed on January 27, 2016.

10. United States Environmental Protection Agency, *Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990 to 2013,* April 2015.

11. U.S. Environmental Protection Agency, *Stratospheric Ozone Protection and Climate Change,* http://www.epa.gov/ozone/climate.html, accessed on January 27, 2016.

12. University of California, Irvine, *Climate Action Plan, 2013 Update*, http://sustainability.uci.edu/wp-content/uploads/sites/5/2014/12/ClimateActionPlanUpdate20132.pdf, accessed February 2016.

6.3 WEB SITES/PROGRAMS

Environ International Corporation and the South Coast Air Quality Management District, *California Emissions Estimator Model (CalEEMod) Version 2013.2.2*, 2013.

Google Earth, 2016.

APPENDIX A: GREENHOUSE GAS EMISSIONS DATA

Parenthetical CALEEMOD Assumptions
For: University Hills PA11 Project
Date: March 2016

CONSTRUCTION

Site Preparation (2016)

- 20 days.

Equipment:

Quantity	Type	Hours of Daily Operation
3	Rubber Tired Dozers	8
4	Tractors/Loaders/Backhoes	8

Grading (2016)

- 600,000 cubic yards and balanced cut and fill.
- 66 days.

Equipment:

Quantity	Type	Hours of Daily Operation
2	Excavators	8
1	Grader	8
1	Rubber Tired Dozer	8
2	Scrapers	8
2	Tractors/Loaders/Backhoes	4

Paving (2016-2017)

- 22 days.

Equipment:

Quantity	Type	Hours of Daily Operation
2	Pavers	8
2	Paving Equipment	8
2	Rollers	6

Building Construction (2017)

- 154 days

Equipment:

Quantity	Type	Hours of Daily Operation
3	Forklifts	8
1	Generator Sets	8
3	Tractors/Loaders/Backhoes	7
1	Welders	8

Architectural Coating (2017)

- 85 days

Equipment:

Quantity	Type	Hours of Daily Operation
1	Air Compressors	6

University Hills PA11

Orange County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Apartments Mid Rise	140.00	Dwelling Unit	14.20	140,000.00	400
Single Family Housing	160.00	Dwelling Unit	15.00	288,000.00	458

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	30
Climate Zone	8			**Operational Year**	2017
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	630.89	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Site acreage

Construction Phase - Construction timeline

Off-road Equipment -

Off-road Equipment - No cranes used

Trips and VMT - Balanced on-site grading

Grading - Site acreage

Woodstoves - Gas only fireplaces per SCAQMD

Construction Off-road Equipment Mitigation - Per SCAQMD requirements

Mobile Land Use Mitigation -

Mobile Commute Mitigation -

Area Mitigation -

Energy Mitigation -

Water Mitigation -

Waste Mitigation -

Vehicle Trips - Campus housing is for University faculty and staff. The campus is 0.3 miles away.

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	CleanPavedRoadPercentReduction	0	26
tblConstructionPhase	NumDays	35.00	85.00
tblConstructionPhase	NumDays	440.00	154.00
tblConstructionPhase	NumDays	45.00	66.00
tblConstructionPhase	NumDays	35.00	22.00
tblConstructionPhase	PhaseEndDate	12/29/2017	12/30/2017
tblFireplaces	NumberWood	7.00	0.00
tblFireplaces	NumberWood	8.00	0.00
tblGrading	AcresOfGrading	165.00	29.20
tblGrading	MaterialExported	0.00	300,000.00
tblGrading	MaterialImported	0.00	300,000.00
tblLandUse	LotAcreage	3.68	14.20
tblLandUse	LotAcreage	51.95	15.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblProjectCharacteristics	OperationalYear	2014	2017
tblTripsAndVMT	HaulingTripLength	20.00	0.15
tblVehicleTrips	HW_TL	14.70	1.00
tblVehicleTrips	HW_TL	14.70	1.00

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					
2016	0.4252	3.4558	4.8336	3.0200e-003	0.4409	0.1500	0.5909	0.2186	0.1380	0.3566	0.0000	277.3459	277.3459	0.0708	0.0000	278.8317
2017	1.9669	2.0860	2.3766	4.3600e-003	0.1654	0.1374	0.3028	0.0442	0.1297	0.1739	0.0000	359.3732	359.3732	0.0489	0.0000	360.3993
Total	**2.3920**	**5.5419**	**7.2101**	**7.3800e-003**	**0.6063**	**0.2875**	**0.8938**	**0.2629**	**0.2677**	**0.5305**	**0.0000**	**636.7191**	**636.7191**	**0.1196**	**0.0000**	**639.2310**

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					
2016	0.4252	3.4558	4.8336	3.0200e-003	0.1710	0.1500	0.3210	0.0831	0.1380	0.2211	0.0000	277.3456	277.3456	0.0708	0.0000	278.8314
2017	1.9669	2.0860	2.3766	4.3600e-003	0.1654	0.1374	0.3028	0.0442	0.1297	0.1739	0.0000	359.3730	359.3730	0.0489	0.0000	360.3991
Total	**2.3920**	**5.5419**	**7.2101**	**7.3800e-003**	**0.3364**	**0.2875**	**0.6238**	**0.1273**	**0.2677**	**0.3950**	**0.0000**	**636.7186**	**636.7186**	**0.1196**	**0.0000**	**639.2305**

	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**	**44.52**	**0.00**	**30.20**	**51.58**	**0.00**	**25.55**	**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	tons/yr										MT/yr					
Area	1.9187	0.0514	4.0444	3.1600e-003		0.1712	0.1712		0.1711	0.1711	20.0770	66.2886	86.3657	0.1001	1.1200e-003	88.8158
Energy	0.0314	0.2685	0.1143	1.7100e-003		0.0217	0.0217		0.0217	0.0217	0.0000	774.9531	774.9531	0.0273	0.0101	778.6615
Mobile	1.1414	2.0116	9.7452	0.0213	1.5148	0.0250	1.5398	0.4047	0.0231	0.4278	0.0000	1,627.8417	1,627.8417	0.0671	0.0000	1,629.2512
Waste						0.0000	0.0000		0.0000	0.0000	51.1903	0.0000	51.1903	3.0253	0.0000	114.7207
Water						0.0000	0.0000		0.0000	0.0000	6.2011	112.0101	118.2112	0.6421	0.0161	136.6868
Total	**3.0914**	**2.3315**	**13.9039**	**0.0262**	**1.5148**	**0.2179**	**1.7327**	**0.4047**	**0.2159**	**0.6206**	**77.4684**	**2,581.0936**	**2,658.5620**	**3.8618**	**0.0273**	**2,748.1360**

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	1.8175	0.0364	3.1253	1.6000e-004		0.0212	0.0212		0.0212	0.0212	0.0000	66.2886	66.2886	6.2500e-003	1.1200e-003	66.7678
Energy	0.0251	0.2148	0.0914	1.3700e-003		0.0174	0.0174		0.0174	0.0174	0.0000	690.3384	690.3384	0.0251	8.7600e-003	693.5804
Mobile	1.1331	1.9534	9.5166	0.0205	1.4561	0.0242	1.4802	0.3891	0.0223	0.4113	0.0000	1,567.9143	1,567.9143	0.0649	0.0000	1,569.2777
Waste						0.0000	0.0000		0.0000	0.0000	25.5951	0.0000	25.5951	1.5126	0.0000	57.3603
Water						0.0000	0.0000		0.0000	0.0000	6.2011	101.6467	107.8478	0.6416	0.0160	126.2829
Total	**2.9757**	**2.2046**	**12.7333**	**0.0221**	**1.4561**	**0.0628**	**1.5189**	**0.3891**	**0.0609**	**0.4499**	**31.7962**	**2,426.1881**	**2,457.9843**	**2.2505**	**0.0259**	**2,513.2691**

	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	3.74	5.44	8.42	15.73	3.88	71.18	12.34	3.87	71.82	27.51	58.96	6.00	7.54	41.73	5.27	8.55

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	9/1/2016	9/28/2016	5	20	
2	Grading	Grading	9/29/2016	12/29/2016	5	66	
3	Paving	Paving	12/30/2016	1/30/2017	5	22	
4	Building Construction	Building Construction	1/31/2017	9/1/2017	5	154	
5	Architectural Coating	Architectural Coating	9/2/2017	12/30/2017	5	85	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 29.2

Acres of Paving: 0

Residential Indoor: 866,700; Residential Outdoor: 288,900; Non-Residential Indoor: 0; Non-Residential Outdoor: 0 (Architectural

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Rubber Tired Dozers	3	8.00	255	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Excavators	2	8.00	162	0.38
Grading	Graders	1	8.00	174	0.41
Grading	Rubber Tired Dozers	1	8.00	255	0.40
Grading	Scrapers	2	8.00	361	0.48
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Paving	Pavers	2	8.00	125	0.42
Paving	Paving Equipment	2	8.00	130	0.36
Paving	Rollers	2	8.00	80	0.38
Building Construction	Cranes	0	7.00	226	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Architectural Coating	Air Compressors	1	6.00	78	0.48

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
Site Preparation	7	18.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	37,500.00	14.70	6.90	0.15	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	8	158.00	32.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	32.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Replace Ground Cover

Water Exposed Area

Water Unpaved Roads

Reduce Vehicle Speed on Unpaved Roads

3.2 Site Preparation - 2016

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					0.1807	0.0000	0.1807	0.0993	0.0000	0.0993	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0508	0.5463	0.4111	3.9000e-004		0.0294	0.0294		0.0270	0.0270	0.0000	36.8771	36.8771	0.0111	0.0000	37.1107
Total	**0.0508**	**0.5463**	**0.4111**	**3.9000e-004**	**0.1807**	**0.0294**	**0.2101**	**0.0993**	**0.0270**	**0.1264**	**0.0000**	**36.8771**	**36.8771**	**0.0111**	**0.0000**	**37.1107**

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	6.2000e-004	9.1000e-004	9.5000e-003	2.0000e-005	1.9800e-003	1.0000e-005	1.9900e-003	5.2000e-004	1.0000e-005	5.4000e-004	0.0000	1.7811	1.7811	9.0000e-005	0.0000	1.7830
Total	**6.2000e-004**	**9.1000e-004**	**9.5000e-003**	**2.0000e-005**	**1.9800e-003**	**1.0000e-005**	**1.9900e-003**	**5.2000e-004**	**1.0000e-005**	**5.4000e-004**	**0.0000**	**1.7811**	**1.7811**	**9.0000e-005**	**0.0000**	**1.7830**

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					0.0669	0.0000	0.0669	0.0368	0.0000	0.0368	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0508	0.5463	0.4111	3.9000e-004		0.0294	0.0294		0.0270	0.0270	0.0000	36.8771	36.8771	0.0111	0.0000	37.1107
Total	**0.0508**	**0.5463**	**0.4111**	**3.9000e-004**	**0.0669**	**0.0294**	**0.0963**	**0.0368**	**0.0270**	**0.0638**	**0.0000**	**36.8771**	**36.8771**	**0.0111**	**0.0000**	**37.1107**

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	6.2000e-004	9.1000e-004	9.5000e-003	2.0000e-005	1.9800e-003	1.0000e-005	1.9900e-003	5.2000e-004	1.0000e-005	5.4000e-004	0.0000	1.7811	1.7811	9.0000e-005	0.0000	1.7830
Total	**6.2000e-004**	**9.1000e-004**	**9.5000e-003**	**2.0000e-005**	**1.9800e-003**	**1.0000e-005**	**1.9900e-003**	**5.2000e-004**	**1.0000e-005**	**5.4000e-004**	**0.0000**	**1.7811**	**1.7811**	**9.0000e-005**	**0.0000**	**1.7830**

3.3 Grading - 2016

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					0.2481	0.0000	0.2481	0.1161	0.0000	0.1161	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.2138	2.4689	1.6215	2.0400e-003		0.1183	0.1183		0.1088	0.1088	0.0000	192.0459	192.0459	0.0579	0.0000	193.2624
Total	**0.2138**	**2.4689**	**1.6215**	**2.0400e-003**	**0.2481**	**0.1183**	**0.3664**	**0.1161**	**0.1088**	**0.2249**	**0.0000**	**192.0459**	**192.0459**	**0.0579**	**0.0000**	**193.2624**

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	0.1566	0.4252	2.7489	4.7000e-004	2.8000e-003	1.6500e-003	4.4500e-003	8.0000e-004	1.5000e-003	2.3000e-003	0.0000	38.9860	38.9860	9.8000e-004	0.0000	39.0065
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	2.2600e-003	3.3400e-003	0.0348	9.0000e-005	7.2500e-003	5.0000e-005	7.3000e-003	1.9200e-003	5.0000e-005	1.9700e-003	0.0000	6.5308	6.5308	3.2000e-004	0.0000	6.5375
Total	**0.1589**	**0.4285**	**2.7837**	**5.6000e-004**	**0.0101**	**1.7000e-003**	**0.0118**	**2.7200e-003**	**1.5500e-003**	**4.2700e-003**	**0.0000**	**45.5168**	**45.5168**	**1.3000e-003**	**0.0000**	**45.5440**

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					0.0919	0.0000	0.0919	0.0430	0.0000	0.0430	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.2138	2.4689	1.6215	2.0400e-003		0.1183	0.1183		0.1088	0.1088	0.0000	192.0457	192.0457	0.0579	0.0000	193.2622
Total	**0.2138**	**2.4689**	**1.6215**	**2.0400e-003**	**0.0919**	**0.1183**	**0.2102**	**0.0430**	**0.1088**	**0.1518**	**0.0000**	**192.0457**	**192.0457**	**0.0579**	**0.0000**	**193.2622**

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	0.1566	0.4252	2.7489	4.7000e-004	2.8000e-003	1.6500e-003	4.4500e-003	8.0000e-004	1.5000e-003	2.3000e-003	0.0000	38.9860	38.9860	9.8000e-004	0.0000	39.0065
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	2.2600e-003	3.3400e-003	0.0348	9.0000e-005	7.2500e-003	5.0000e-005	7.3000e-003	1.9200e-003	5.0000e-005	1.9700e-003	0.0000	6.5308	6.5308	3.2000e-004	0.0000	6.5375
Total	**0.1589**	**0.4285**	**2.7837**	**5.6000e-004**	**0.0101**	**1.7000e-003**	**0.0118**	**2.7200e-003**	**1.5500e-003**	**4.2700e-003**	**0.0000**	**45.5168**	**45.5168**	**1.3000e-003**	**0.0000**	**45.5440**

3.4 Paving - 2016

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	1.0400e-003	0.0112	7.4100e-003	1.0000e-005		6.3000e-004	6.3000e-004		5.8000e-004	5.8000e-004	0.0000	1.0507	1.0507	3.2000e-004	0.0000	1.0574
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.0400e-003**	**0.0112**	**7.4100e-003**	**1.0000e-005**		**6.3000e-004**	**6.3000e-004**		**5.8000e-004**	**5.8000e-004**	**0.0000**	**1.0507**	**1.0507**	**3.2000e-004**	**0.0000**	**1.0574**

Unmitigated Construction Off-Site

Category	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
	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-005	4.0000e-005	4.0000e-004	0.0000	8.0000e-005	0.0000	8.0000e-005	2.0000e-005	0.0000	2.0000e-005	0.0000	0.0742	0.0742	0.0000	0.0000	0.0743
Total	**3.0000e-005**	**4.0000e-005**	**4.0000e-004**	**0.0000**	**8.0000e-005**	**0.0000**	**8.0000e-005**	**2.0000e-005**	**0.0000**	**2.0000e-005**	**0.0000**	**0.0742**	**0.0742**	**0.0000**	**0.0000**	**0.0743**

Mitigated Construction On-Site

Category	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
	tons/yr										MT/yr					
Off-Road	1.0400e-003	0.0112	7.4100e-003	1.0000e-005		6.3000e-004	6.3000e-004		5.8000e-004	5.8000e-004	0.0000	1.0507	1.0507	3.2000e-004	0.0000	1.0573
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.0400e-003**	**0.0112**	**7.4100e-003**	**1.0000e-005**		**6.3000e-004**	**6.3000e-004**		**5.8000e-004**	**5.8000e-004**	**0.0000**	**1.0507**	**1.0507**	**3.2000e-004**	**0.0000**	**1.0573**

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-005	4.0000e-005	4.0000e-004	0.0000	8.0000e-005	0.0000	8.0000e-005	2.0000e-005	0.0000	2.0000e-005	0.0000	0.0742	0.0742	0.0000	0.0000	0.0743
Total	**3.0000e-005**	**4.0000e-005**	**4.0000e-004**	**0.0000**	**8.0000e-005**	**0.0000**	**8.0000e-005**	**2.0000e-005**	**0.0000**	**2.0000e-005**	**0.0000**	**0.0742**	**0.0742**	**0.0000**	**0.0000**	**0.0743**

3.4 Paving - 2017

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	0.0200	0.2131	0.1546	2.3000e-004		0.0120	0.0120		0.0110	0.0110	0.0000	21.7281	21.7281	6.6600e-003	0.0000	21.8679
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0200**	**0.2131**	**0.1546**	**2.3000e-004**		**0.0120**	**0.0120**		**0.0110**	**0.0110**	**0.0000**	**21.7281**	**21.7281**	**6.6600e-003**	**0.0000**	**21.8679**

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	4.9000e-004	7.2000e-004	7.5700e-003	2.0000e-005	1.7300e-003	1.0000e-005	1.7400e-003	4.6000e-004	1.0000e-005	4.7000e-004	0.0000	1.4982	1.4982	7.0000e-005	0.0000	1.4997
Total	**4.9000e-004**	**7.2000e-004**	**7.5700e-003**	**2.0000e-005**	**1.7300e-003**	**1.0000e-005**	**1.7400e-003**	**4.6000e-004**	**1.0000e-005**	**4.7000e-004**	**0.0000**	**1.4982**	**1.4982**	**7.0000e-005**	**0.0000**	**1.4997**

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	0.0200	0.2131	0.1546	2.3000e-004		0.0120	0.0120		0.0110	0.0110	0.0000	21.7281	21.7281	6.6600e-003	0.0000	21.8679
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0200**	**0.2131**	**0.1546**	**2.3000e-004**		**0.0120**	**0.0120**		**0.0110**	**0.0110**	**0.0000**	**21.7281**	**21.7281**	**6.6600e-003**	**0.0000**	**21.8679**

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	4.9000e-004	7.2000e-004	7.5700e-003	2.0000e-005	1.7300e-003	1.0000e-005	1.7400e-003	4.6000e-004	1.0000e-005	4.7000e-004	0.0000	1.4982	1.4982	7.0000e-005	0.0000	1.4997
Total	**4.9000e-004**	**7.2000e-004**	**7.5700e-003**	**2.0000e-005**	**1.7300e-003**	**1.0000e-005**	**1.7400e-003**	**4.6000e-004**	**1.0000e-005**	**4.7000e-004**	**0.0000**	**1.4982**	**1.4982**	**7.0000e-005**	**0.0000**	**1.4997**

3.5 Building Construction - 2017

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	0.1952	1.5149	1.2102	1.6800e-003		0.1141	0.1141		0.1076	0.1076	0.0000	149.1172	149.1172	0.0346	0.0000	149.8433
Total	**0.1952**	**1.5149**	**1.2102**	**1.6800e-003**		**0.1141**	**0.1141**		**0.1076**	**0.1076**	**0.0000**	**149.1172**	**149.1172**	**0.0346**	**0.0000**	**149.8433**

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	0.0212	0.2023	0.2750	5.3000e-004	0.0152	3.0300e-003	0.0182	4.3300e-003	2.7800e-003	7.1100e-003	0.0000	47.5163	47.5163	3.4000e-004	0.0000	47.5233
Worker	0.0378	0.0559	0.5844	1.5900e-003	0.1336	9.3000e-004	0.1345	0.0355	8.6000e-004	0.0363	0.0000	115.7256	115.7256	5.4600e-003	0.0000	115.8403
Total	**0.0590**	**0.2582**	**0.8594**	**2.1200e-003**	**0.1487**	**3.9600e-003**	**0.1527**	**0.0398**	**3.6400e-003**	**0.0434**	**0.0000**	**163.2418**	**163.2418**	**5.8000e-003**	**0.0000**	**163.3637**

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	0.1952	1.5149	1.2102	1.6800e-003		0.1141	0.1141		0.1076	0.1076	0.0000	149.1170	149.1170	0.0346	0.0000	149.8431
Total	**0.1952**	**1.5149**	**1.2102**	**1.6800e-003**		**0.1141**	**0.1141**		**0.1076**	**0.1076**	**0.0000**	**149.1170**	**149.1170**	**0.0346**	**0.0000**	**149.8431**

Mitigated Construction Off-Site

Category	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
	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	0.0212	0.2023	0.2750	5.3000e-004	0.0152	3.0300e-003	0.0182	4.3300e-003	2.7800e-003	7.1100e-003	0.0000	47.5163	47.5163	3.4000e-004	0.0000	47.5233
Worker	0.0378	0.0559	0.5844	1.5900e-003	0.1336	9.3000e-004	0.1345	0.0355	8.6000e-004	0.0363	0.0000	115.7256	115.7256	5.4600e-003	0.0000	115.8403
Total	**0.0590**	**0.2582**	**0.8594**	**2.1200e-003**	**0.1487**	**3.9600e-003**	**0.1527**	**0.0398**	**3.6400e-003**	**0.0434**	**0.0000**	**163.2418**	**163.2418**	**5.8000e-003**	**0.0000**	**163.3637**

3.6 Architectural Coating - 2017

Unmitigated Construction On-Site

Category	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
	tons/yr										MT/yr					
Archit. Coating	1.6738					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0141	0.0929	0.0794	1.3000e-004		7.3700e-003	7.3700e-003		7.3700e-003	7.3700e-003	0.0000	10.8513	10.8513	1.1500e-003	0.0000	10.8754
Total	**1.6879**	**0.0929**	**0.0794**	**1.3000e-004**		**7.3700e-003**	**7.3700e-003**		**7.3700e-003**	**7.3700e-003**	**0.0000**	**10.8513**	**10.8513**	**1.1500e-003**	**0.0000**	**10.8754**

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	4.2200e-003	6.2500e-003	0.0653	1.8000e-004	0.0149	1.0000e-004	0.0150	3.9600e-003	1.0000e-004	4.0600e-003	0.0000	12.9366	12.9366	6.1000e-004	0.0000	12.9494
Total	**4.2200e-003**	**6.2500e-003**	**0.0653**	**1.8000e-004**	**0.0149**	**1.0000e-004**	**0.0150**	**3.9600e-003**	**1.0000e-004**	**4.0600e-003**	**0.0000**	**12.9366**	**12.9366**	**6.1000e-004**	**0.0000**	**12.9494**

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	1.6738					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0141	0.0929	0.0794	1.3000e-004		7.3700e-003	7.3700e-003		7.3700e-003	7.3700e-003	0.0000	10.8513	10.8513	1.1500e-003	0.0000	10.8754
Total	**1.6879**	**0.0929**	**0.0794**	**1.3000e-004**		**7.3700e-003**	**7.3700e-003**		**7.3700e-003**	**7.3700e-003**	**0.0000**	**10.8513**	**10.8513**	**1.1500e-003**	**0.0000**	**10.8754**

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	4.2200e-003	6.2500e-003	0.0653	1.8000e-004	0.0149	1.0000e-004	0.0150	3.9600e-003	1.0000e-004	4.0600e-003	0.0000	12.9366	12.9366	6.1000e-004	0.0000	12.9494
Total	**4.2200e-003**	**6.2500e-003**	**0.0653**	**1.8000e-004**	**0.0149**	**1.0000e-004**	**0.0150**	**3.9600e-003**	**1.0000e-004**	**4.0600e-003**	**0.0000**	**12.9366**	**12.9366**	**6.1000e-004**	**0.0000**	**12.9494**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Increase Density

Improve Destination Accessibility

Improve Pedestrian Network

Implement Trip Reduction Program

Employee Vanpool/Shuttle

Provide Riade Sharing Program

	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	1.1331	1.9534	9.5166	0.0205	1.4561	0.0242	1.4802	0.3891	0.0223	0.4113	0.0000	1,567.9143	1,567.9143	0.0649	0.0000	1,569.2777
Unmitigated	1.1414	2.0116	9.7452	0.0213	1.5148	0.0250	1.5398	0.4047	0.0231	0.4278	0.0000	1,627.8417	1,627.8417	0.0671	0.0000	1,629.2512

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments Mid Rise	922.60	1,002.40	849.80	1,512,844	1,454,217
Single Family Housing	1,531.20	1,612.80	1403.20	2,497,227	2,400,451
Total	2,453.80	2,615.20	2,253.00	4,010,071	3,854,668

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-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Apartments Mid Rise	1.00	5.90	8.70	40.20	19.20	40.60	86	11	3
Single Family Housing	1.00	5.90	8.70	40.20	19.20	40.60	86	11	3

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.510449	0.057012	0.191854	0.151889	0.041459	0.005887	0.015572	0.014818	0.001440	0.002145	0.004716	0.000509	0.002251

5.0 Energy Detail

4.4 Fleet Mix

Historical Energy Use: N

5.1 Mitigation Measures Energy

Exceed Title 24

Install High Efficiency Lighting

Install Energy Efficient Appliances

	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	441.5884	441.5884	0.0203	4.2000e-003	443.3165
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	463.9867	463.9867	0.0213	4.4100e-003	465.8025
NaturalGas Mitigated	0.0251	0.2148	0.0914	1.3700e-003		0.0174	0.0174		0.0174	0.0174	0.0000	248.7500	248.7500	4.7700e-003	4.5600e-003	250.2639
NaturalGas Unmitigated	0.0314	0.2685	0.1143	1.7100e-003		0.0217	0.0217		0.0217	0.0217	0.0000	310.9665	310.9665	5.9600e-003	5.7000e-003	312.8590

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					
Single Family Housing	4.62136e+006	0.0249	0.2130	0.0906	1.3600e-003		0.0172	0.0172		0.0172	0.0172	0.0000	246.6134	246.6134	4.7300e-003	4.5200e-003	248.1142
Apartments Mid Rise	1.20593e+006	6.5000e-003	0.0556	0.0237	3.5000e-004		4.4900e-003	4.4900e-003		4.4900e-003	4.4900e-003	0.0000	64.3531	64.3531	1.2300e-003	1.1800e-003	64.7448
Total		**0.0314**	**0.2685**	**0.1143**	**1.7100e-003**		**0.0217**	**0.0217**		**0.0217**	**0.0217**	**0.0000**	**310.9665**	**310.9665**	**5.9600e-003**	**5.7000e-003**	**312.8590**

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					
Single Family Housing	3.69878e+006	0.0199	0.1704	0.0725	1.0900e-003		0.0138	0.0138		0.0138	0.0138	0.0000	197.3810	197.3810	3.7800e-003	3.6200e-003	198.5822
Apartments Mid Rise	962619	5.1900e-003	0.0444	0.0189	2.8000e-004		3.5900e-003	3.5900e-003		3.5900e-003	3.5900e-003	0.0000	51.3690	51.3690	9.8000e-004	9.4000e-004	51.6816
Total		**0.0251**	**0.2148**	**0.0914**	**1.3700e-003**		**0.0174**	**0.0174**		**0.0174**	**0.0174**	**0.0000**	**248.7500**	**248.7500**	**4.7600e-003**	**4.5600e-003**	**250.2639**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Apartments Mid Rise	487038	139.3740	6.4100e-003	1.3300e-003	139.9195
Single Family Housing	1.13435e+006	324.6126	0.0149	3.0900e-003	325.8830
Total		**463.9867**	**0.0213**	**4.4200e-003**	**465.8025**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Apartments Mid Rise	464495	132.9230	6.1100e-003	1.2600e-003	133.4432
Single Family Housing	1.07862e+006	308.6654	0.0142	2.9400e-003	309.8733
Total		**441.5884**	**0.0203**	**4.2000e-003**	**443.3165**

6.0 Area Detail

6.1 Mitigation Measures Area

Use Low VOC Paint - Residential Interior

Use Low VOC Paint - Residential Exterior

Use Low VOC Paint - Non-Residential Interior

Use Low VOC Paint - Non-Residential Exterior

Use only Natural Gas Hearths

Use Low VOC Cleaning Supplies

	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	1.8175	0.0364	3.1253	1.6000e-004		0.0212	0.0212		0.0212	0.0212	0.0000	66.2886	66.2886	6.2500e-003	1.1200e-003	66.7678
Unmitigated	1.9187	0.0514	4.0444	3.1600e-003		0.1712	0.1712		0.1711	0.1711	20.0770	66.2886	86.3657	0.1001	1.1200e-003	88.8158

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	0.1674					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	1.5466					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	0.1074	0.0150	0.9195	3.0000e-003		0.1542	0.1542		0.1542	0.1542	20.0770	61.2350	81.3120	0.0950	1.1200e-003	83.6557
Landscaping	0.0973	0.0364	3.1250	1.6000e-004		0.0170	0.0170		0.0170	0.0170	0.0000	5.0537	5.0537	5.0700e-003	0.0000	5.1602
Total	**1.9187**	**0.0514**	**4.0444**	**3.1600e-003**		**0.1712**	**0.1712**		**0.1711**	**0.1711**	**20.0770**	**66.2886**	**86.3657**	**0.1001**	**1.1200e-003**	**88.8158**

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	0.1674					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	1.5466					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	6.1900e-003	0.0000	3.4000e-004	0.0000		4.2700e-003	4.2700e-003		4.2300e-003	4.2300e-003	0.0000	61.2350	61.2350	1.1700e-003	1.1200e-003	61.6076
Landscaping	0.0973	0.0364	3.1250	1.6000e-004		0.0170	0.0170		0.0170	0.0170	0.0000	5.0537	5.0537	5.0700e-003	0.0000	5.1602
Total	**1.8175**	**0.0364**	**3.1253**	**1.6000e-004**		**0.0212**	**0.0212**		**0.0212**	**0.0212**	**0.0000**	**66.2886**	**66.2886**	**6.2400e-003**	**1.1200e-003**	**66.7678**

7.0 Water Detail

7.1 Mitigation Measures Water

Apply Water Conservation Strategy

Use Reclaimed Water

Install Low Flow Bathroom Faucet

Install Low Flow Kitchen Faucet

Install Low Flow Toilet

Install Low Flow Shower

Use Water Efficient Irrigation System

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	107.8478	0.6416	0.0160	126.2829
Unmitigated	118.2112	0.6421	0.0161	136.6868

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Apartments Mid Rise	9.12156 / 5.75055	55.1652	0.2996	7.5200e-003	63.7872
Single Family Housing	10.4246 / 6.57206	63.0460	0.3424	8.5900e-003	72.8996
Total		**118.2112**	**0.6421**	**0.0161**	**136.6868**

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Apartments Mid Rise	9.12156 / 4.60044	50.3290	0.2994	7.4700e-003	58.9320
Single Family Housing	10.4246 / 5.25765	57.5189	0.3422	8.5400e-003	67.3509
Total		**107.8478**	**0.6416**	**0.0160**	**126.2829**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Institute Recycling and Composting Services

Category/Year

	Total CO_2	CH_4	N_2O	CO_2e
	MT/yr			
Mitigated	25.5951	1.5126	0.0000	57.3603
Unmitigated	51.1903	3.0253	0.0000	114.7207

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO_2	CH_4	N_2O	CO_2e
Land Use	tons	MT/yr			
Apartments Mid Rise	64.4	13.0726	0.7726	0.0000	29.2966
Single Family Housing	187.78	38.1176	2.2527	0.0000	85.4241
Total		**51.1903**	**3.0253**	**0.0000**	**114.7207**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Apartments Mid Rise	32.2	6.5363	0.3863	0.0000	14.6483
Single Family Housing	93.89	19.0588	1.1263	0.0000	42.7121
Total		**25.5951**	**1.5126**	**0.0000**	**57.3603**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Vegetation

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APPENDIX C

Acoustical Assessment

Acoustical Assessment
University Hills Area 11

CONSULTANT:

Michael Baker International
14725 Alton Parkway
Irvine, California 92618

Michael Baker
INTERNATIONAL

This document is designed for double-sided printing to conserve natural resources.

ACOUSTICAL ASSESSMENT

for the

University Hills Area 11 Project

University of California, Irvine

Consultant:

MICHAEL BAKER INTERNATIONAL, INC.
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March 4, 2016

JN 150070

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DEFINITIONS OF COMMONLY USED TERMS IN NOISE CONTROL

The definitions that follow are in general agreement with those contained in publications of various professional organizations, including the American National Standards Institute (ANSI); the American Society for Testing and Materials (ASTM); the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE); the International Organization for Standardization (ISO); and the International Electrotechnical Commission (IEC).

TERMINOLOGY

acoustic; acoustical: *Acoustic* is usually used when the term being qualified designates something that has the properties, dimensions, or physical characteristics associated with sound waves (e.g., acoustic power); *acoustical* is usually used when the term which it modifies does not explicitly designate something that has the properties, dimensions, or physical characteristics of sound (e.g., acoustical material).

ambient noise: The all-encompassing noise associated with a given environment at a specified time, usually being a composite of sound from many sources arriving from many directions, near and far; no particular sound is dominant.

attenuation: The decrease in level of sound, usually from absorption, divergence, scattering, or the cancellation of the sound waves.

average sound level (L_{eq}): The level of a steady sound which, in a stated time period and at a stated location, has the same A-weighted sound energy as the time-varying sound.
Unit: decibel.

A-weighted sound level (L_A): The sound level measured with a sound-level meter using A-weighting. *Unit*: decibel (dBA).

background noise: The total noise from all sources other than a particular sound that is of interest (e.g., other than the noise being measured or other than the speech or music being listened to).

decibel (dB): A unit of level which denotes the ratio between two quantities that are proportional to power; the number of decibels correspond to the logarithm (to the base 10) of this ratio. [In many sound fields, the sound pressure ratios are not proportional to the corresponding power ratios, but it is common practice to extend the use of the decibel to such cases. One decibel equals one-tenth of a *bel*.]

equivalent continuous sound level (average sound level) (L_{eq}): The level of a steady sound which, in a stated time period and at a stated location, has the same A-weighted sound energy as the time-varying sound. *Unit*: decibel (dBA).

frequency (f): Of a periodic function, the number of times that a quantity repeats itself in one second, i.e., the number of cycles per second. *Unit*: hertz (Hz).

noise: Any disagreeable or undesired sound, i.e., unwanted sound.

noise level: Same as sound level. Usually used to describe the sound level of an unwanted sound.

noise reduction (NR): The difference in sound pressure level between any two points along a path of sound propagation.

sound: (1) A change in air pressure that is capable of being detected by the human ear.
(2) The hearing sensation excited by a change in air pressure.

sound level: Ten times the logarithm to the base 10 of the square of the ratio of the frequency-weighted (and time-averaged) sound pressure to the reference sound pressure of 20 micropascals. The frequency-weightings and time-weighting employed should be specified; if they are not specified, it is understood that A-frequency-weighting is used and that an averaging time of 0.125 is used. *Unit*: decibel (dBA).

SYMBOLS, ABBREVIATIONS, AND ACRONYMS

ADT	Average Daily Traffic
ANSI	American National Standards Institute
AM	Ante Meridiem
APN	Assessor's Parcel Number
CEQA	California Environmental Quality Act
CNEL	Community Noise Equivalent Level
dB	decibel
dBA	A-weighted decibel
EPA	United States Environmental Protection Agency
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
INCE	Institute of Noise Control Engineering
HVAC	heating, ventilation, and air conditioning
in/sec	inches per second
Ldn	average day/night sound level
Leq	equivalent sound level
Lmax	maximum noise level
Lmin	minimum noise level
Ln	exceedance level
MPH	miles per hour
PM	Post Meridiem
PPV	peak particle velocity
STC	sound transmission class
VdB	velocity decibels

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EXECUTIVE SUMMARY

The purpose of this Acoustical Assessment is to evaluate potential short- and long-term noise impacts resulting from implementation of the proposed University Hills PA11 project ("project" or "proposed project").

The proposed project is located at the northwest corner of the Culver Drive and Bonita Canyon Drive intersection, on the University of California, Irvine (UCI) campus. The project site is approximately 2.15 miles south of Interstate 405 (I-405), and 0.42 miles north of State Route 73 (SR-73) in the City of Irvine, California.

The project proposes to construct 160 single family homes, and 140 apartment units for UCI faculty and staff. The site would be served by an extensive trail of pedestrian paths and sidewalks through this area of the campus, and bike trails on each roadway in the area lead to the UCI main campus. It is expected that residents of the proposed project that work at the main campus would take advantage of the opportunities to walk or bike to their destination on campus. Vehicular access to the proposed project would be provided by a new driveway off of Anteater Drive on the east side and a connection to Gabrielino Road through residential uses to the west.

<u>Temporary Impacts</u>. Based upon the results of the analysis, noise from construction activities would not exceed the noise standards of the City of Irvine's *Municipal Code* at nearby residential uses with compliance with the recommended mitigation measures. Additionally, short-term vibration impacts from construction would be less than significant.

<u>Long-Term Impacts</u>. The analysis has concluded that implementation of the proposed project would result in less than significant impacts with regard to mobile noise sources from project operations. Less than significant impacts have been identified in regard to stationary sources.

1.0 INTRODUCTION

The purpose of this Acoustical Assessment is to evaluate potential short- and long-term noise impacts resulting from implementation of the proposed University Hills Area 11 project ("project" or "proposed project") on the University of California, Irvine (UCI) campus.

1.1 PROJECT LOCATION

The proposed project is located at the northwest corner of the Culver Drive and Bonita Canyon Drive intersection, on the UCI campus, in the City of Irvine, California. The project site is located on the approximately 2.15 miles south of Interstate 405 (I-405), and 0.42 miles north of State Route 73 (SR-73); refer to Exhibit 1, *Regional Vicinity*. Overall, the project site is located within a developed area of the City and consists of vacant land; refer to Exhibit 2, *Site Vicinity*.

1.2 PROJECT DESCRIPTION

The project site is approximately 29 acres, and currently consists of vacant land. The project proposes to construct 160 single family homes, and 140 apartment units for UCI faculty and staff; refer to Exhibit 3, *Conceptual Site Plan*. The site would be served by an extensive trail of pedestrian paths and sidewalks through this area of the campus, and bike trails on each roadway in the area lead to the UCI main campus. It is expected that residents of the proposed project that work at the main campus would take advantage of the opportunities to walk or bike to their destination on campus. Vehicular access to the proposed project would be provided by a new driveway off of Anteater Drive on the east side and a connection to Gabrielino Road through residential uses to the west.

Subject Site

not to scale

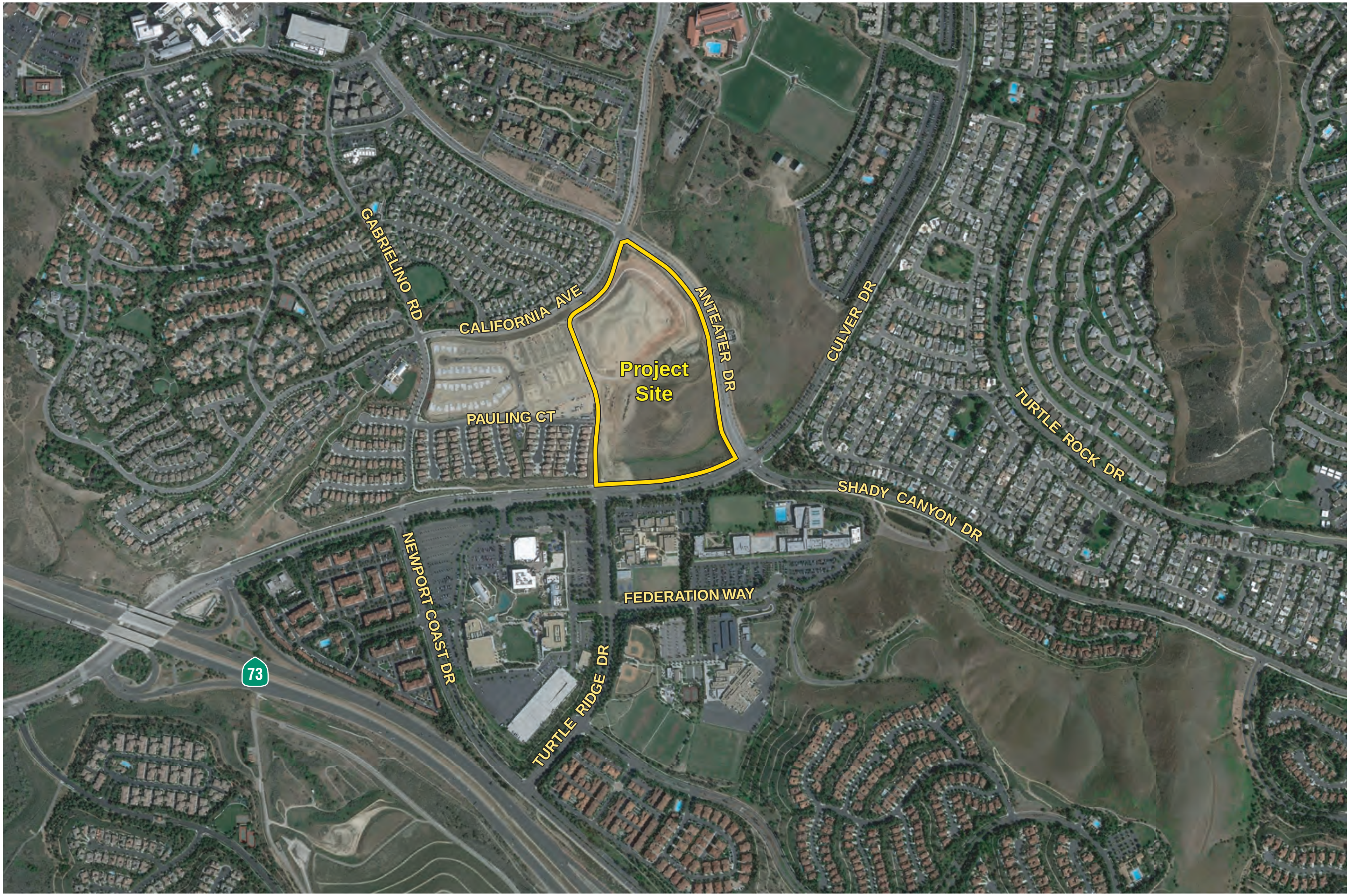
UNIVERSITY HILLS AREA 11 • ACOUSTICAL ASSESSMENT

Regional Vicinity

02/02/16 JN 150070-21529 MAS

Exhibit 1

Michael Baker INTERNATIONAL



Michael Baker INTERNATIONAL

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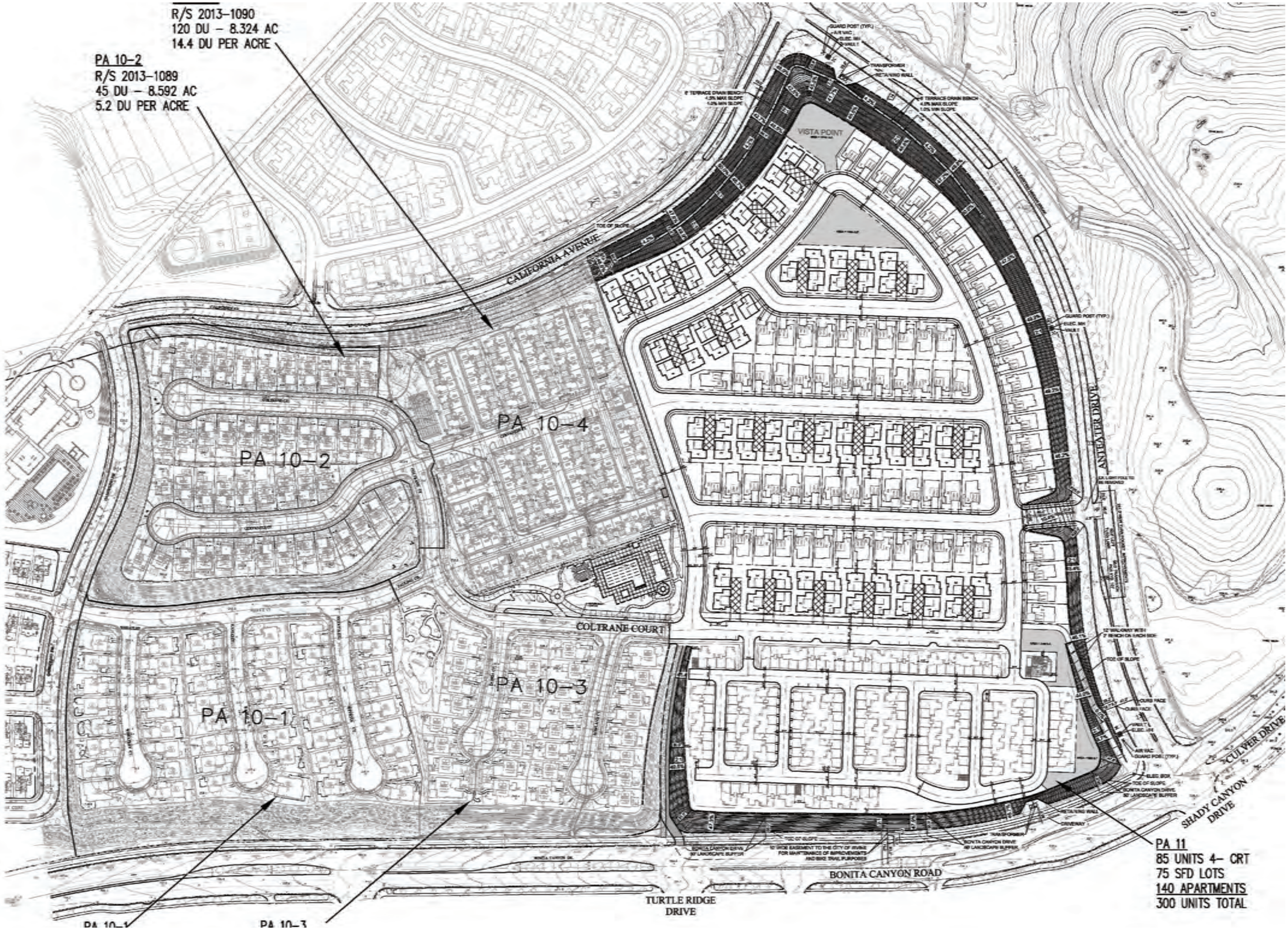
02/02/16 JN 150070-21529 MAS

UNIVERSITY HILLS AREA 11 • ACOUSTICAL ASSESSMENT

Site Vicinity

Exhibit 2



UNIVERSITY HILLS AREA 11 • ACOUSTICAL ASSESSMENT

Site Plan

Exhibit 3

not to scale

Michael Baker INTERNATIONAL

02/02/16 JN 150070-21529 MAS

2.0 DESCRIPTION OF NOISE METRICS

2.1 STANDARD UNIT OF MEASUREMENT

Sound is described in terms of the loudness (amplitude) of the sound and frequency (pitch) of the sound. The standard unit of measurement of the loudness of sound is the decibel (dB). Since the human ear is not equally sensitive to sound at all frequencies, a special frequency-dependent rating scale has been devised to relate noise to human sensitivity. The A-weighted decibel scale (dBA) performs this compensation by differentiating among frequencies in a manner approximating the sensitivity of the human ear.

Decibels are based on the logarithmic scale. The logarithmic scale compresses the wide range in sound pressure levels to a more usable range of numbers in a manner similar to the Richter scale used to measure earthquakes. In terms of human response to noise, a sound 10 dBA higher than another is perceived to be twice as loud and 20 dBA higher is perceived to be four times as loud, and so forth. Everyday sounds normally range from 30 dBA (very quiet) to 100 dBA (very loud). Examples of various sound levels in different environments are illustrated on Exhibit 4, *Common Environmental Noise Levels*.

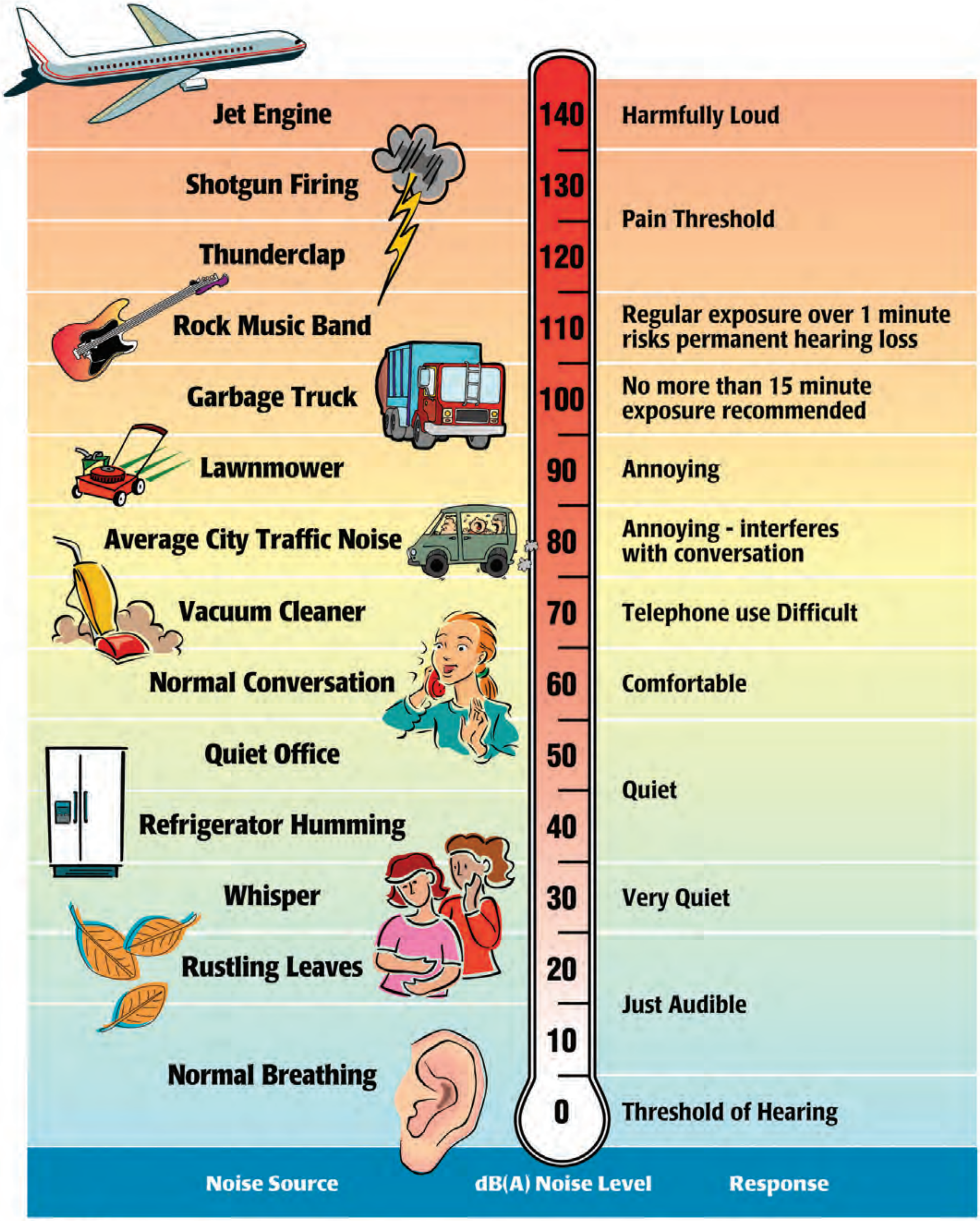
Many methods have been developed for evaluating community noise to account for, among other things:

- The variation of noise levels over time;
- The influence of periodic individual loud events; and
- The community response to changes in the community noise environment.

Table 1, *Noise Descriptors*, provides a listing of methods to measure sound over a period of time.

2.2 HEALTH EFFECTS OF NOISE

Human response to sound is highly individualized. Annoyance is the most common issue regarding community noise. The percentage of people claiming to be annoyed by noise generally increases with the environmental sound level. However, many factors also influence people's response to noise. The factors can include the character of the noise, the variability of the sound level, the presence of tones or impulses, and the time of day of the occurrence. Additionally, non-acoustical factors, such as the person's opinion of the noise source, the ability to adapt to the noise, the attitude towards the source and those associated with it, and the predictability of the noise, all influence people's response. As such, response to noise varies widely from one person to another and with any particular noise, individual responses would range from "not annoyed" to "highly annoyed."



Source:

Melville C. Branch and R. Dale Beland, *Outdoor Noise in the Metropolitan Environment*, 1970.

Environmental Protection Agency, *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety (EPA/ONAC 550/9-74-004)*, March 1974.

Table 1
Noise Descriptors

Term	Definition
Decibel (dB)	The unit for measuring the volume of sound equal to 10 times the logarithm (base 10) of the ratio of the pressure of a measured sound to a reference pressure (20 micropascals).
A-Weighted Decibel (dBA)	A sound measurement scale that adjusts the pressure of individual frequencies according to human sensitivities. The scale accounts for the fact that the region of highest sensitivity for the human ear is between 2,000 and 4,000 cycles per second (hertz).
Equivalent Sound Level (L_{eq})	The sound level containing the same total energy as a time varying signal over a given time period. The L_{eq} is the value that expresses the time averaged total energy of a fluctuating sound level.
Maximum Sound Level (L_{max})	The highest individual sound level (dBA) occurring over a given time period.
Minimum Sound Level (L_{min})	The lowest individual sound level (dBA) occurring over a given time period.
Community Noise Equivalent Level (CNEL)	A rating of community noise exposure to all sources of sound that differentiates between daytime, evening, and nighttime noise exposure. These adjustments are +5 dBA for the evening, 7:00 PM to 10:00 PM, and +10 dBA for the night, 10:00 PM to 7:00 AM.
Day/Night Average (L_{dn})	The L_{dn} is a measure of the 24-hour average noise level at a given location. It was adopted by the U.S. Environmental Protection Agency for developing criteria for the evaluation of community noise exposure. It is based on a measure of the average noise level over a given time period called the L_{eq}. The L_{dn} is calculated by averaging the L_{eq}'s for each hour of the day at a given location after penalizing the "sleeping hours" (defined as 10:00 PM to 7:00 AM) by 10 dBA to account for the increased sensitivity of people to noises that occur at night.
Exceedance Level (L_n)	The A-weighted noise levels that are exceeded 1%, 10%, 50%, and 90% (L_{01}, L_{10}, L_{50}, L_{90}, respectively) of the time during the measurement period.
Source: Cyril M. Harris, *Handbook of Noise Control*, 1979.	

When the noise level of an activity rises above 70 dBA, the chance of receiving a complaint is possible, and as the noise level rises, dissatisfaction among the public steadily increases. However, an individual's reaction to a particular noise depends on many factors, such as the source of the sound, its loudness relative to the background noise, and the time of day. The reaction to noise can also be highly subjective; the perceived effect of a particular noise can vary widely among individuals in a community.

The effects of noise are often only transitory, but adverse effects can be cumulative with prolonged or repeated exposure. The effects of noise on the community can be organized into six broad categories:

- Noise-Induced Hearing Loss;
- Interference with Communication;
- Effects of Noise on Sleep;
- Effects on Performance and Behavior;
- Extra-Auditory Health Effects; and
- Annoyance.

Although it often causes discomfort and sometimes pain, noise-induced hearing loss usually takes years to develop. Noise-induced hearing loss can impair the quality of life through a reduction in the ability to hear important sounds and to communicate with family and friends. Hearing loss is one of the most obvious and easily quantified effects of excessive exposure to noise. While the loss may be temporary at first, it could become permanent after continued exposure. When combined with hearing loss associated with aging, the amount of hearing loss directly caused by the environment is difficult to quantify. Although the major cause of noise-induced hearing loss is occupational, substantial damage can be caused by non-occupational sources.

According to the United States Public Health Service, nearly ten million of the estimated 21 million Americans with hearing impairments owe their losses to noise exposure. Noise can mask important sounds and disrupt communication between individuals in a variety of settings. This process can cause anything from a slight irritation to a serious safety hazard, depending on the circumstance. Noise can disrupt face-to-face communication and telephone communication, and the enjoyment of music and television in the home. It can also disrupt effective communication between teachers and pupils in schools, and can cause fatigue and vocal strain in those who need to communicate in spite of the noise.

Interference with communication has proven to be one of the most important components of noise-related annoyance. Noise-induced sleep interference is one of the critical components of community annoyance. Sound level, frequency distribution, duration, repetition, and variability can make it difficult to fall asleep and may cause momentary shifts in the natural sleep pattern, or level of sleep. It can produce short-term adverse effects on mood changes and job performance, with the possibility of more serious effects on health if it continues over long periods. Noise can cause adverse effects on task performance and behavior at work, and non-occupational and social settings. These effects are the subject of some controversy, since the presence and degree of effects depends on a variety of intervening variables. Most research in this area has focused mainly on occupational settings, where noise levels must be sufficiently high and the task sufficiently complex for effects on performance to occur.

Recent research indicates that more moderate noise levels can produce disruptive after-effects, commonly manifested as a reduced tolerance for frustration, increased anxiety, decreased incidence of “helping” behavior, and increased incidence of “hostile” behavior. Noise has been implicated in the development or exacerbation of a variety of health problems, ranging from hypertension to psychosis. As with other categories, quantifying these effects is difficult due to the amount of variables that need to be considered in each situation. As a biological stressor, noise can influence the entire physiological system. Most effects seem to be transitory, but with continued exposure some effects have been shown to be chronic in laboratory animals.

Annoyance can be viewed as the expression of negative feelings resulting from interference with activities, as well as the disruption of one's peace of mind and the enjoyment of one's environment. Field evaluations of community annoyance are useful for predicting the consequences of planned actions involving highways, airports, road traffic, railroads, or other noise sources. The consequences of noise-induced annoyance are privately held dissatisfaction, publicly expressed complaints to authorities, and potential adverse health effects, as discussed above. In a study conducted by the United States Department of Transportation, the relationship between the effects of annoyance and the community were quantified. In areas where exterior noise levels were consistently above 60 dBA Community Noise Equivalent Level (CNEL), approximately nine percent of the community is highly annoyed. When levels exceed 65 dBA CNEL, that percentage rises to 15 percent. Although evidence for the various effects of noise have differing levels of certainty, it is clear that noise can affect human health. Most of the effects are, to a varying degree, stress related.

3.0 LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Land uses deemed sensitive by the State of California (State) within the vicinity of the project site include schools. Many jurisdictions also consider single- and multi-family residential uses particularly noise-sensitive because families and individuals expect to use time in the home for rest and relaxation, and noise can interfere with those activities. Some jurisdictions may also identify other noise-sensitive uses such as churches. Land uses that are relatively insensitive to noise include office, commercial, and retail developments. There is a range of insensitive noise receptors that include uses that generate significant noise levels and that typically have a low level of human occupancy.

This noise analysis was conducted in accordance with Federal, State, and local criteria described in the following sections.

3.1 U.S. ENVIRONMENTAL PROTECTION AGENCY

The U.S. Environmental Protection Agency (EPA) offers guidelines for community noise exposure in the publication *Noise Effects Handbook – A Desk Reference to Health and Welfare Effects of Noise*. These guidelines consider occupational noise exposure as well as noise exposure in homes. The EPA recognizes an exterior noise level of 55 decibels day-night level (dB L_{dn}) as a general goal to protect the public from hearing loss, activity interference, sleep disturbance, and annoyance. The EPA and other Federal agencies have adopted suggested land use compatibility guidelines that indicate that residential noise exposures of 55 to 65 dB L_{dn} are acceptable. However, the EPA notes that these levels are not regulatory goals, but are levels defined by a negotiated scientific consensus, without concern for economic and technological feasibility or the needs and desires of any particular community.

3.2 CALIFORNIA ENVIRONMENTAL QUALITY ACT

The California Environmental Quality Act (CEQA) was enacted in 1970 and requires that all known environmental effects of a project be analyzed, including environmental noise impacts. Under CEQA, a project has a potentially significant impact if the project exposes people to noise levels in excess of standards established in the local general plan or noise ordinance. Additionally, under CEQA, a project has a potentially significant impact if the project creates a substantial increase in the ambient noise levels in the project vicinity above levels existing without the project. If a project has a potentially significant impact, mitigation measures must be considered. If mitigation measures to reduce the impact to less than significant are not feasible due to economic, social, environmental, legal, or other conditions, the most feasible mitigation measures must be considered.

3.3 CALIFORNIA GOVERNMENT CODE

California Government Code Section 65302 (f) mandates that the legislative body of each county and city adopt a noise element as part of its comprehensive general plan. The local noise element must recognize the land use compatibility guidelines established by the State Department of Health Services.

The guidelines rank noise land use compatibility in terms of “normally acceptable”, “conditionally acceptable”, “normally unacceptable”, and “clearly unacceptable” noise levels for various land use types. Single-family homes are “normally acceptable” in exterior noise environments up to 60 CNEL and “conditionally acceptable” up to 70 CNEL. Multiple-family residential uses are “normally acceptable” up to 65 CNEL and “conditionally acceptable” up to 70 CNEL. Schools, libraries, and churches are “normally acceptable” up to 70 CNEL, as are office buildings and business, commercial, and professional uses.

3.4 LOCAL JURISDICTION

Although UCI is not subject to municipal regulations, the City of Irvine’s noise standards are relevant to UCI to establish guidelines and evaluating noise impacts. City regulations are relevant for addressing UCI development projects that would affect adjacent noise-sensitive land uses in the City of Irvine.

CITY OF IRVINE LAND USE COMPATIBILITY CRITERIA

Since the campus is located in the City of Irvine, the City’s land use compatibility noise standards are relevant to UCI in establishing guidelines and evaluating impacts. UCI typically pursues consistency with local plans and policies where feasible. The *City of Irvine General Plan Noise Element* (Noise Element) sets forth general community noise and land use compatibility guidelines, as shown in Table 2, *City of Irvine Land Use Compatibility*. These guidelines are based primarily on noise/land use recommendations from a United States Department of Housing and Urban Development (HUD) document entitled *Planning Guidelines for Local Agencies*. Sound levels up to 65 dBA CNEL are normally compatible for single-family residential, transient lodging, and park uses. Sound levels up to 60 dBA CNEL are normally compatible for institutional uses such as hospitals, churches, libraries, and schools.

CITY OF IRVINE NOISE ORDINANCE

The City of Irvine Noise Ordinance (Noise Ordinance, Chapter 2 of the City’s *Municipal Code*) regulates noise from construction. Section 6-8-205(A) indicates that construction activities may occur between 7:00 a.m. and 7:00 p.m. Mondays through Fridays, and 9:00 a.m. and 6:00 p.m. on Saturdays. No construction activities shall be permitted outside of these hours or on Sundays and federal holidays unless a temporary waiver is granted by the Chief Building Official or his or her authorized representative. Trucks, vehicles, and equipment that are making, or are involved with, material deliveries, loading, transfer of materials, equipment service, maintenance of any devices or appurtenances for (or within) any construction project in the City, shall not be operated or driven on City streets outside of these hours or on Sundays and federal holidays unless a temporary waiver is granted by the City. Any waiver granted shall take into consideration the potential impact upon the community. No construction activity would be permitted outside of these hours, except in emergencies including maintenance work on the City rights-of-way that might be required.

Table 2
City of Irvine Land Use Compatibility

Land Use Category	Uses	Energy Average (CNEL)						
		≤	55	60	65	70	75	80 ≥
Residential	Single-Family, Multiple-Family	A	A	B	B	C	D	D
	Mobile Home	A	A	B	C	C	D	D
Commercial Regional Family	Hotel, Motel, Transient Lodging	A	A	B	B	C	C	D
Commercial Regional Community	Commercial retail, Bank, Restaurant, Movie theater	A	A	A	A	B	B	C
Commercial Community Industrial & Institutional	Office building, Research & development Professional office, City office building	A	A	A	B	B	C	D
Commercial Recreation Institutional General	Amphitheater, Concert Hall, Auditorium, Meeting Hall	B	B	C	C	D	D	D
Commercial Recreation	Children's amusement park, Miniature golf, Go-cart track, Health club, Equestrian center	A	A	A	B	B	D	D
Commercial Community Industrial General	Automobile Service station, Auto dealer, Manufacturing, Warehousing, Wholesale, Utilities	A	A	A	A	B	B	B
Institutional General	Hospital, Church, Library, School classrooms	A	A	B	C	C	D	D
Open Space	Parks	A	A	A	B	C	D	D
	Golf courses, Nature centers, Cemeteries, Wildlife reserves, Wildlife habitat	A	A	A	A	B	C	C
Agricultural	Agriculture	A	A	A	A	A	A	A

Notes:
Zone A: **Clearly Compatible:** Specified land use is satisfactory based upon the assumption that any buildings involved are of normal conventional construction without any special noise insulation requirements.
Zone B: **Normally Compatible**: New construction or development should be undertaken only after detailed analysis of the noise reduction requirements are made and needed noise insulation features in the design are determined. Conventional construction, with closed windows and fresh air supply systems or air conditioning, will normally suffice.
Zone C: **Normally Incompatible**: New construction or development should normally be discouraged. If new construction or development does proceed, a detailed analysis or noise reduction requirements must be made and needed noise insulation features must be included in the design.
Zone D: **Clearly Incompatible.** New construction or development should generally not be undertaken.

Source: City of Irvine, *City of Irvine General Plan*, Supp. No. 9, July 2015.

The noise Ordinance also provides exterior and interior noise limit thresholds for certain periods of time. Table 3, *City of Irvine Noise Ordinance Limits*, presents noise standards published in Section 6-8-204 of the City's Noise Ordinance.

Table 3
City of Irvine Noise Ordinance Limits

<table>
<tr><th rowspan="2">Noise Zone</th><th rowspan="2">Exterior or Interior?</th><th rowspan="2">Time Period</th><th colspan="5">Noise Levels (dBA) for a Period Not Exceeding</th></tr>
<tr><th>30 min</th><th>15 min</th><th>5 min</th><th>1 min</th><th>0 (anytime)</th></tr>
<tr><td rowspan="4">I: All hospitals, libraries, churches, schools, and residential properties</td><td rowspan="2">Exterior</td><td>7:00 a.m. – 10:00 p.m.</td><td>55</td><td>60</td><td>65[1]</td><td>70</td><td>75</td></tr>
<tr><td>10:00 a.m. – 7:00 a.m.</td><td>50</td><td>55</td><td>60</td><td>65[1]</td><td>70</td></tr>
<tr><td rowspan="2">Interior</td><td>7:00 a.m. – 10:00 p.m.</td><td>-</td><td>-</td><td>55</td><td>60</td><td>65</td></tr>
<tr><td>10:00 a.m. – 7:00 a.m.</td><td>-</td><td>-</td><td>45</td><td>50</td><td>55</td></tr>
<tr><td rowspan="2">II: All professional office and public institutional properties.</td><td>Exterior</td><td>Any time</td><td>55</td><td>60</td><td>65</td><td>70</td><td>75</td></tr>
<tr><td>Interior</td><td>Any time</td><td>-</td><td>-</td><td>55</td><td>60</td><td>65</td></tr>
<tr><td rowspan="2">III: All commercial properties excluding professional office properties.</td><td>Exterior</td><td>Any time</td><td>60</td><td>65</td><td>70</td><td>75</td><td>80</td></tr>
<tr><td>Interior</td><td>Any time</td><td>-</td><td>-</td><td>55</td><td>60</td><td>65</td></tr>
<tr><td rowspan="2">IV: All industrial properties.</td><td>Exterior</td><td>Any time</td><td>70</td><td>75</td><td>80</td><td>85</td><td>90</td></tr>
<tr><td>Interior</td><td>Any time</td><td>-</td><td>-</td><td>55</td><td>60</td><td>65</td></tr>
<tr><td colspan="8">Notes:
1. This standard does not apply to multi-family residence private balconies. Multi-family developments with balconies that do not meet the 65 CNEL are required to provide occupancy disclosure notice to all future tenants regarding potential noise impacts.
2. It shall be unlawful for any person at any location within the City to create any noise or to allow the creation of any noise on property owned, leased, occupied, or otherwise controlled by such person which causes the noise level when measured on any property within designated noise zones either within or without the City to exceed the applicable noise standard.
3. Each of the noise standards specified above shall be reduced by five dBA for impact, or predominant tone noise or for noises consisting of speech or music.
4. In the event that the noise source and the affected property are within different noise zones, the noise standards of the affected property shall apply.</td></tr>
<tr><td colspan="8">Source: City of Irvine, Municipal Code, Title 6, Division 8, Chapter 2, Section 6-8-204.</td></tr>
</table>

4.0 EXISTING CONDITIONS

4.1 NOISE MEASUREMENTS

In order to quantify existing ambient noise levels in the project area, noise measurements were conducted on February 2, 2016; refer to Table 4, *Noise Measurements*. The noise measurement sites were representative of typical existing noise exposure within and immediately adjacent to the project site. Ten-minute measurements were taken, between 10:00 a.m. and 11:00 a.m., at each site during the day. Short-term (L_{eq}) measurements are considered representative of the noise levels in the project vicinity.

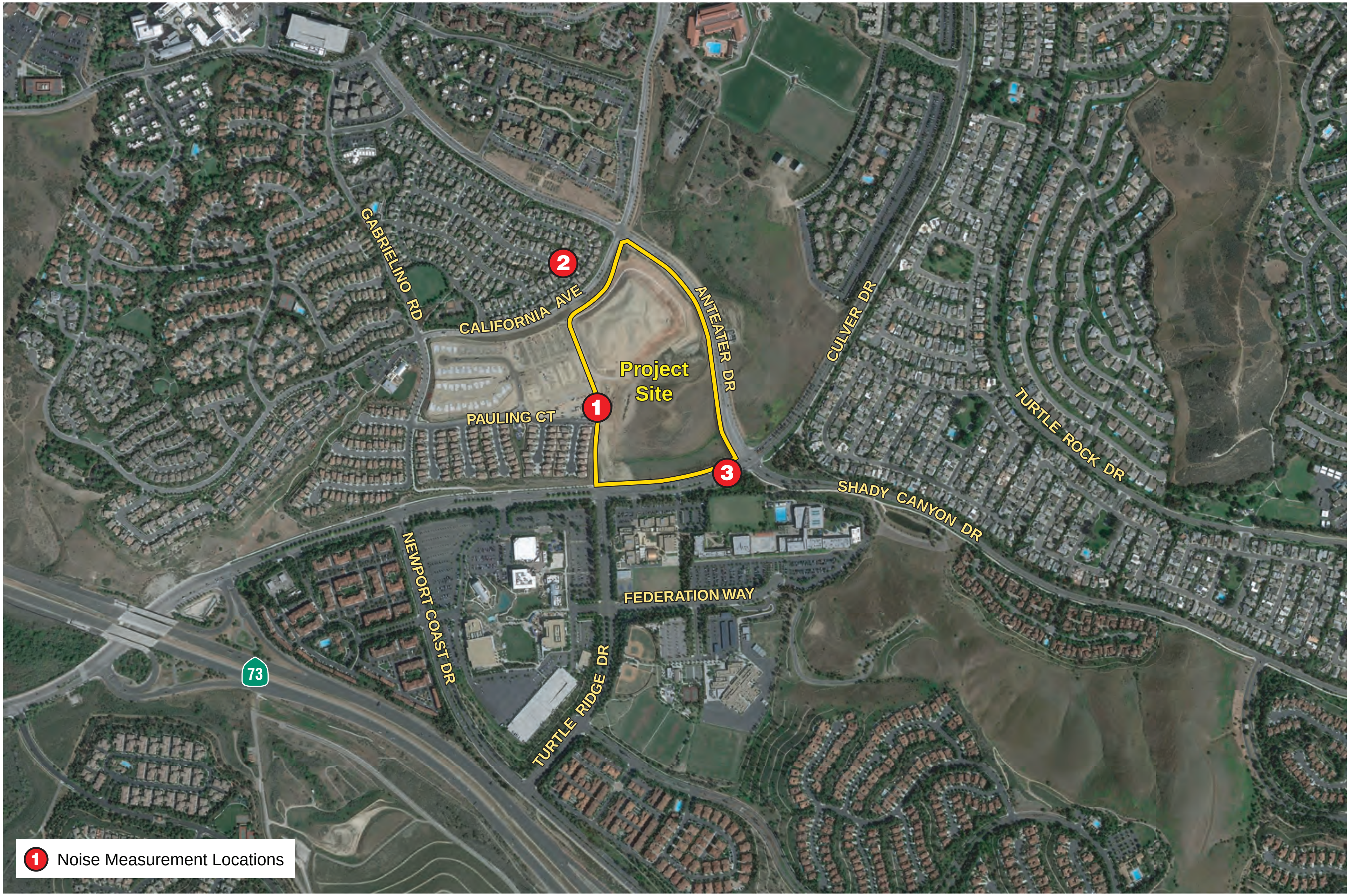
Table 4
Noise Measurements

Site No.	Location	L_{eq} (dBA)	L_{min} (dBA)	L_{max} (dBA)	Peak (dBA)	Time
1	Easternmost portion of Pauling Court, near western boundary of project site.	62.4	47.5	87.9	90.1	10:17 a.m.
2	In residential neighborhood, at the intersection of Fuertes and Murasaki Street.	46.2	35.8	77.4	78.3	10:34 a.m.
3	Near the southwestern corner of the Culver Drive and Anteater Drive intersection.	65.6	49.0	75.6	84.1	10:52 a.m.
Source: Michael Baker International, Inc., February 2, 2016.						

Meteorological conditions were clear skies, cool temperatures, with light wind speeds (0 to 5 miles per hour), and low humidity. Measured noise levels during the daytime measurements ranged from 46.2 to 65.6 dBA L_{eq}. Noise monitoring equipment used for the ambient noise survey consisted of a Brüel & Kjær Hand-held Analyzer Type 2250 equipped with a Type 4189 pre-polarized microphone. The monitoring equipment complies with applicable requirements of the American National Standards Institute (ANSI) for Type I (precision) sound level meters. The results of the field measurements are included in Appendix A, *Noise Measurement and Modeling Data*. Refer to Exhibit 5, *Noise Measurement Locations*, for the noise measurement sites.

4.2 SENSITIVE RECEPTORS

Certain land uses are particularly sensitive to noise, including schools, hospitals, rest homes, long-term medical and mental care facilities, and parks and recreation areas. Residential areas are also considered noise sensitive, especially during the nighttime hours. Existing sensitive receptors located in the project vicinity include residential uses, schools, hospitals, places of worship, parks, recreational areas, retirement homes, and rehabilitation centers. Sensitive receptors are listed in Table 5, *Sensitive Receptors*.



Michael Baker INTERNATIONAL

not to scale

02/02/16 JN 150070-21529 MAS

UNIVERSITY HILLS AREA 11 • ACOUSTICAL ASSESSMENT

Site Vicinity

Exhibit 5

Table 5
Sensitive Receptors

Type	Name	Distance from Project Site (feet)[1]	Direction from Project Site	Location
Residential	Residential Uses	Adjacent	North	North of California Avenue/Anteater Drive intersection.
		450 feet	North	North of California Avenue.
		1,000 feet	East	62600 Arroyo Drive.
		560 feet	East	East of the Bonita Canyon Drive/Shady Canyon Drive intersection.
		2,042 feet	South	Along Shady Lane.
		Adjacent	West	Along Paulding Court, northwest of the Bonita Canyon Drive/Turtle Ridge intersection.
Schools	Tarbut V'Torah Community Day School	280 feet	South	5200 Bonita Canyon Drive.
	Vista Verde Elementary School	1,430 feet	South	6 Federation Way.
Institutional	Merage Jewish Community Center of Orange County	470	South	1 Federation Way #200.
Places of Worship	Mariners Church	1,134 feet	Southwest	5001 Newport Coast Drive.
Parks/Recreational Areas	UC Irvine Recreational Sports Fields	1,164 feet	North/Northeast	680 California Avenue.
	Chaparral Park	3,360 feet	East	North of Turtle Rock Drive.

Note:
1. Distances are measured from the exterior project boundary only and not from individual construction areas within the interior of the project site.

4.3 EXISTING NOISE LEVELS

MOBILE SOURCES

The majority of the existing noise in the project area is generated from vehicles traveling along Bonita Canyon Drive, and Anteater Drive. Noise models were run using the Federal Highway Administration's Highway Noise Prediction Model (FHWA RD-77-108) together with several roadway and site parameters. These parameters determine the projected impact of vehicular traffic noise and include the roadway cross-section (such as the number of lanes), roadway width, average daily traffic (ADT), vehicle travel speed, percentages of auto and truck traffic, roadway grade, angle-of-view, and site conditions ("hard" or "soft"). The model does not account for ambient noise levels (i.e., noise from adjacent land uses) or topographical differences between the roadway and adjacent land uses. Noise projections are based on modeled vehicular average daily traffic (ADT) estimates derived from the *Draft University Hills PA11 Traffic Study* (*Traffic Study*), prepared by Stantec Consulting Services, Inc., dated September 22, 2015. Table 6, *Existing Traffic Noise Levels*, depict the existing traffic noise levels in the vicinity of the project site. A 40- to 50-mile per hour (mph) average vehicle speed was assumed for existing conditions based on empirical observations and posted maximum speeds along the adjacent roadways. The ADT estimates were obtained from the project's *Traffic Study*; refer to Appendix A. As shown in Table 6, noise within the area from mobile noise ranges from 60.4 dBA to 68.6 dBA.

Table 6
Existing Traffic Noise Levels

Roadway Segment	Existing Conditions				
	ADT	dBA @ 100 Feet from Roadway Segment	60 CNEL Noise Contour	65 CNEL Noise Contour	70 CNEL Noise Contour
Culver Drive					
Campus Drive to Anteater Dive/Shady Canyon Drive	20,600	68.6	832	263	83
Bonita Canyon Drive					
Shady Canyon Drive to Newport Coast Drive	28,600	69.7	1,154	365	115
West of Newport Coast Drive	24,500	69.1	989	313	99
California Avenue					
East of Anteater Drive	5,200	60.4	122	39	12
Anteater Drive					
North of California Avenue	8,900	62.7	209	66	21
South of California Avenue	6,100	61.1	143	45	14
Note: Distances are measured from the exterior project boundary only and not from individual construction areas within the interior of the project site.					

STATIONARY SOURCES

The primary sources of stationary noise in the project vicinity are those associated with the operations of adjacent residential uses to the north, east, and west, recreational uses to the north, and institutional uses to the south and southwest. The noise associated with these sources may represent a single-event noise occurrence, short-term, or long-term/continuous noise.

5.0 POTENTIAL ACOUSTICAL IMPACTS

CEQA THRESHOLDS

Appendix G of the State *CEQA Guidelines* contains analysis guidelines related to the assessment of noise impacts. These guidelines have been used to develop thresholds of significance for this analysis. As stated in Appendix G, a project would create a significant environmental impact if it would:

- Expose persons to, or generate noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies (refer to Impact Statement NOI-1);

- Expose persons to or generate excessive ground borne vibration or ground borne noise levels (refer to Impact Statement NOI-2);

- Result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project (refer to Impact Statement NOI-1);

- Result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project (refer to Impact Statement NOI-1);

- 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, expose people residing or working in the project area to excessive noise levels (refer to Impact Statement NOI-3); and

- For a project within the vicinity of a private airstrip, expose people residing or working in the project area to excessive noise levels (refer to Impact Statement NOI-3).

Based on these standards and thresholds, the effects of the proposed project have been categorized as either a "less than significant impact" or a "potentially significant impact." Mitigation measures are provided for all potentially significant impacts.

SIGNIFICANCE OF CHANGES IN TRAFFIC NOISE LEVELS

An off-site traffic noise impact typically occurs when there is a discernable increase in traffic and the resulting noise level exceeds an established noise standard. In community noise considerations, changes in noise levels greater than 3 dB are often identified as substantial, while changes less than 1 dB will not be discernible to local residents. In the range of 1 to 3 dB, residents who are very sensitive to noise may perceive a slight change. In laboratory testing situations, humans are able to detect noise level changes of slightly less than 1 dB. However, this is based on a direct, immediate comparison of two sound levels. Community noise exposures occur over a long period of time and changes in noise levels occur over years (rather than the immediate comparison made in a laboratory situation). Therefore, the level at which changes in community noise levels become discernible is likely to be some value greater than 1 dB, and 3 dB is the most commonly accepted discernable difference. A 5 dB change is generally recognized as a clearly discernable difference.

As traffic noise levels at sensitive uses likely approach or exceed the applicable land use compatibility standard (refer to Table 2), a 3 dB increase as a result of the project is used as the increase threshold for the project. Thus, a project would result in a significant noise impact when a permanent increase in ambient noise levels of 3 dB occur upon project implementation and the resulting noise level exceeds the applicable exterior standard at a noise sensitive use.

NOI-1

- ***EXPOSE PERSONS TO, OR GENERATE NOISE LEVELS IN EXCESS OF STANDARDS ESTABLISHED IN THE LOCAL GENERAL PLAN OR NOISE ORDINANCE, OR APPLICABLE STANDARDS OF OTHER AGENCIES?***

- ***A SUBSTANTIAL PERMANENT INCREASE IN AMBIENT NOISE LEVELS IN THE PROJECT VICINITY ABOVE LEVELS EXISTING WITHOUT THE PROJECT?***

- ***A SUBSTANTIAL TEMPORARY OR PERIODIC INCREASE IN AMBIENT NOISE LEVELS IN THE PROJECT VICINITY ABOVE LEVELS EXISTING WITHOUT THE PROJECT?***

Level of Significance Before Mitigation: *Potentially Significant Impact.*

SHORT-TERM CONSTRUCTION

Construction activities would include site preparation, grading, paving, building construction, and architectural coating. Ground-borne noise and other types of construction-related noise impacts would typically occur during excavation activities of the grading phase. This phase of construction has the potential to create the highest levels of noise. Typical noise levels generated by construction equipment are shown in Table 7, *Maximum Noise Levels Generated by Construction Equipment*. It should be noted that the noise levels identified in Table 7 are maximum sound levels (L_{max}), which are the highest individual sound occurring at an individual time period. Operating cycles for these types of construction equipment may involve one or two minutes of full power operation followed by three to four minutes at lower power settings. Other primary sources of acoustical disturbance would be due to random incidents, which would last less than one minute (such as dropping large pieces of equipment or the hydraulic movement of machinery lifts).

Table 7
Maximum Noise Levels Generated by Construction Equipment

Type of Equipment	Acoustical Use Factor[1]	L_{max} at 50 Feet (dBA)
Concrete Saw	20	90
Crane	16	81
Concrete Mixer Truck	40	79
Backhoe	40	78
Dozer	40	82
Excavator	40	81
Forklift	40	78
Paver	50	77
Roller	20	80
Tractor	40	84
Water Truck	40	80
Grader	40	85
General Industrial Equipment	50	85

Note:
1. Acoustical Use Factor (percent): Estimates the fraction of time each piece of construction equipment is operating at full power (i.e., its loudest condition) during a construction operation.

Source: Federal Highway Administration, *Roadway Construction Noise Model (FHWA-HEP-05-054)*, January 2006.

Pursuant to *Municipal Code* Section 6-8-205(A), construction activities may occur between the hours of 7:00 a.m. and 7:00 p.m. on weekdays, and 9:00 a.m. and 6:00 p.m. on Saturdays. No construction activities shall be permitted outside of these hours or on Sundays and federal holidays unless a temporary waiver is granted by the Chief Building Official or his or her authorized representative. These permitted hours of construction are included in the code in recognition that construction activities undertaken during daytime hours are a typical part of living in an urban environment and do not cause a significant disruption. It should be noted that the noise levels depicted in Table 7 are maximum noise levels, which would occur sporadically when construction equipment is operated in proximity to sensitive receptors. With implementation of time limits specified in the City's Noise Ordinance, noise impacts would be reduced to a less than significant level. Additionally, to further reduce the potential for nuisance noise impacts, Mitigation Measure NOI-1 would be implemented to incorporate best management practices during construction and to ensure nuisances do not occur. Implementation of Mitigation Measure NOI-1 would further minimize impacts from construction noise as it requires construction equipment to be equipped with properly operating and maintained mufflers and other state required noise attenuation devices. Thus, with mitigation, a less than significant noise impact would result from construction activities.

LONG-TERM OPERATIONAL IMPACTS

Off-Site Mobile Noise

Existing Plus Project Conditions

Future development generated by the proposed project would result in additional traffic on adjacent roadways, thereby increasing vehicular noise in the vicinity of existing and proposed land uses. Based on the *Traffic Study*, the proposed project would result in approximately 2,860 daily trips. The "Existing Without Project" and "Existing Plus Project" scenarios are compared in Table 8, *Existing Plus Project Traffic Noise Levels*. As depicted in Table 8, under the "Existing Without Project" scenario, noise levels would range from approximately 60.4 dBA to 68.6 dBA, with the highest noise levels occurring along Bonita Canyon Drive (between Shady Canyon Drive and Newport Coast Drive). The "Existing Plus Project" scenario noise levels would range from approximately 61.2 dBA to 69.9 dBA with the highest noise levels also occurring along Bonita Canyon Drive (between Shady Canyon Drive and Newport Coast Drive). The noise levels would result in a maximum increase of 0.8 dBA as a result of the proposed project. This increase would occur along California Avenue (east of Anteater Drive).

Table 8
Existing Plus Project Traffic Noise Levels

Roadway Segment	Existing Without Project					Existing Plus Project					Difference In dBA @ 100 Feet from Roadway
	ADT	dBA @ 100 Feet from Roadway Centerline	Distance from Roadway Centerline to: (Feet)			ADT	dBA @ 100 Feet from Roadway Centerline	Distance from Roadway Centerline to: (Feet)			
			60 CNEL Noise Contour	65 CNEL Noise Contour	70 CNEL Noise Contour			60 CNEL Noise Contour	65 CNEL Noise Contour	70 CNEL Noise Contour	
Culver Drive											
Campus Drive to Anteater Dive/Shady Canyon Drive	20,600	68.6	832	263	83	20,900	68.7	843	267	84	0.1
Bonita Canyon Drive											
Shady Canyon Drive to Newport Coast Drive	28,600	69.7	1,154	365	115	29,600	69.9	1,194	378	119	0.2
West of Newport Coast Drive	24,500	69.1	989	313	99	25,500	69.2	1,028	325	103	0.1
California Avenue											
East of Anteater Drive	5,200	60.4	122	39	12	6,300	61.2	148	47	15	0.8
Anteater Drive											
North of California Avenue	8,900	62.7	209	66	21	9,300	62.9	218	69	22	0.2
South of California Avenue	6,100	61.1	143	45	14	7,500	62.0	176	56	18	0.9

Notes: ADT = average daily traffic; dBA = A-weighted decibels; CNEL = community noise equivalent level
Source: Noise modeling is based on traffic data within the *University Hills PA11 Traffic Study*, prepared by Stantec Consulting Services, Inc. (September 22, 2015).

It is noted that although traffic noise levels would exceed the State of California "normally acceptable" limit of 65 dBA for multi-family residential land uses along the southern portion of site along Bonita Canyon Drive under Existing Plus Project conditions, traffic noise along this roadway exceeds 65 dBA under existing conditions, and the project's contribution to traffic noise levels would not be perceivable (i.e., increases would be less than 3 dB). Therefore, the proposed project would not significantly increase noise levels along the roadway segments analyzed, and a less than significant impact would occur.

Year 2035 With Project Conditions

The "Year 2035 Without Project" and "Year 2035 With Project" scenarios are compared in Table 9, *Year 2035 Project Traffic Noise Levels*. As depicted in Table 9, under the "Year 2035 Without Project" scenario, noise levels would range from approximately 62.3 dBA to 69.7 dBA, with the highest noise levels occurring along Bonita Canyon Drive (between Shady Canyon Drive and Newport Coast Drive). The "Year 2035 With Project" scenario noise levels would range from approximately 63.6 dBA to 70.0 dBA with the highest noise levels also occurring along Bonita Canyon Drive (between Shady Canyon Drive and Newport Coast Drive). The noise levels would result in a maximum increase of 1.3 dBA as a result of the proposed project. This increase in noise would occur along Anteater Drive (South of California Avenue). Since the proposed project would not significantly increase noise levels along the roadway segments analyzed, a less than significant impact would occur.

Table 9
Year 2035 Project Traffic Noise Levels

Roadway Segment	Year 2035 Without Project					Year 2035 With Project					Difference In dBA @ 100 Feet from Roadway
	ADT	dBA @ 100 Feet from Roadway Centerline	Distance from Roadway Centerline to: (Feet)			ADT	dBA @ 100 Feet from Roadway Centerline	Distance from Roadway Centerline to: (Feet)			
			60 CNEL Noise Contour	65 CNEL Noise Contour	70 CNEL Noise Contour			60 CNEL Noise Contour	65 CNEL Noise Contour	70 CNEL Noise Contour	
Culver Drive											
Campus Drive to Anteater Dive/Shady Canyon Drive	24,310	69.4	982	310	98	24,600	69.4	993	314	99	0
Bonita Canyon Drive											
Shady Canyon Drive to Newport Coast Drive	28,290	69.7	1,143	361	114	30,300	70.0	1,222	386	122	0.3
West of Newport Coast Drive	22,410	68.7	904	286	90	23,400	68.9	944	299	94	0.2
California Avenue											
East of Anteater Drive	9,910	63.2	232	73	23	11,000	63.7	258	82	26	0.5
Anteater Drive											
North of California Avenue	13,630	64.5	320	101	32	14,000	64.6	328	104	33	0.1
South of California Avenue	8,140	62.3	191	60	19	11,000	63.6	258	82	26	1.3

Notes: ADT = average daily traffic; dBA = A-weighted decibels; CNEL = community noise equivalent level
Source: Noise modeling is based on traffic data within the *University Hills PA11 Traffic Study*, prepared by Stantec Consulting Services, Inc. (September 22, 2015).

Cumulative Mobile Source Impacts

A project's contribution to a cumulative traffic noise increase would be considered significant when the combined effect exceeds perception level (i.e., auditory level increase) threshold. The combined effect compares the "cumulative with project" condition to "existing" conditions. This comparison accounts for the traffic noise increase generated by a project combined with the traffic noise increase generated by projects in the cumulative project list. The following criteria have been utilized to evaluate the combined effect of the cumulative noise increase.

Combined Effect. The cumulative with project noise level ("Year 2035 With Project") would cause a significant cumulative impact if a 3.0 dB increase over existing conditions occurs and the resulting noise level exceeds the applicable exterior standard at a sensitive use.

Although there may be a significant noise increase due to the proposed project in combination with other related projects (combined effects), it must also be demonstrated that the project has an incremental effect. In other words, a significant portion of the noise increase must be due to the proposed project. The following criteria have been utilized to evaluate the incremental effect of the cumulative noise increase.

Incremental Effects. The "Year 2035 With Project" causes a 1.0 dBA increase in noise over the "Future Without Project" noise level.

A significant impact would result only if both the combined and incremental effects criteria have been exceeded. Noise by definition is a localized phenomenon, and reduces as distance from the source increases. Consequently, only the proposed project and growth due to occur in the project site's general vicinity would contribute to cumulative noise impacts. Table 10, Cumulative Noise Scenario, lists the traffic noise effects along roadway segments in the project vicinity for "Existing," "Year 2035 Without Project," and "Year 2035 With Project," conditions, including incremental and net cumulative impacts.

Table 10
Cumulative Noise Scenario

Roadway Segment	Existing	Future Without Project	Future With Project	Combined Effects	Incremental Effects	Cumulatively Significant Impact?
	dBA @ 100 Feet from Roadway Centerline	dBA @ 100 Feet from Roadway Centerline	dBA @ 100 Feet from Roadway Centerline	Difference In dBA Between Existing and Future With Project	Difference In dBA Between Future Without Project and Future With Project	
Culver Drive						
Campus Drive to Anteater Dive/Shady Canyon Drive	68.6	69.4	69.4	0.8	0	No
Bonita Canyon Drive						
Shady Canyon Drive to Newport Coast Drive	69.7	69.7	70.0	0.3	0.3	No
West of Newport Coast Drive	69.1	68.7	68.9	-0.2	0.2	No
California Avenue						
East of Anteater Drive	60.4	63.2	63.7	3.3	0.5	No
Anteater Drive						
North of California Avenue	62.7	64.5	64.6	1.9	0.1	No
South of California Avenue	61.1	62.3	63.6	2.5	1.3	No

Notes: ADT = average daily traffic; dBA = A-weighted decibels; CNEL = community noise equivalent level
Source: Noise modeling is based on traffic data within the *University Hills PA11 Traffic Study, prepared by Stantec Consulting Services, Inc. (September 22, 2015).*

As indicated in Table 10, the *Combined Effects* are exceeded along California Avenue, east of Anteater Drive, and the *Incremental Effects* are exceeded along Anteater Drive, south of California Avenue. However, the *Combined Effects* and *Incremental Effects* are not jointly exceeded along any roadway segments. As such, none of the roadway segments would exceed both the *Incremental Effects* and *Combined Effects* criteria; thus, none of the roadway segments would be significantly impacted. Therefore, the proposed project, in combination with cumulative background traffic noise levels, would result in less than significant impacts.

On-Site Mobile Noise

Residential Uses

The proposed project includes the construction of 160 unit single-family, and 140 multi-family apartment units for UCI faculty and staff. Based on the modeled noise levels in Table 9, the loudest exterior noise levels would be approximately 70.0 dBA at 100 feet from the centerline of Bonita Canyon Drive (from Shady Canyon Drive to Newport Coast Drive), which would exceed the state's noise standards of 60 dBA CNEL (single-family campus housing), and 65 dBA CNEL (multi-family campus housing, dormitories, lodging). It was previously determined in the UCI *2007 Long Range Development Flan Final Environmental Impact Report* (2007 LRPD EIR, prepared by ATKINS, November 2007) that future residents at the project site would be exposed to noise levels above the state noise standards at buildout of the LRDP. Thus, the project would be required to utilize window treatments (minimum Sound Transmission Class rating of 32) to attenuate interior traffic noise levels to below 45 dBA CNEL in compliance with LRDP EIR Mitigation Measure Noi-1A; refer to Mitigation Measure NOI-2. It is noted that the closest residential dwelling units would be located approximately 150 feet to the north of the Bonita Canyon Drive roadway centerline. In addition, the residential units to the north of Bonita Canyon Drive would be elevated above Bonita Canyon Drive, and buffered by a 50-foot landscaped buffer and perimeter wall to further attenuate traffic roadway noise. These project features would further attenuate traffic noise along Bonita Canyon Drive.

Open Space and Park Areas

The proposed project would include four on-site open space/park areas for its residents (i.e., two in the northern portion near the Anteater Drive/California Avenue intersection, and two in the southern portion of the site near the Bonita Canyon Drive/Anteater drive intersection). The closest open space/park area would be located approximately 80 feet to the north of the Bonita Canyon Drive centerline, would be elevated above Bonita Canyon Drive, and would be buffered by a 50-foot landscaped area and perimeter wall to attenuate traffic roadway noise. The remaining three open space/park areas would be located further from the Bonita Canyon Drive centerline (beyond approximately 300 feet), positioned behind/surrounded by the proposed on-site residential buildings, and would be guarded by a perimeter wall that would attenuate traffic noise.

As discussed above, compliance with Mitigation Measure NOI-2 would result in a less than significant impact with regard to on-site traffic noise levels at residential receptors. Noise levels at exterior open space/park areas would be sufficiently blocked by the proposed residential buildings, and attenuated by project features. As such, traffic noise would not create an impact at the project site. A less than significant impact would occur in this regard.

STATIONARY NOISE IMPACTS

Mechanical Equipment

The primary stationary noise source associated with the proposed residential development would be heating, ventilation, and air conditioning (HVAC) units. HVAC units would be positioned on the property of each single-family, and multiple-family residential unit. HVAC systems typically result in noise levels that average between 40 and 50 dBA Leq at 50 feet from the equipment. The closest the HVAC units would be positioned to an adjoining residence would be approximately 25 feet. At this distance, noise levels form HVAC units would be approximately 56 dBA, which is below the State of California "normally acceptable" limit of 65 dBA for multi-family residential land uses, and 60 dBA for single-family residential uses. Therefore, noise from the HVAC units would not be perceptible from adjoining residences on the project site. Impacts from mechanical equipment would be less than significant.

Mitigation Measures:

NOI-1 The Project Applicant and/or Contractor shall implement the following noise-attenuating measures during construction of the proposed project:

- Construction contracts specify that all construction equipment, fixed or mobile, shall be equipped with properly operating and maintained mufflers and other state required noise attenuation devices.

- Property owners and occupants located within 200 feet of the project boundary shall be sent a notice, at least 15 days prior to commencement of construction of each phase, regarding the construction schedule of the proposed project. A sign, legible at a distance of 50 feet shall also be posted at the project construction site. All notices and signs shall indicate the dates and duration of construction activities, as well as provide a contact name and a telephone number where residents can inquire about the construction process and register complaints.

- The Contractor shall provide evidence that a construction staff member will be designated as a Noise Disturbance Coordinator and will be present on-site during construction activities. The Noise Disturbance Coordinator shall be responsible for responding to any local complaints about construction noise. When a complaint is received, the Noise Disturbance Coordinator shall implement reasonable measures to resolve the complaint, as deemed acceptable by the

Community Development Director (or designee). All notices that are sent to residential units immediately surrounding the construction site and all signs posted at the construction site shall include the contact name and the telephone number for the Noise Disturbance Coordinator.

- Prior to issuance of any Grading or Building Permit, the Project Applicant shall demonstrate to the satisfaction of the Community Development Director (or designee) that construction noise reduction methods shall be used where feasible. These reduction methods include shutting off idling equipment, installing temporary acoustic barriers around stationary construction noise sources, maximizing the distance between construction equipment staging areas and occupied residential areas, and electric air compressors and similar power tools.

- Construction haul routes shall be designed to avoid noise sensitive uses (e.g., residences, convalescent homes, etc.), to the extent feasible.

- During construction, stationary construction equipment shall be placed such that emitted noise is directed away from sensitive noise receivers.

- Construction activities shall not take place outside of the allowable hours specified by the City's *Municipal Code* Section 6-8-205(A) (7:00 a.m. and 7:00 p.m. on weekdays, and 9:00 a.m. and 6:00 p.m. on Saturdays; construction activities are not permitted on Sundays or legal holidays).

(Mitigation Measure NOI-1 correlates with Mitigation Measure Noi-2A in the 2007 LRDP EIR. This mitigation measure includes updates specific to the proposed project and to reflect the latest practices and recommendations).

NOI-2 During project plan review and prior to construction, UCI shall ensure that the project design includes the following project design features:

i. Specific window treatments, such as dual glazing <u>(a minimum Sound Transmission Class rating of 32) and mechanical ventilation shall be utilized at all residential units fronting Bonita Canyon Drive</u>.

(Mitigation Measure NOI-2 correlates with Mitigation Measure Noi-1A in the 2007 LRDP EIR. This mitigation measure includes updates specific to the proposed project and to reflect the latest practices and recommendations).

Level of Significance After Mitigation: *Less Than Significant Impact.*

NOI-2 EXPOSURE OF PERSONS TO OR GENERATION OF EXCESSIVE GROUNDBORNE VIBRATION OR GROUNDBORNE NOISE LEVELS?

Level of Significance Before Mitigation: *Less Than Significant Impact.*

SHORT-TERM CONSTRUCTION

Project construction can generate varying degrees of groundborne vibration, depending on the construction procedure and the construction equipment used. Operation of construction equipment generates vibrations that spread through the ground and diminish in amplitude with distance from the source. The effect on buildings located in the vicinity of the construction site often varies depending on soil type, ground strata, and construction characteristics of the receiver building(s). The results from vibration can range from no perceptible effects at the lowest vibration levels, to low rumbling sounds and perceptible vibration at moderate levels, to slight damage at the highest levels. Groundborne vibrations from construction activities rarely reach levels that damage structures.

The Federal Transit Administration (FTA) has published standard vibration velocities for construction equipment operations. In general, the FTA architectural damage criterion for continuous vibrations (i.e., 0.2 inch/second) appears to be conservative. The types of construction vibration impacts include human annoyance and building damage. Human annoyance occurs when construction vibration rises significantly above the threshold of human perception for extended periods of time. Building damage can be cosmetic or structural. Ordinary buildings that are not particularly fragile would not experience any cosmetic damage (e.g., plaster cracks) at distances beyond 30 feet. This distance can vary substantially depending on the soil composition and underground geological layer between vibration source and receiver. In addition, not all buildings respond similarly to vibration generated by construction equipment. For example, for a building that is constructed with reinforced concrete with no plaster, the FTA guidelines show that a vibration level of up to 0.20 inch per second (in/sec) is considered safe and would not result in any construction vibration damage. The vibration produced by construction equipment, is illustrated in Table 11, *Typical Vibration Levels for Construction Equipment*.

Groundborne vibration decreases rapidly with distance. As indicated in Table 11, based on the Federal Transit Administration (FTA) data, vibration velocities from typical heavy construction equipment operation that would be used during project construction range from 0.003 to 0.089 in/sec peak particle velocity (PPV) at 25 feet from the source of activity. As such, vibration at the nearest sensitive receptor (approximately 25 feet) during construction activities would be a maximum of approximately 0.089 PPV, which would be below the FTA's 0.20 PPV threshold. Therefore, vibration impacts associated with the proposed project would be less than significant.

Table 11
Typical Vibration Levels for Construction Equipment

Equipment	Approximate peak particle velocity at 15 feet (inches/second) [1]	Approximate peak particle velocity at 25 feet (inches/second) [2]	Approximate peak particle velocity at 45 feet (inches/second) [2]
Large bulldozer	0.191	0.089	0.037
Loaded trucks	0.164	0.076	0.031
Small bulldozer	0.006	0.003	0.001

Notes:
1 – Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Guidelines*, May 2006. Table 12-2.
2 – Calculated using the following formula:

$$PPV_{equip} = PPV_{ref} \times (25/D)^{1.5}$$

where: PPV (equip) = the peak particle velocity in in/sec of the equipment adjusted for the distance
PPV (ref) = the reference vibration level in in/sec from Table 12-2 of the FTA *Transit Noise and Vibration Impact Assessment Guidelines*
D = the distance from the equipment to the receiver

LONG-TERM OPERATIONAL IMPACTS

The project proposes 160 single-family and 140 multi-family residential units that would not generate ground-borne vibration that could be felt at surrounding uses. The proposed project would not involve railroads or substantial heavy truck operations, and therefore would not result in vibration impacts at surrounding uses. No impact would occur in this regard.

***Mitigation Measures*:** No mitigation measures are required.

Level of Significance After Mitigation: *No Impact.*

NOI-3

- ***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, EXPOSE PEOPLE RESIDING OR WORKING IN THE PROJECT AREA TO EXCESSIVE NOISE LEVELS?***

- ***FOR A PROJECT WITHIN THE VICINITY OF A PRIVATE AIRSTRIP, EXPOSE PEOPLE RESIDING OR WORKING IN THE PROJECT AREA TO EXCESSIVE NOISE LEVELS?***

Level of Significance Before Mitigation: *Less Than Significant.*

LONG-TERM OPERATIONAL IMPACTS

According to the *Land Use Plan for John Wayne Airport*, the project is not located within any impact zone(s), and is outside the 60 dBA CNEL contour.[1] As such, the project would not be exposed to noise levels that would exceed the State of California "normally acceptable" limit of 65 dBA for multi-family residential land uses. A less than significant impact would occur in this regard.

***Mitigation Measures*:** No mitigation measures are required.

Level of Significance After Mitigation: *Less Than Significant.*

1 Airport Land Use Commission, *Land Use Plan for John Wayne Airport*, April 17, 2008.

6.0 REFERENCES

6.1 LIST OF PREPARERS

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6.2 DOCUMENTS

1. ATKINS, *University of California, Irvine, 2007 Long Range Development Plan Environmental Impact Report*, November 2007.

2. California Department of Transportation, *Technical Noise Supplement to the Traffic Noise Analysis Protocol,* September 2013.

3. City of Irvine, *City of Irvine General Plan*, Supp. No. 9, July 2015.

4. City of Irvine, *Municipal Code*, codified through Ordinance No. 15-02, adopted April 28, 2015.

5. City of Irvine, *CEQA Manual*, May 2012.

6. Federal Highway Administration, *Effective Noise Control During Nighttime Construction*, 2006, http://ops.fhwa.dot.gov/wz/workshops/accessible/Schexnayder _paper.htm

7. Federal Highway Administration, *Roadway Construction Noise Model (FHWA-HEP-05-054),* January 2006.

8. Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Guidelines*, May 2006.

9. Harris, Cyril, *Handbook of Noise Control,* 1979.

10. Office of Planning and Research, California, *General Plan Guidelines*, October 2003.

11. Stantec Consulting Services, Inc., *University Hills PA11 Traffic Study*, September 22, 2015.

12. State of California, Governor's Office of Planning and Research, *General Plan Guidelines,* October 2003.

13. University of California, Irvine, *2007 Long Range Development Plan*, November 2007.

14. U.S. Department of Housing and Urban Development, *The Noise Guidebook*, March 2009.

15. U.S. Environmental Protection Agency, *Noise Effects Handbook – A Desk Reference to Health and Welfare Effects of Noise*, October 1979 (revised July 1981).

16. U.S. Environmental Protection Agency, *Protective Noise Levels (EPA 550/9-79-100)*, November 1979.

6.3 SOFTWARE/WEBSITES

Federal High Administration, *Highway Traffic Noise Prediction Model (FHWA-RD-77-108)*.

Google Earth, 2016.

APPENDIX A: NOISE MEASUREMENT AND MODELING DATA

NOISE MEASUREMENT DATA

Site Number: 1			
Recorded By: Ryan Chiene			
Job Number: 150070			
Date: 2/2/16			
Time: 10:17 AM			
Location: Easternmost portion of Pauling Court, near western boundary of project site.			
Source of Peak Noise: Traffic on Culver Drive, people talking, construction equipment, plane overhead.			
Noise Data			
Leq (dB)	Lmin (dB)	Lmax (dB)	Peak (dB)
62.4	47.5	87.9	90.1

Equipment						
Category	Type	Vendor	Model	Serial No.	Cert. Date	Note
Sound	Sound Level Meter	Brüel & Kjær	2250	2548189	11/18/2014	
	Microphone	Brüel & Kjær	4189	2543364	11/18/2014	
	Preamp	Brüel & Kjær	ZC 0032	4265	11/18/2014	
	Calibrator	Brüel & Kjær	4231	2545667	11/18/2014	

Weather Data			
Est.	Duration: 10 minutes		Sky:
	Note: dBA Offset = 0.04		Sensor Height (ft): 5 ft
	Wind Ave Speed (mph / m/s)	Temperature (degrees Fahrenheit)	Barometer Pressure (inches)
	0-2	57	30.18

Photo of Measurement Location

2250

Instrument:		2250
Application:		BZ7225 Version 4.4
Start Time:		02/02/2016 10:17:08
End Time:		02/02/2016 10:27:08
Elapsed Time:		00:10:00
Bandwidth:		1/3-octave
Max Input Level:		138.71

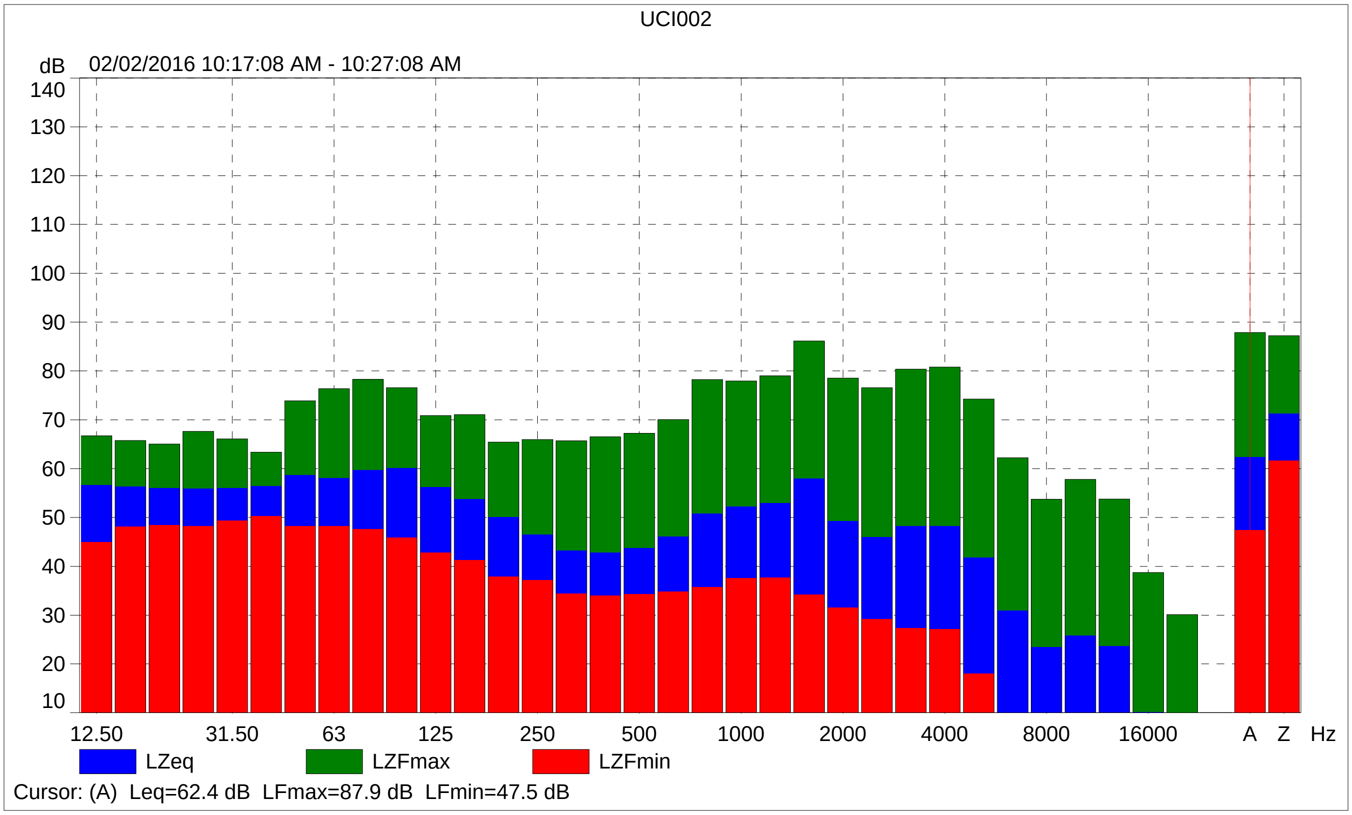
	Time	Frequency
Broadband (excl. Peak):	FSI	AZ
Broadband Peak:		C
Spectrum:	FS	Z

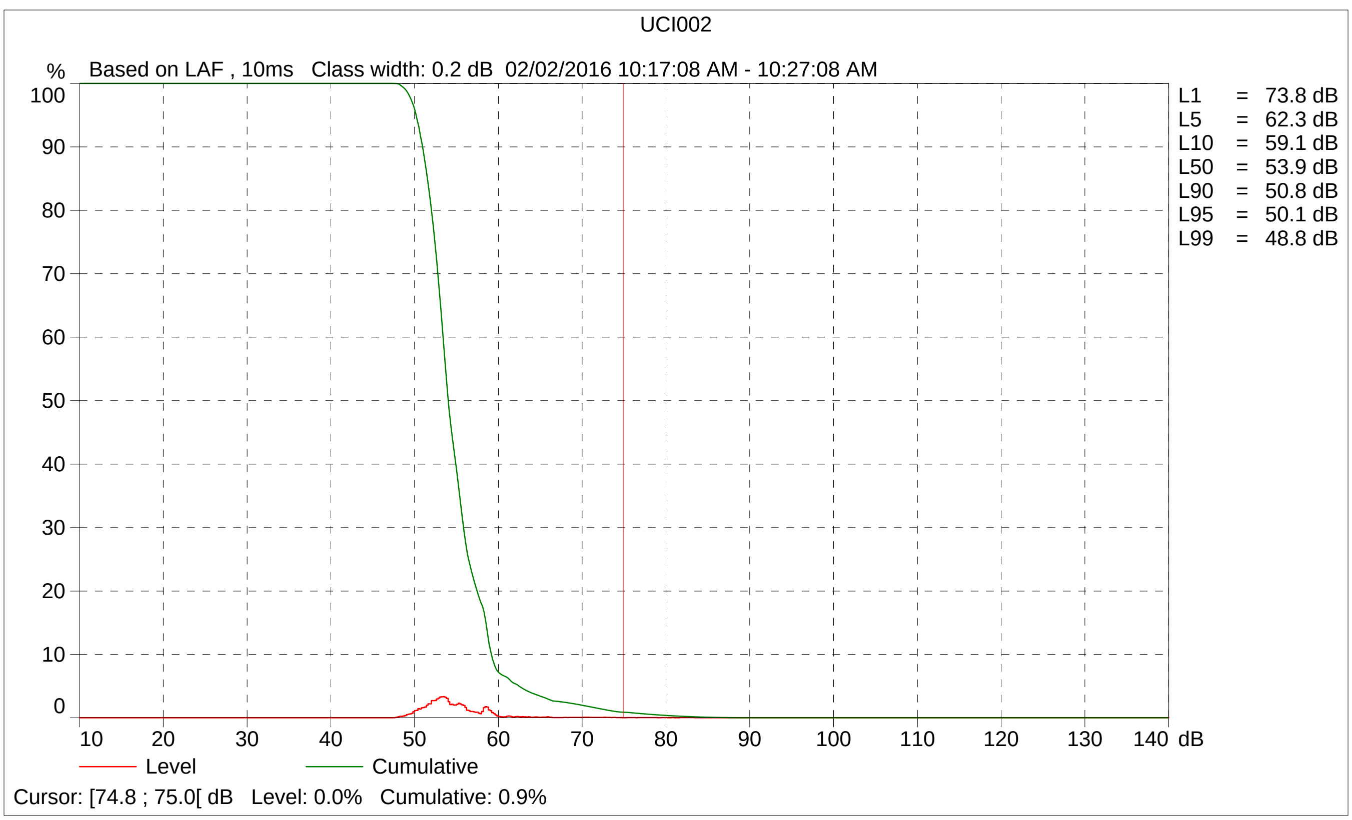
Instrument Serial Number:		2548189
Microphone Serial Number:		2543364
Input:		Top Socket
Windscreen Correction:		None
Sound Field Correction:		Free-field

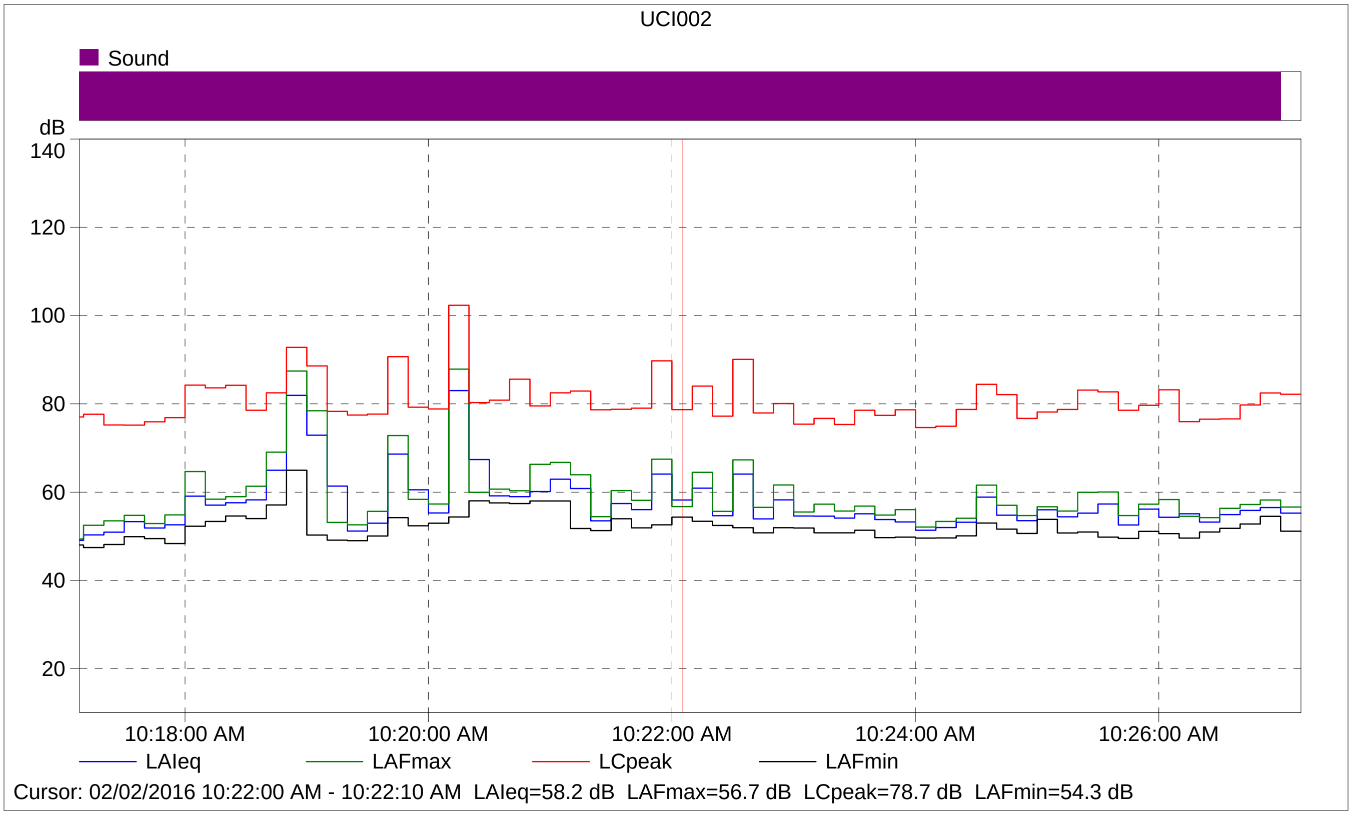
Calibration Time:		02/02/2016 09:32:14
Calibration Type:		External reference
Sensitivity:		64.6653547883034 mV/Pa

UCI002

	Start time	End time	Elapsed time	Overload [%]	LAeq [dB]	LAFmax [dB]	LAFmin [dB]
Value				0.00	62.4	87.9	47.5
Time	10:17:08 AM	10:27:08 AM	0:10:00				
Date	02/02/2016	02/02/2016					


UCI002
dB 02/02/2016 10:17:08 AM - 10:27:08 AM
140
130
120
110
100
90
80
70
60
50
40
30
20
10
12.50
31.50
63
125
250
500
1000
2000
4000
8000
16000
A
Z
Hz
LZeq
LZFmax
LZFmin
Cursor: (A) Leq=62.4 dB LFmax=87.9 dB LFmin=47.5 dB

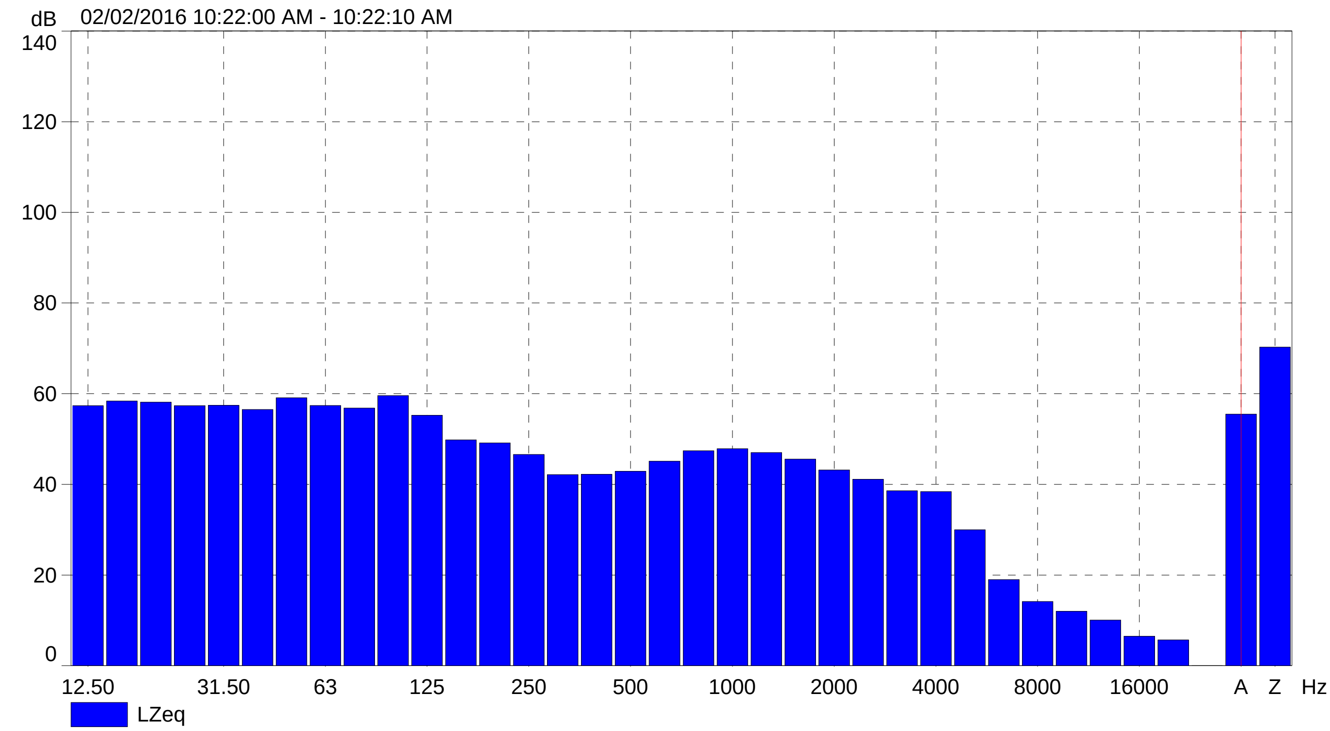

UCI002
% Based on LAF , 10ms Class width: 0.2 dB 02/02/2016 10:17:08 AM - 10:27:08 AM
100
90
80
70
60
50
40
30
20
10
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140 dB
L1 = 73.8 dB
L5 = 62.3 dB
L10 = 59.1 dB
L50 = 53.9 dB
L90 = 50.8 dB
L95 = 50.1 dB
L99 = 48.8 dB
Level
Cumulative
Cursor: [74.8 ; 75.0[dB Level: 0.0% Cumulative: 0.9%



UCI002

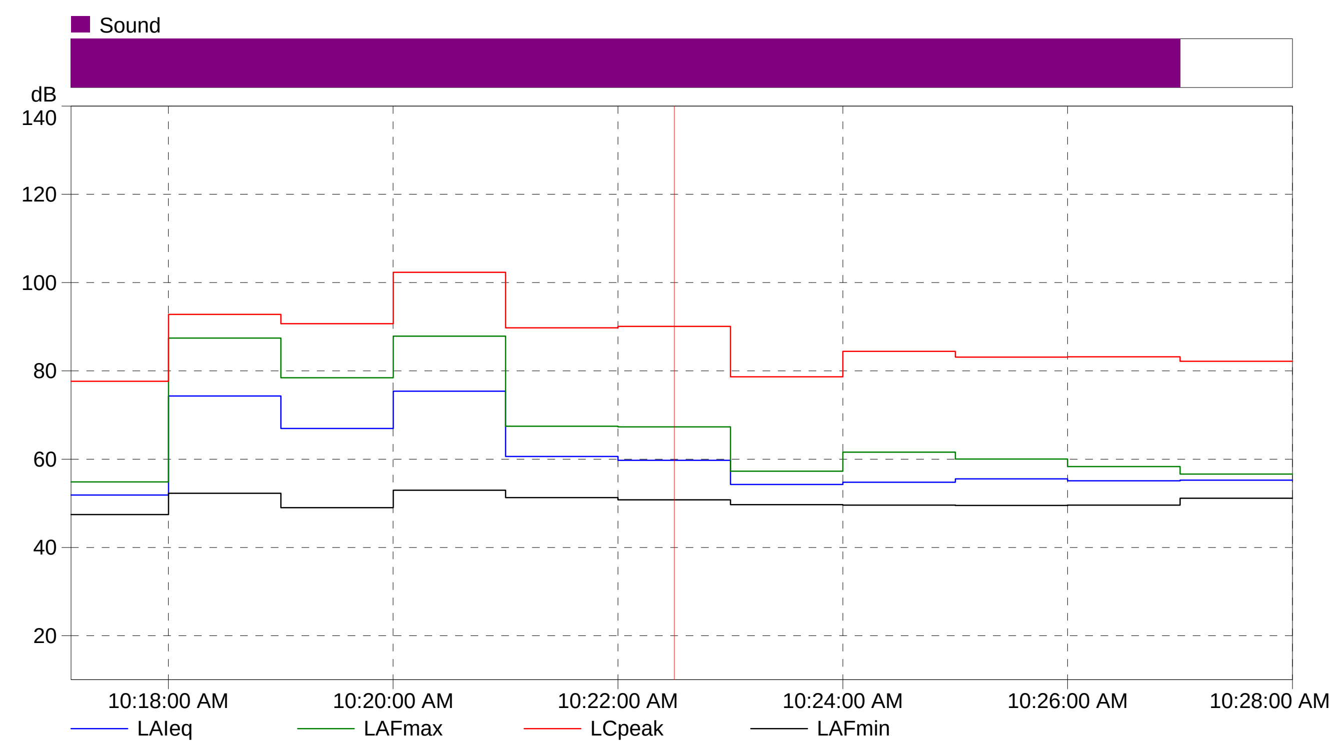
	Start time	Elapsed time	LAIeq [dB]	LAFmax [dB]	LAFmin [dB]
Value			58.2	56.7	54.3
Time	10:22:00 AM	0:00:10			
Date	02/02/2016				

UCI002



Cursor: (A) Leq=55.5 dB

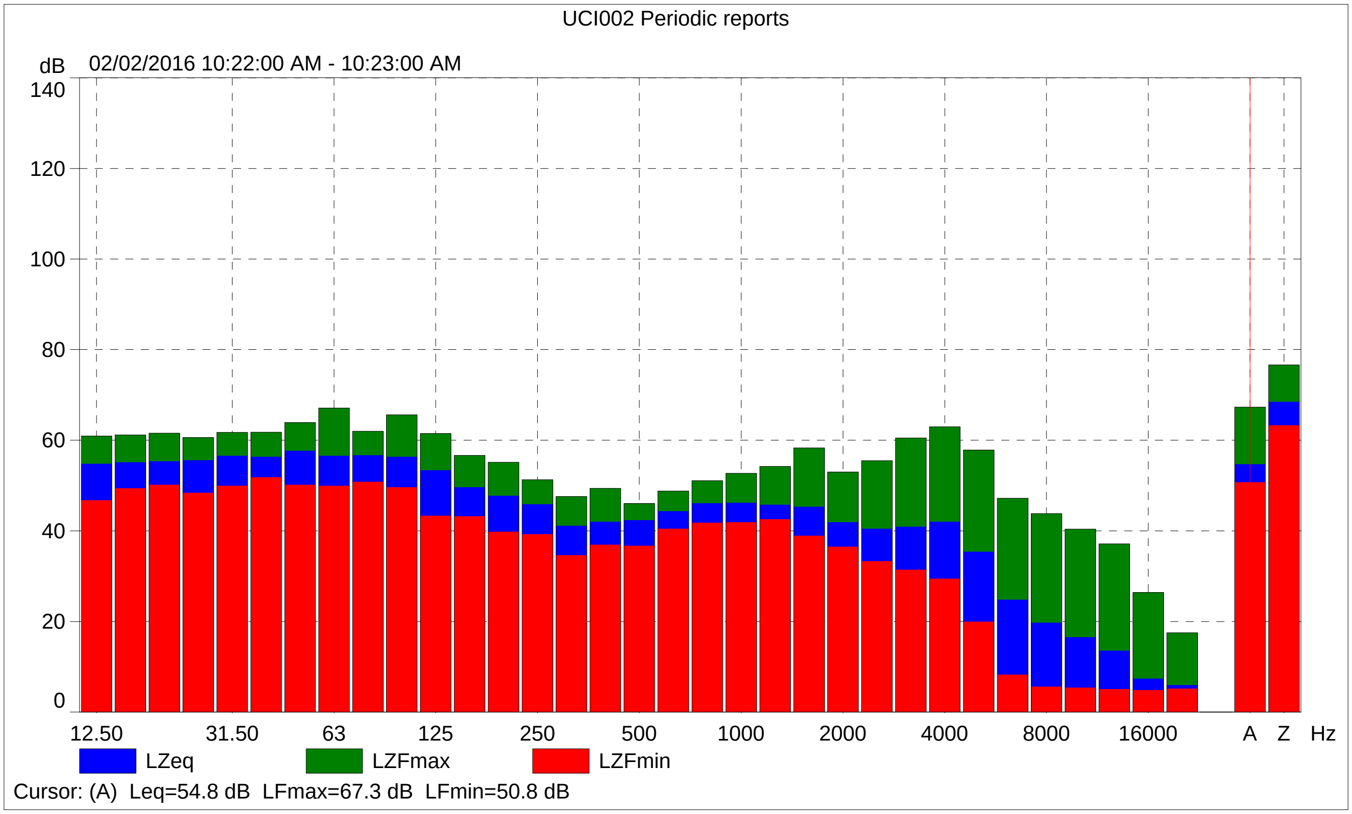
UCI002 Periodic reports



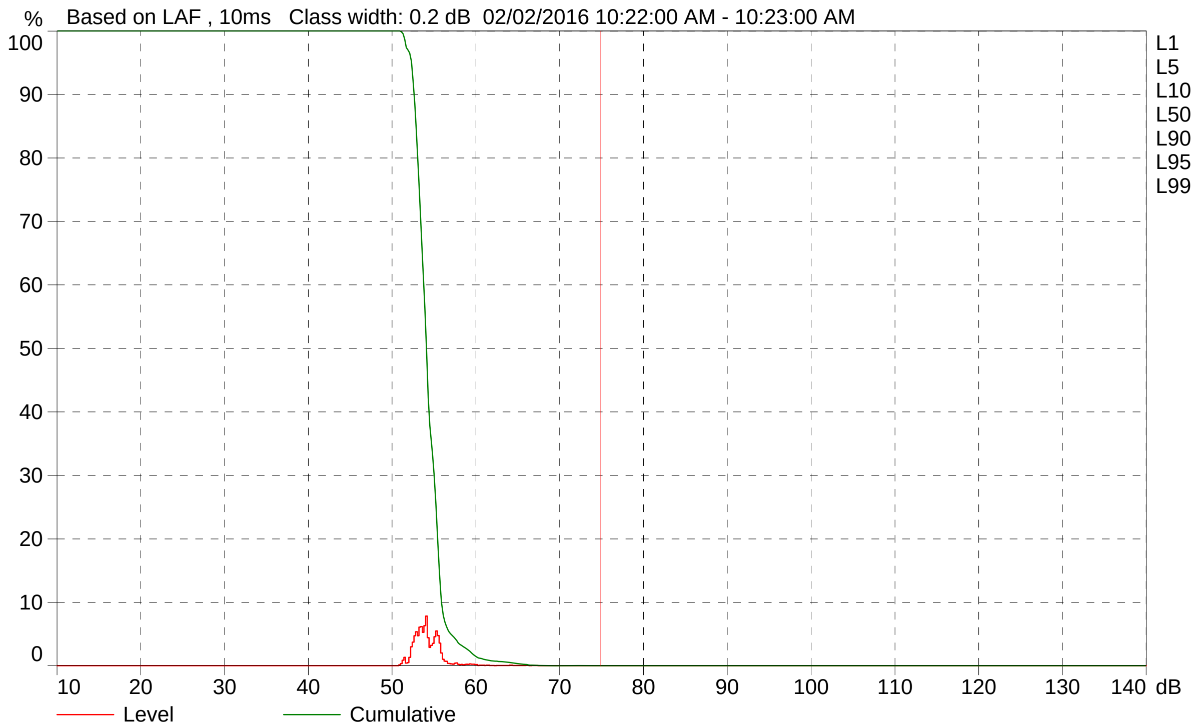
Cursor: 02/02/2016 10:22:00 AM - 10:23:00 AM LAIeq=59.7 dB LAFmax=67.3 dB LCpeak=90.1 dB LAFmin=50.8 dB

UCI002 Periodic reports

	Start time	Elapsed time	Overload [%]	LAIeq [dB]	LAFmax [dB]	LAFmin [dB]
Value			0.00	59.7	67.3	50.8
Time	10:22:00 AM	0:01:00				
Date	02/02/2016					



UCI002 Periodic reports



L1 = 60.8 dB
L5 = 56.9 dB
L10 = 55.8 dB
L50 = 54.0 dB
L90 = 52.5 dB
L95 = 52.2 dB
L99 = 51.3 dB

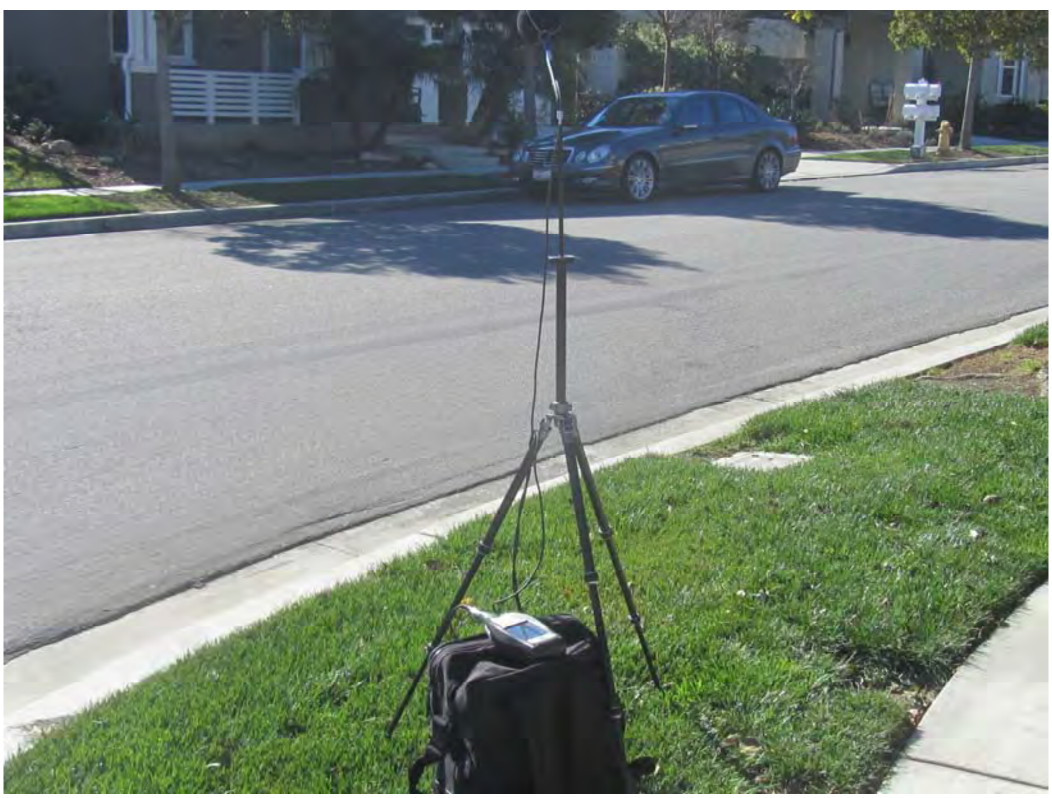
Cursor: [74.8 ; 75.0[dB Level: 0.0% Cumulative: 0.0%

Site Number: 2			
Recorded By: Ryan Chiene			
Job Number: 150070			
Date: 2/2/16			
Time: 10:34 AM			
Location: Near intersection of Fuertes/Murasaki Street, in residential neighborhood to the north of the project site.			
Source of Peak Noise: Traffic on California Avenue, plane flying overhead, birds chirping, wind.			
Noise Data			
Leq (dB)	Lmin (dB)	Lmax (dB)	Peak (dB)
46.2	35.8	77.4	78.3

Equipment						
Category	Type	Vendor	Model	Serial No.	Cert. Date	Note
Sound	Sound Level Meter	Brüel & Kjær	2250	2548189	11/18/2014	
	Microphone	Brüel & Kjær	4189	2543364	11/18/2014	
	Preamp	Brüel & Kjær	ZC 0032	4265	11/18/2014	
	Calibrator	Brüel & Kjær	4231	2545667	11/18/2014	

Weather Data			
Est.	Duration: 10 minutes		Sky: Sunny
	Note: dBA Offset = 0.04		Sensor Height (ft): 5 ft
	Wind Ave Speed (mph / m/s)	Temperature (degrees Fahrenheit)	Barometer Pressure (inches)
	2-3	55	30.18

Photo of Measurement Location



2250

Instrument:		2250
Application:		BZ7225 Version 4.4
Start Time:		02/02/2016 10:34:10
End Time:		02/02/2016 10:44:10
Elapsed Time:		00:10:00
Bandwidth:		1/3-octave
Max Input Level:		138.71

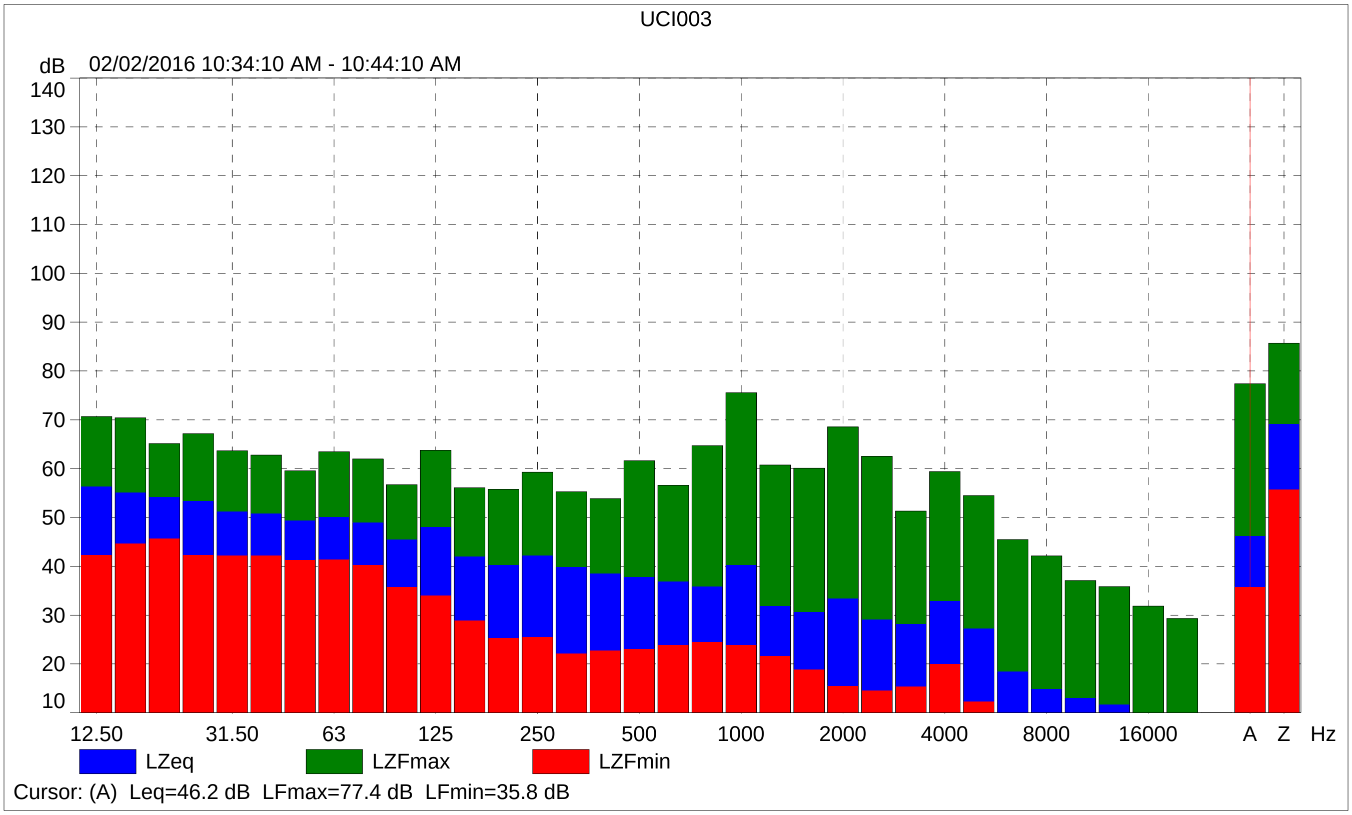
	Time	Frequency
Broadband (excl. Peak):	FSI	AZ
Broadband Peak:		C
Spectrum:	FS	Z

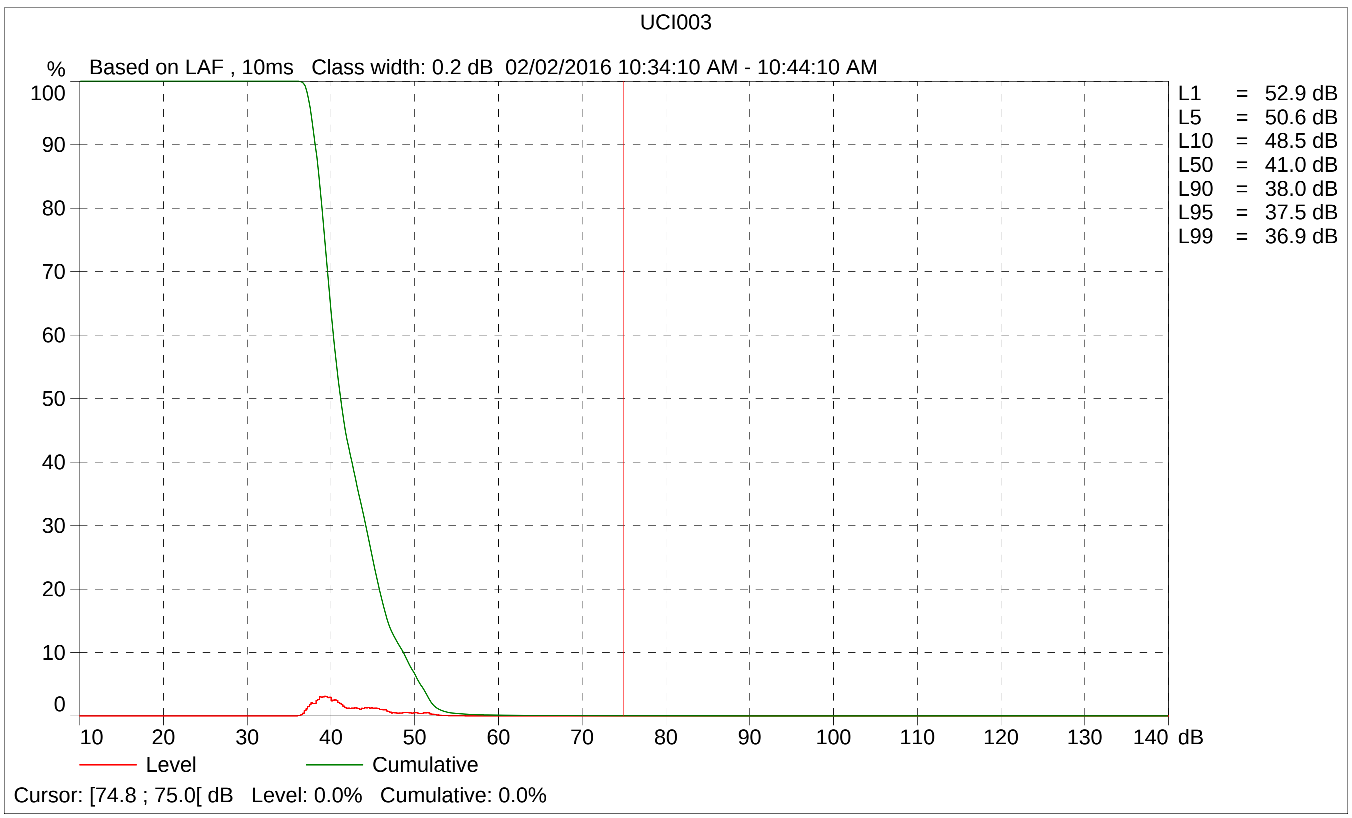
Instrument Serial Number:		2548189
Microphone Serial Number:		2543364
Input:		Top Socket
Windscreen Correction:		None
Sound Field Correction:		Free-field

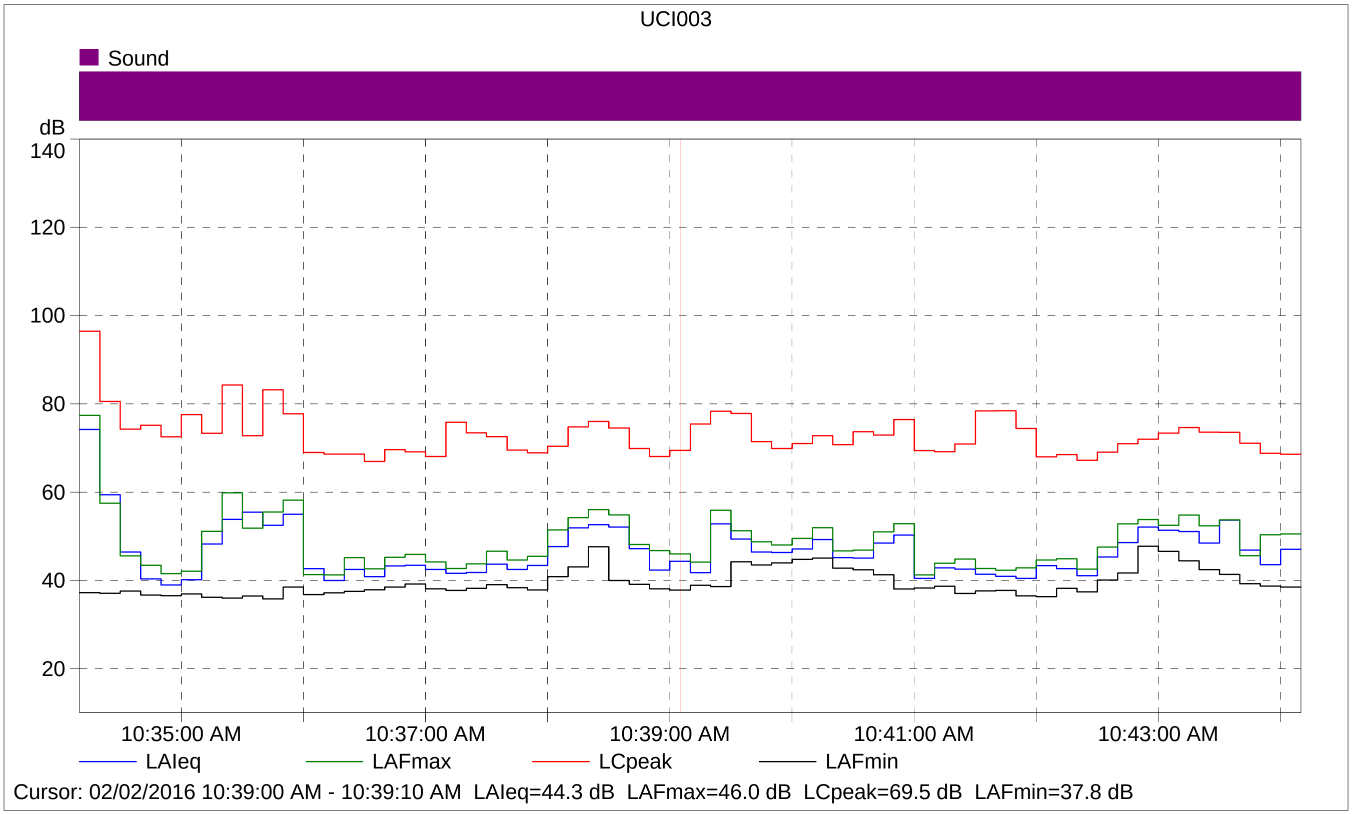
Calibration Time:		02/02/2016 09:32:14
Calibration Type:		External reference
Sensitivity:		64.6653547883034 mV/Pa

UCI003

	Start time	End time	Elapsed time	Overload [%]	LAeq [dB]	LAFmax [dB]	LAFmin [dB]
Value				0.00	46.2	77.4	35.8
Time	10:34:10 AM	10:44:10 AM	0:10:00				
Date	02/02/2016	02/02/2016					

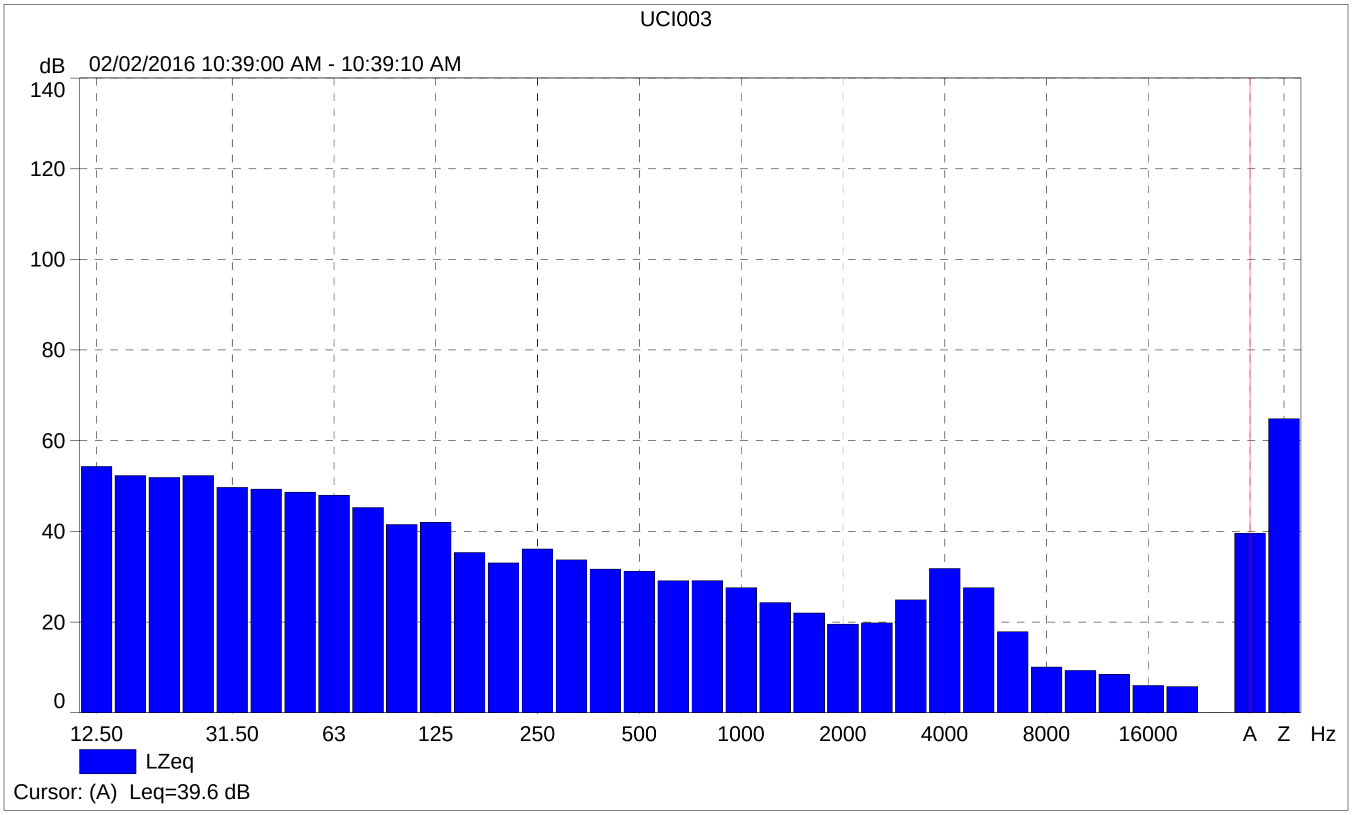

UCI003
dB
02/02/2016 10:34:10 AM - 10:44:10 AM
140
130
120
110
100
90
80
70
60
50
40
30
20
10
12.50
31.50
63
125
250
500
1000
2000
4000
8000
16000
A
Z
Hz
LZeq
LZFmax
LZFmin
Cursor: (A) Leq=46.2 dB LFmax=77.4 dB LFmin=35.8 dB

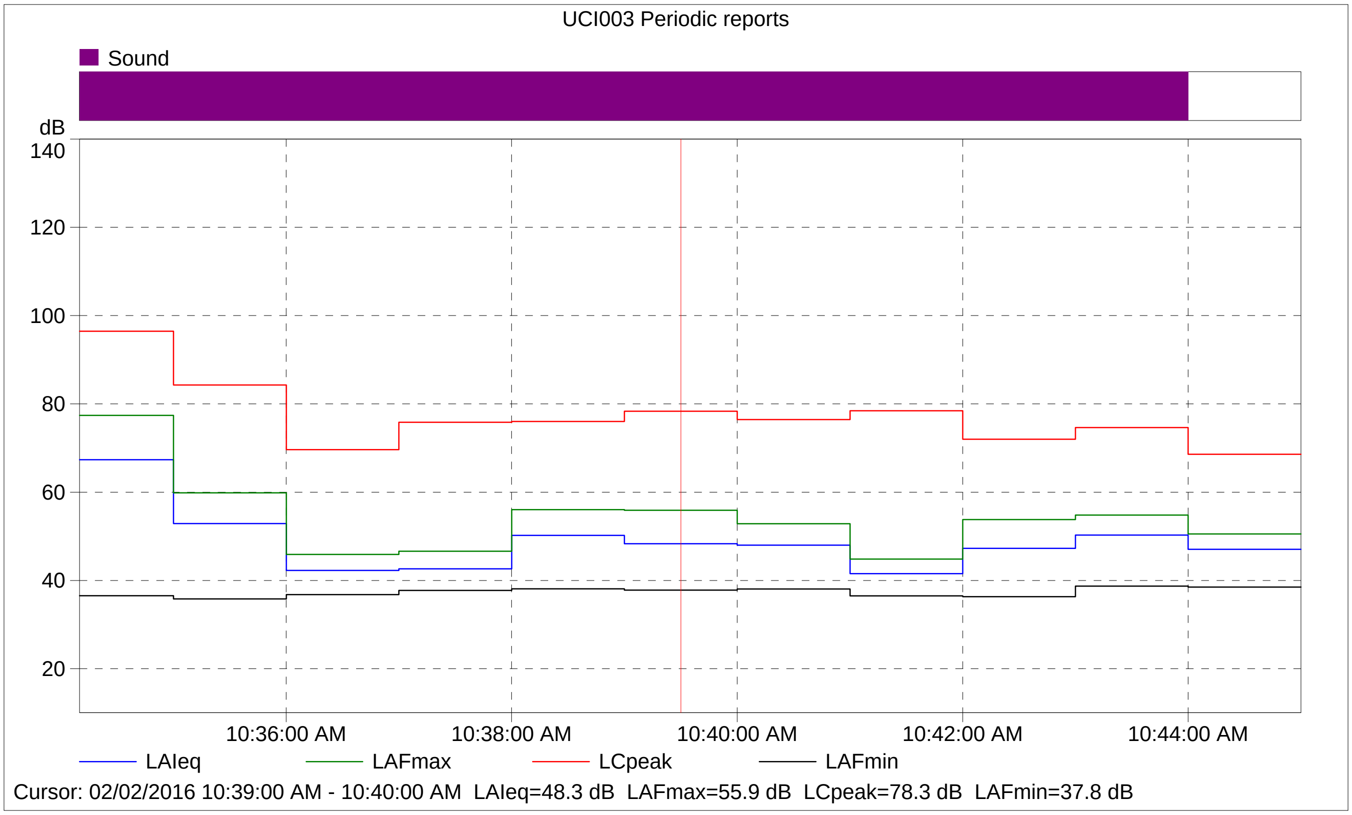

UCI003
%
Based on LAF , 10ms Class width: 0.2 dB 02/02/2016 10:34:10 AM - 10:44:10 AM
100
90
80
70
60
50
40
30
20
10
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140 dB
L1 = 52.9 dB
L5 = 50.6 dB
L10 = 48.5 dB
L50 = 41.0 dB
L90 = 38.0 dB
L95 = 37.5 dB
L99 = 36.9 dB
Level
Cumulative
Cursor: [74.8 ; 75.0[dB Level: 0.0% Cumulative: 0.0%



UCI003

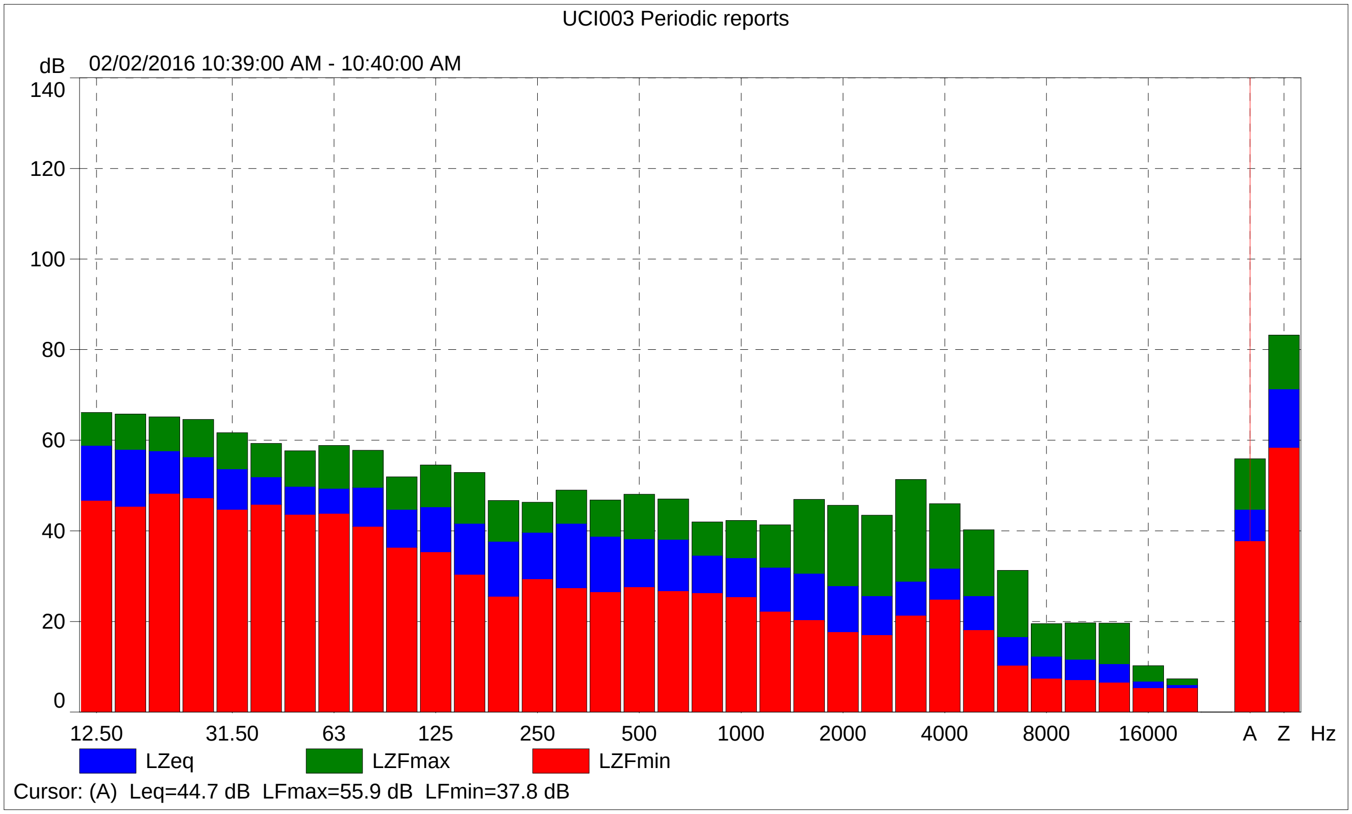
	Start time	Elapsed time	LAIeq [dB]	LAFmax [dB]	LAFmin [dB]
Value			44.3	46.0	37.8
Time	10:39:00 AM	0:00:10			
Date	02/02/2016				

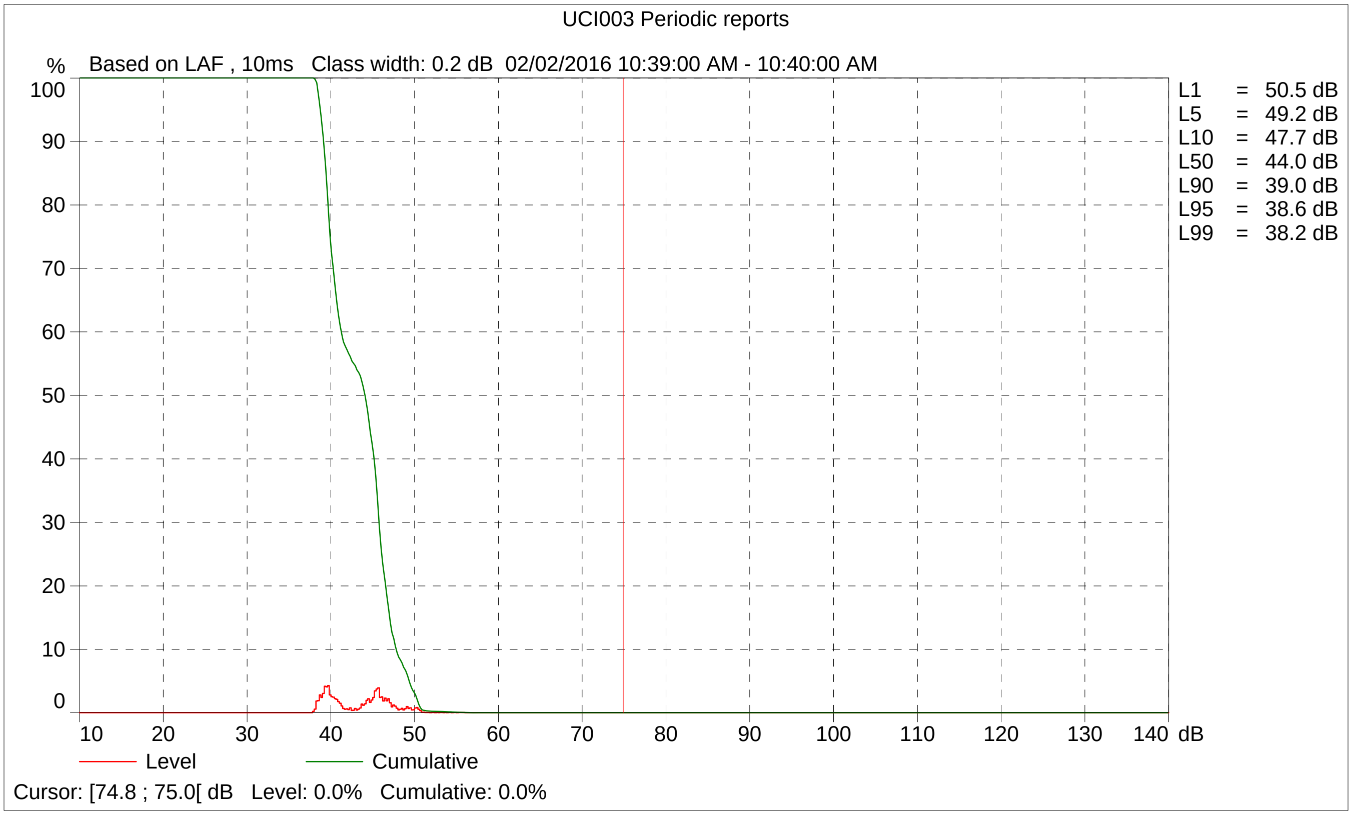

UCI003
dB 02/02/2016 10:39:00 AM - 10:39:10 AM
140
120
100
80
60
40
20
0
12.50
31.50
63
125
250
500
1000
2000
4000
8000
16000
A
Z
Hz
LZeq
Cursor: (A) Leq=39.6 dB


UCI003 Periodic reports
Sound
dB
140
120
100
80
60
40
20
10:36:00 AM
10:38:00 AM
10:40:00 AM
10:42:00 AM
10:44:00 AM
LAIeq
LAFmax
LCpeak
LAFmin
Cursor: 02/02/2016 10:39:00 AM - 10:40:00 AM LAIeq=48.3 dB LAFmax=55.9 dB LCpeak=78.3 dB LAFmin=37.8 dB

UCI003 Periodic reports

	Start time	Elapsed time	Overload [%]	LAIeq [dB]	LAFmax [dB]	LAFmin [dB]
Value			0.00	48.3	55.9	37.8
Time	10:39:00 AM	0:01:00				
Date	02/02/2016					





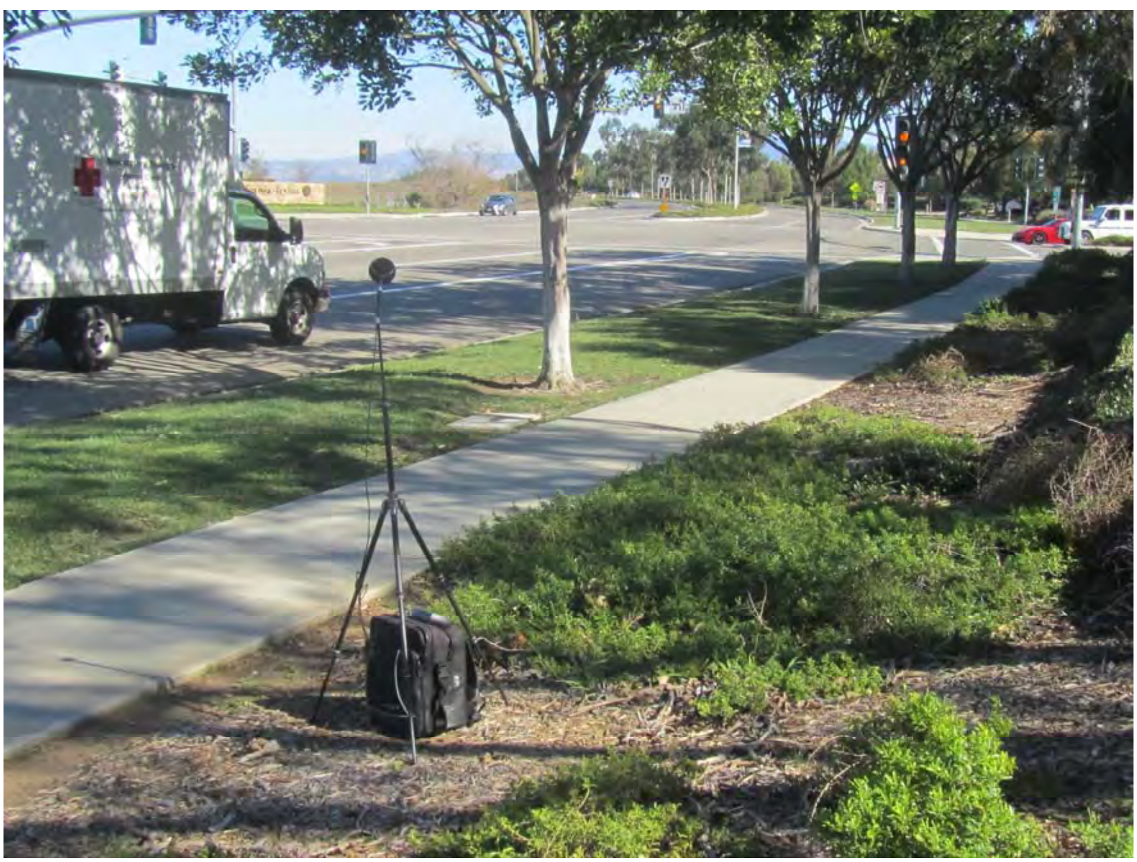
UCI003 Periodic reports
% Based on LAF , 10ms Class width: 0.2 dB 02/02/2016 10:39:00 AM - 10:40:00 AM
L1 = 50.5 dB
L5 = 49.2 dB
L10 = 47.7 dB
L50 = 44.0 dB
L90 = 39.0 dB
L95 = 38.6 dB
L99 = 38.2 dB
dB
Level
Cumulative
Cursor: [74.8 ; 75.0[dB Level: 0.0% Cumulative: 0.0%

Site Number: 3			
Recorded By: Erin Coffey			
Job Number: 150070			
Date: 2/2/16			
Time: 10:52:40 AM – 11:02:40 AM			
Location: Near southwest corner of Culver Drive and Anteater Drive.			
Source of Peak Noise: Traffic on Culver Drive.			
Noise Data			
Leq (dB)	Lmin (dB)	Lmax (dB)	Peak (dB)
65.6	49.0	75.6	84.1

Equipment						
Category	Type	Vendor	Model	Serial No.	Cert. Date	Note
Sound	Sound Level Meter	Brüel & Kjær	2250	2548189	11/18/2014	
	Microphone	Brüel & Kjær	4189	2543364	11/18/2014	
	Preamp	Brüel & Kjær	ZC 0032	4265	11/18/2014	
	Calibrator	Brüel & Kjær	4231	2545667	11/18/2014	

Weather Data			
Est.	Duration: 10 minutes		Sky: Sunny
	Note: dBA Offset = 0.04		Sensor Height (ft): 5 ft
	Wind Ave Speed (mph / m/s)	Temperature (degrees Fahrenheit)	Barometer Pressure (inches)
	4	54	30.18

Photo of Measurement Location



2250

Instrument:		2250
Application:		BZ7225 Version 4.4
Start Time:		02/02/2016 10:52:40
End Time:		02/02/2016 11:02:40
Elapsed Time:		00:10:00
Bandwidth:		1/3-octave
Max Input Level:		138.71

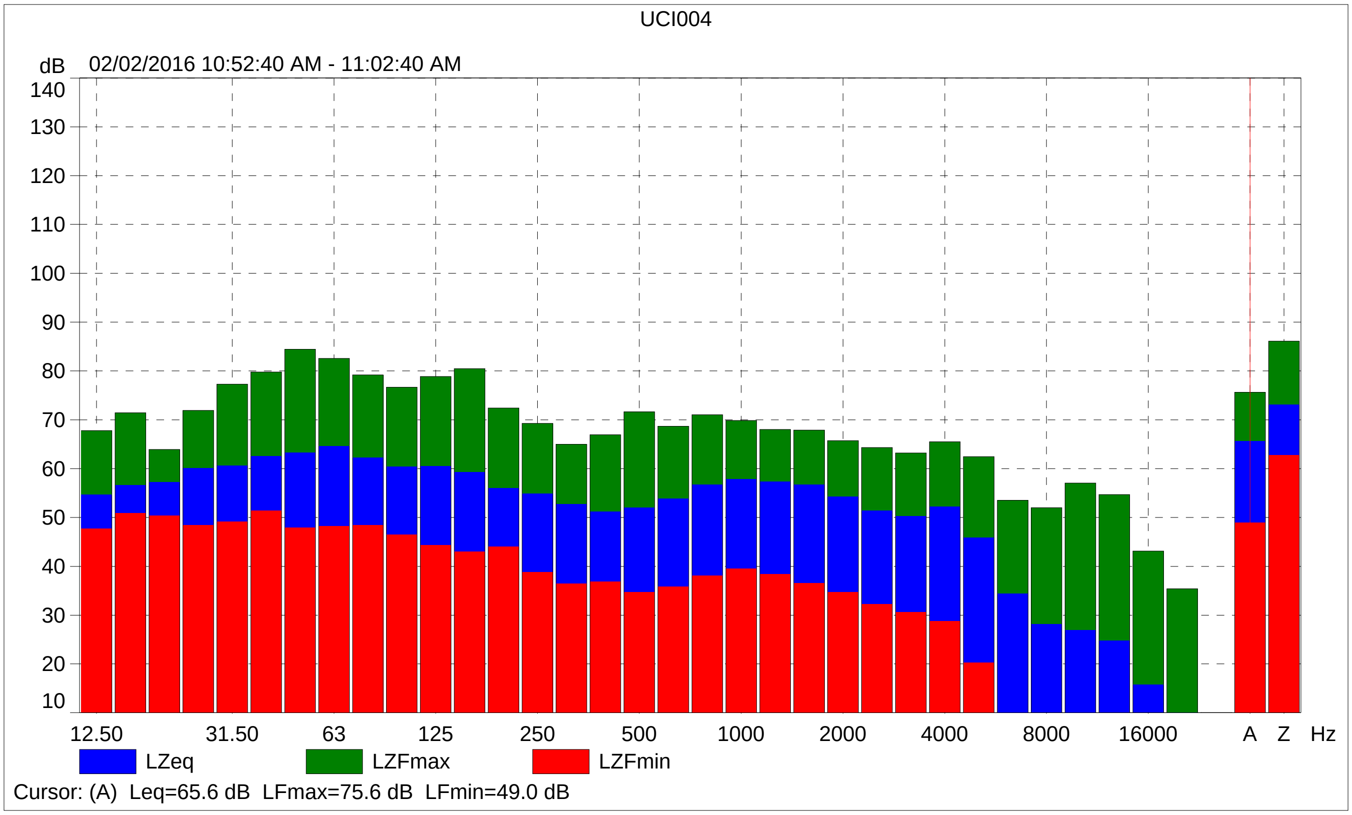
	Time	Frequency
Broadband (excl. Peak):	FSI	AZ
Broadband Peak:		C
Spectrum:	FS	Z

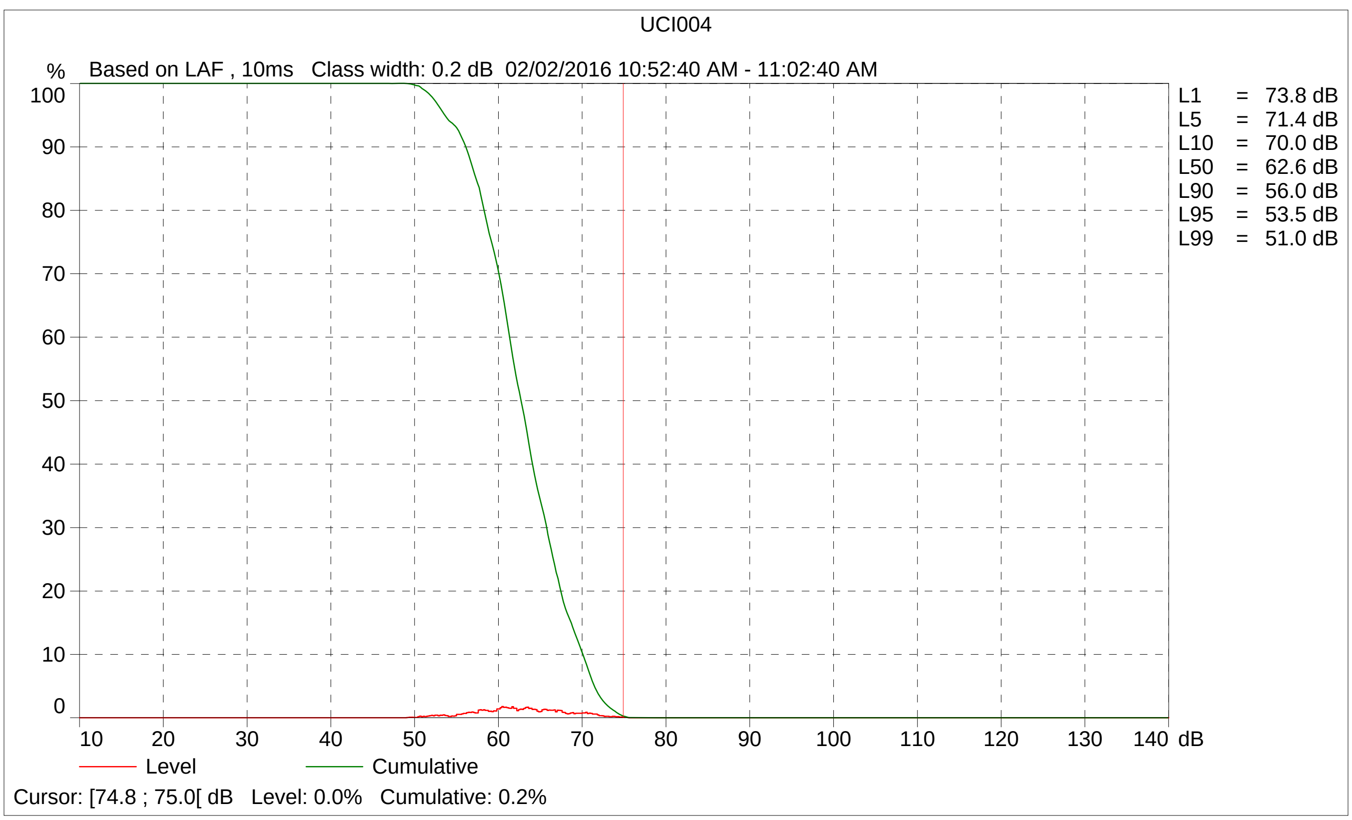
Instrument Serial Number:		2548189
Microphone Serial Number:		2543364
Input:		Top Socket
Windscreen Correction:		None
Sound Field Correction:		Free-field

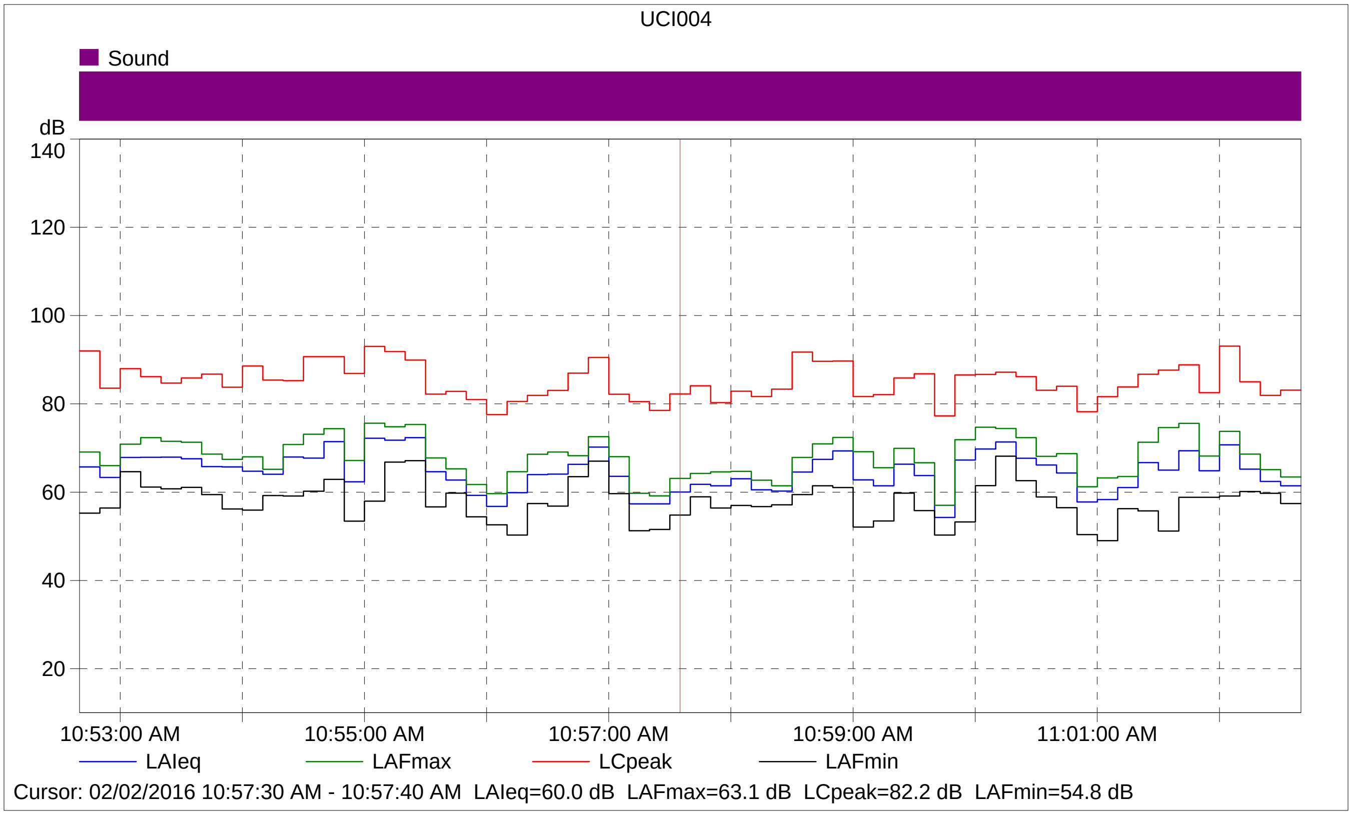
Calibration Time:		02/02/2016 09:32:14
Calibration Type:		External reference
Sensitivity:		64.6653547883034 mV/Pa

UCI004

	Start time	End time	Elapsed time	Overload [%]	LAeq [dB]	LAFmax [dB]	LAFmin [dB]
Value				0.00	65.6	75.6	49.0
Time	10:52:40 AM	11:02:40 AM	0:10:00				
Date	02/02/2016	02/02/2016					

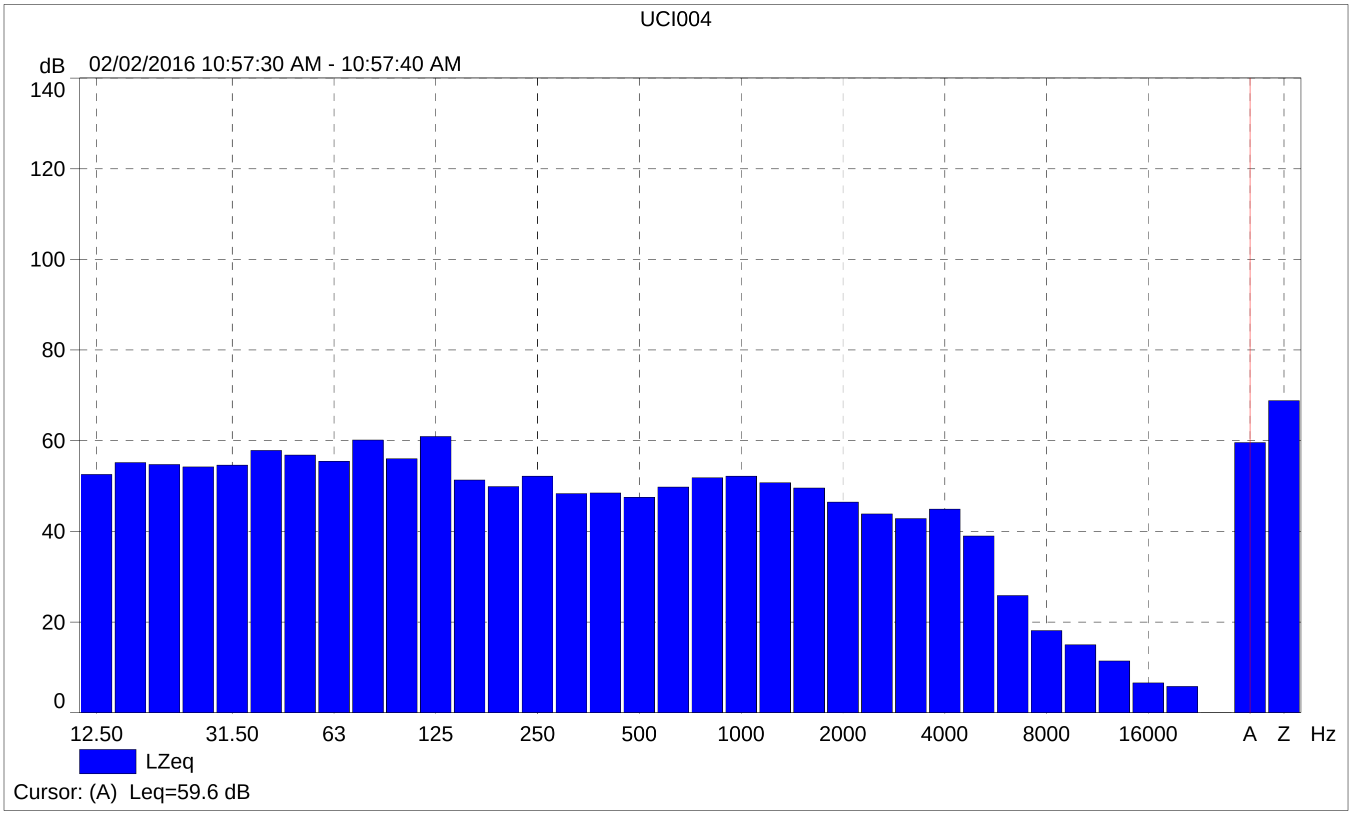

UCI004
dB 02/02/2016 10:52:40 AM - 11:02:40 AM
140
130
120
110
100
90
80
70
60
50
40
30
20
10
12.50
31.50
63
125
250
500
1000
2000
4000
8000
16000
A
Z
Hz
LZeq
LZFmax
LZFmin
Cursor: (A) Leq=65.6 dB LFmax=75.6 dB LFmin=49.0 dB


UCI004
% Based on LAF , 10ms Class width: 0.2 dB 02/02/2016 10:52:40 AM - 11:02:40 AM
100
90
80
70
60
50
40
30
20
10
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140 dB
L1 = 73.8 dB
L5 = 71.4 dB
L10 = 70.0 dB
L50 = 62.6 dB
L90 = 56.0 dB
L95 = 53.5 dB
L99 = 51.0 dB
Level
Cumulative
Cursor: [74.8 ; 75.0[dB Level: 0.0% Cumulative: 0.2%

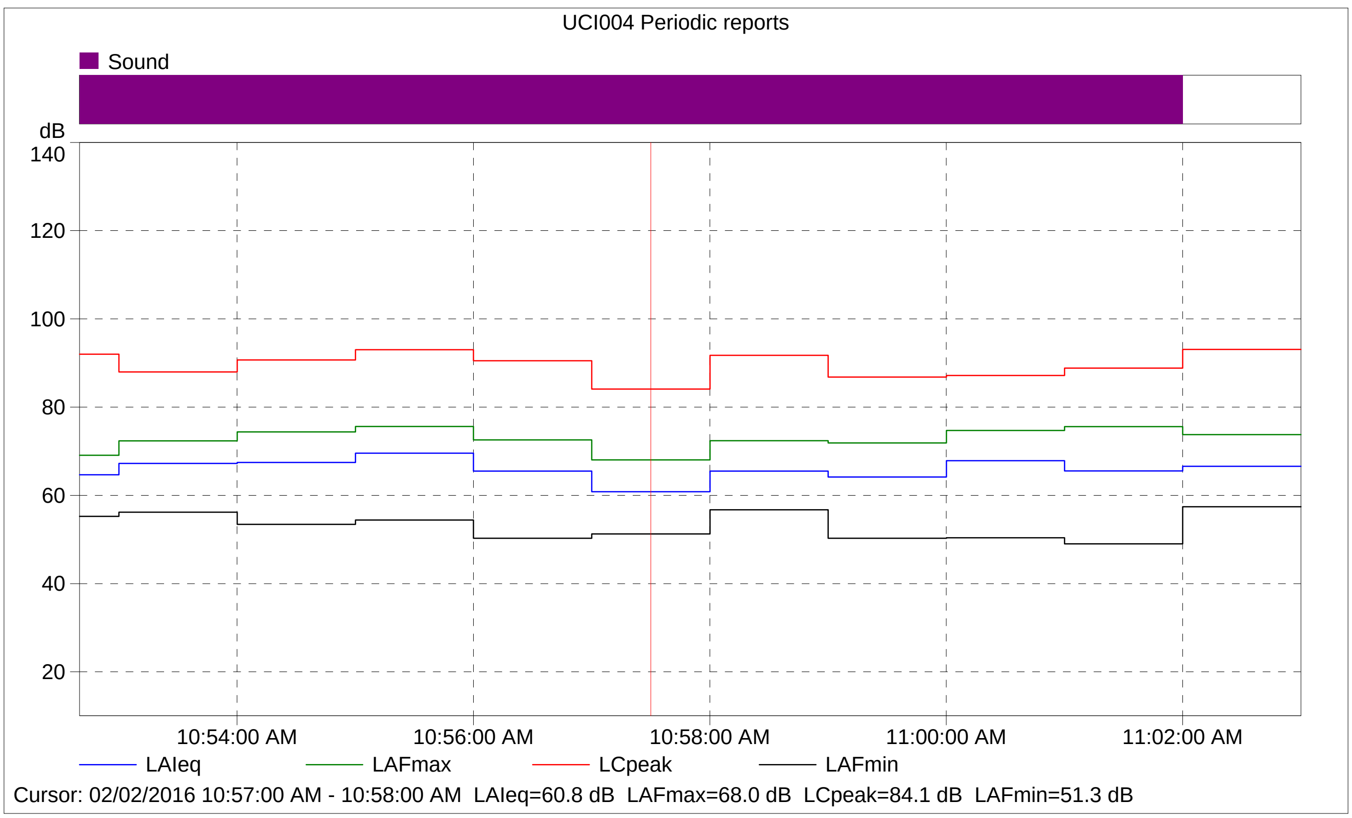


UCI004

	Start time	Elapsed time	LAIeq [dB]	LAFmax [dB]	LAFmin [dB]
Value			60.0	63.1	54.8
Time	10:57:30 AM	0:00:10			
Date	02/02/2016				



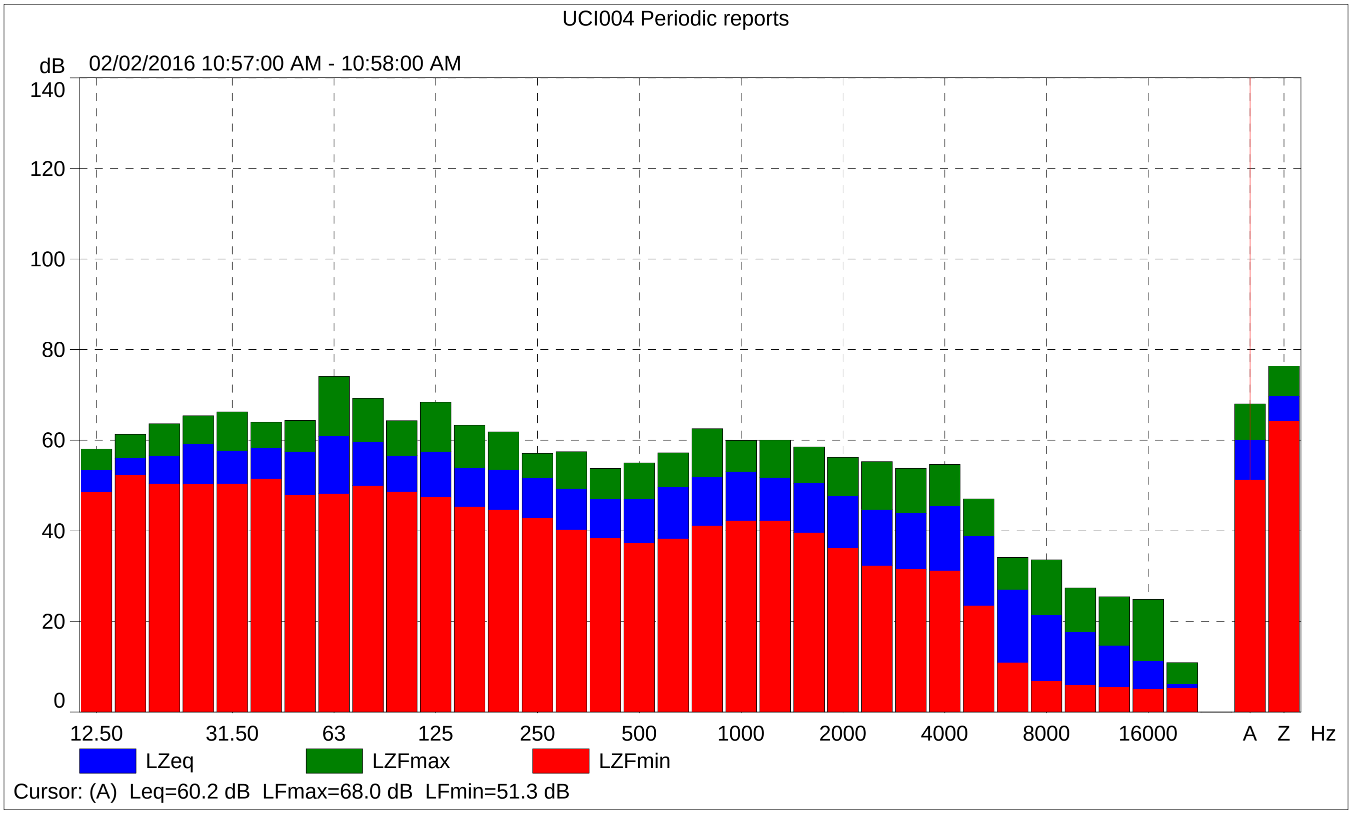
UCI004
dB
02/02/2016 10:57:30 AM - 10:57:40 AM
140
120
100
80
60
40
20
0
12.50
31.50
63
125
250
500
1000
2000
4000
8000
16000
A
Z
Hz
LZeq
Cursor: (A) Leq=59.6 dB

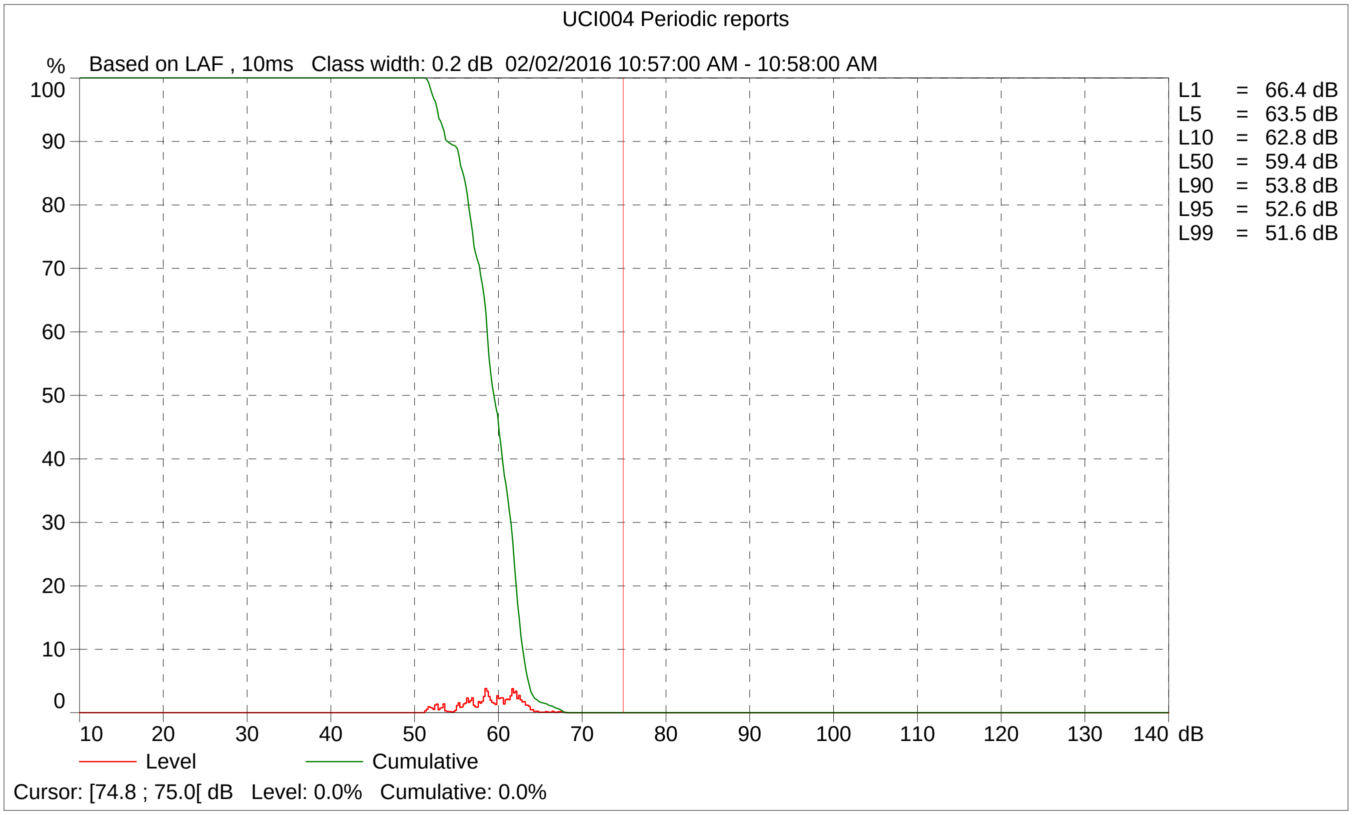


UCI004 Periodic reports
Sound
dB
140
120
100
80
60
40
20
10:54:00 AM
10:56:00 AM
10:58:00 AM
11:00:00 AM
11:02:00 AM
LAIeq
LAFmax
LCpeak
LAFmin
Cursor: 02/02/2016 10:57:00 AM - 10:58:00 AM LAIeq=60.8 dB LAFmax=68.0 dB LCpeak=84.1 dB LAFmin=51.3 dB

UCI004 Periodic reports

	Start time	Elapsed time	Overload [%]	LAIeq [dB]	LAFmax [dB]	LAFmin [dB]
Value			0.00	60.8	68.0	51.3
Time	10:57:00 AM	0:01:00				
Date	02/02/2016					





UCI004 Periodic reports
% Based on LAF , 10ms Class width: 0.2 dB 02/02/2016 10:57:00 AM - 10:58:00 AM
100
90
80
70
60
50
40
30
20
10
0
10 20 30 40 50 60 70 80 90 100 110 120 130 140 dB
L1 = 66.4 dB
L5 = 63.5 dB
L10 = 62.8 dB
L50 = 59.4 dB
L90 = 53.8 dB
L95 = 52.6 dB
L99 = 51.6 dB
Level
Cumulative
Cursor: [74.8 ; 75.0[dB Level: 0.0% Cumulative: 0.0%

NOISE MODELING DATA

Federal Highway Administration RD-77-108
Traffic Noise Prediction Model (CALVENO)

Project Name:	UCI Housing	Scenario:	Existing
Analyst:	Ryan Chiene	Job #:	150070
Roadway:	Culver Drive		
Road Segment:	Campus Drive to Anteater Drive/Shady Canyon Drive		

PROJECT DATA

Centerline Dist to Barrier	**0**
Barrier (0=wall, 1= berm):	**0**
Receiver Barrier Dist:	**0**
Centerline Dist. To Observer:	**100**
Barrier Near Lane CL Dist:	**0**
Barrier Far lane CL Dist:	**0**
Pad Elevation:	**0.5**
Road Elevation:	**0**
Observer Height (above grade):	**0**
Barrier Height:	**0**
Rt View: **90**	Lft View: **-90**

NOISE SOURCE ELEVATIONS (Feet)

Autos:	**0**
Medium Trucks:	**2.3**
Heavy Trucks:	**8**

SITE DATA

Road Grade:	0
Average Daily Traffic:	20600
Peak Hour Traffic:	**2060**
Vehicle Speed:	50
Centerline Separation:	30

NOISE INPUTS

Site conditions **HARD SITE**

FLEET MIX

Type	Day	Evening	Night	Daily
Auto	0.775	0.129	0.096	0.9742
Med. Truck	0.848	0.049	0.103	0.0184
Heavy Truck	0.865	0.027	0.108	0.0074

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)

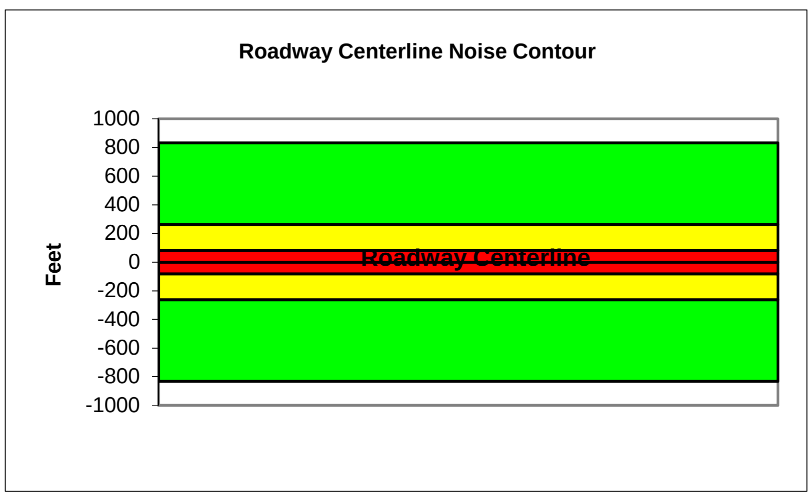
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	57.5	66.3	64.5	58.4	67.1	67.7
Medium Trucks:	65.2	57.1	50.7	49.2	57.7	57.9
Heavy Trucks:	69.4	57.5	48.4	49.6	59.0	59.2
Vehicle Noise:	**71.7**	**67.4**	**64.8**	**59.5**	**68.1**	**68.6**

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:						
Medium Trucks:						
Heavy Trucks:						
Vehicle Noise:						

CENTERLINE NOISE CONTOUR

Unmitigated	
60 dBA	832
65 dBA	263
70 dBA	83
Mitigated	
60 dBA	
65 dBA	
70 dBA	



Federal Highway Administration RD-77-108
Traffic Noise Prediction Model (CALVENO)

Project Name:	UCI Housing	Scenario:	Existing
Analyst:	Ryan Chiene	Job #:	150070
Roadway:	Bonita Canyon Drive		
Road Segment:	Shady Canyon Drive to Newport Coast Drive		

PROJECT DATA

Centerline Dist to Barrier	**0**
Barrier (0=wall, 1= berm):	**0**
Receiver Barrier Dist:	**0**
Centerline Dist. To Observer:	**100**
Barrier Near Lane CL Dist:	**0**
Barrier Far lane CL Dist:	**0**
Pad Elevation:	**0.5**
Road Elevation:	**0**
Observer Height (above grade):	**0**
Barrier Height:	**0**
Rt View: **90**	Lft View: **-90**

NOISE SOURCE ELEVATIONS (Feet)

Autos:	**0**
Medium Trucks:	**2.3**
Heavy Trucks:	**8**

SITE DATA

Road Grade:	0
Average Daily Traffic:	28600
Peak Hour Traffic:	**2860**
Vehicle Speed:	50
Centerline Separation:	50

NOISE INPUTS

Site conditions **HARD SITE**

FLEET MIX

Type	Day	Evening	Night	Daily
Auto	0.775	0.129	0.096	0.9742
Med. Truck	0.848	0.049	0.103	0.0184
Heavy Truck	0.865	0.027	0.108	0.0074

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)

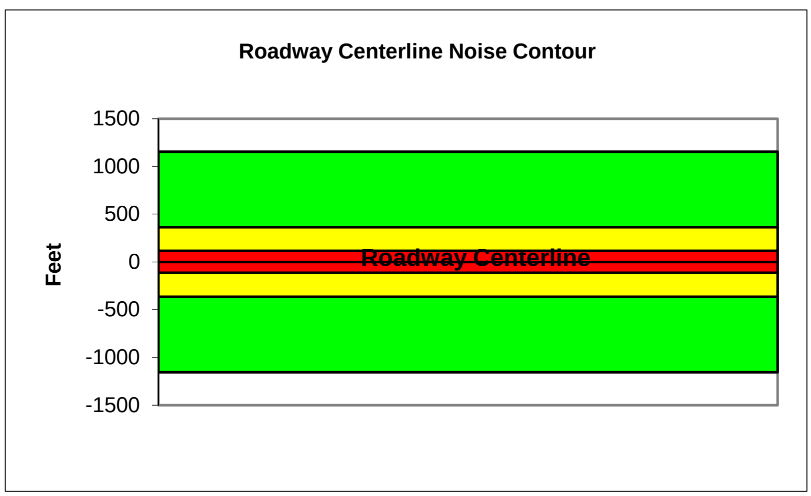
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	58.6	67.4	65.6	59.5	68.2	68.8
Medium Trucks:	66.3	58.2	51.9	50.3	58.8	59.0
Heavy Trucks:	70.5	58.6	49.5	50.8	60.1	60.3
Vehicle Noise:	**72.8**	**68.5**	**65.9**	**60.6**	**69.2**	**69.7**

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:						
Medium Trucks:						
Heavy Trucks:						
Vehicle Noise:						

CENTERLINE NOISE CONTOUR

Unmitigated	
60 dBA	1154
65 dBA	365
70 dBA	115
Mitigated	
60 dBA	
65 dBA	
70 dBA	



Federal Highway Administration RD-77-108
Traffic Noise Prediction Model (CALVENO)

Project Name:	UCI Housing	Scenario:	Existing
Analyst:	Ryan Chiene	Job #:	150070
Roadway:	Bonita Canyon Drive		
Road Segment:	West of Newport Coast Drive		

PROJECT DATA

Centerline Dist to Barrier			**0**
Barrier (0=wall, 1= berm):			**0**
Receiver Barrier Dist:			**0**
Centerline Dist. To Observer:			**100**
Barrier Near Lane CL Dist:			**0**
Barrier Far lane CL Dist:			**0**
Pad Elevation:			**0.5**
Road Elevation:			**0**
Observer Height (above grade):			**0**
Barrier Height:			**0**
Rt View:	**90**	Lft View:	**-90**

NOISE SOURCE ELEVATIONS (Feet)

Autos:	**0**
Medium Trucks:	**2.3**
Heavy Trucks:	**8**

SITE DATA

Road Grade:	0
Average Daily Traffic:	24500
Peak Hour Traffic:	**2450**
Vehicle Speed:	50
Centerline Separation:	50

NOISE INPUTS

Site conditions **HARD SITE**

FLEET MIX

Type	Day	Evening	Night	Daily
Auto	0.775	0.129	0.096	0.9742
Med. Truck	0.848	0.049	0.103	0.0184
Heavy Truck	0.865	0.027	0.108	0.0074

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)

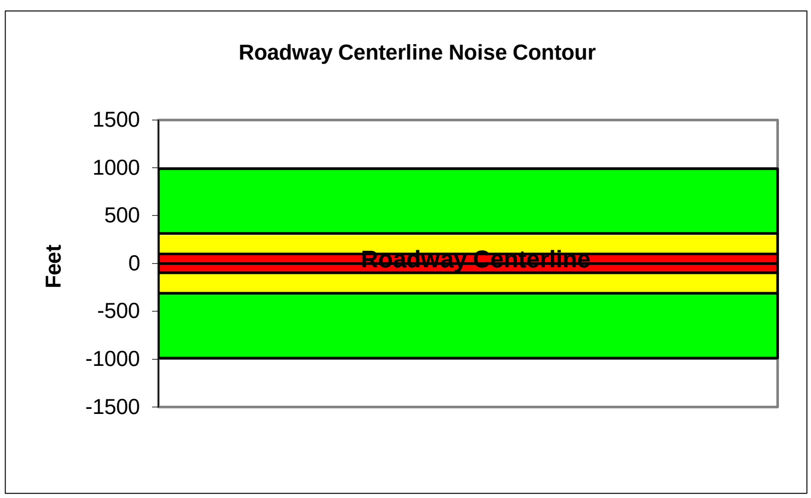
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	58.0	66.7	64.9	58.9	67.5	68.1
Medium Trucks:	65.6	57.6	51.2	49.6	58.1	58.3
Heavy Trucks:	69.9	57.9	48.9	50.1	59.5	59.6
Vehicle Noise:	**72.2**	**67.8**	**65.3**	**60.0**	**68.6**	**69.1**

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:						
Medium Trucks:						
Heavy Trucks:						
Vehicle Noise:						

CENTERLINE NOISE CONTOUR

Unmitigated	
60 dBA	989
65 dBA	313
70 dBA	99
Mitigated	
60 dBA	
65 dBA	
70 dBA	



Federal Highway Administration RD-77-108
Traffic Noise Prediction Model (CALVENO)

Project Name:	UCI Housing	Scenario:	Existing
Analyst:	Ryan Chiene	Job #:	150070
Roadway:	California Avenue		
Road Segment:	East of Anteater Drive		

PROJECT DATA

Centerline Dist to Barrier	**0**
Barrier (0=wall, 1= berm):	**0**
Receiver Barrier Dist:	**0**
Centerline Dist. To Observer:	**100**
Barrier Near Lane CL Dist:	**0**
Barrier Far lane CL Dist:	**0**
Pad Elevation:	**0.5**
Road Elevation:	**0**
Observer Height (above grade):	**0**
Barrier Height:	**0**
Rt View: **90**	Lft View: **-90**

NOISE SOURCE ELEVATIONS (Feet)

Autos:	**0**
Medium Trucks:	**2.3**
Heavy Trucks:	**8**

SITE DATA

Road Grade:	0
Average Daily Traffic:	5200
Peak Hour Traffic:	**520**
Vehicle Speed:	40
Centerline Separation:	24

NOISE INPUTS

Site conditions **HARD SITE**

FLEET MIX

Type	Day	Evening	Night	Daily
Auto	0.775	0.129	0.096	0.9742
Med. Truck	0.848	0.049	0.103	0.0184
Heavy Truck	0.865	0.027	0.108	0.0074

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)

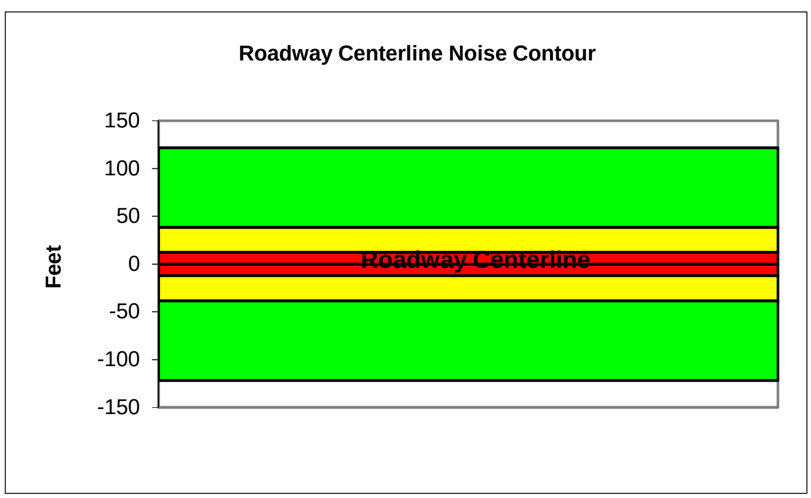
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	48.8	57.6	55.8	49.8	58.4	59.0
Medium Trucks:	57.8	49.7	43.4	41.8	50.3	50.5
Heavy Trucks:	62.6	50.7	41.7	42.9	52.6	52.7
Vehicle Noise:	**65.0**	**59.2**	**56.3**	**51.3**	**59.9**	**60.4**

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:						
Medium Trucks:						
Heavy Trucks:						
Vehicle Noise:						

CENTERLINE NOISE CONTOUR

Unmitigated	
60 dBA	122
65 dBA	39
70 dBA	12
Mitigated	
60 dBA	
65 dBA	
70 dBA	



Federal Highway Administration RD-77-108
Traffic Noise Prediction Model (CALVENO)

Project Name:	UCI Housing	Scenario:	Existing
Analyst:	Ryan Chiene	Job #:	150070
Roadway:	Anteater Drive		
Road Segment:	North of California Avenue		

PROJECT DATA

Centerline Dist to Barrier	**0**
Barrier (0=wall, 1= berm):	**0**
Receiver Barrier Dist:	**0**
Centerline Dist. To Observer:	**100**
Barrier Near Lane CL Dist:	**0**
Barrier Far lane CL Dist:	**0**
Pad Elevation:	**0.5**
Road Elevation:	**0**
Observer Height (above grade):	**0**
Barrier Height:	**0**
Rt View: **90**	Lft View: **-90**

NOISE SOURCE ELEVATIONS (Feet)

Autos:	**0**
Medium Trucks:	**2.3**
Heavy Trucks:	**8**

SITE DATA

Road Grade:	0
Average Daily Traffic:	8900
Peak Hour Traffic:	**890**
Vehicle Speed:	40
Centerline Separation:	28

NOISE INPUTS

Site conditions **HARD SITE**

FLEET MIX

Type	Day	Evening	Night	Daily
Auto	0.775	0.129	0.096	0.9742
Med. Truck	0.848	0.049	0.103	0.0184
Heavy Truck	0.865	0.027	0.108	0.0074

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)

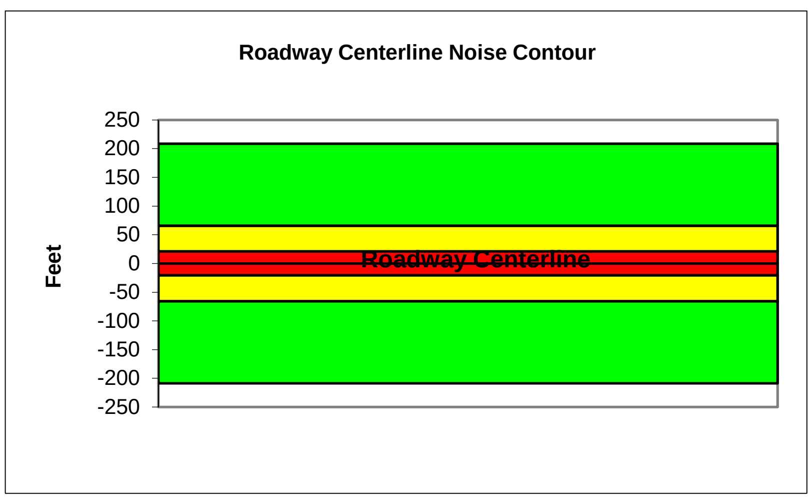
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	51.1	59.9	58.1	52.0	60.7	61.3
Medium Trucks:	60.1	52.0	45.6	44.0	52.5	52.8
Heavy Trucks:	64.9	53.0	43.9	45.1	54.9	55.0
Vehicle Noise:	**67.3**	**61.5**	**58.6**	**53.6**	**62.2**	**62.7**

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:						
Medium Trucks:						
Heavy Trucks:						
Vehicle Noise:						

CENTERLINE NOISE CONTOUR

Unmitigated	
60 dBA	209
65 dBA	66
70 dBA	21
Mitigated	
60 dBA	
65 dBA	
70 dBA	



Federal Highway Administration RD-77-108
Traffic Noise Prediction Model (CALVENO)

Project Name:	UCI Housing	Scenario:	Existing
Analyst:	Ryan Chiene	Job #:	150070
Roadway:	Anteater Drive		
Road Segment:	South of California Avenue		

PROJECT DATA

Centerline Dist to Barrier			**0**
Barrier (0=wall, 1= berm):			**0**
Receiver Barrier Dist:			**0**
Centerline Dist. To Observer:			**100**
Barrier Near Lane CL Dist:			**0**
Barrier Far lane CL Dist:			**0**
Pad Elevation:			**0.5**
Road Elevation:			**0**
Observer Height (above grade):			**0**
Barrier Height:			**0**
Rt View:	**90**	Lft View:	**-90**

NOISE SOURCE ELEVATIONS (Feet)

Autos:	**0**
Medium Trucks:	**2.3**
Heavy Trucks:	**8**

SITE DATA

Road Grade:	0
Average Daily Traffic:	6100
Peak Hour Traffic:	**610**
Vehicle Speed:	40
Centerline Separation:	26

NOISE INPUTS

Site conditions **HARD SITE**

FLEET MIX

Type	Day	Evening	Night	Daily
Auto	0.775	0.129	0.096	0.9742
Med. Truck	0.848	0.049	0.103	0.0184
Heavy Truck	0.865	0.027	0.108	0.0074

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)

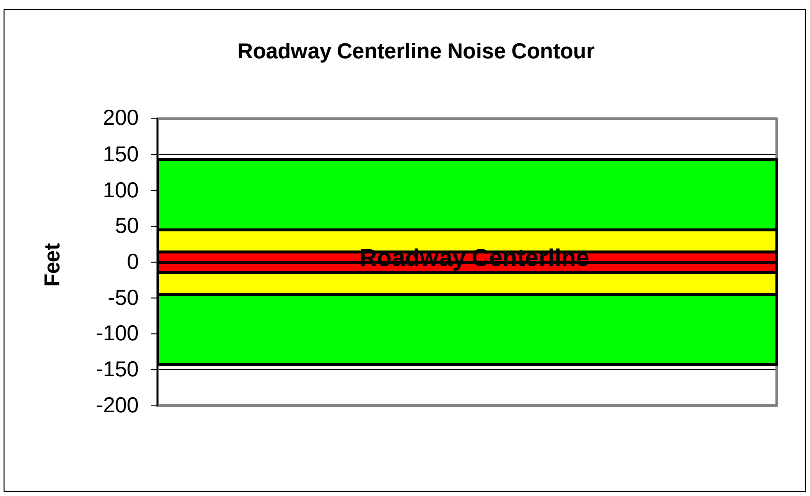
Vehicle Type	**Peak Leq**	**Leq Day**	**Leq Evening**	**Leq Night**	**Ldn**	**CNEL**
Autos:	49.5	58.3	56.5	50.4	59.1	59.7
Medium Trucks:	58.5	50.4	44.0	42.4	50.9	51.2
Heavy Trucks:	63.3	51.4	42.3	43.5	53.2	53.4
Vehicle Noise:	**65.7**	**59.9**	**56.9**	**52.0**	**60.6**	**61.1**

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)

Vehicle Type	**Peak Leq**	**Leq Day**	**Leq Evening**	**Leq Night**	**Ldn**	**CNEL**
Autos:						
Medium Trucks:						
Heavy Trucks:						
Vehicle Noise:						

CENTERLINE NOISE CONTOUR

Unmitigated	
60 dBA	143
65 dBA	45
70 dBA	14
Mitigated	
60 dBA	
65 dBA	
70 dBA	



Federal Highway Administration RD-77-108
Traffic Noise Prediction Model (CALVENO)

Project Name:	UCI Housing	Scenario:	Existing Plus Project
Analyst:	Ryan Chiene	Job #:	150070
Roadway:	Culver Drive		
Road Segment:	Campus Drive to Anteater Drive/Shady Canyon Drive		

PROJECT DATA

Centerline Dist to Barrier	**0**
Barrier (0=wall, 1= berm):	**0**
Receiver Barrier Dist:	**0**
Centerline Dist. To Observer:	**100**
Barrier Near Lane CL Dist:	**0**
Barrier Far lane CL Dist:	**0**
Pad Elevation:	**0.5**
Road Elevation:	**0**
Observer Height (above grade):	**0**
Barrier Height:	**0**
Rt View: **90**	Lft View: **-90**

NOISE SOURCE ELEVATIONS (Feet)

Autos:	**0**
Medium Trucks:	**2.3**
Heavy Trucks:	**8**

SITE DATA

Road Grade:	0
Average Daily Traffic:	20900
Peak Hour Traffic:	**2090**
Vehicle Speed:	50
Centerline Separation:	30

NOISE INPUTS

Site conditions **HARD SITE**

FLEET MIX

Type	Day	Evening	Night	Daily
Auto	0.775	0.129	0.096	0.9742
Med. Truck	0.848	0.049	0.103	0.0184
Heavy Truck	0.865	0.027	0.108	0.0074

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)

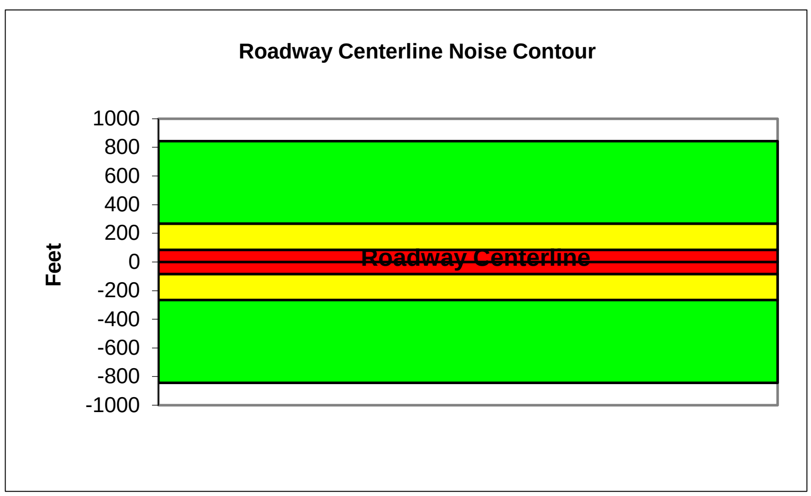
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	57.6	66.4	64.6	58.5	67.1	67.7
Medium Trucks:	65.3	57.2	50.8	49.2	57.7	57.9
Heavy Trucks:	69.5	57.5	48.5	49.7	59.1	59.2
Vehicle Noise:	**71.8**	**67.5**	**64.9**	**59.6**	**68.2**	**68.7**

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:						
Medium Trucks:						
Heavy Trucks:						
Vehicle Noise:						

CENTERLINE NOISE CONTOUR

Unmitigated	
60 dBA	843
65 dBA	267
70 dBA	84
Mitigated	
60 dBA	
65 dBA	
70 dBA	



Federal Highway Administration RD-77-108
Traffic Noise Prediction Model (CALVENO)

Project Name:	UCI Housing	Scenario:	Existing Plus Project
Analyst:	Ryan Chiene	Job #:	150070
Roadway:	Bonita Canyon Drive		
Road Segment:	Shady Canyon Drive to Newport Coast Drive		

PROJECT DATA			
Centerline Dist to Barrier			**0**
Barrier (0=wall, 1= berm):			**0**
Receiver Barrier Dist:			**0**
Centerline Dist. To Observer:			**100**
Barrier Near Lane CL Dist:			**0**
Barrier Far lane CL Dist:			**0**
Pad Elevation:			**0.5**
Road Elevation:			**0**
Observer Height (above grade):			**0**
Barrier Height:			**0**
Rt View:	**90**	Lft View:	**-90**

NOISE SOURCE ELEVATIONS (Feet)	
Autos:	**0**
Medium Trucks:	**2.3**
Heavy Trucks:	**8**

SITE DATA	
Road Grade:	0
Average Daily Traffic:	29600
Peak Hour Traffic:	**2960**
Vehicle Speed:	50
Centerline Separation:	50

NOISE INPUTS

Site conditions **HARD SITE**

FLEET MIX

Type	Day	Evening	Night	Daily
Auto	0.775	0.129	0.096	0.9742
Med. Truck	0.848	0.049	0.103	0.0184
Heavy Truck	0.865	0.027	0.108	0.0074

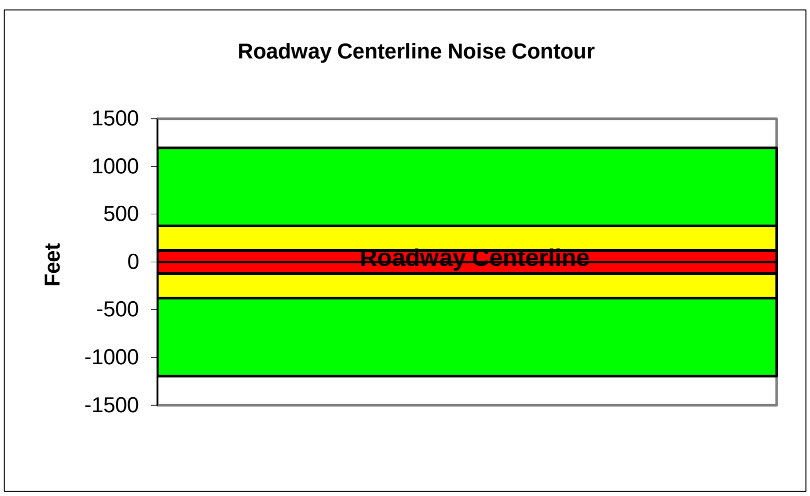
UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	58.8	67.6	65.8	59.7	68.3	68.9
Medium Trucks:	66.5	58.4	52.0	50.4	58.9	59.1
Heavy Trucks:	70.7	58.7	49.7	50.9	60.3	60.4
Vehicle Noise:	**73.0**	**68.7**	**66.1**	**60.8**	**69.4**	**69.9**

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:						
Medium Trucks:						
Heavy Trucks:						
Vehicle Noise:						

CENTERLINE NOISE CONTOUR	
Unmitigated	
60 dBA	1194
65 dBA	378
70 dBA	119
Mitigated	
60 dBA	
65 dBA	
70 dBA	



Federal Highway Administration RD-77-108
Traffic Noise Prediction Model (CALVENO)

Project Name:	UCI Housing	Scenario:	Existing Plus Project
Analyst:	Ryan Chiene	Job #:	150070
Roadway:	Bonita Canyon Drive		
Road Segment:	West of Newport Coast Drive		

PROJECT DATA

Centerline Dist to Barrier			**0**
Barrier (0=wall, 1= berm):			**0**
Receiver Barrier Dist:			**0**
Centerline Dist. To Observer:			**100**
Barrier Near Lane CL Dist:			**0**
Barrier Far lane CL Dist:			**0**
Pad Elevation:			**0.5**
Road Elevation:			**0**
Observer Height (above grade):			**0**
Barrier Height:			**0**
Rt View:	**90**	Lft View:	**-90**

SITE DATA

Road Grade:	0
Average Daily Traffic:	25500
Peak Hour Traffic:	**2550**
Vehicle Speed:	50
Centerline Separation:	50

NOISE INPUTS

Site conditions **HARD SITE**

FLEET MIX

Type	Day	Evening	Night	Daily
Auto	0.775	0.129	0.096	0.9742
Med. Truck	0.848	0.049	0.103	0.0184
Heavy Truck	0.865	0.027	0.108	0.0074

NOISE SOURCE ELEVATIONS (Feet)

Autos:	**0**
Medium Trucks:	**2.3**
Heavy Trucks:	**8**

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)

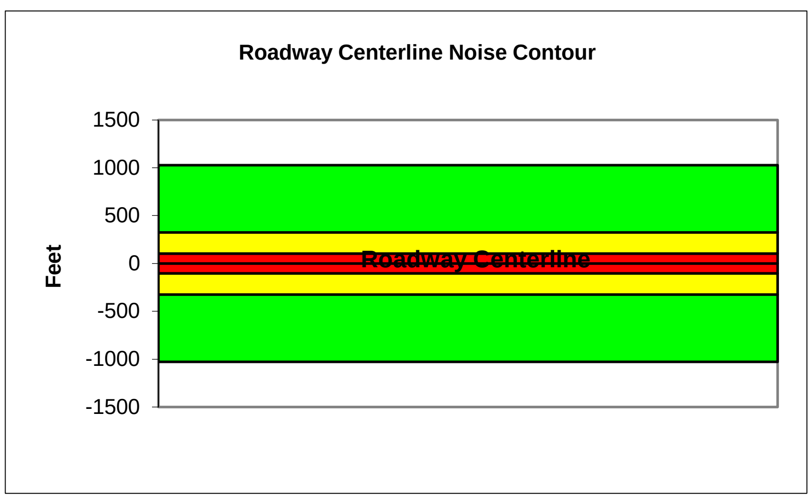
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	58.1	66.9	65.1	59.0	67.7	68.3
Medium Trucks:	65.8	57.7	51.4	49.8	58.3	58.5
Heavy Trucks:	70.0	58.1	49.0	50.3	59.7	59.8
Vehicle Noise:	**72.3**	**68.0**	**65.4**	**60.1**	**68.7**	**69.2**

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:						
Medium Trucks:						
Heavy Trucks:						
Vehicle Noise:						

CENTERLINE NOISE CONTOUR

Unmitigated	
60 dBA	1028
65 dBA	325
70 dBA	103
Mitigated	
60 dBA	
65 dBA	
70 dBA	



Federal Highway Administration RD-77-108
Traffic Noise Prediction Model (CALVENO)

Project Name:	UCI Housing	Scenario:	Existing Plus Project
Analyst:	Ryan Chiene	Job #:	150070
Roadway:	California Avenue		
Road Segment:	East of Anteater Drive		

PROJECT DATA

Centerline Dist to Barrier			**0**
Barrier (0=wall, 1= berm):			**0**
Receiver Barrier Dist:			**0**
Centerline Dist. To Observer:			**100**
Barrier Near Lane CL Dist:			**0**
Barrier Far lane CL Dist:			**0**
Pad Elevation:			**0.5**
Road Elevation:			**0**
Observer Height (above grade):			**0**
Barrier Height:			**0**
Rt View:	**90**	Lft View:	**-90**

NOISE SOURCE ELEVATIONS (Feet)

Autos:	**0**
Medium Trucks:	**2.3**
Heavy Trucks:	**8**

SITE DATA

Road Grade:	0
Average Daily Traffic:	6300
Peak Hour Traffic:	**630**
Vehicle Speed:	40
Centerline Separation:	24

NOISE INPUTS

Site conditions **HARD SITE**

FLEET MIX

Type	Day	Evening	Night	Daily
Auto	0.775	0.129	0.096	0.9742
Med. Truck	0.848	0.049	0.103	0.0184
Heavy Truck	0.865	0.027	0.108	0.0074

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)

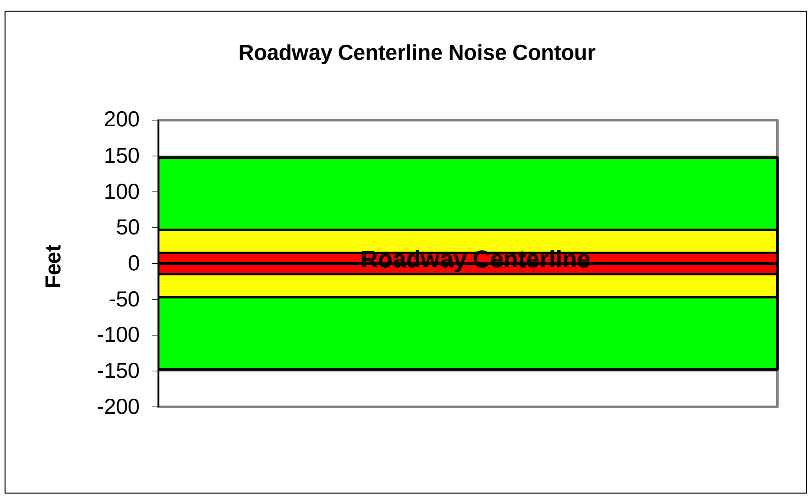
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	49.7	58.5	56.7	50.6	59.2	59.8
Medium Trucks:	58.6	50.6	44.2	42.6	51.1	51.3
Heavy Trucks:	63.5	51.5	42.5	43.7	53.4	53.5
Vehicle Noise:	**65.9**	**60.0**	**57.1**	**52.2**	**60.7**	**61.2**

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:						
Medium Trucks:						
Heavy Trucks:						
Vehicle Noise:						

CENTERLINE NOISE CONTOUR

Unmitigated	
60 dBA	148
65 dBA	47
70 dBA	15
Mitigated	
60 dBA	
65 dBA	
70 dBA	



Federal Highway Administration RD-77-108
Traffic Noise Prediction Model (CALVENO)

Project Name:	UCI Housing	Scenario:	Existing Plus Project
Analyst:	Ryan Chiene	Job #:	150070
Roadway:	Anteater Drive		
Road Segment:	North of California Avenue		

PROJECT DATA

Centerline Dist to Barrier	**0**
Barrier (0=wall, 1= berm):	**0**
Receiver Barrier Dist:	**0**
Centerline Dist. To Observer:	**100**
Barrier Near Lane CL Dist:	**0**
Barrier Far lane CL Dist:	**0**
Pad Elevation:	**0.5**
Road Elevation:	**0**
Observer Height (above grade):	**0**
Barrier Height:	**0**
Rt View: **90**	Lft View: **-90**

NOISE SOURCE ELEVATIONS (Feet)

Autos:	**0**
Medium Trucks:	**2.3**
Heavy Trucks:	**8**

SITE DATA

Road Grade:	0
Average Daily Traffic:	9300
Peak Hour Traffic:	**930**
Vehicle Speed:	40
Centerline Separation:	28

NOISE INPUTS

Site conditions **HARD SITE**

FLEET MIX

Type	Day	Evening	Night	Daily
Auto	0.775	0.129	0.096	0.9742
Med. Truck	0.848	0.049	0.103	0.0184
Heavy Truck	0.865	0.027	0.108	0.0074

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)

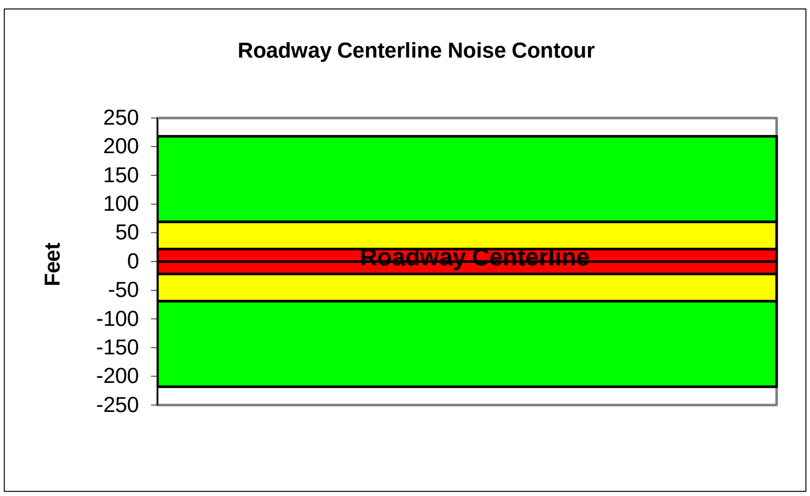
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	51.3	60.1	58.3	52.2	60.9	61.5
Medium Trucks:	60.3	52.2	45.8	44.2	52.7	53.0
Heavy Trucks:	65.1	53.2	44.1	45.3	55.0	55.2
Vehicle Noise:	**67.5**	**61.7**	**58.7**	**53.8**	**62.4**	**62.9**

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:						
Medium Trucks:						
Heavy Trucks:						
Vehicle Noise:						

CENTERLINE NOISE CONTOUR

Unmitigated	
60 dBA	218
65 dBA	69
70 dBA	22
Mitigated	
60 dBA	
65 dBA	
70 dBA	



Federal Highway Administration RD-77-108
Traffic Noise Prediction Model (CALVENO)

Project Name:	UCI Housing	Scenario:	Existing Plus Project
Analyst:	Ryan Chiene	Job #:	150070
Roadway:	Anteater Drive		
Road Segment:	South of California Avenue		

PROJECT DATA

Centerline Dist to Barrier	**0**
Barrier (0=wall, 1= berm):	**0**
Receiver Barrier Dist:	**0**
Centerline Dist. To Observer:	**100**
Barrier Near Lane CL Dist:	**0**
Barrier Far lane CL Dist:	**0**
Pad Elevation:	**0.5**
Road Elevation:	**0**
Observer Height (above grade):	**0**
Barrier Height:	**0**
Rt View: **90**	Lft View: **-90**

NOISE SOURCE ELEVATIONS (Feet)

Autos:	**0**
Medium Trucks:	**2.3**
Heavy Trucks:	**8**

SITE DATA

Road Grade:	0
Average Daily Traffic:	7500
Peak Hour Traffic:	**750**
Vehicle Speed:	40
Centerline Separation:	26

NOISE INPUTS

Site conditions **HARD SITE**

FLEET MIX

Type	Day	Evening	Night	Daily
Auto	0.775	0.129	0.096	0.9742
Med. Truck	0.848	0.049	0.103	0.0184
Heavy Truck	0.865	0.027	0.108	0.0074

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)

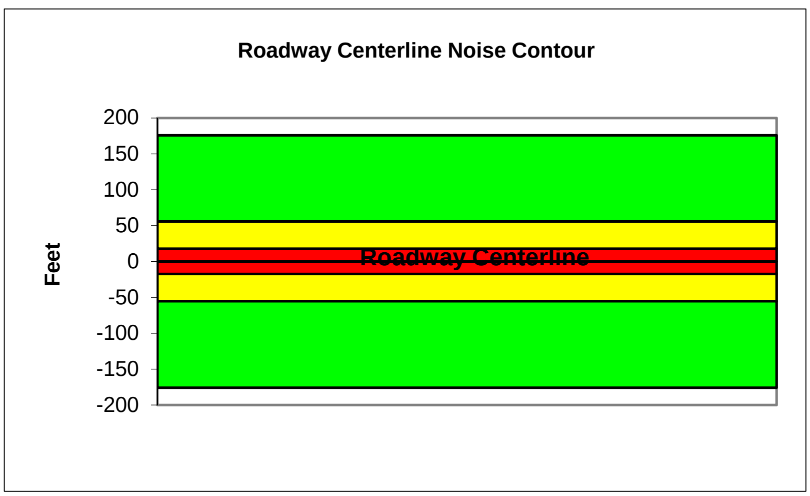
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	50.4	59.2	57.4	51.3	60.0	60.6
Medium Trucks:	59.4	51.3	44.9	43.3	51.8	52.1
Heavy Trucks:	64.2	52.3	43.2	44.4	54.1	54.3
Vehicle Noise:	**66.6**	**60.8**	**57.8**	**52.9**	**61.5**	**62.0**

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:						
Medium Trucks:						
Heavy Trucks:						
Vehicle Noise:						

CENTERLINE NOISE CONTOUR

Unmitigated	
60 dBA	176
65 dBA	56
70 dBA	18
Mitigated	
60 dBA	
65 dBA	
70 dBA	



Federal Highway Administration RD-77-108
Traffic Noise Prediction Model (CALVENO)

Project Name:	UCI Housing	Scenario:	Future
Analyst:	Ryan Chiene	Job #:	150070
Roadway:	Culver Drive		
Road Segment:	Campus Drive to Anteater Drive/Shady Canyon Drive		

PROJECT DATA

Centerline Dist to Barrier	**0**
Barrier (0=wall, 1= berm):	**0**
Receiver Barrier Dist:	**0**
Centerline Dist. To Observer:	**100**
Barrier Near Lane CL Dist:	**0**
Barrier Far lane CL Dist:	**0**
Pad Elevation:	**0.5**
Road Elevation:	**0**
Observer Height (above grade):	**0**
Barrier Height:	**0**
Rt View: **90**	Lft View: **-90**

NOISE SOURCE ELEVATIONS (Feet)

Autos:	**0**
Medium Trucks:	**2.3**
Heavy Trucks:	**8**

SITE DATA

Road Grade:	0
Average Daily Traffic:	24310
Peak Hour Traffic:	**2431**
Vehicle Speed:	50
Centerline Separation:	30

NOISE INPUTS

Site conditions **HARD SITE**

FLEET MIX

Type	Day	Evening	Night	Daily
Auto	0.775	0.129	0.096	0.9742
Med. Truck	0.848	0.049	0.103	0.0184
Heavy Truck	0.865	0.027	0.108	0.0074

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)

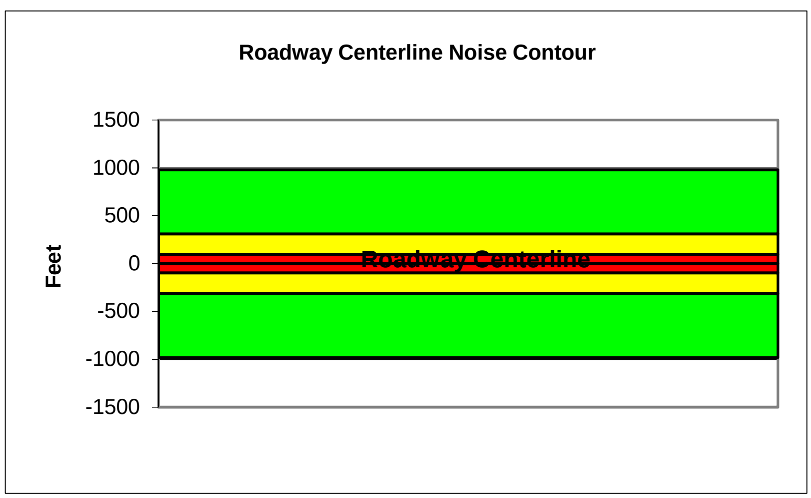
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	58.2	67.0	65.2	59.1	67.8	68.4
Medium Trucks:	65.9	57.8	51.5	49.9	58.4	58.6
Heavy Trucks:	70.1	58.2	49.1	50.4	59.8	59.9
Vehicle Noise:	**72.5**	**68.1**	**65.5**	**60.2**	**68.8**	**69.4**

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:						
Medium Trucks:						
Heavy Trucks:						
Vehicle Noise:						

CENTERLINE NOISE CONTOUR

Unmitigated	
60 dBA	982
65 dBA	310
70 dBA	98
Mitigated	
60 dBA	
65 dBA	
70 dBA	



Federal Highway Administration RD-77-108
Traffic Noise Prediction Model (CALVENO)

Project Name:	UCI Housing	Scenario:	Future
Analyst:	Ryan Chiene	Job #:	150070
Roadway:	Bonita Canyon Drive		
Road Segment:	Shady Canyon Drive to Newport Coast Drive		

PROJECT DATA

Centerline Dist to Barrier	**0**
Barrier (0=wall, 1= berm):	**0**
Receiver Barrier Dist:	**0**
Centerline Dist. To Observer:	**100**
Barrier Near Lane CL Dist:	**0**
Barrier Far lane CL Dist:	**0**
Pad Elevation:	**0.5**
Road Elevation:	**0**
Observer Height (above grade):	**0**
Barrier Height:	**0**
Rt View: **90**	Lft View: **-90**

NOISE SOURCE ELEVATIONS (Feet)

Autos:	**0**
Medium Trucks:	**2.3**
Heavy Trucks:	**8**

SITE DATA

Road Grade:	0
Average Daily Traffic:	28290
Peak Hour Traffic:	**2829**
Vehicle Speed:	50
Centerline Separation:	50

NOISE INPUTS

Site conditions **HARD SITE**

FLEET MIX

Type	Day	Evening	Night	Daily
Auto	0.775	0.129	0.096	0.9742
Med. Truck	0.848	0.049	0.103	0.0184
Heavy Truck	0.865	0.027	0.108	0.0074

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)

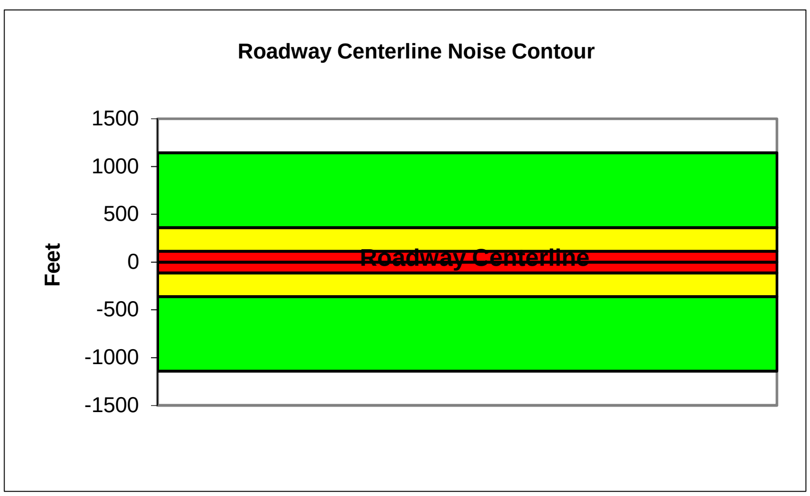
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	58.6	67.4	65.6	59.5	68.1	68.7
Medium Trucks:	66.3	58.2	51.8	50.2	58.7	59.0
Heavy Trucks:	70.5	58.5	49.5	50.7	60.1	60.2
Vehicle Noise:	**72.8**	**68.5**	**65.9**	**60.6**	**69.2**	**69.7**

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:						
Medium Trucks:						
Heavy Trucks:						
Vehicle Noise:						

CENTERLINE NOISE CONTOUR

Unmitigated	
60 dBA	1143
65 dBA	361
70 dBA	114
Mitigated	
60 dBA	
65 dBA	
70 dBA	



Federal Highway Administration RD-77-108
Traffic Noise Prediction Model (CALVENO)

Project Name:	UCI Housing	Scenario:	Future
Analyst:	Ryan Chiene	Job #:	150070
Roadway:	Bonita Canyon Drive		
Road Segment:	West of Newport Coast Drive		

PROJECT DATA

Centerline Dist to Barrier	**0**
Barrier (0=wall, 1= berm):	**0**
Receiver Barrier Dist:	**0**
Centerline Dist. To Observer:	**100**
Barrier Near Lane CL Dist:	**0**
Barrier Far lane CL Dist:	**0**
Pad Elevation:	**0.5**
Road Elevation:	**0**
Observer Height (above grade):	**0**
Barrier Height:	**0**
Rt View: **90**	Lft View: **-90**

NOISE SOURCE ELEVATIONS (Feet)

Autos:	**0**
Medium Trucks:	**2.3**
Heavy Trucks:	**8**

SITE DATA

Road Grade:	0
Average Daily Traffic:	22410
Peak Hour Traffic:	**2241**
Vehicle Speed:	50
Centerline Separation:	50

NOISE INPUTS

Site conditions **HARD SITE**

FLEET MIX

Type	Day	Evening	Night	Daily
Auto	0.775	0.129	0.096	0.9742
Med. Truck	0.848	0.049	0.103	0.0184
Heavy Truck	0.865	0.027	0.108	0.0074

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)

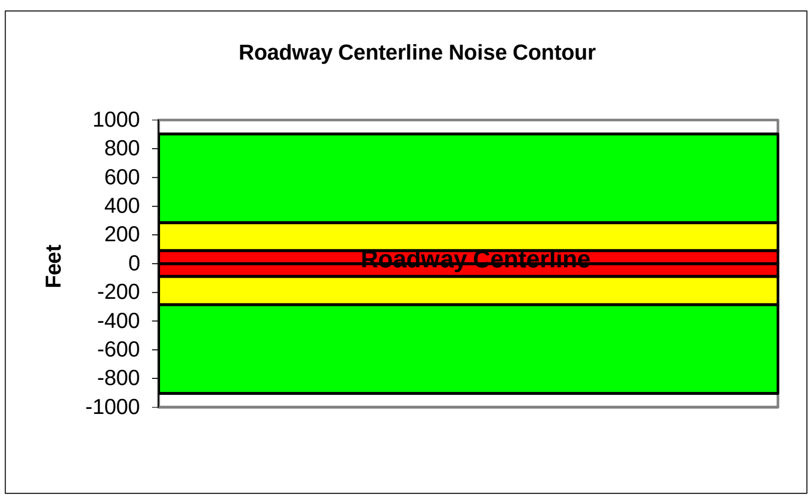
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	57.6	66.3	64.6	58.5	67.1	67.7
Medium Trucks:	65.2	57.2	50.8	49.2	57.7	57.9
Heavy Trucks:	69.5	57.5	48.5	49.7	59.1	59.2
Vehicle Noise:	**71.8**	**67.4**	**64.9**	**59.6**	**68.2**	**68.7**

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:						
Medium Trucks:						
Heavy Trucks:						
Vehicle Noise:						

CENTERLINE NOISE CONTOUR

Unmitigated	
60 dBA	904
65 dBA	286
70 dBA	90
Mitigated	
60 dBA	
65 dBA	
70 dBA	



Federal Highway Administration RD-77-108
Traffic Noise Prediction Model (CALVENO)

Project Name:	UCI Housing	Scenario:	Future
Analyst:	Ryan Chiene	Job #:	150070
Roadway:	California Avenue		
Road Segment:	East of Anteater Drive		

PROJECT DATA

Centerline Dist to Barrier			**0**
Barrier (0=wall, 1= berm):			**0**
Receiver Barrier Dist:			**0**
Centerline Dist. To Observer:			**100**
Barrier Near Lane CL Dist:			**0**
Barrier Far lane CL Dist:			**0**
Pad Elevation:			**0.5**
Road Elevation:			**0**
Observer Height (above grade):			**0**
Barrier Height:			**0**
Rt View:	**90**	Lft View:	**-90**

SITE DATA

Road Grade:	0
Average Daily Traffic:	9910
Peak Hour Traffic:	**991**
Vehicle Speed:	40
Centerline Separation:	24

NOISE INPUTS

Site conditions **HARD SITE**

FLEET MIX

Type	Day	Evening	Night	Daily
Auto	0.775	0.129	0.096	0.9742
Med. Truck	0.848	0.049	0.103	0.0184
Heavy Truck	0.865	0.027	0.108	0.0074

NOISE SOURCE ELEVATIONS (Feet)

Autos:	**0**
Medium Trucks:	**2.3**
Heavy Trucks:	**8**

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)

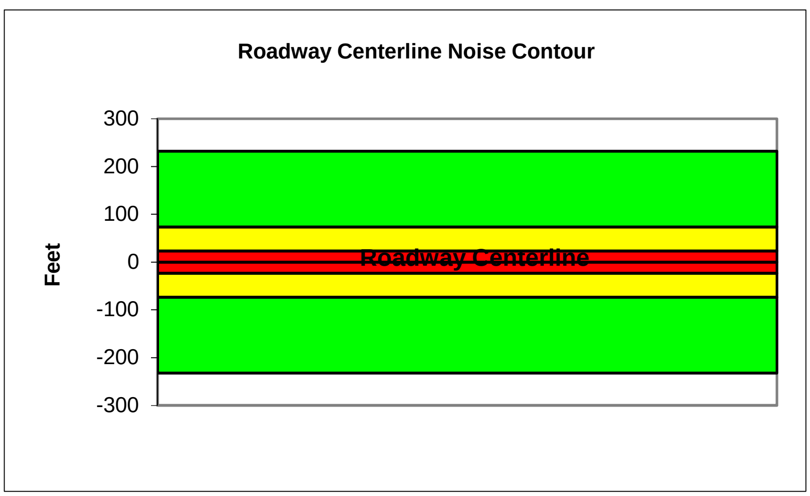
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	51.6	60.4	58.6	52.6	61.2	61.8
Medium Trucks:	60.6	52.5	46.2	44.6	53.1	53.3
Heavy Trucks:	65.4	53.5	44.5	45.7	55.4	55.5
Vehicle Noise:	**67.8**	**62.0**	**59.1**	**54.1**	**62.7**	**63.2**

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:						
Medium Trucks:						
Heavy Trucks:						
Vehicle Noise:						

CENTERLINE NOISE CONTOUR

Unmitigated	
60 dBA	232
65 dBA	73
70 dBA	23
Mitigated	
60 dBA	
65 dBA	
70 dBA	



Federal Highway Administration RD-77-108
Traffic Noise Prediction Model (CALVENO)

Project Name:	UCI Housing	Scenario:	Future
Analyst:	Ryan Chiene	Job #:	150070
Roadway:	Anteater Drive		
Road Segment:	North of California Avenue		

PROJECT DATA

Centerline Dist to Barrier			**0**
Barrier (0=wall, 1= berm):			**0**
Receiver Barrier Dist:			**0**
Centerline Dist. To Observer:			**100**
Barrier Near Lane CL Dist:			**0**
Barrier Far lane CL Dist:			**0**
Pad Elevation:			**0.5**
Road Elevation:			**0**
Observer Height (above grade):			**0**
Barrier Height:			**0**
Rt View:	**90**	Lft View:	**-90**

NOISE SOURCE ELEVATIONS (Feet)

Autos:	**0**
Medium Trucks:	**2.3**
Heavy Trucks:	**8**

SITE DATA

Road Grade:	0
Average Daily Traffic:	13630
Peak Hour Traffic:	**1363**
Vehicle Speed:	40
Centerline Separation:	28

NOISE INPUTS

Site conditions **HARD SITE**

FLEET MIX

Type	Day	Evening	Night	Daily
Auto	0.775	0.129	0.096	0.9742
Med. Truck	0.848	0.049	0.103	0.0184
Heavy Truck	0.865	0.027	0.108	0.0074

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)

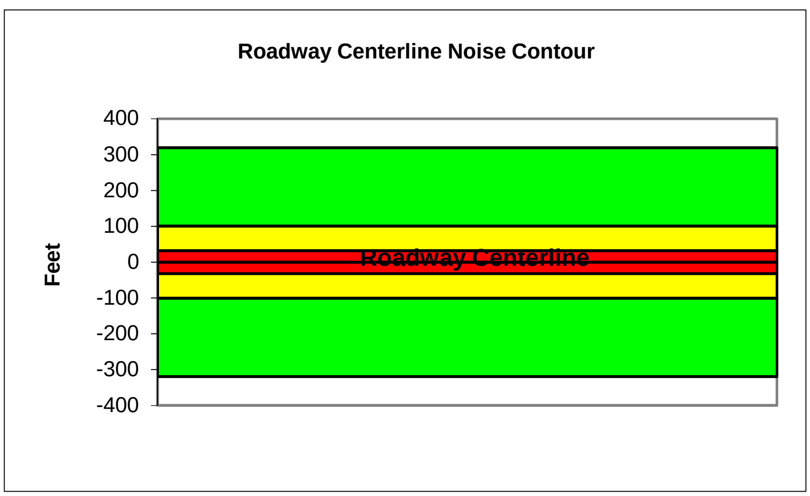
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	53.0	61.7	60.0	53.9	62.5	63.1
Medium Trucks:	61.9	53.8	47.5	45.9	54.4	54.6
Heavy Trucks:	66.8	54.8	45.8	47.0	56.7	56.8
Vehicle Noise:	**69.1**	**63.3**	**60.4**	**55.4**	**64.0**	**64.5**

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:						
Medium Trucks:						
Heavy Trucks:						
Vehicle Noise:						

CENTERLINE NOISE CONTOUR

Unmitigated	
60 dBA	320
65 dBA	101
70 dBA	32
Mitigated	
60 dBA	
65 dBA	
70 dBA	



Federal Highway Administration RD-77-108
Traffic Noise Prediction Model (CALVENO)

Project Name:	UCI Housing	Scenario:	Future
Analyst:	Ryan Chiene	Job #:	150070
Roadway:	Anteater Drive		
Road Segment:	South of California Avenue		

PROJECT DATA

Centerline Dist to Barrier	**0**
Barrier (0=wall, 1= berm):	**0**
Receiver Barrier Dist:	**0**
Centerline Dist. To Observer:	**100**
Barrier Near Lane CL Dist:	**0**
Barrier Far lane CL Dist:	**0**
Pad Elevation:	**0.5**
Road Elevation:	**0**
Observer Height (above grade):	**0**
Barrier Height:	**0**
Rt View: **90**	Lft View: **-90**

NOISE SOURCE ELEVATIONS (Feet)

Autos:	**0**
Medium Trucks:	**2.3**
Heavy Trucks:	**8**

SITE DATA

Road Grade:	0
Average Daily Traffic:	8140
Peak Hour Traffic:	**814**
Vehicle Speed:	40
Centerline Separation:	26

NOISE INPUTS

Site conditions **HARD SITE**

FLEET MIX

Type	Day	Evening	Night	Daily
Auto	0.775	0.129	0.096	0.9742
Med. Truck	0.848	0.049	0.103	0.0184
Heavy Truck	0.865	0.027	0.108	0.0074

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)

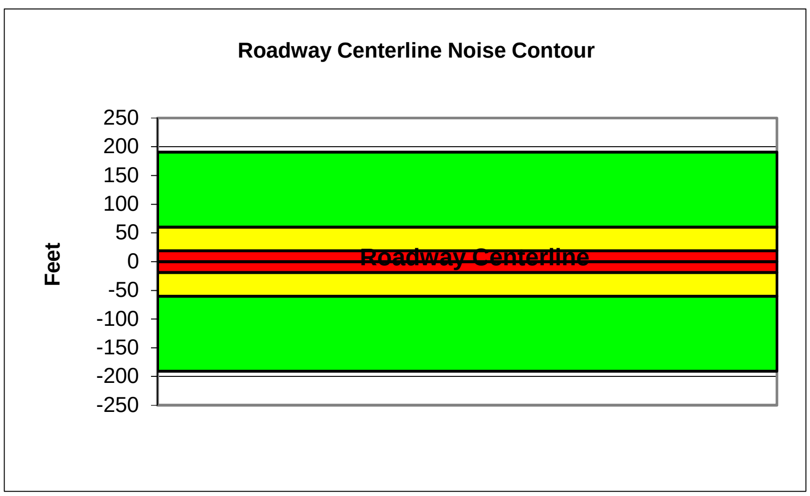
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	50.8	59.5	57.8	51.7	60.3	60.9
Medium Trucks:	59.7	51.6	45.3	43.7	52.2	52.4
Heavy Trucks:	64.6	52.6	43.6	44.8	54.5	54.6
Vehicle Noise:	**66.9**	**61.1**	**58.2**	**53.2**	**61.8**	**62.3**

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:						
Medium Trucks:						
Heavy Trucks:						
Vehicle Noise:						

CENTERLINE NOISE CONTOUR

Unmitigated	
60 dBA	191
65 dBA	60
70 dBA	19
Mitigated	
60 dBA	
65 dBA	
70 dBA	



Federal Highway Administration RD-77-108
Traffic Noise Prediction Model (CALVENO)

Project Name:	UCI Housing	Scenario:	Future Plus Project
Analyst:	Ryan Chiene	Job #:	150070
Roadway:	Culver Drive		
Road Segment:	Campus Drive to Anteater Drive/Shady Canyon Drive		

PROJECT DATA

Centerline Dist to Barrier	**0**
Barrier (0=wall, 1= berm):	**0**
Receiver Barrier Dist:	**0**
Centerline Dist. To Observer:	**100**
Barrier Near Lane CL Dist:	**0**
Barrier Far lane CL Dist:	**0**
Pad Elevation:	**0.5**
Road Elevation:	**0**
Observer Height (above grade):	**0**
Barrier Height:	**0**
Rt View: **90**	Lft View: **-90**

NOISE SOURCE ELEVATIONS (Feet)

Autos:	**0**
Medium Trucks:	**2.3**
Heavy Trucks:	**8**

SITE DATA

Road Grade:	0
Average Daily Traffic:	24600
Peak Hour Traffic:	**2460**
Vehicle Speed:	50
Centerline Separation:	30

NOISE INPUTS

Site conditions **HARD SITE**

FLEET MIX

Type	Day	Evening	Night	Daily
Auto	0.775	0.129	0.096	0.9742
Med. Truck	0.848	0.049	0.103	0.0184
Heavy Truck	0.865	0.027	0.108	0.0074

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)

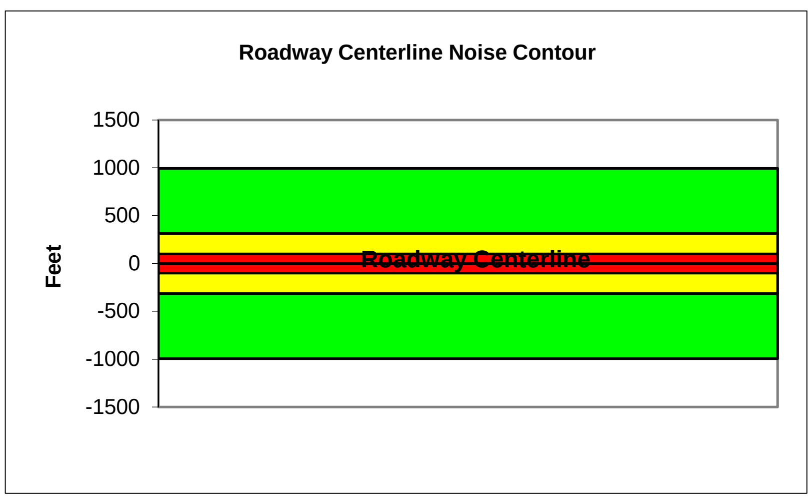
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	58.3	67.1	65.3	59.2	67.8	68.5
Medium Trucks:	66.0	57.9	51.5	49.9	58.4	58.7
Heavy Trucks:	70.2	58.2	49.2	50.4	59.8	59.9
Vehicle Noise:	**72.5**	**68.2**	**65.6**	**60.3**	**68.9**	**69.4**

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:						
Medium Trucks:						
Heavy Trucks:						
Vehicle Noise:						

CENTERLINE NOISE CONTOUR

Unmitigated	
60 dBA	993
65 dBA	314
70 dBA	99
Mitigated	
60 dBA	
65 dBA	
70 dBA	



Federal Highway Administration RD-77-108
Traffic Noise Prediction Model (CALVENO)

Project Name:	UCI Housing	Scenario:	Future Plus Project
Analyst:	Ryan Chiene	Job #:	150070
Roadway:	Bonita Canyon Drive		
Road Segment:	Shady Canyon Drive to Newport Coast Drive		

PROJECT DATA

Centerline Dist to Barrier			**0**
Barrier (0=wall, 1= berm):			**0**
Receiver Barrier Dist:			**0**
Centerline Dist. To Observer:			**200**
Barrier Near Lane CL Dist:			**0**
Barrier Far lane CL Dist:			**0**
Pad Elevation:			**0.5**
Road Elevation:			**0**
Observer Height (above grade):			**0**
Barrier Height:			**0**
Rt View:	**90**	Lft View:	**-90**

NOISE SOURCE ELEVATIONS (Feet)

Autos:	**0**
Medium Trucks:	**2.3**
Heavy Trucks:	**8**

SITE DATA

Road Grade:	0
Average Daily Traffic:	30300
Peak Hour Traffic:	**3030**
Vehicle Speed:	50
Centerline Separation:	50

NOISE INPUTS

Site conditions **HARD SITE**

FLEET MIX

Type	Day	Evening	Night	Daily
Auto	0.775	0.129	0.096	0.9742
Med. Truck	0.848	0.049	0.103	0.0184
Heavy Truck	0.865	0.027	0.108	0.0074

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)

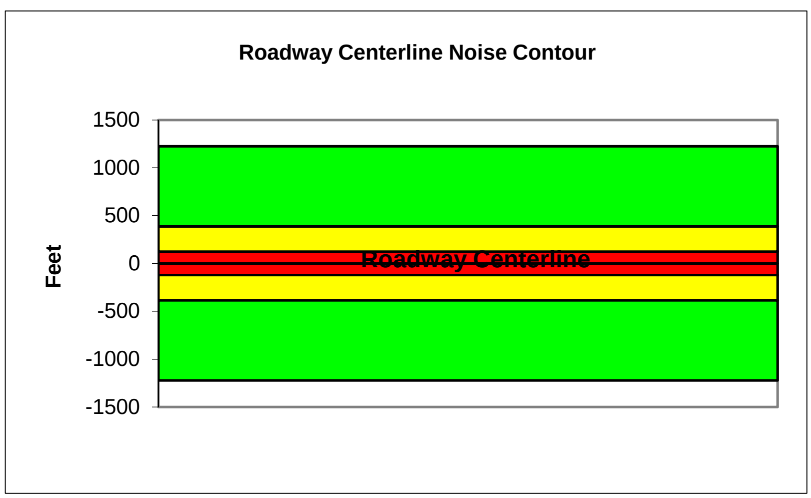
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	56.3	65.0	63.3	57.2	65.8	66.4
Medium Trucks:	63.9	55.9	49.5	47.9	56.4	56.6
Heavy Trucks:	68.2	56.2	47.2	48.4	57.8	57.9
Vehicle Noise:	**70.5**	**66.1**	**63.6**	**58.3**	**66.9**	**67.4**

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:						
Medium Trucks:						
Heavy Trucks:						
Vehicle Noise:						

CENTERLINE NOISE CONTOUR

Unmitigated	
60 dBA	1223
65 dBA	387
70 dBA	122
Mitigated	
60 dBA	
65 dBA	
70 dBA	



Federal Highway Administration RD-77-108
Traffic Noise Prediction Model (CALVENO)

Project Name:	UCI Housing	Scenario:	Future Plus Project
Analyst:	Ryan Chiene	Job #:	150070
Roadway:	Bonita Canyon Drive		
Road Segment:	West of Newport Coast Drive		

PROJECT DATA

Centerline Dist to Barrier	**0**
Barrier (0=wall, 1= berm):	**0**
Receiver Barrier Dist:	**0**
Centerline Dist. To Observer:	**100**
Barrier Near Lane CL Dist:	**0**
Barrier Far lane CL Dist:	**0**
Pad Elevation:	**0.5**
Road Elevation:	**0**
Observer Height (above grade):	**0**
Barrier Height:	**0**
Rt View: **90**	Lft View: **-90**

NOISE SOURCE ELEVATIONS (Feet)

Autos:	**0**
Medium Trucks:	**2.3**
Heavy Trucks:	**8**

SITE DATA

Road Grade:	0
Average Daily Traffic:	23400
Peak Hour Traffic:	**2340**
Vehicle Speed:	50
Centerline Separation:	50

NOISE INPUTS

Site conditions **HARD SITE**

FLEET MIX

Type	Day	Evening	Night	Daily
Auto	0.775	0.129	0.096	0.9742
Med. Truck	0.848	0.049	0.103	0.0184
Heavy Truck	0.865	0.027	0.108	0.0074

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)

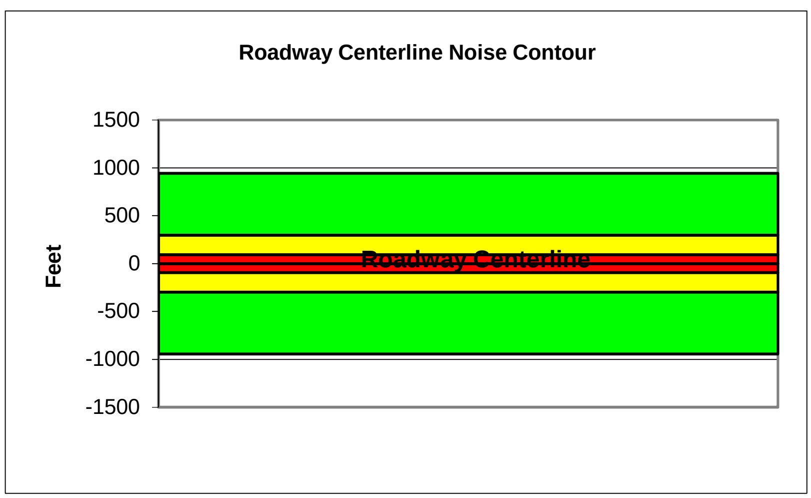
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	57.8	66.5	64.7	58.7	67.3	67.9
Medium Trucks:	65.4	57.4	51.0	49.4	57.9	58.1
Heavy Trucks:	69.7	57.7	48.7	49.9	59.3	59.4
Vehicle Noise:	**72.0**	**67.6**	**65.1**	**59.8**	**68.4**	**68.9**

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:						
Medium Trucks:						
Heavy Trucks:						
Vehicle Noise:						

CENTERLINE NOISE CONTOUR

Unmitigated	
60 dBA	944
65 dBA	299
70 dBA	94
Mitigated	
60 dBA	
65 dBA	
70 dBA	



Federal Highway Administration RD-77-108
Traffic Noise Prediction Model (CALVENO)

Project Name:	UCI Housing	Scenario:	Future Plus Project
Analyst:	Ryan Chiene	Job #:	150070
Roadway:	California Avenue		
Road Segment:	East of Anteater Drive		

PROJECT DATA			
Centerline Dist to Barrier			**0**
Barrier (0=wall, 1= berm):			**0**
Receiver Barrier Dist:			**0**
Centerline Dist. To Observer:			**100**
Barrier Near Lane CL Dist:			**0**
Barrier Far lane CL Dist:			**0**
Pad Elevation:			**0.5**
Road Elevation:			**0**
Observer Height (above grade):			**0**
Barrier Height:			**0**
Rt View:	**90**	Lft View:	**-90**

NOISE SOURCE ELEVATIONS (Feet)	
Autos:	**0**
Medium Trucks:	**2.3**
Heavy Trucks:	**8**

SITE DATA	
Road Grade:	0
Average Daily Traffic:	11000
Peak Hour Traffic:	**1100**
Vehicle Speed:	40
Centerline Separation:	24

NOISE INPUTS

Site conditions **HARD SITE**

FLEET MIX

Type	Day	Evening	Night	Daily
Auto	0.775	0.129	0.096	0.9742
Med. Truck	0.848	0.049	0.103	0.0184
Heavy Truck	0.865	0.027	0.108	0.0074

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)

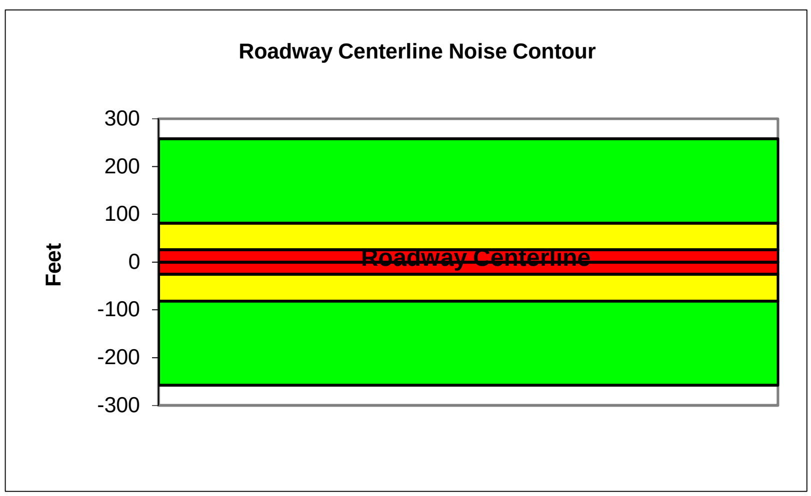
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	52.1	60.9	59.1	53.0	61.7	62.3
Medium Trucks:	61.1	53.0	46.6	45.0	53.5	53.8
Heavy Trucks:	65.9	54.0	44.9	46.1	55.8	56.0
Vehicle Noise:	**68.3**	**62.5**	**59.5**	**54.6**	**63.2**	**63.7**

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:						
Medium Trucks:						
Heavy Trucks:						
Vehicle Noise:						

CENTERLINE NOISE CONTOUR

Unmitigated	
60 dBA	258
65 dBA	82
70 dBA	26
Mitigated	
60 dBA	
65 dBA	
70 dBA	



Federal Highway Administration RD-77-108
Traffic Noise Prediction Model (CALVENO)

Project Name:	UCI Housing	Scenario:	Future Plus Project
Analyst:	Ryan Chiene	Job #:	150070
Roadway:	Anteater Drive		
Road Segment:	North of California Avenue		

PROJECT DATA

Centerline Dist to Barrier	**0**
Barrier (0=wall, 1= berm):	**0**
Receiver Barrier Dist:	**0**
Centerline Dist. To Observer:	**100**
Barrier Near Lane CL Dist:	**0**
Barrier Far lane CL Dist:	**0**
Pad Elevation:	**0.5**
Road Elevation:	**0**
Observer Height (above grade):	**0**
Barrier Height:	**0**
Rt View: **90**	Lft View: **-90**

NOISE SOURCE ELEVATIONS (Feet)

Autos:	**0**
Medium Trucks:	**2.3**
Heavy Trucks:	**8**

SITE DATA

Road Grade:	0
Average Daily Traffic:	14000
Peak Hour Traffic:	**1400**
Vehicle Speed:	40
Centerline Separation:	28

NOISE INPUTS

Site conditions **HARD SITE**

FLEET MIX

Type	Day	Evening	Night	Daily
Auto	0.775	0.129	0.096	0.9742
Med. Truck	0.848	0.049	0.103	0.0184
Heavy Truck	0.865	0.027	0.108	0.0074

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)

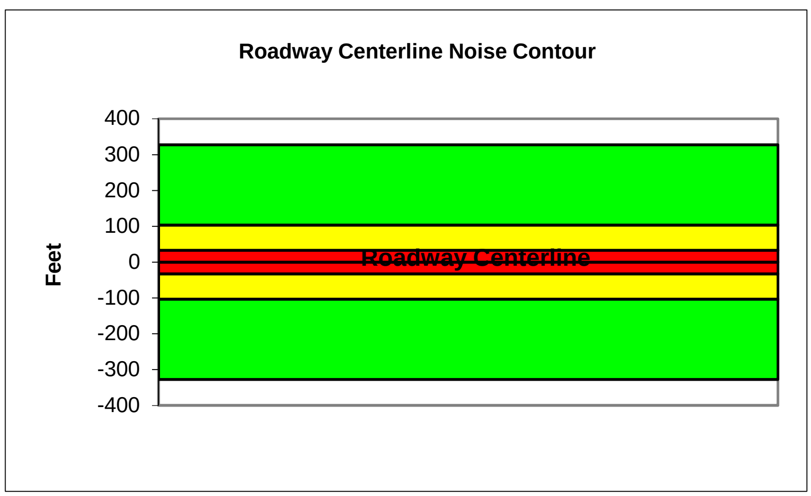
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	53.1	61.9	60.1	54.0	62.6	63.2
Medium Trucks:	62.0	54.0	47.6	46.0	54.5	54.7
Heavy Trucks:	66.9	54.9	45.9	47.1	56.8	56.9
Vehicle Noise:	**69.3**	**63.4**	**60.5**	**55.6**	**64.1**	**64.6**

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:						
Medium Trucks:						
Heavy Trucks:						
Vehicle Noise:						

CENTERLINE NOISE CONTOUR

Unmitigated	
60 dBA	328
65 dBA	104
70 dBA	33
Mitigated	
60 dBA	
65 dBA	
70 dBA	



Federal Highway Administration RD-77-108
Traffic Noise Prediction Model (CALVENO)

Project Name:	UCI Housing	Scenario:	Future Plus Project
Analyst:	Ryan Chiene	Job #:	150070
Roadway:	Anteater Drive		
Road Segment:	South of California Avenue		

PROJECT DATA

Centerline Dist to Barrier	**0**
Barrier (0=wall, 1= berm):	**0**
Receiver Barrier Dist:	**0**
Centerline Dist. To Observer:	**100**
Barrier Near Lane CL Dist:	**0**
Barrier Far lane CL Dist:	**0**
Pad Elevation:	**0.5**
Road Elevation:	**0**
Observer Height (above grade):	**0**
Barrier Height:	**0**
Rt View: **90**	Lft View: **-90**

NOISE SOURCE ELEVATIONS (Feet)

Autos:	**0**
Medium Trucks:	**2.3**
Heavy Trucks:	**8**

SITE DATA

Road Grade:	0
Average Daily Traffic:	11000
Peak Hour Traffic:	**1100**
Vehicle Speed:	40
Centerline Separation:	26

NOISE INPUTS

Site conditions **HARD SITE**

FLEET MIX

Type	Day	Evening	Night	Daily
Auto	0.775	0.129	0.096	0.9742
Med. Truck	0.848	0.049	0.103	0.0184
Heavy Truck	0.865	0.027	0.108	0.0074

UNMITIGATED NOISE LEVELS (No topographic or barrier attenuation)

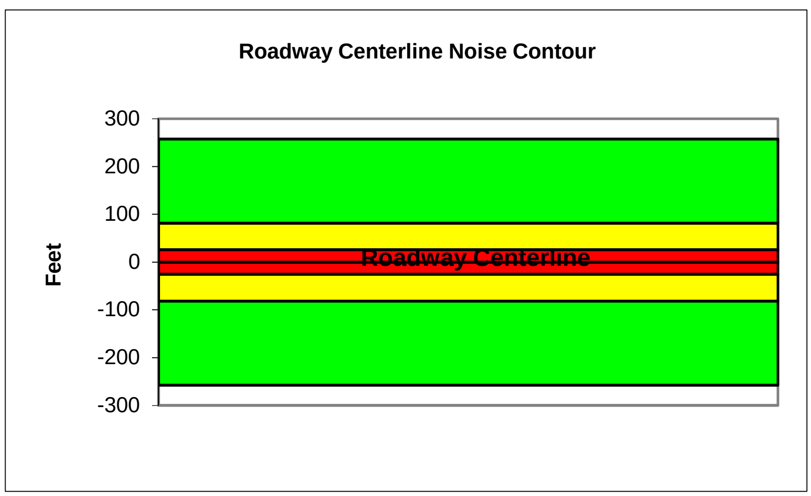
Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	52.1	60.8	59.1	53.0	61.6	62.2
Medium Trucks:	61.0	53.0	46.6	45.0	53.5	53.7
Heavy Trucks:	65.9	53.9	44.9	46.1	55.8	55.9
Vehicle Noise:	**68.2**	**62.4**	**59.5**	**54.6**	**63.1**	**63.6**

MITIGATED NOISE LEVELS (With topographic or barrier attenuation)

Vehicle Type	Peak Leq	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:						
Medium Trucks:						
Heavy Trucks:						
Vehicle Noise:						

CENTERLINE NOISE CONTOUR

Unmitigated	
60 dBA	258
65 dBA	82
70 dBA	26
Mitigated	
60 dBA	
65 dBA	
70 dBA	



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APPENDIX D

Traffic Study

University Hills PA11
Traffic Study

UC Irvine

Prepared for:
Irvine Campus Housing Authority

Prepared by:
Stantec Consulting Services Inc.

March 4, 2016

Sign-off Sheet

This document entitled University Hills PA11 Traffic Study was prepared by Stantec Consulting Services Inc. ("Stantec") for the account of the Irvine Campus Housing Authority (the "Client").

Prepared by ____
(signature)

Cathy Lawrence, PE
(949) 923-6064

Reviewed by ____
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Reviewed by ____
(signature)

Melissa Dugan, PTP, ENV SP
(949) 923-6216

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Glossary

ADT	**Average Daily Traffic.** Generally used to measure the total two-directional traffic volumes passing a given point on a roadway.
CMP	**Congestion Management Program.** A state mandated program administered by the Orange County Transportation Authority (OCTA) that provides a mechanism for coordinating land use and development decisions.
DU	**Dwelling Unit.** Used in quantifying residential land use.
ICU	**Intersection Capacity Utilization.** A measure of the volume-to-capacity ratio for an intersection. Typically used to determine the peak hour level of service for a given set of intersection volumes.
LOS	**Level of Service.** A scale used to evaluate circulation system performance based on ICU values at intersections or volume-to-capacity ratios of arterial segments.
MPAH	**Master Plan of Arterial Highways.**
Peak Hour	This refers to the hour during the AM peak period (typically 7 AM to 9 AM) or the PM peak period (typically 4 PM to 6 PM) in which the greatest number of vehicle trips are generated by a given land use or are travelling on a given roadway.
TSF	**Thousand Square Feet.** Used in quantifying non-residential land uses, and refers to building floor area.
V/C	**Volume-to-Capacity Ratio.** This is typically used to describe the percentage of capacity utilized by existing or projected traffic on a segment of an arterial or intersection.

1.0 INTRODUCTION

Stantec Consulting Services Inc. (Stantec) has performed a traffic impact analysis for a proposed faculty/staff residential project in the University Hills area of the UC Irvine campus. The purpose of the study is to determine the amount of traffic generated by the proposed project and to analyze the impacts of the project on the circulation system. This report summarizes the traffic impact analysis prepared for the environmental review process.

1.1 BACKGROUND AND SCOPE

The project site is located on 29.2 acres along Anteater Drive between California Avenue and Bonita Canyon Road/Culver Drive. The project site is generally bounded by California Avenue to the north, Anteater Drive to the east, Bonita Canyon Drive to the south, and University Hills Area 10, currently under construction, to the west. The location of the project site is shown in **Figure 1-1**. The proposed project consists of 160 single family dwelling units and 140 apartment units for a total of 300 dwelling units. The project site is currently undeveloped.

The current UCI Long Range Development Plan (LRDP) was adopted in 2007, and established a land use plan and physical planning framework to accommodate projected enrollment levels, additional academic facilities and housing, and the on-campus circulation system through the 2025-2026 horizon year. Development of the proposed project will complete the faculty housing component of the LRDP. Furthermore, the proposed 300 dwelling unit project would add 26 dwelling units above the level of faculty/staff housing planned in the LRDP.

The traffic study provides near term and long-range conditions as required by the California Environmental Quality Act (CEQA). These scenarios include existing conditions and long-range cumulative conditions (2035 and beyond). The long-range analysis examines the project in a LRDP buildout context. The study area includes mid-block segments and intersections located in the cities of Irvine and Newport Beach, as well as on the UCI main campus.

Chapter 2.0 of this report provides the transportation setting for the impact analysis, and Chapter 3.0 provides a detailed project description. Chapter 4.0 focuses on the potential traffic impacts of the project.

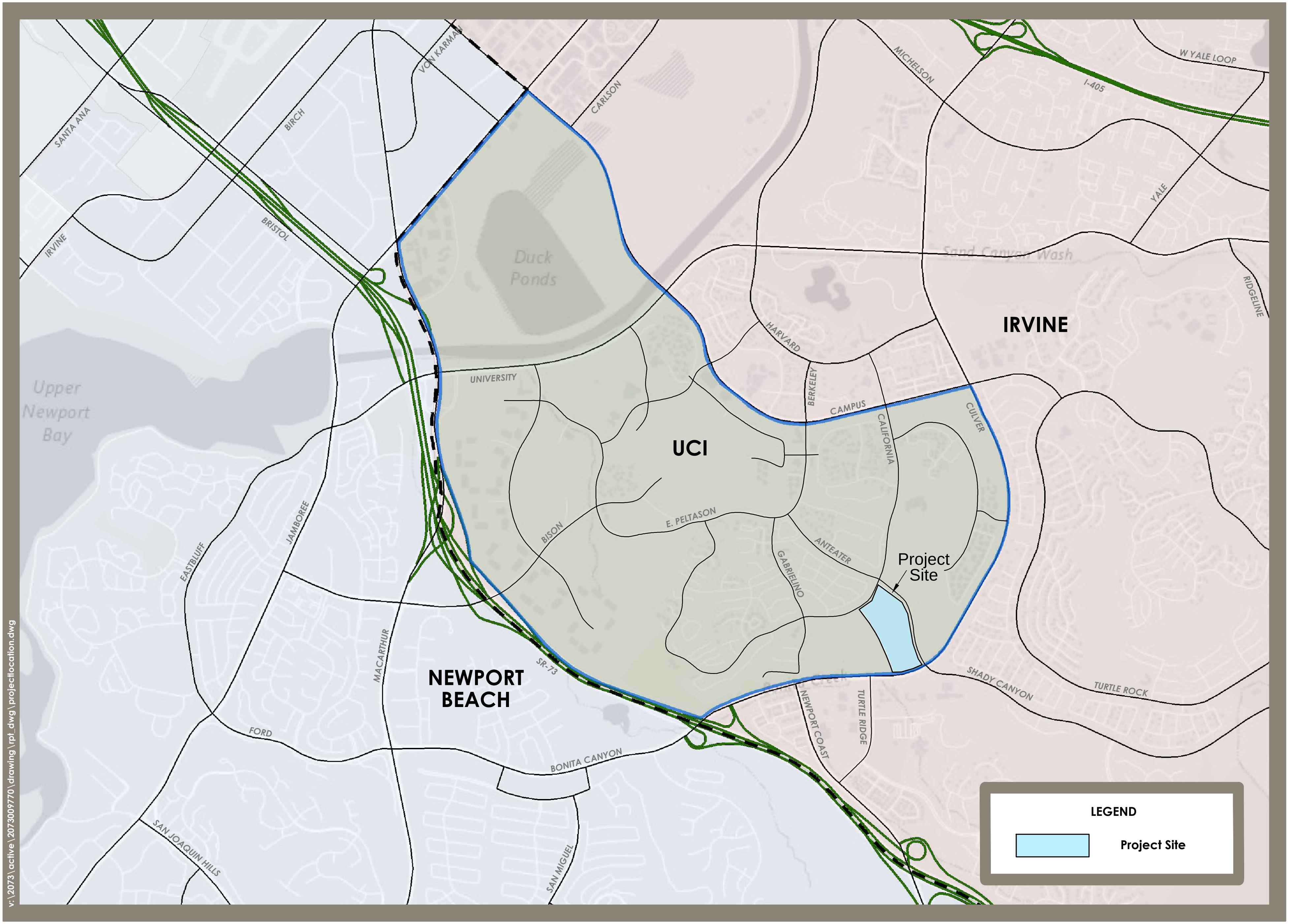

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Figure 1-1

Project Location

1.2 METHODOLOGY

The traffic forecasts for the study area circulation system were generated using a combination of data from the UCI Main Campus Traffic Model (MCTM) and the City of Irvine Traffic Analysis Model (ITAM) for the long-range analysis. Project-generated traffic volumes are estimated using the MCTM and the overall distribution of project traffic is based on the project trip distribution derived from the ITAM. The ITAM can provide off-campus trip distribution patterns whereas the UCI MCTM is limited to on-campus traffic patterns. The project volumes were then added to the no-project volumes, resulting in with-project volumes.

1.3 PERFORMANCE CRITERIA

The traffic analysis uses a set of performance criteria for evaluating intersection capacity to determine potential project impacts. In traffic impact studies, impact criteria are based on two primary measures. The first is "capacity," which establishes the vehicle carrying ability of a road segment, and the second is "volume." The volume-to-capacity (V/C) ratio corresponds with a level of service (LOS). Traffic LOS is designated A through F, with LOS A representing free flow conditions, and LOS F representing severe traffic congestion. Traffic flow quality for the different LOS is described in **Table 1-1**.

Average daily traffic (ADT) volumes are presented for roadway links in the study area, and the V/C ratios of off-campus roadways in the City of Irvine are analyzed. The traffic analysis also analyzes the AM and PM peak hour volumes for study area intersections. Peak hour volumes and capacities are compared by means of intersection capacity utilization (ICU) values for signalized intersections.

For the stop-controlled intersections, the Highway Capacity Manual (HCM) methodology for estimating intersection delay is used to determine the intersection peak hour LOS. In addition, the Caltrans freeway/toll road ramp intersections are analyzed in this study using the HCM delay methodology, which is preferred by Caltrans, for signalized intersections in addition to the ICU methodology. The ICU values and vehicle delay ranges that correspond to LOS A through F are summarized in **Table 1-2**.

Both the V/C and LOS are used in identifying impacts. Certain LOS values are deemed acceptable by the various governing jurisdictions within the traffic analysis study area, and increases in the V/C ratio which cause or contribute to the LOS being unacceptable are defined as an adverse impact. LOS D is the performance standard applied in this study for the intersections in the study area.

Table 1-1 Level of Service Descriptions – Arterial Streets and Intersections

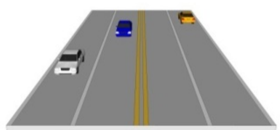
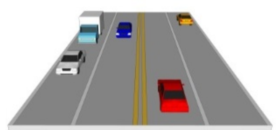
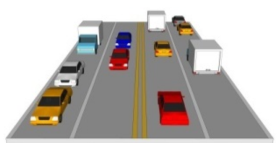
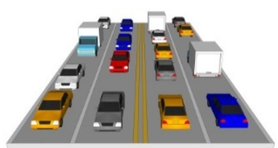
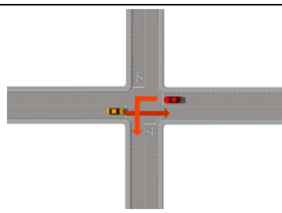
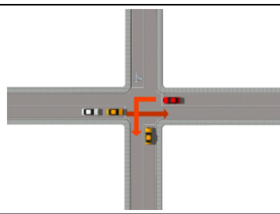
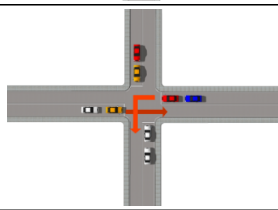
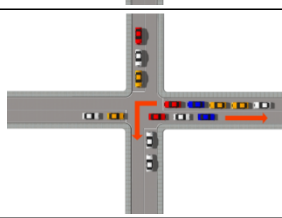
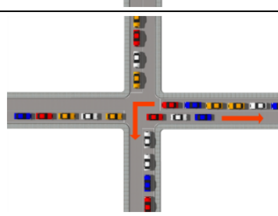
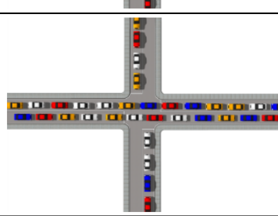
Level of Service (LOS)		Description
A		LOS A describes primarily free-flow operations. Vehicles are completely unimpeded in their ability to maneuver within the traffic stream. Control delay at the intersections is minimal. The travel speed exceeds 85% of the base free-flow speed.
B		LOS B describes reasonably unimpeded operation. The ability to maneuver within the traffic stream is only slightly restricted, and control delay at the intersections is not significant. The travel speed is between 67% and 85% of the base free-flow speed.
C		LOS C describes stable operation. The ability to maneuver and change lanes at midsegment locations may be more restricted than at LOS B. Longer queues at the intersections may contribute to lower travel speeds. The travel speed is between 50% and 67% of the base free-flow speed.
D		LOS D indicates a less stable condition in which small increases in flow may cause substantial increases in delay and decreases in travel speed. This operation may be due to adverse signal progression, high volume, or inappropriate signal timing at the intersections. The travel speed is between 40% and 50% of the base free-flow speed.
E		LOS E is characterized by unstable operation and significant delay. Such operations may be due to some combination of adverse progression, high volume, and inappropriate signal timing at the intersections. The travel speed is between 30% and 40% of the base free-flow speed.
F		LOS F is characterized by flow at extremely low speed. Congestion is likely occurring at the intersections, as indicated by high delay and extensive queuing. The travel speed is 30% or less of the base free-flow speed.
Source: Highway Capacity Manual 2010, Transportation Research Board, National Research Council		

Table 1-2 Intersection Level of Service Ranges (ICU and HCM Delay)

Level of Service (LOS)		Intersection Capacity Utilization (ICU)	Highway Capacity Manual (HCM) Average Delay	
			Signalized Intersection	Stop-Controlled Intersection
A		0.00 – 0.60	0.00 – 10.0 seconds	0.00 – 10.0 seconds
B		0.61 – 0.70	10.1 – 20.0 seconds	10.1 – 15.0 seconds
C		0.71 – 0.80	20.1 – 35.0 seconds	15.1 – 25.0 seconds
D		0.81 – 0.90	35.1 – 55.0 seconds	25.1 – 35.0 seconds
E		0.91 – 1.00	55.1 – 80.0 seconds	35.1 – 50.0 seconds
F		Above 1.00	Above 80.0 seconds	Above 50.0 seconds
Source: Highway Capacity Manual 2010, Transportation Research Board, National Research Council				

Significant impacts are defined for this analysis as an increase of .02 or more in the V/C or ICU value per the City of Irvine Traffic Impact Analysis Guidelines, or .01 or more per the City of Newport Beach Traffic Impact Analysis Guidelines, or an increase of 5 seconds or more in the average delay at a signalized intersection that reaches LOS E or F during the AM or PM peak hour. These increases at a signalized intersection operating at LOS D or better are not considered a significant impact. Since UCI does not have an adopted performance criteria for intersections, the City of Irvine's performance criteria were used in the analysis to identify project impacts at on-campus signalized intersection locations. For the stop-controlled study intersections, if the LOS reaches E or F, the intersection is evaluated further for possible improvement with a traffic signal.

The performance criteria adopted by the cities of Irvine and Newport Beach are summarized in **Table 1-3**.

1.4 STUDY AREA

The study area encompasses 13 intersections in and around the UCI campus. The study area was determined by where the project impact becomes insignificant on a peak hour basis. Three of the intersections are located within the UCI campus, nine are located in the City of Irvine, and one is located in the City of Newport Beach. Two of the study intersections in the City of Irvine and the intersection in Newport Beach are also under Caltrans jurisdiction. There are no Orange County Congestion Management Program (CMP) monitoring intersections within the study area. **Figure 1-2** illustrates the study area for the project.

1.5 REFERENCES

1. *Highway Capacity Manual 2010*, Transportation Research Board, 2010.

2. *Trip Generation Manual, 9th Edition*, Institute of Transportation Engineers, 2012.

Table 1-3 Performance Criteria for Locations Analyzed within the Study Area

I. Arterial Roads

V/C Calculation Methodology

Level of service based on average daily traffic (ADT) volume/capacity ratios and calculated using the following capacities:

City of Irvine

Major Arterial (8)	8 lanes	72,000
Major Arterial (6)	6 lanes	54,000
Primary Arterial	4 lanes	32,000
Secondary Arterial	4 lanes	28,000
Commuter	2 lanes	13,000

As required by the City of Irvine Link Capacity Analysis guidelines, arterial deficiencies identified based on ADT V/C ratios are to be further examined using peak hour data.

Performance Standard

City of Irvine
Level of service D (V/C less than or equal to 0.90)

Mitigation Requirement

For arterial roads in the City of Irvine with a V/C greater than the acceptable level of service, mitigation of the project contribution is required to bring the link location back to acceptable level of service where the deficiency is caused by the project, or to no-project conditions or better for locations where the project adds to a deficient condition by 0.02 or greater.
(The City of Newport Beach does not apply a performance standard to roadway segments, instead relying on intersection analysis for the determination of significant impacts)

II. Intersections

V/C Calculation Methodology

Level of service based on peak hour intersection capacity utilization (ICU) values and calculated using the following assumptions:

City of Irvine & UCI
Saturation Flow Rate: 1,700 vehicles/hour/lane
Clearance Interval: .05
Right-Turn-On-Red Utilization Factor*: .75
* "De-facto" right-turn lane is assumed in the ICU calculation if 19 feet from edge to outside of through-lane exists and parking is prohibited during peak periods.

City of Newport Beach
Saturation Flow Rate: 1,600 vehicles/hour/lane
Clearance Interval: .00
Right-Turn-On-Red Utilization Factor*: .00
* "De-facto" right-turn lane is assumed in the ICU calculation if 19 feet from edge to outside of through-lane exists and parking is prohibited during peak periods.

Table 1-3 (cont.)

II. Intersections (cont.)

HCM Delay Methodology

Level of service based on peak hour average intersection delay and calculated using the following assumptions:

Ideal Flow Rate: 1,900 vehicles/hour/lane
Peak Hour Factor: .92 at signalized intersections, measured PHF at stop-controlled intersections
Percent Heavy Vehicles: 2%
Yellow Clearance: 3.5 seconds
All-red: .5 seconds

Performance Standard

Level of service D

Mitigation Requirement

For signalized intersections operating greater than the acceptable level of service, mitigation of the project contribution is required to bring the intersection back to an acceptable level of service where the deficiency is caused by the project, or to no-project conditions or better for locations where the project adds to a deficient condition by .02 or greater for locations in the City of Irvine, or .01 or greater for locations in the City of Newport Beach, or a delay of 5 seconds or more for a Caltrans intersection.

For stop-controlled intersections operating greater than the acceptable level of service, the intersection is evaluated further for possible improvement with a traffic signal.

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Figure 1-2

Study Intersection Location

2.0 TRANSPORTATION SETTING

This chapter describes the transportation setting for the proposed project. Existing and opening year traffic conditions in the traffic analysis study area are summarized, and the future circulation system planned for the UCI LRDP buildout is described.

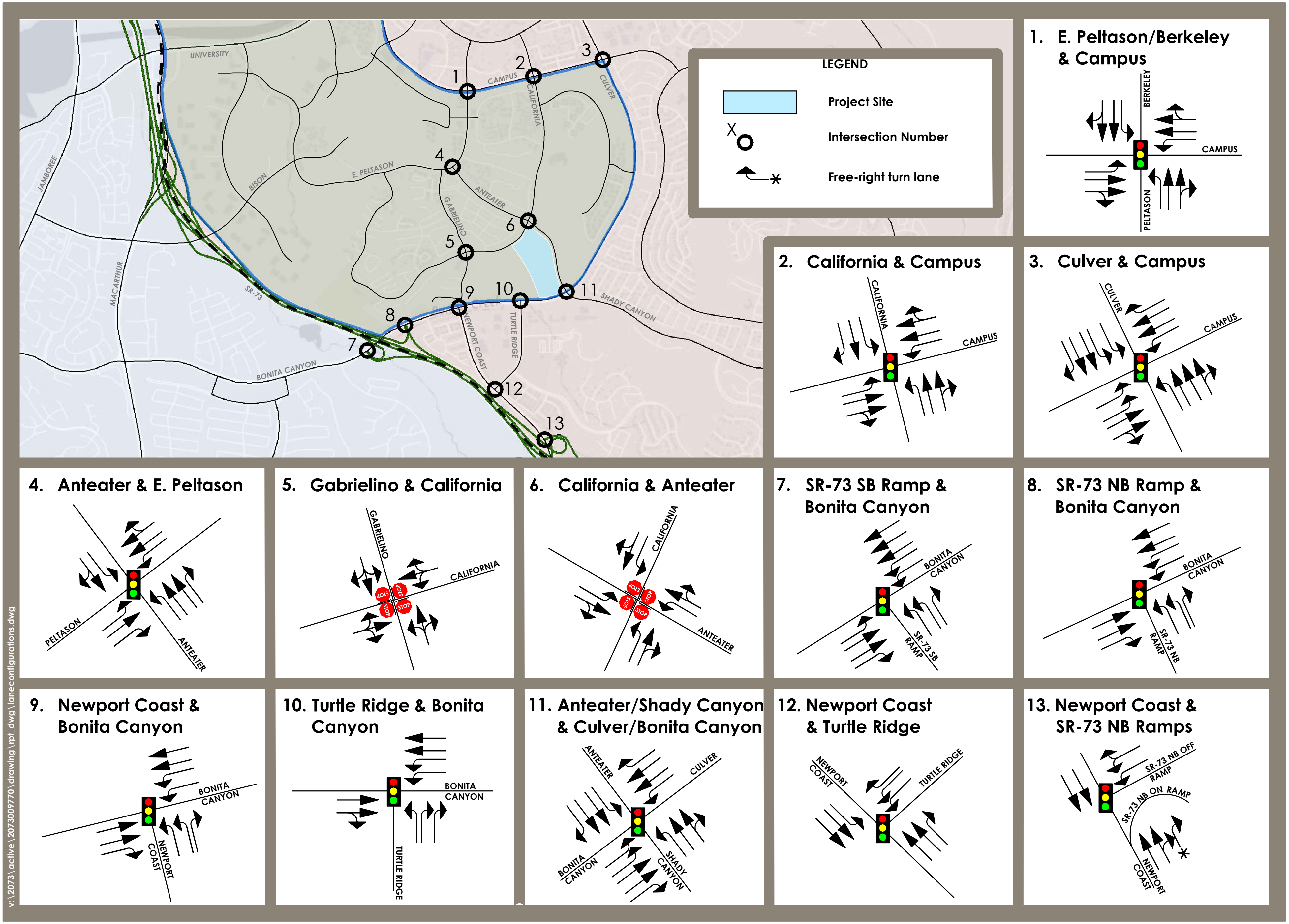
2.1 EXISTING ROADWAY SYSTEM

The study area encompasses three intersections within the UCI campus and 10 intersections along the perimeter of the UCI campus and in the surrounding cities of Irvine and Newport Beach. Two of the on-campus study intersections are stop-controlled, and the remaining study intersections are signalized. The off-campus study intersections are located along Campus Drive, Culver Drive/Bonita Canyon Drive, and Newport Coast Drive. Intersection lane configurations and intersection controls are illustrated in **Figure 2-1**.

Campus Drive is designated as a Primary Arterial on the City of Irvine and the Orange County Master Plan of Arterial Highways (MPAH). Campus Drive begins at MacArthur Boulevard to the west and continues in a generally northwest to southeast direction to east of Culver Drive. Campus Drive provides four travel lanes with a raised median through the study area. Campus Drive provides the northeast boundary of the UCI main campus. The speed limit is 45 mph in the vicinity. On-street parking is not allowed, and a striped bike lane is provided.

Culver Drive runs generally northeast to southwest from Portola Parkway in northeast Irvine to Michelson Drive where it curves toward the south between Michelson Drive and University Drive. South of University Drive, it curves southeast and then west around the eastern and southern boundary of the UCI campus, where Culver Drive turns into Bonita Canyon Drive west of Shady Canyon Drive/Anteater Drive. Bonita Canyon Drive continues west into the City of Newport Beach and becomes Ford Road west of MacArthur Boulevard. Bonita Canyon Drive provides full access to SR-73 just west of the project site. Culver Drive is a Major Arterial north of Campus Drive and a Primary Arterial south of Campus Drive through the study area. Bonita Canyon Drive is designated as a Primary Arterial. Culver Drive/Bonita Canyon Drive is four lanes with a raised median through the study area, except for a short section near the SR-73 Toll Road where the roadway varies from five to six lanes. On-street parking is prohibited and a striped bike lane is provided. The speed limit on Culver Drive is 50 mph north of Campus Drive and 55 mph south of Campus Drive, and the speed limit on Bonita Canyon Drive is 50 mph.

Peltason Drive begins opposite Bridge Road at Campus Drive and loops through the UCI campus to opposite Berkeley Avenue at Campus Drive. Peltason Drive is a two-lane local street through most of the campus with a raised median east of Bison Avenue, and a four-lane local street with a raised median from Pereira Drive to Berkeley Avenue. The speed limit is 30 mph. On-street parking is not allowed. An on-street bike lane is provided.



Stantec

Figure 2-1

Intersection Lane Configurations and Traffic Control

California Avenue begins on-campus at the end of Los Trancos Drive west of the project site, and continues in a generally northeast direction past the project site where it turns toward the north and terminates north of the UCI campus at Harvard Avenue. California Avenue is designated as a Primary Arterial. It is a two-lane road between Los Trancos Drive and Adobe Circle, and a four-lane road north of Adobe Circle. On-street parking is prohibited, and a striped bike lane is provided.

Anteater Drive is a Secondary Arterial located on-campus between E. Peltason Drive and Culver Drive/Bonita Canyon Drive and has a speed limit of 40 mph. Anteater Drive is a two lane roadway with a raised median and turn pockets at intersections. Parking is prohibited, and a bike lane is provided. A four-way stop is provided at California Avenue, and signals are provided at E. Peltason Drive and at Culver Drive/Bonita Canyon Drive. Shady Canyon Drive begins opposite Anteater Drive at Culver Drive/Bonita Canyon Drive which provides access to the gated community of Shady Canyon east of the campus.

Newport Coast Drive begins at Bonita Canyon Drive and continues south to Coast Highway. It provides limited access to SR-73. Newport Coast Drive is a Primary Arterial north of SR-73 and a Major Arterial south of SR-73. Newport Coast Drive is four lanes north of SR-73 and six lanes south of SR-73. Parking is prohibited, and a bike lane is provided.

SR-73, known as the Corona del Mar Freeway north of Bonita Canyon Road and San Joaquin Hills Transportation Corridor south of Bonita Canyon Road, is a toll facility between Bonita Canyon Road and its terminus at I-5 southeast of the project site. SR-73 travels southeast from I-405 in Costa Mesa to I-5 in San Juan Capistrano. SR-73 provides eight lanes in the vicinity. Interchanges that serve the UCI campus area are provided at University Drive, Bison Avenue, Bonita Canyon Drive, and Newport Coast Drive.

2.2 EXISTING VOLUMES

Existing ADT and peak hour volumes were counted in November 2015 while classes were in session. ADT volumes were counted for key roadway segments in the vicinity and are illustrated in **Figure 2-2**. The City of Irvine requires a link capacity analysis based on the V/C ratios. All of the mid-block study segments in the City of Irvine currently operate at LOS D or better.

Existing peak hour turning movement volumes were collected at the study intersections. **Figure 2-3** illustrates the existing AM peak hour intersection volumes at the study intersections, and **Figure 2-4** illustrates the existing PM peak hour volumes. Actual count data is included in **Appendix A**.

2.3 EXISTING INTERSECTION LEVELS OF SERVICE

Existing ICU values were calculated for the signalized study intersections based on the AM and PM peak hour turning movement counts presented above and existing lane configurations.

Existing AM and PM peak hour ICU values are summarized in **Table 2-2** (actual ICU calculation worksheets are included in **Appendix B**). As this table shows, the signalized study intersections currently operate at LOS A during the AM and PM peak hours based on the ICU methodology.

Table 2-1 Existing Intersection LOS Summary

Intersection	Jurisdiction	AM Peak Hour		PM Peak Hour	
		ICU/Delay	LOS	ICU/Delay	LOS
ICU Methodology					
1. E Peltason/Berkeley & Campus	Irvine	.40	A	.50	A
2. California & Campus	Irvine	.39	A	.49	A
3. Culver & Campus	Irvine	.53	A	.51	A
4. Anteater & E Peltason	UCI	.46	A	.58	A
7. SR-73 SB & Bonita Canyon	Newport Bch/Caltrans	.38	A	.52	A
8. SR-73 NB & Bonita Canyon	Irvine/Caltrans	.51	A	.49	A
9. Newport Coast & Bonita Canyon	Irvine	.44	A	.50	A
10. Turtle Ridge & Bonita Canyon	Irvine	.51	A	.50	A
11. Anteater/Shady Cyn & Culver/Bonita Cyn	Irvine	.52	A	.42	A
12. Newport Coast & Turtle Ridge	Irvine	.31	A	.32	A
13. Newport Coast & SR-73 NB	Irvine/Caltrans	.37	A	.30	A
HCM Delay Methodology					
5. Gabrielino & California [1]	UCI	8 sec	A	8 sec	A
6. California & Anteater [1]	UCI	11 sec	B	13 sec	B
7. SR-73 SB & Bonita Canyon	Newport Bch/Caltrans	4 sec	A	7 sec	A
8. SR-73 NB & Bonita Canyon	Irvine/Caltrans	10 sec	B	7 sec	A
13. Newport Coast & SR-73 NB	Irvine/Caltrans	6 sec	A	3 sec	A
[1] Stop-controlled intersection					

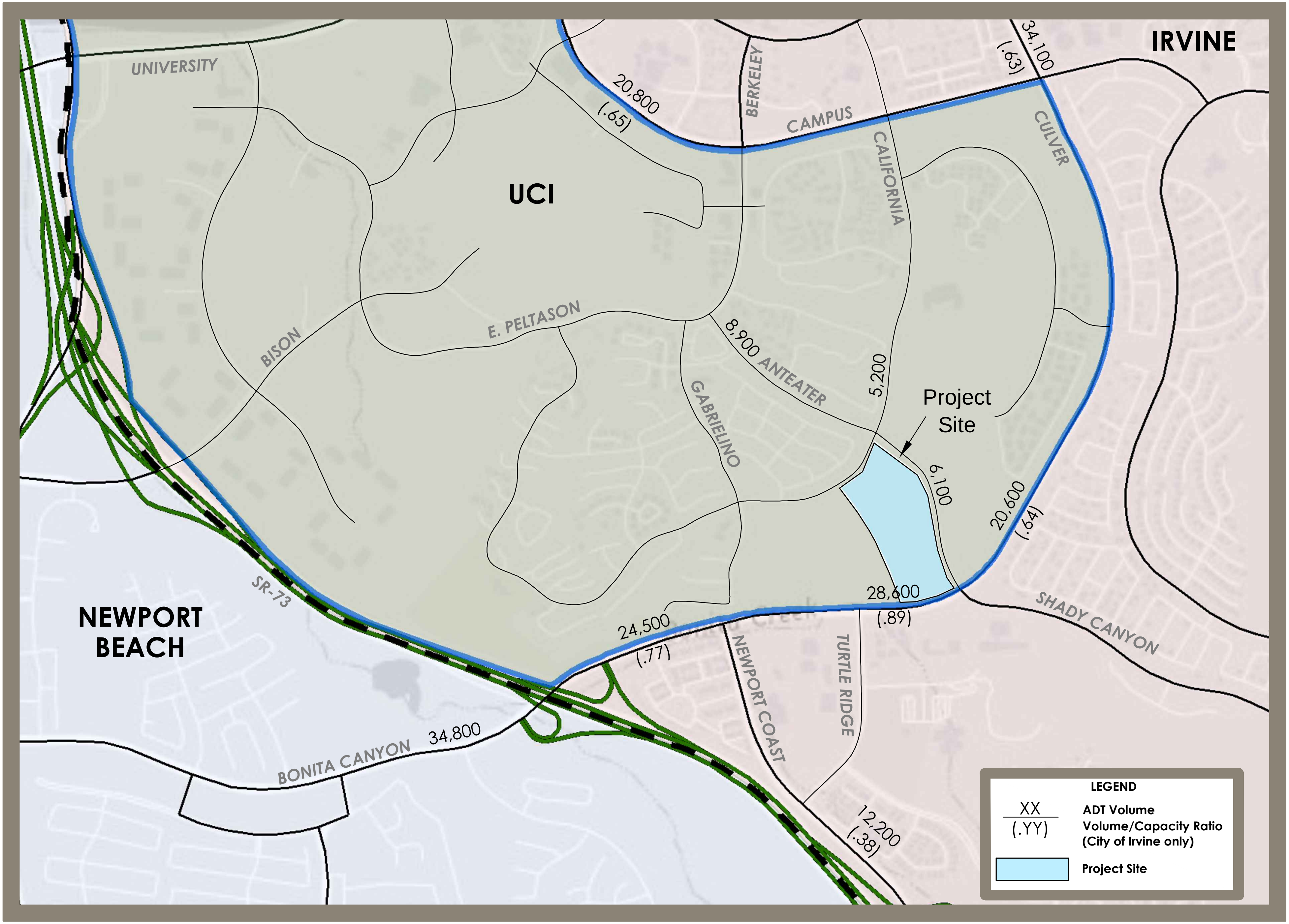


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Figure 2-2

Existing ADT Volumes

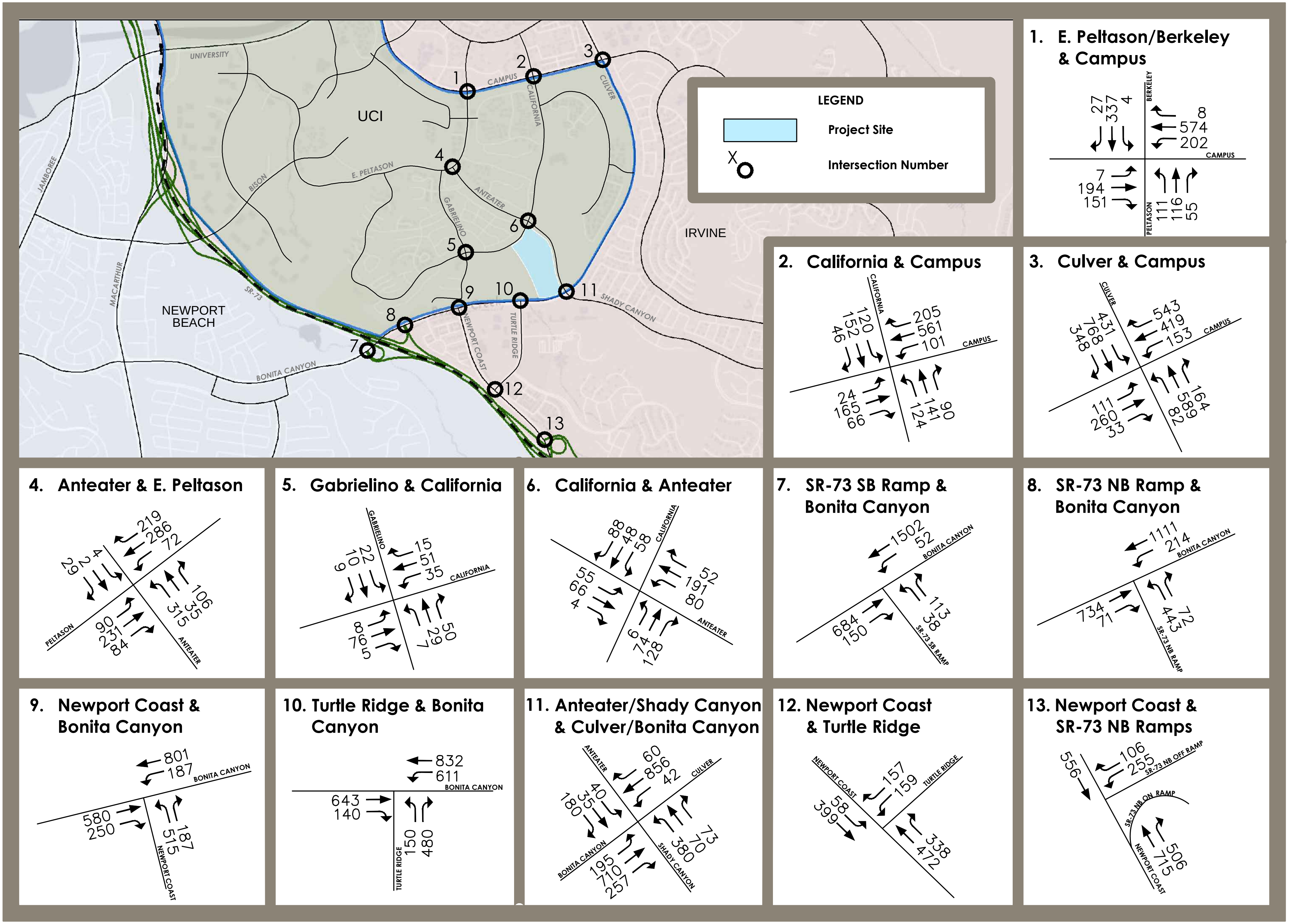

Figure 2-3

Existing AM Peak Hour Intersection Volumes

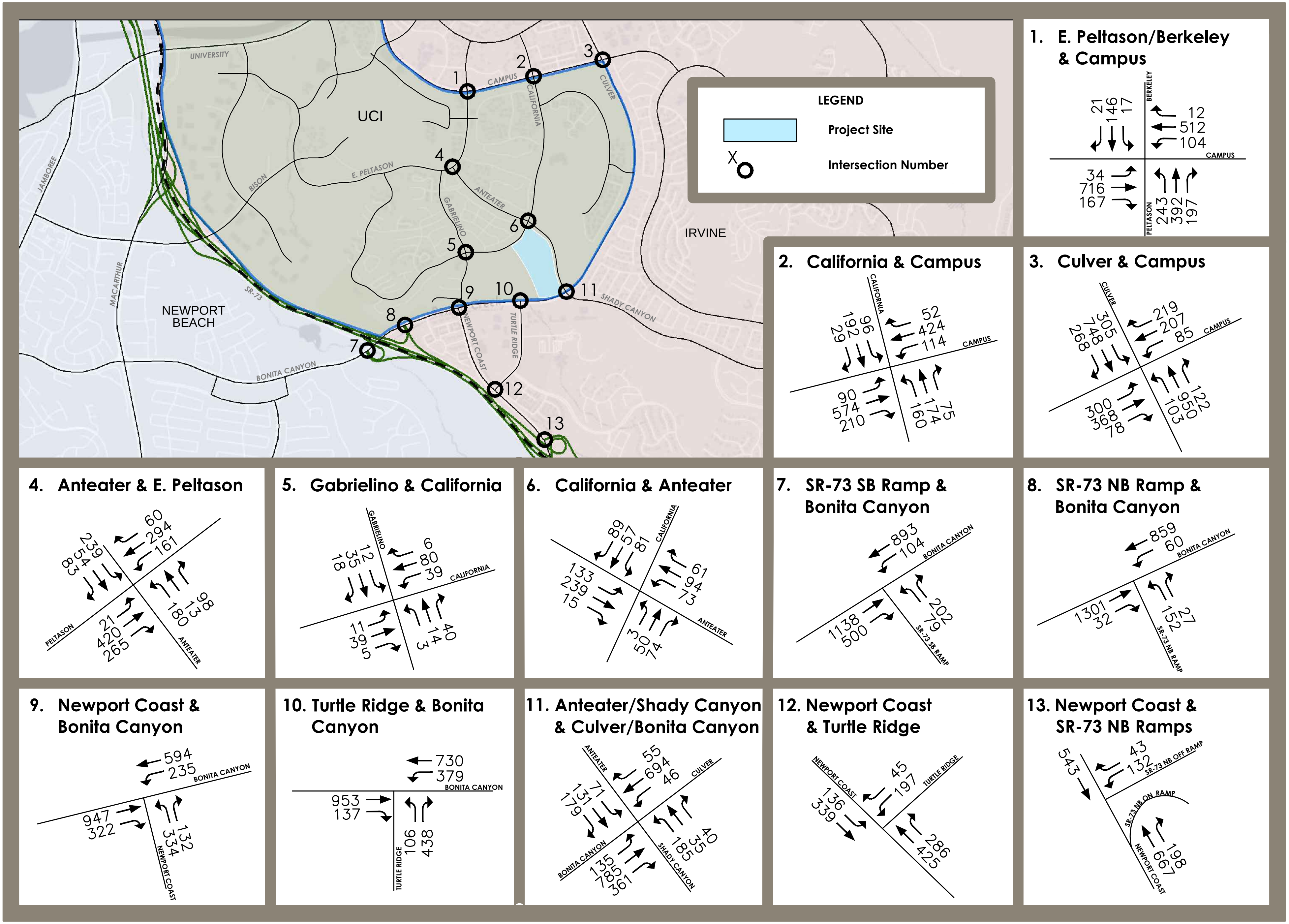

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Figure 2-4

Existing PM Peak Hour Intersection Volumes

The SR-73 on- and off-ramps are under Caltrans jurisdiction. Caltrans uses the HCM delay methodology for the analysis of its intersections. The two study intersections at the SR-73/Bonita Canyon Road interchange and the SR-73/Newport Coast Drive interchange were analyzed using the HCM delay methodology in addition to the ICU analysis. The results of both analyses are summarized in Table 2-1 (HCM delay calculation worksheets are included in **Appendix C**). Also, the intersections of Gabrielino Road at California Avenue and California Avenue at Anteater Drive are stop-controlled intersections. For the stop-controlled study intersections, the HCM delay methodology was used. The average delay is rounded to the nearest second to allow for minor fluctuations in daily traffic volumes, which is appropriate for planning purposes. As the above-referenced table shows, the SR-73 interchanges and the stop-controlled study intersections are operating at acceptable LOS A or B during the AM and PM peak hours.

2.4 BUILDOUT TRAFFIC FORECAST VOLUMES

Buildout conditions are analyzed since the residential units exceed the total faculty/staff housing in the LRDP. This would represent the buildout of the area, assumed to be 2035 and beyond. The long-range volumes were obtained from the UCI MCTM and ITAM. Buildout volumes for on-campus intersections came from the previous University Hills PA10 traffic study, and volumes for off-campus intersections were obtained from ITAM 12.4 Post-2035 Cumulative Condition (February 2015) with UCI North Campus and Main Campus zones factored to 2007 LRDP trips.

Figure 2-5 illustrates 2035 ADT volumes on mid-block links in the study area based on the LRDP. As this figure shows, two arterial links in the City of Irvine will operate at unacceptable LOS E. Since Campus Drive west of E. Peltason Drive/Berkeley Avenue and Bonita Canyon Drive west of Anteater Drive/Shady Canyon Drive operate worse than acceptable LOS D based on the daily traffic volume, these mid-block segments are further evaluated using peak hour data. **Table 2-2** summarizes the peak hour arterial roadway analysis for Campus Drive west of E. Peltason Drive/Berkeley Avenue and for Bonita Canyon Drive west of Anteater Drive/Shady Canyon Drive under 2035 conditions. Although the daily volume exceeds acceptable LOS D, these mid-block segments would operate at LOS A during the peak hours.

Table 2-2 2035 Arterial Roadway Peak Hour Analysis Summary

Roadway	Lanes	ADT	Peak Hour Capacity per Direction	Highest Peak Hour Directional Volume	Peak Hour V/C	Peak Hour LOS
Campus Drive (west of E. Peltason/Berkeley)	4	30,700	3,200	1,110 (PM Eastbound)	.35	A
Bonita Canyon (west of Anteater/Shady Canyon)	4	30,300	3,200	1,030 (AM Westbound)	.32	A

Figure 2-6 illustrates the AM peak hour intersection volumes under 2035 buildout conditions, and **Figure 2-7** illustrates the PM peak hour volumes.

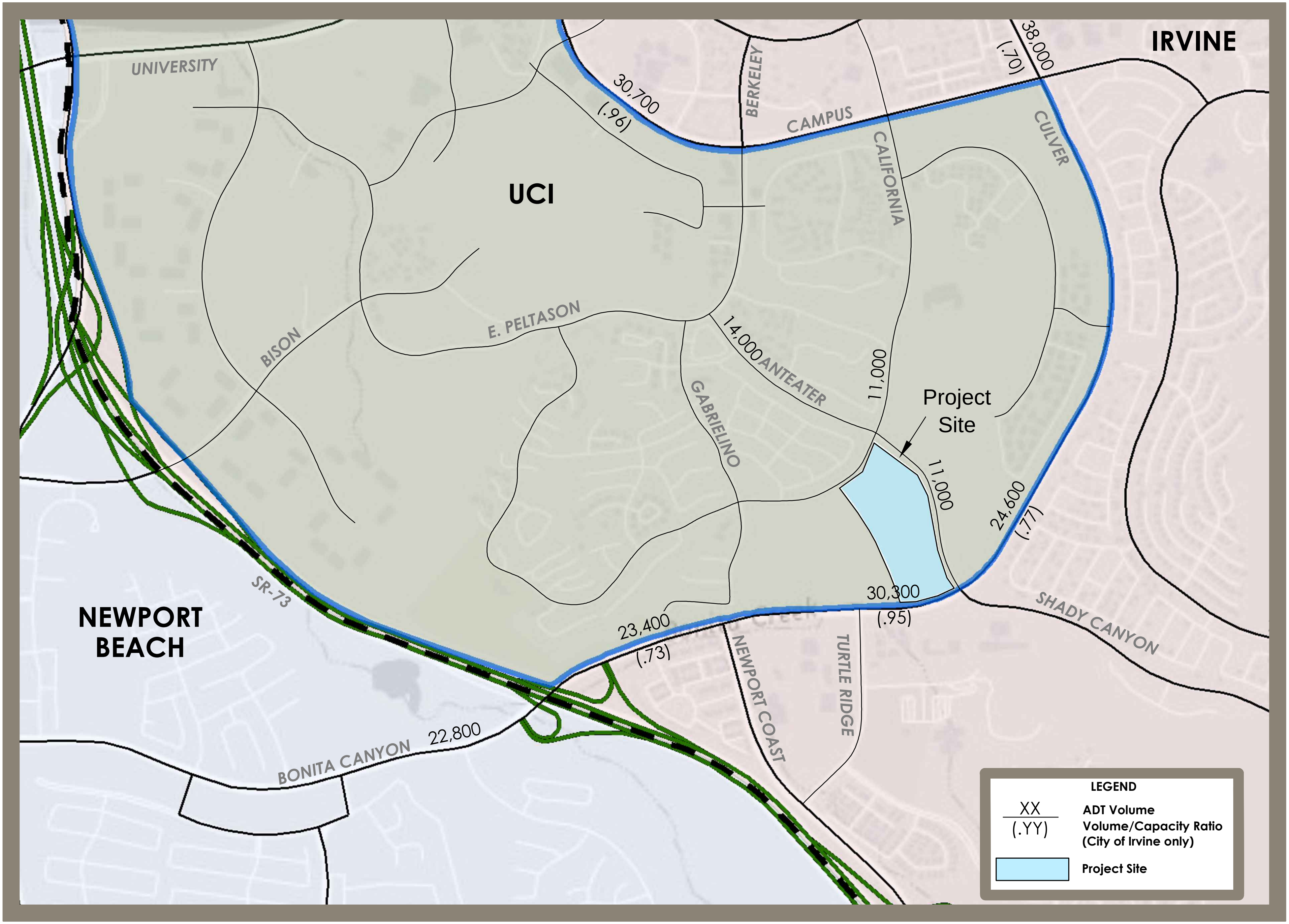

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Figure 2-5

2035 ADT Volumes

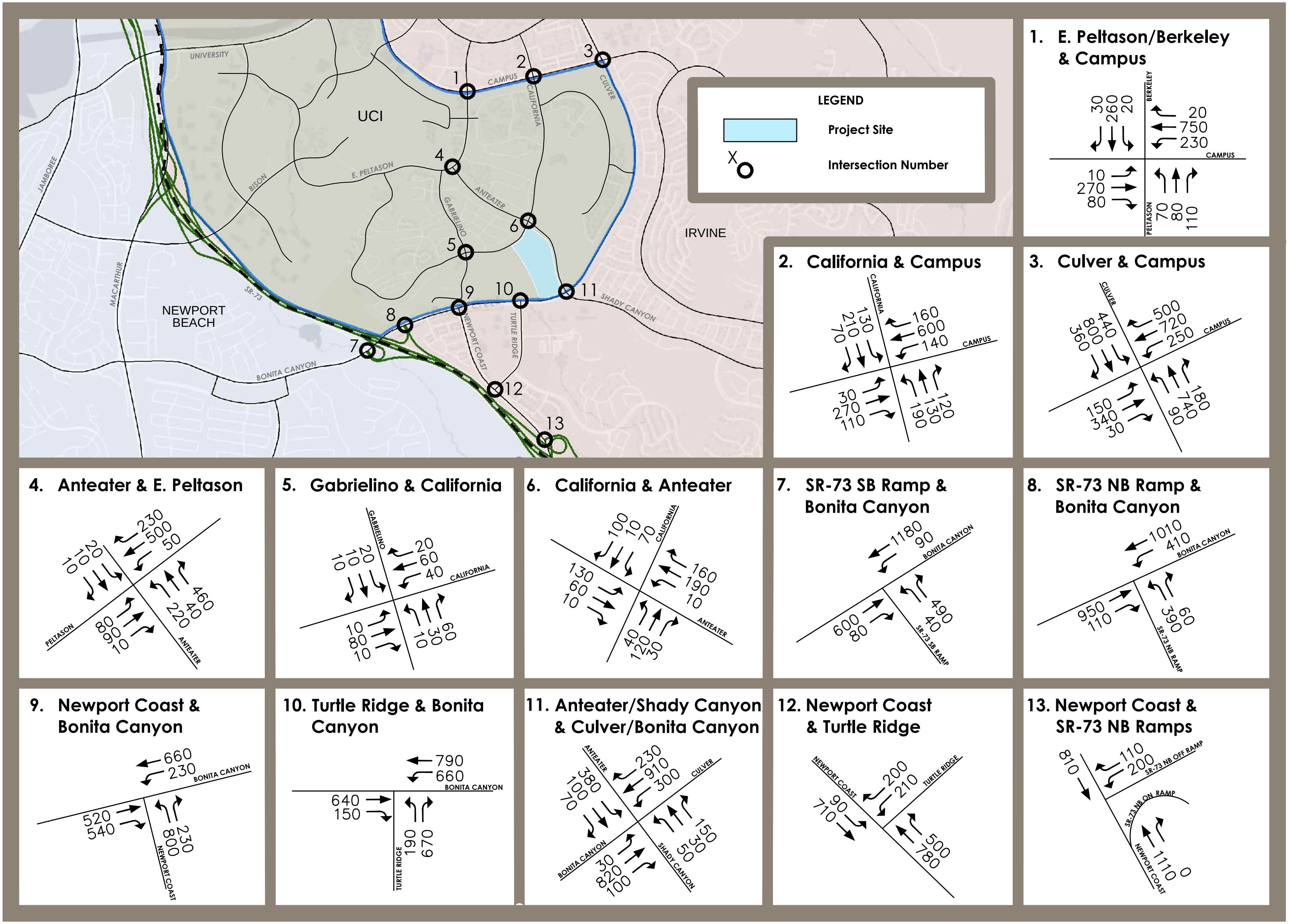

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Figure 2-6

2035 AM Peak Hour Intersection Volumes

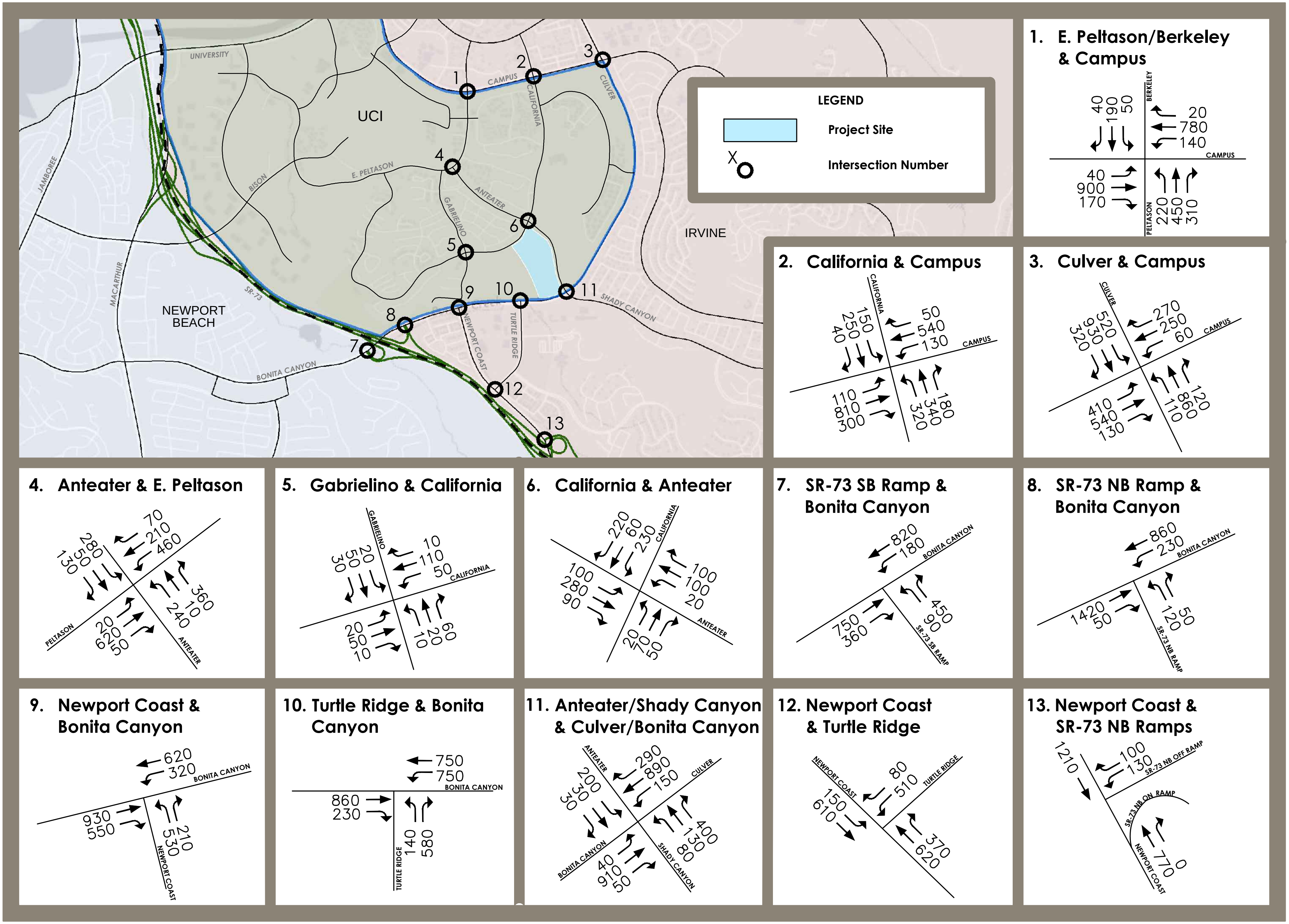

Figure 2-7

2035 PM Peak Hour Intersection Volumes

Table 2-3 summarizes the 2035 ICU and HCM delay values at the study intersections. Under 2035 conditions, all study intersections will operate at acceptable LOS D or better during the AM and PM peak hours based on the LRDP.

Table 2-3 2035 No-Project Intersection LOS Summary

Intersection	Jurisdiction	AM Peak Hour		PM Peak Hour	
		ICU/Delay	LOS	ICU/Delay	LOS
ICU Methodology					
1. E Peltason/Berkeley & Campus	Irvine	.40	A	.58	A
2. California & Campus	Irvine	.48	A	.71	C
3. Culver & Campus	Irvine	.60	A	.62	B
4. Anteater & E Peltason	UCI	.45	A	.77	C
7. SR-73 SB & Bonita Canyon	Newport Bch/Caltrans	.56	A	.57	A
8. SR-73 NB & Bonita Canyon	Irvine/Caltrans	.56	A	.58	A
9. Newport Coast & Bonita Canyon	Irvine	.51	A	.57	A
10. Turtle Ridge & Bonita Canyon	Irvine	.54	A	.60	A
11. Anteater/Shady Cyn & Culver/Bonita Cyn	Irvine	.80	C	.84	D
12. Newport Coast & Turtle Ridge	Irvine	.42	A	.47	A
13. Newport Coast & SR-73 NB	Irvine/Caltrans	.47	A	.48	A
HCM Delay Methodology					
5. Gabrielino & California [1]	UCI	8 sec	A	9 sec	A
6. California & Anteater [1]	UCI	12 sec	B	18 sec	C
7. SR-73 SB & Bonita Canyon	Newport Bch/Caltrans	13 sec	B	12 sec	B
8. SR-73 NB & Bonita Canyon	Irvine/Caltrans	13 sec	B	10 sec	A
13. Newport Coast & SR-73 NB	Irvine/Caltrans	5 sec	A	4 sec	A
[1] Stop-controlled intersection					

3.0 PROJECT DESCRIPTION

This chapter describes the traffic characteristics of the proposed project. Trip generation for the project is summarized, and the distribution of project trips on the study area circulation system is presented.

3.1 PROJECT DESCRIPTION

The proposed project is located in the southern portion of the UCI main campus in the "University Hills" area. The project consists of 160 single family dwelling units and 140 apartment units for UCI faculty and staff located on a parcel bounded by California Avenue, Anteater Drive, Bonita Canyon Drive, and University Hills PA 10 on the southern portion of the UCI main campus. At least one person within each dwelling unit must be employed by UCI. Access to the proposed project will be provided by a new driveway off of Anteater Drive on the east side and a connection to Gabrielino Road through PA 10 to the west. The project site is currently undeveloped.

The site will be served by an extensive trail of pedestrian paths and sidewalks through this area of the campus, and bike trails on each roadway in the area lead to the UCI main campus. It is expected that residents of the proposed project that work at the main campus would take advantage of the opportunities to walk or bike to their destination on campus.

The proposed site plan is illustrated in **Figure 3-1**.

The LRDP contains a total of 1,700 on-campus faculty/staff housing units. There are currently 1,426 dwelling units built or under construction on campus. The development of the proposed project would bring the total number of on-campus faculty/staff housing units to 1,726, exceeding the planned housing total by 26 dwelling units.

The southeast portion of the project site was designated as mixed use-commercial space in the LRDP. With development of the proposed project, the mixed use-commercial space would be removed from the LRDP.

3.2 TRIP GENERATION

Trip generation rates for the project were obtained from the UCI MCTM. **Table 3-1** summarizes the trip generation rates per dwelling unit and the resulting total trip generation for the proposed residential project. As this table shows, the project would generate a total of 2,860 daily trips, of which 152 would occur during the AM peak hour and 181 would occur during the PM peak hour. Impacts from the full project are analyzed under existing conditions.

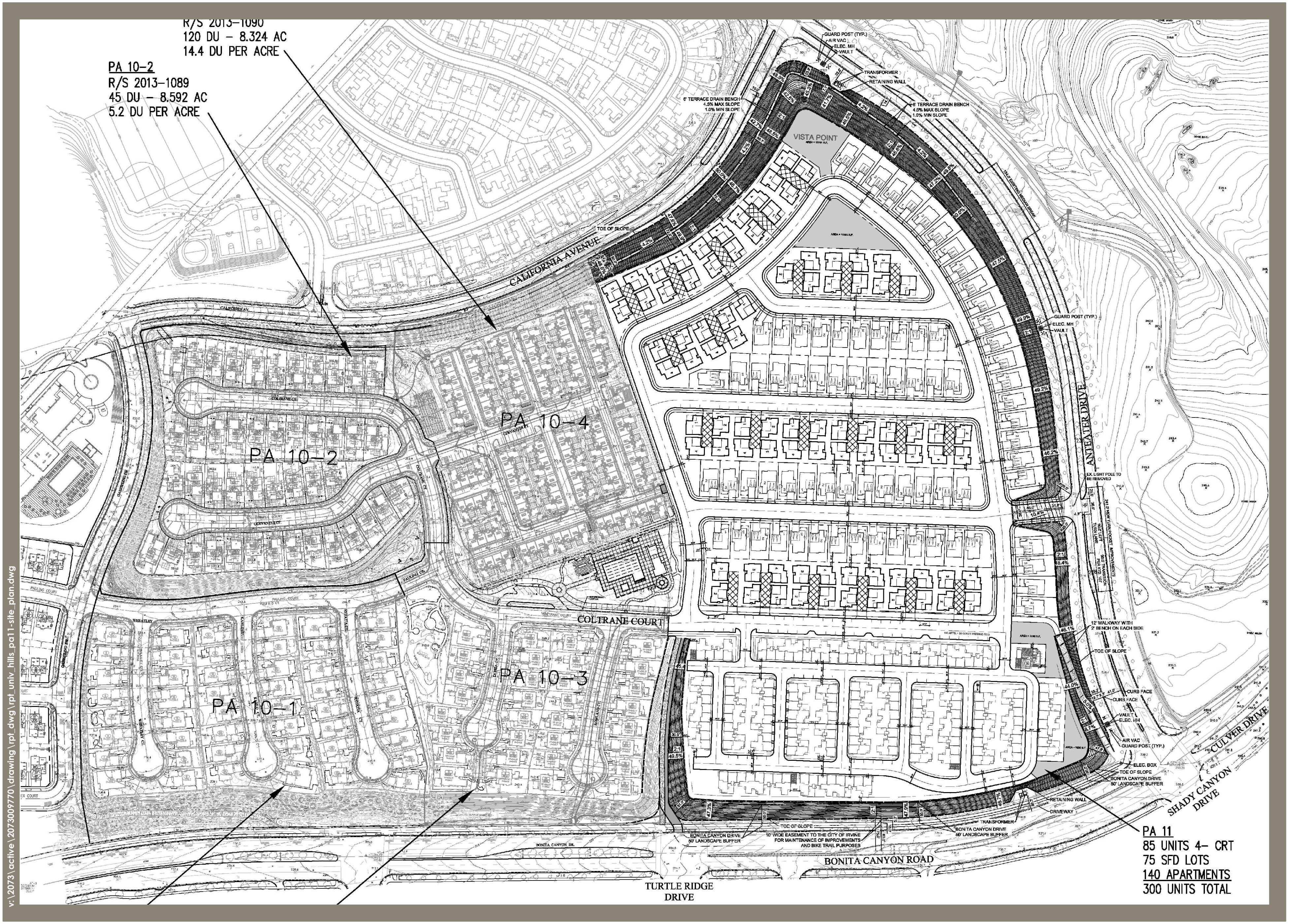

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Figure 3-1

Proposed Site Plan

Table 3-1 Proposed Project Trip Generation Summary

Land Use	Amount	AM Peak Hour			PM Peak Hour			ADT
		In	Out	Total	In	Out	Total	
Trip Generation								
Faculty/Staff Apt (3 Bdrm)	140 DU	1	66	67	55	25	80	1,260
Faculty/Staff (SFD)	160 DU	2	83	85	69	32	101	1,600
TOTAL		3	149	152	124	57	181	2,860
Trip Rates (MCTM)								
Faculty/Staff Apt (3 Bdrm) [1]	DU	.01	.47	.48	.39	.18	.57	9.00
Faculty/Staff (SFD)	DU	.01	.52	.53	.43	.20	.63	10.00
LRDP Adjustment								
Added Housing	26 DU	0	14	14	11	5	16	260
Mixed Use-Commercial (removed)	*23.0 TSF*	*-14*	*-0*	*-14*	*-5*	*-16*	*-21*	*-240*
Change to LRDP		-14	14	0	6	-11	-5	20

Source: *UCI Main Campus Traffic Model (MCTM)*
Notes:
[1] Trip rates for 3-bedroom apartments used here for worst-case purposes, actual development may also include 2-bedroom apartments

ADT = average daily trips
DU = dwelling unit
SFD = single family detached

The proposed project would add 26 dwelling units above the level of faculty/staff housing planned in the LRDP. However, the proposed project would remove 23,000 square feet of mixed use-commercial space. By replacing mixed use-commercial space with dwelling units, the project would add no additional traffic during the AM peak hour, would decrease traffic by 5 trips during the PM peak hour, and would increase daily traffic by a negligible 20 trips. As such, the project would have no measurable increase in traffic over the current LRDP. Graduate student housing, which was also allocated for the project site in the 2007 LRDP, is still anticipated to be built on campus at a new location to be determined in the future. This graduate student housing remains in the traffic model and is reflected in the traffic forecasts utilized for this analysis.

3.3 TRIP DISTRIBUTION

The trips generated by the project will use Anteater Drive and Gabrielino Road to access the surrounding circulation system. However, since Gabrielino Road at E. Peltason Drive is restricted to right turns only due to the raised median on E. Peltason Drive, a very small amount of project traffic is expected to use the Gabrielino Road access.

Project trip distribution was determined based on ADT volumes from ITAM. Approximately 48 percent of project trips are oriented toward Culver Drive/Bonita Canyon Drive to the south via Anteater Avenue, 14 percent of project trips are oriented north on Anteater Avenue towards E. Peltason Drive, and 38 percent of project trips are oriented toward the north via California Avenue. From there, project trips will disperse along Campus Drive, Culver Drive, Bonita Canyon Drive, Newport Coast Drive, Shady Canyon Drive, and SR-73. ITAM estimates that approximately 10 percent of project trips are estimated to remain within the UCI main campus; however, that percentage could be higher based on the number of households with multiple UCI faculty/staff.

Figure 3-2 illustrates the general distribution for the proposed project. **Figure 3-3** illustrates the project ADT volumes on the study area roadways, and **Figures 3-4** and **3-5** illustrate the AM and PM peak hour project-generated trips, respectively, based on the distribution.

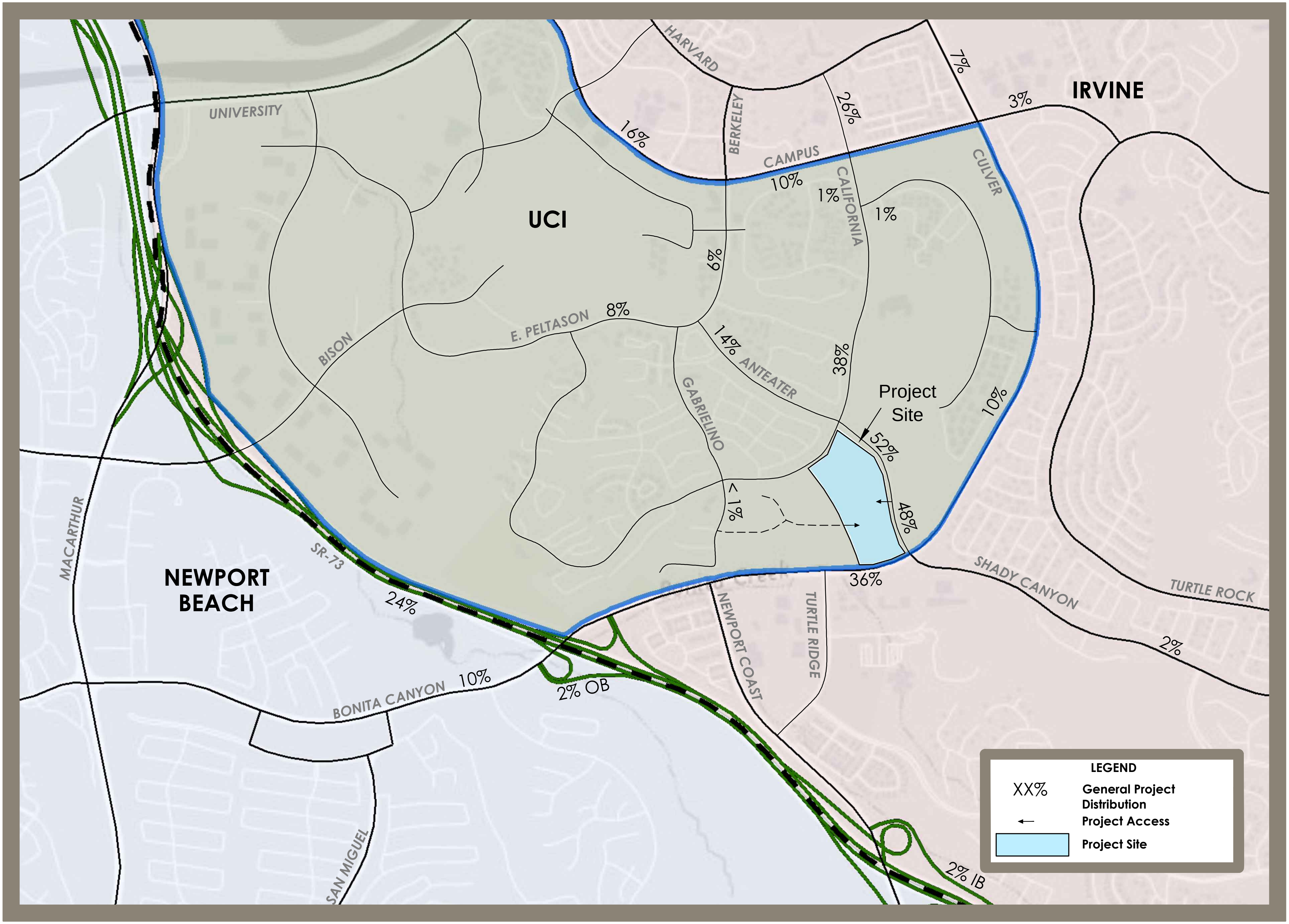

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Figure 3-2

Project Trip Distribution

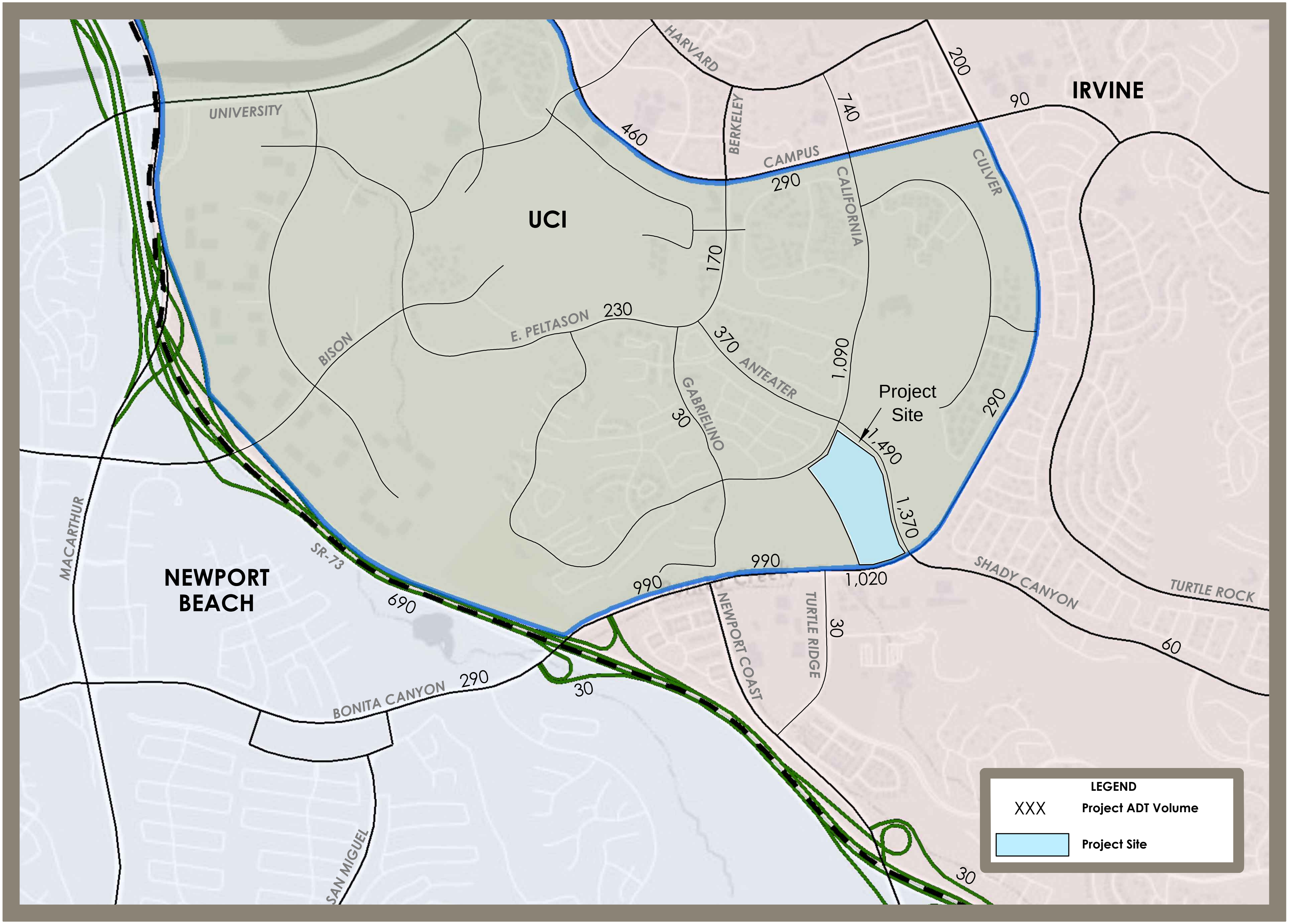

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Figure 3-3

Project-Generated ADT Trips

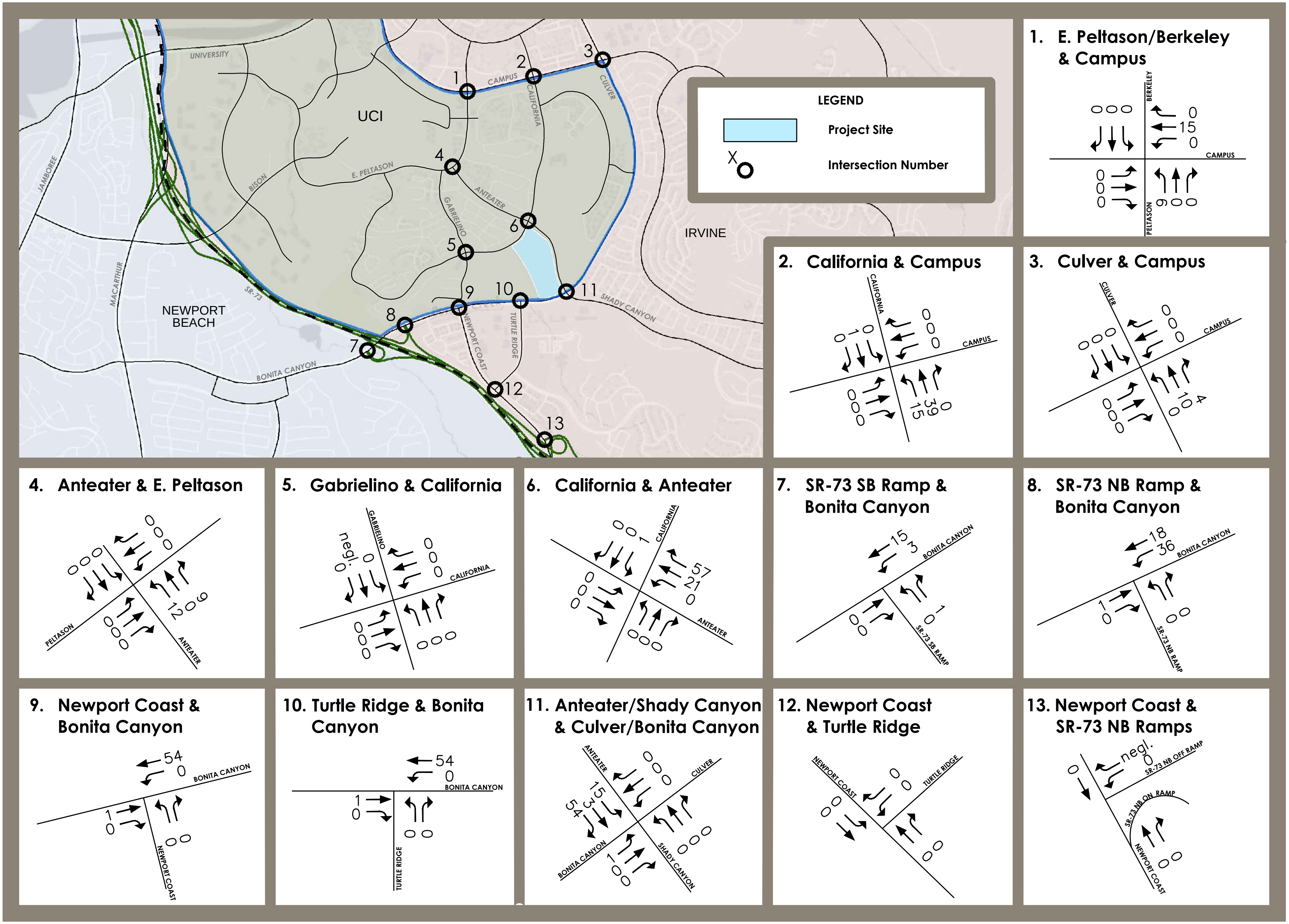

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Figure 3-4

Project-Generated AM Peak Hour Trips

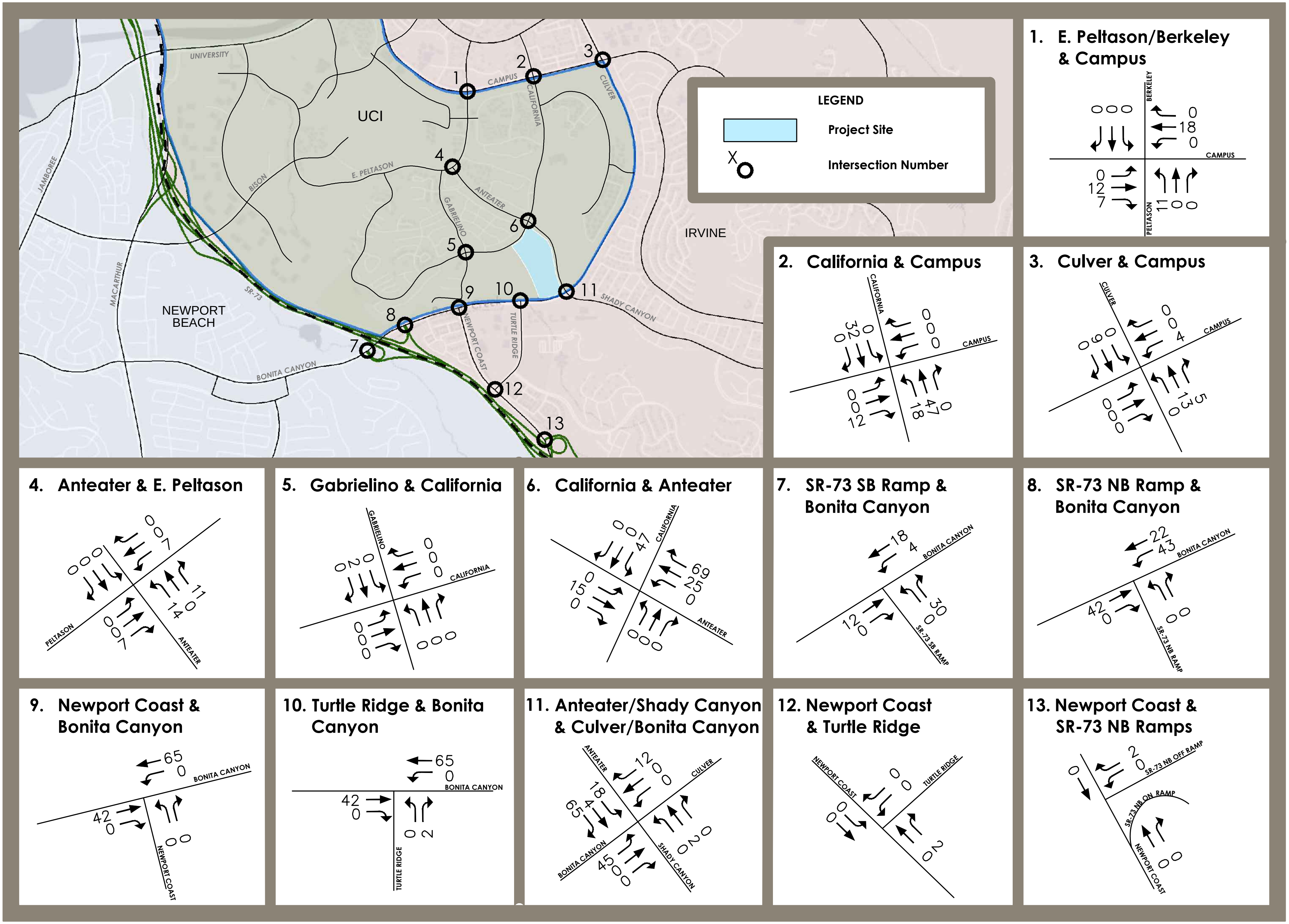


Figure 3-5

Project-Generated PM Peak Hour Trips

4.0 IMPACT ANALYSIS

This chapter presents the with-project intersection volumes, and evaluates the project impacts on the mid-block links and study intersections. Project increases resulting in significant impacts, if any, are discussed and mitigation measures are identified if necessary.

4.1 EXISTING PLUS PROJECT CONDITIONS

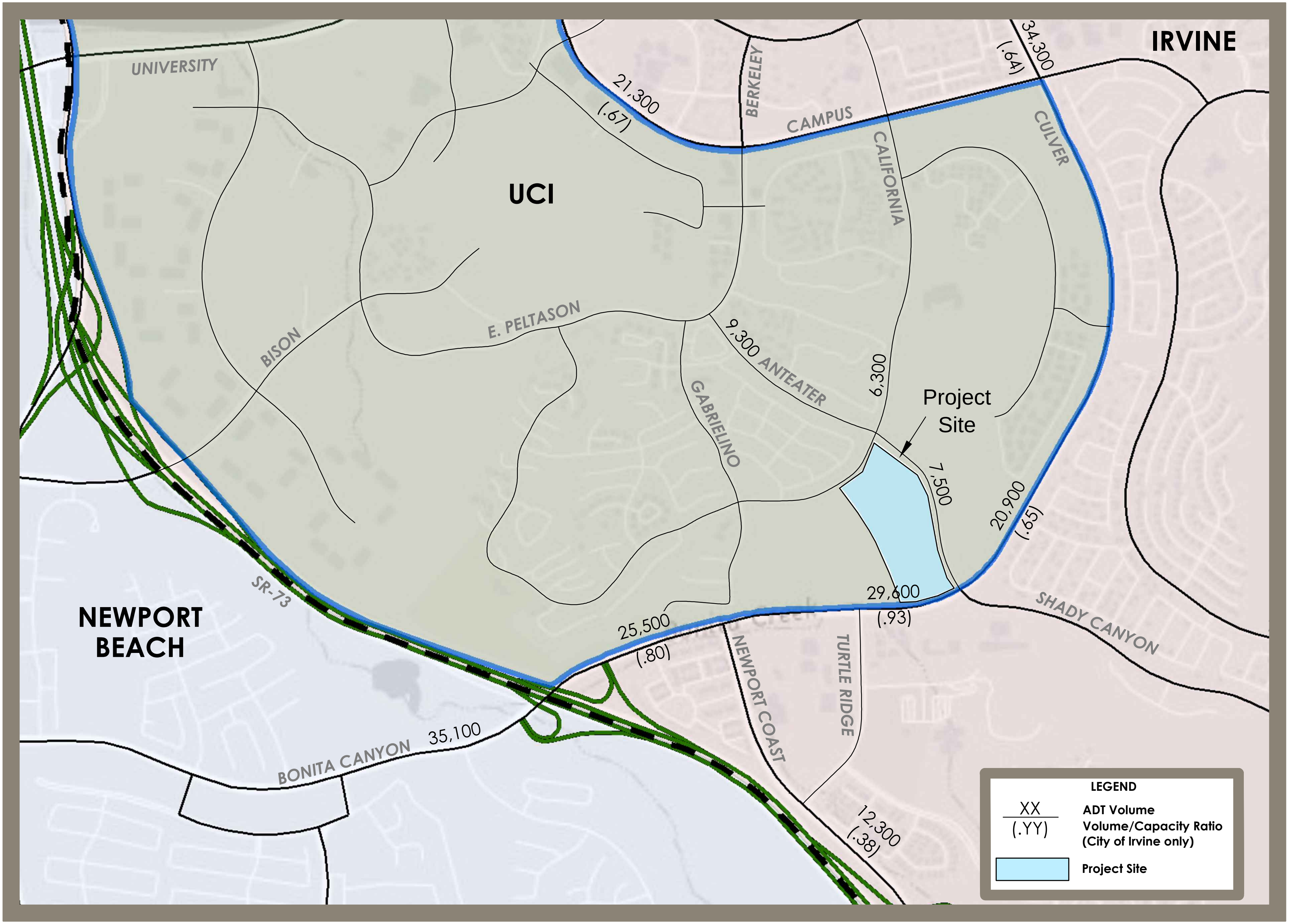
Impacts from the full project are analyzed under existing conditions. Existing-plus-project peak hour volumes were obtained by adding the project-generated peak hour trips, presented in Section 3.3, to the existing intersection turning movement volumes at the study intersections.

Figure 4-1 illustrates the existing-plus-project ADT volumes on the mid-block links in the study area. As this figure shows, the segment of Bonita Canyon Drive west of Anteater Drive/Shady Canyon Drive will operate at unacceptable LOS E with the project based on daily volumes. Since Bonita Canyon Drive west of Anteater Drive/Shady Canyon Drive operates worse than acceptable LOS D based on the daily traffic volume, this mid-block segment is further evaluated using peak hour data. **Table 4-1** shows that the mid-block link operates at acceptable LOS A during the peak hour, and the project has no significant impact on the roadway.

Table 4-1 Existing-Plus-Project Arterial Roadway Peak Hour Analysis Summary

Roadway	Lanes	ADT	Peak Hour Capacity per Direction	Highest Peak Hour Directional Volume	Peak Hour	
					V/C	LOS
Bonita Canyon (west of Anteater/Shady Canyon)	4	29,600	3,200	1,470 (AM Westbound)	.46	A

Figures 4-2 and **4-3** illustrate the existing-plus-project AM and PM peak hour volumes, respectively. The existing and existing-plus-project LOS based on existing lane configurations are summarized in **Table 4-2** (the ICU calculation worksheets are included in **Appendix B**, and HCM delay calculation worksheets are included in **Appendix C**).



Stantec

Figure 4-1

Existing-Plus-Project ADT Volumes

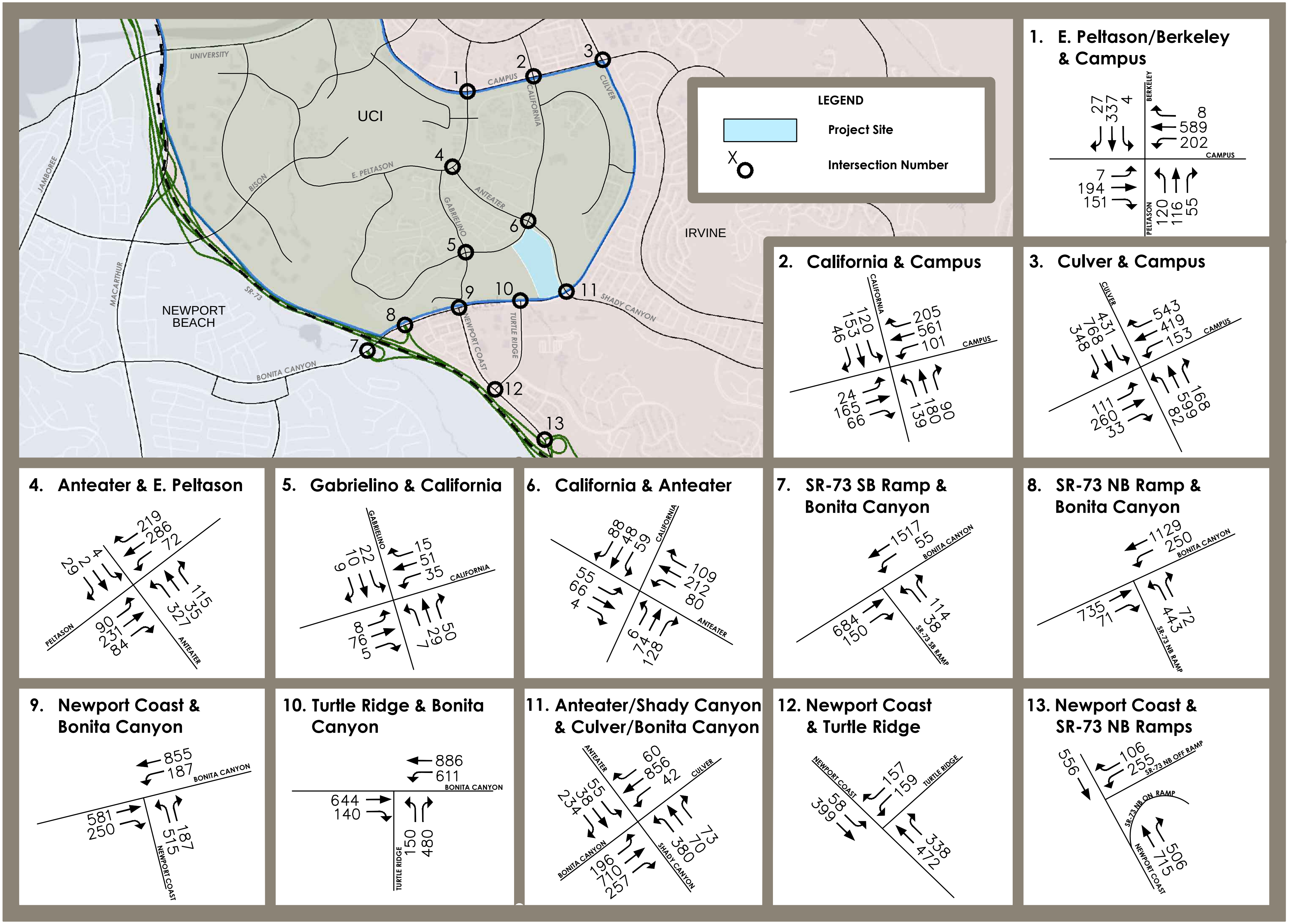


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Figure 4-2

Existing-Plus-Project AM Peak Hour Intersection Volumes

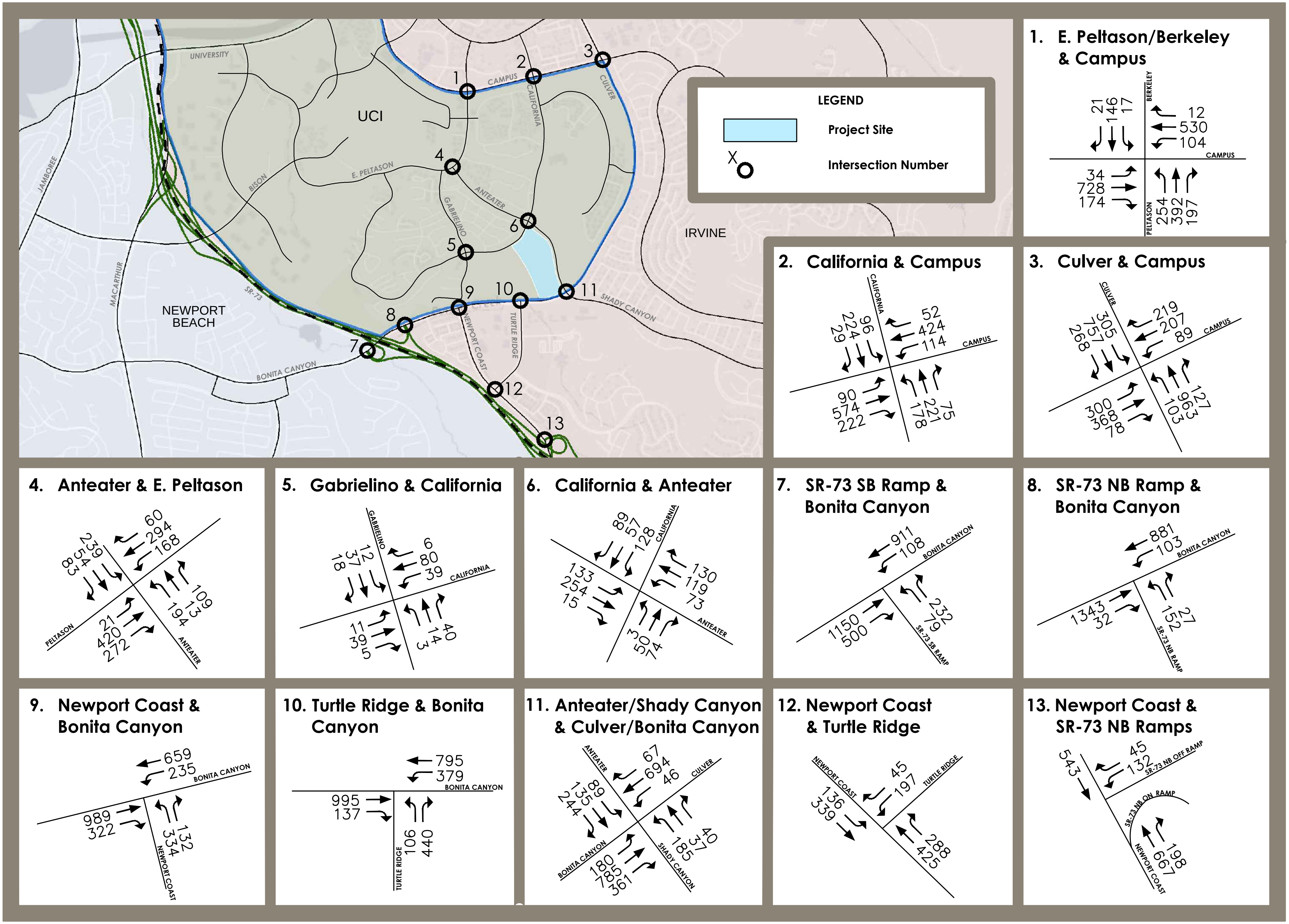

Figure 4-3

Existing-Plus-Project PM Peak Hour Intersection Volumes

Table 4-2 Existing-Plus-Project Intersection LOS Summary

Intersection	Existing				Existing + Project			
	AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
	ICU/Delay	LOS	ICU/Delay	LOS	ICU/Delay	LOS	ICU/Delay	LOS
ICU Methodology								
1. E Peltason/Berkeley & Campus	.40	A	.50	A	.40	A	.51	A
2. California & Campus	.39	A	.49	A	.40	A	.52	A
3. Culver & Campus	.53	A	.51	A	.53	A	.51	A
4. Anteater & E Peltason	.46	A	.58	A	.46	A	.59	A
7. SR-73 SB & Bonita Canyon	.38	A	.52	A	.39	A	.54	A
8. SR-73 NB & Bonita Canyon	.51	A	.49	A	.51	A	.52	A
9. Newport Coast & Bonita Canyon	.44	A	.50	A	.45	A	.51	A
10. Turtle Ridge & Bonita Canyon	.51	A	.50	A	.51	A	.51	A
11. Anteater/Shady Cyn & Culver/Bonita Cyn	.53	A	.42	A	.56	A	.45	A
12. Newport Coast & Turtle Ridge	.31	A	.32	A	.31	A	.32	A
13. Newport Coast & SR-73 NB	.37	A	.30	A	.37	A	.30	A
HCM Delay Methodology								
5. Gabrielino & California [1]	8 sec	A	8 sec	A	8 sec	A	8 sec	A
6. California & Anteater [1]	11 sec	B	13 sec	B	11 sec	B	14 sec	B
7. SR-73 SB & Bonita Canyon	4 sec	A	7 sec	A	4 sec	A	7 sec	A
8. SR-73 NB & Bonita Canyon	10 sec	B	7 sec	A	10 sec	B	8 sec	A
13. Newport Coast & SR-73 NB	6 sec	A	3 sec	A	6 sec	A	3 sec	A
[1] Stop-controlled intersection								

The signalized intersections operate at LOS A during the AM and PM peak hours with the addition of the proposed project traffic based on the ICU methodology. The project would add up to .03 to the ICU value at the intersections; however, the study intersections operate at acceptable LOS (LOS D or better) during the AM and PM peak hours, and the project has no significant impact.

Based on the HCM signalized delay methodology, the signalized ramp intersections operate at LOS A or B with the addition of project-generated traffic. The project would add 1 second or less to the average delay at these intersections. The intersections would continue to operate at acceptable LOS (LOS D or better) during the AM and PM peak hours, and the project has no significant impact on the ramp intersections based on the HCM delay methodology.

The stop-controlled study intersections operate at LOS B or better with the addition of project-generated traffic during the AM and PM peak hours. The intersections would operate at acceptable LOS (LOS D or better) during the AM and PM peak hours, and the project has no significant impact on the stop-controlled intersections.

4.2 LONG-RANGE ANALYSIS

As discussed in Section 3.3, the proposed project would add 26 dwelling units above the level of faculty/staff housing planned in the LRDP; however, the project would replace 23,000 square feet of planned mixed use-commercial space on the site. The peak hour trips generated by the project would be equal to or less than the trips generated by the mixed use-commercial space in the LRDP. Therefore, the project would result in a negligible impact on the study intersections under LRDP buildout conditions and no mitigation is required.

5.0 CONCLUSIONS

The proposed project consists of 160 single family homes and 140 apartment units on-campus for faculty and staff. The project would generate approximately 2,860 trips daily, of which 152 would occur during the AM peak hour and 181 would occur during the PM peak hour. These peak hour trips were assigned to the surrounding street system and added to existing traffic volumes to determine the project impacts.

Under existing conditions, all study intersections operate at LOS B or better during the AM and PM peak hours based on the ICU values as well as the HCM delay values. The project increases the ICU values by .03 or less and the average intersection delay by 1 second or less. The project has no significant impact on the study intersections under existing conditions.

All study intersections would operate at LOS D or better under long-range buildout (2035) conditions. The project would add 26 dwelling units above the level of faculty/staff housing identified in the LRDP and would replace 23,000 square feet of mixed use-commercial space in the LRDP. The project generates no additional peak hour trips than previously studied in the LRDP and, therefore, has no significant impact on the study intersections under 2035 conditions.

The project has no significant impact on the surrounding circulation system under existing or 2035 conditions, and no mitigation is required.

Appendix A COUNT DATA

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Figure A-1

Study Intersection Location

Transportation Studies, Inc.

2640 Walnut Avenue, Suite H
Tustin, CA. 92780

Location	: CAMPUS DRIVE	Site:	IRVINE
Segment	: W/O E. PELTASON DRIVE	Date:	11/18/15
Client	: STANTEC		

Interval	EB				WB				Combined				Day:	Wednesday
Begin	AM		PM		AM		PM		AM		PM			
12:00	48	159	160	625	40	177	190	721	88	336	350	1,346		
12:15	48		136		47		178		95		314			
12:30	35		184		49		178		84		362			
12:45	28		145		41		175		69		320			
01:00	26	86	186	618	23	78	156	615	49	164	342	1,233		
01:15	28		142		24		130		52		272			
01:30	18		142		19		155		37		297			
01:45	14		148		12		174		26		322			
02:00	11	50	166	577	16	39	176	682	27	89	342	1,259		
02:15	15		146		11		138		26		284			
02:30	15		121		5		176		20		297			
02:45	9		144		7		192		16		336			
03:00	10	25	201	666	2	20	162	707	12	45	363	1,373		
03:15	2		138		8		189		10		327			
03:30	5		178		5		182		10		360			
03:45	8		149		5		174		13		323			
04:00	6	22	218	764	6	30	162	669	12	52	380	1,433		
04:15	6		174		4		167		10		341			
04:30	2		200		9		162		11		362			
04:45	8		172		11		178		19		350			
05:00	10	38	232	878	5	70	202	797	15	108	434	1,675		
05:15	10		214		17		172		27		386			
05:30	12		214		22		211		34		425			
05:45	6		218		26		212		32		430			
06:00	38	158	220	901	20	153	216	828	58	311	436	1,729		
06:15	27		228		30		206		57		434			
06:30	44		251		57		218		101		469			
06:45	49		202		46		188		95		390			
07:00	60	364	205	678	48	434	175	633	108	798	380	1,311		
07:15	73		160		84		180		157		340			
07:30	97		165		122		144		219		309			
07:45	134		148		180		134		314		282			
08:00	72	344	139	591	188	683	123	523	260	1,027	262	1,114		
08:15	76		156		158		141		234		297			
08:30	88		122		163		137		251		259			
08:45	108		174		174		122		282		296			
09:00	107	409	158	555	132	518	110	452	239	927	268	1,007		
09:15	84		123		126		140		210		263			
09:30	104		120		128		94		232		214			
09:45	114		154		132		108		246		262			
10:00	103	430	166	480	107	509	108	342	210	939	274	822		
10:15	91		139		122		88		213		227			
10:30	116		95		130		84		246		179			
10:45	120		80		150		62		270		142			
11:00	146	506	90	285	126	607	66	266	272	1,113	156	551		
11:15	112		61		130		71		242		132			
11:30	114		77		180		69		294		146			
11:45	134		57		171		60		305		117			
Totals	2,591		7,618		3,318		7,235		5,909		14,853			
Split%	43.8		51.3		56.2		48.7							
Day Totals		10,209				10,553				20,762				
Day Splits		49.2				50.8								
Peak Hour	11:00		05:45		07:45		05:45		11:00		05:45			
Volume	506		917		689		852		1,113		1,769			
Factor	0.87		0.91		0.92		0.98		0.91		0.94			

Transportation Studies, Inc.

2640 Walnut Avenue, Suite H
Tustin, CA. 92780

Location	: CULVER DRIVE	Site:	IRVINE
Segment	: N/O CAMPUS DRIVE	Date:	11/18/15
Client	: STANTEC		

Interval	NB				SB				Combined				Day:	Wednesday
Begin	AM		PM		AM		PM		AM		PM			
12:00	31	107	227	974	28	94	271	1,067	59	201	498	2,041		
12:15	29		246		24		249		53		495			
12:30	24		226		24		283		48		509			
12:45	23		275		18		264		41		539			
01:00	16	63	280	1.163	26	66	274	1.098	42	129	554	2.261		
01:15	22		252		16		302		38		554			
01:30	15		331		12		264		27		595			
01:45	10		300		12		258		22		558			
02:00	13	38	279	1.320	10	34	195	1.025	23	72	474	2.345		
02:15	5		315		13		294		18		609			
02:30	11		384		8		262		19		646			
02:45	9		342		3		274		12		616			
03:00	5	21	296	1.256	8	24	254	1.116	13	45	550	2.372		
03:15	8		302		5		296		13		598			
03:30	2		334		6		270		8		604			
03:45	6		324		5		296		11		620			
04:00	8	50	330	1,272	3	42	270	1,170	11	92	600	2,442		
04:15	9		332		10		288		19		620			
04:30	13		290		13		302		26		592			
04:45	20		320		16		310		36		630			
05:00	23	146	371	1,359	17	147	308	1,308	40	293	679	2,667		
05:15	46		400		22		318		68		718			
05:30	36		313		40		342		76		655			
05:45	41		275		68		340		109		615			
06:00	60	346	302	1,067	64	497	346	1,327	124	843	648	2,394		
06:15	68		286		95		329		163		615			
06:30	92		247		130		338		222		585			
06:45	126		232		208		314		334		546			
07:00	142	995	232	782	172	1.227	253	903	314	2.222	485	1.685		
07:15	198		194		239		220		437		414			
07:30	303		202		368		228		671		430			
07:45	352		154		448		202		800		356			
08:00	352	1.251	166	670	414	1.348	193	753	766	2.599	359	1.423		
08:15	282		171		310		193		592		364			
08:30	280		184		311		176		591		360			
08:45	337		149		313		191		650		340			
09:00	284	993	184	596	268	1,097	173	598	552	2,090	357	1,194		
09:15	236		140		308		158		544		298			
09:30	249		126		259		145		508		271			
09:45	224		146		262		122		486		268			
10:00	222	851	149	401	171	804	105	372	393	1,655	254	773		
10:15	215		124		208		100		423		224			
10:30	182		76		219		89		401		165			
10:45	232		52		206		78		438		130			
11:00	226	874	62	195	192	997	64	222	418	1,871	126	417		
11:15	220		59		224		57		444		116			
11:30	190		35		266		53		456		88			
11:45	238		39		315		48		553		87			
Totals	5.735		11.055		6.377		10.959		12.112		22.014			
Split%	47.3		50.2		52.7		49.8							
Day Totals		16.790				17.336				34,126				
Day Splits		49.2				50.8								
Peak Hour	07:30		04:45		07:30		05:30		07:30		04:45			
Volume	1.289		1.404		1.540		1.357		2.829		2.682			
Factor	0.92		0.88		0.86		0.98		0.88		0.93			

Transportation Studies, Inc.

2640 Walnut Avenue, Suite H
Tustin, CA. 92780

Location : ANTEATER DRIVE — Site: IRVINE
Segment : E/O E. PELTASON DRIVE — Date: 11/18/15
Client : STANTEC

Interval Begin	EB AM		EB PM		WB AM		WB PM		Combined AM		Combined PM		Day: Wednesday
12:00	14	30	91	276	7	22	44	207	21	52	135	483	
12:15	6		59		6		42		12		101		
12:30	4		60		6		38		10		98		
12:45	6		66		3		83		9		149		
01:00	8	24	86	256	7	17	56	224	15	41	142	480	
01:15	9		50		3		53		12		103		
01:30	6		58		6		55		12		113		
01:45	1		62		1		60		2		122		
02:00	2	6	68	252	1	4	40	162	3	10	108	414	
02:15	0		68		1		30		1		98		
02:30	2		46		1		48		3		94		
02:45	2		70		1		44		3		114		
03:00	0	6	76	322	2	3	42	193	2	9	118	515	
03:15	2		92		1		39		3		131		
03:30	4		76		0		52		4		128		
03:45	0		78		0		60		0		138		
04:00	3	7	128	514	1	8	65	245	4	15	193	759	
04:15	0		110		2		48		2		158		
04:30	2		140		2		64		4		204		
04:45	2		136		3		68		5		204		
05:00	1	19	196	705	6	27	58	242	7	46	254	947	
05:15	1		192		4		53		5		245		
05:30	8		172		5		63		13		235		
05:45	9		145		12		68		21		213		
06:00	12	75	156	617	4	47	59	248	16	122	215	865	
06:15	20		164		12		67		32		231		
06:30	13		147		15		59		28		206		
06:45	30		150		16		63		46		213		
07:00	16	155	91	366	34	251	53	164	50	406	144	530	
07:15	36		93		47		49		83		142		
07:30	41		98		73		36		114		134		
07:45	62		84		97		26		159		110		
08:00	72	231	91	316	92	472	39	150	164	703	130	466	
08:15	53		92		130		43		183		135		
08:30	46		65		114		36		160		101		
08:45	60		68		136		32		196		100		
09:00	75	211	52	199	98	338	31	120	173	549	83	319	
09:15	56		57		79		38		135		95		
09:30	34		44		83		24		117		68		
09:45	46		46		78		27		124		73		
10:00	64	192	56	151	88	245	20	68	152	437	76	219	
10:15	36		32		45		19		81		51		
10:30	40		39		48		17		88		56		
10:45	52		24		64		12		116		36		
11:00	49	188	28	91	50	197	17	42	99	385	45	133	
11:15	35		27		42		9		77		36		
11:30	62		18		56		11		118		29		
11:45	42		18		49		5		91		23		
Totals	1,144		4,065		1,631		2,065		2,775		6,130		
Split%	41.2		66.3		58.8		33.7						
Day Totals		5,209				3,696				8,905			
Day Splits		58.5				41.5							
Peak Hour	08:30		05:00		08:15		05:30		08:15		05:00		
Volume	237		705		478		257		712		947		
Factor	0.79		0.90		0.88		0.94		0.91		0.93		

Transportation Studies, Inc.

2640 Walnut Avenue, Suite H
Tustin, CA. 92780

Location : ANTEATER DRIVE | Site: IRVINE
Segment : E/O CALIFORNIA AVENUE | Date: 11/18/15
Client : STANTEC | Day: Wednesday

Interval	EB				WB				Combined			
Begin	AM		PM		AM		PM		AM		PM	
12:00	3	13	52	193	2	6	36	148	5	19	88	341
12:15	1		48		2		30		3		78	
12:30	4		49		0		40		4		89	
12:45	5		44		2		42		7		86	
01:00	1	7	70	208	0	1	46	195	1	8	116	403
01:15	2		54		0		39		2		93	
01:30	2		44		0		58		2		102	
01:45	2		40		1		52		3		92	
02:00	0	1	48	206	0	3	34	160	0	4	82	366
02:15	0		60		1		34		1		94	
02:30	0		48		2		40		2		88	
02:45	1		50		0		52		1		102	
03:00	0	1	52	268	2	3	36	170	2	4	88	438
03:15	1		76		1		32		2		108	
03:30	0		66		0		58		0		124	
03:45	0		74		0		44		0		118	
04:00	0	2	74	302	0	2	49	194	0	4	123	496
04:15	0		62		0		43		0		105	
04:30	0		88		1		54		1		142	
04:45	2		78		1		48		3		126	
05:00	6	23	99	386	2	17	53	217	8	40	152	603
05:15	6		101		5		50		11		151	
05:30	5		90		1		64		6		154	
05:45	6		96		9		50		15		146	
06:00	7	38	72	279	7	77	58	185	14	115	130	464
06:15	3		76		9		36		12		112	
06:30	12		72		15		47		27		119	
06:45	16		59		46		44		62		103	
07:00	23	219	66	186	38	213	32	96	61	432	98	282
07:15	43		40		38		29		81		69	
07:30	85		44		62		16		147		60	
07:45	68		36		75		19		143		55	
08:00	90	228	24	104	90	366	20	77	180	594	44	181
08:15	41		27		98		19		139		46	
08:30	43		26		88		25		131		51	
08:45	54		27		90		13		144		40	
09:00	54	169	32	103	62	215	20	77	116	384	52	180
09:15	35		27		46		18		81		45	
09:30	40		21		59		20		99		41	
09:45	40		23		48		19		88		42	
10:00	38	127	13	53	39	160	9	33	77	287	22	86
10:15	24		16		40		7		64		23	
10:30	34		16		46		10		80		26	
10:45	31		8		35		7		66		15	
11:00	34	146	10	35	28	158	6	15	62	304	16	50
11:15	34		5		36		4		70		9	
11:30	42		12		43		2		85		14	
11:45	36		8		51		3		87		11	
Totals	974		2,323		1,221		1,567		2,195		3,890	
Split%	44.4		59.7		55.6		40.3					
Day Totals		3,297				2,788				6,085		
Day Splits		54.2				45.8						
Peak Hour	07:15		05:00		08:00		05:15		07:30		05:00	
Volume	286		386		366		222		609		603	
Factor	0.79		0.96		0.93		0.87		0.85		0.98	

Transportation Studies, Inc.

2640 Walnut Avenue, Suite H
Tustin, CA. 92780

Location : CALIFORNIA AVENUE
Segment : N/O ANTEATER DRIVE
Client : STANTEC

Site: IRVINE
Date: 11/18/15
Day: Wednesday

Interval Begin	NB AM		NB PM		SB AM		SB PM		Combined AM		Combined PM	
12:00	6	13	34	124	7	27	34	165	13	40	68	289
12:15	4		24		6		30		10		54	
12:30	0		36		7		44		7		80	
12:45	3		30		7		57		10		87	
01:00	3	11	24	108	7	19	47	184	10	30	71	292
01:15	2		30		2		52		4		82	
01:30	5		24		8		48		13		72	
01:45	1		30		2		37		3		67	
02:00	1	5	29	136	0	4	29	141	1	9	58	277
02:15	1		32		1		29		2		61	
02:30	3		35		1		43		4		78	
02:45	0		40		2		40		2		80	
03:00	0	1	44	191	1	1	42	193	1	2	86	384
03:15	0		40		0		52		0		92	
03:30	1		53		0		48		1		101	
03:45	0		54		0		51		0		105	
04:00	2	7	51	183	0	6	42	198	2	13	93	381
04:15	1		44		1		47		2		91	
04:30	3		44		0		49		3		93	
04:45	1		44		5		60		6		104	
05:00	1	17	72	241	6	19	50	227	7	36	122	468
05:15	4		64		3		58		7		122	
05:30	4		56		3		48		7		104	
05:45	8		49		7		71		15		120	
06:00	10	49	58	236	4	55	48	235	14	104	106	471
06:15	18		54		4		67		22		121	
06:30	11		58		9		58		20		116	
06:45	10		66		38		62		48		128	
07:00	8	138	36	124	24	136	57	176	32	274	93	300
07:15	18		34		27		38		45		72	
07:30	68		24		30		47		98		71	
07:45	44		30		55		34		99		64	
08:00	44	160	26	100	72	206	38	138	116	366	64	238
08:15	38		34		52		33		90		67	
08:30	35		26		40		33		75		59	
08:45	43		14		42		34		85		48	
09:00	45	122	21	86	41	171	32	137	86	293	53	223
09:15	24		21		36		46		60		67	
09:30	30		20		38		36		68		56	
09:45	23		24		56		23		79		47	
10:00	27	116	26	67	32	135	23	73	59	251	49	140
10:15	25		15		25		23		50		38	
10:30	26		14		28		13		54		27	
10:45	38		12		50		14		88		26	
11:00	36	118	8	34	35	131	16	47	71	249	24	81
11:15	25		13		28		7		53		20	
11:30	21		3		30		15		51		18	
11:45	36		10		38		9		74		19	
Totals	757		1,630		910		1,914		1,667		3,544	
Split%	45.4		46.0		54.6		54.0					

	NB	SB	Combined
Day Totals	2,387	2,824	5,211
Day Splits	45.8	54.2	

	NB AM	NB PM	SB AM	SB PM	Combined AM	Combined PM
Peak Hour	07:30	05:00	07:45	05:45	07:30	06:00
Volume	194	241	219	244	403	471
Factor	0.71	0.84	0.76	0.86	0.87	0.92

Transportation Studies, Inc.

2640 Walnut Avenue, Suite H
Tustin, CA. 92780

Location	: BONITA CANYON DRIVE	Site:	IRVINE
Segment	: W/O SR-73 SB RAMPS	Date:	11/18/15
Client	: STANTEC	Day:	Wednesday

Interval	EB				WB				Combined			
Begin	AM		PM		AM		PM		AM		PM	
12:00	8	35	168	712	9	36	344	1,419	17	71	512	2,131
12:15	16		186		9		336		25		522	
12:30	4		198		10		381		14		579	
12:45	7		160		8		358		15		518	
01:00	5	16	198	803	7	21	342	1.466	12	37	540	2.269
01:15	3		218		3		405		6		623	
01:30	6		192		9		313		15		505	
01:45	2		195		2		406		4		601	
02:00	2	8	198	894	0	8	335	1.457	2	16	533	2.351
02:15	2		208		1		374		3		582	
02:30	2		250		3		386		5		636	
02:45	2		238		4		362		6		600	
03:00	2	9	242	1.032	0	7	374	1.844	2	16	616	2.876
03:15	4		266		4		458		8		724	
03:30	0		242		1		504		1		746	
03:45	3		282		2		508		5		790	
04:00	3	35	259	1,163	8	31	470	1,782	11	66	729	2,945
04:15	6		279		6		422		12		701	
04:30	9		294		6		441		15		735	
04:45	17		331		11		449		28		780	
05:00	15	125	384	1,576	30	145	466	1,786	45	270	850	3,362
05:15	24		448		24		456		48		904	
05:30	38		400		28		488		66		888	
05:45	48		344		63		376		111		720	
06:00	42	298	346	1,141	56	469	352	1,112	98	767	698	2,253
06:15	48		317		66		308		114		625	
06:30	93		264		122		232		215		496	
06:45	115		214		225		220		340		434	
07:00	162	734	173	612	206	1.448	252	740	368	2.182	425	1.352
07:15	166		177		400		178		566		355	
07:30	192		146		404		180		596		326	
07:45	214		116		438		130		652		246	
08:00	206	796	139	489	542	2.374	107	420	748	3.170	246	909
08:15	194		119		586		119		780		238	
08:30	200		136		606		107		806		243	
08:45	196		95		640		87		836		182	
09:00	174	718	93	375	527	1,840	128	429	701	2,558	221	804
09:15	195		78		456		135		651		213	
09:30	177		116		443		86		620		202	
09:45	172		88		414		80		586		168	
10:00	142	583	84	201	324	1,291	62	157	466	1,874	146	358
10:15	153		47		276		37		429		84	
10:30	142		38		336		31		478		69	
10:45	146		32		355		27		501		59	
11:00	132	669	14	54	298	1,404	24	85	430	2,073	38	139
11:15	175		16		324		29		499		45	
11:30	180		12		370		14		550		26	
11:45	182		12		412		18		594		30	
Totals	4,026		9,052		9,074		12,697		13,100		21,749	
Split%	30.7		41.6		69.3		58.4					
Day Totals		13,078				21,771				34,849		
Day Splits		37.5				62.5						
Peak Hour	07:45		05:00		08:00		03:15		08:00		04:45	
Volume	814		1.576		2.374		1.940		3.170		3.422	
Factor	0.95		0.88		0.93		0.95		0.95		0.95	

Transportation Studies, Inc.

2640 Walnut Avenue, Suite H

Tustin, CA. 92780

Location : BONITA CANYON DRIVE — Site: IRVINE

Segment : W/O NEWPORT COAST DRIVE — Date: 11/18/15

Client : STANTEC

Day: Wednesday

Interval	EB				WB				Combined			
Begin	AM		PM		AM		PM		AM		PM	
12:00	9	30	154	651	9	43	176	718	18	73	330	1,369
12:15	11		162		10		174		21		336	
12:30	4		185		13		188		17		373	
12:45	6		150		11		180		17		330	
01:00	5	16	176	687	6	24	181	751	11	40	357	1.438
01:15	1		184		3		179		4		363	
01:30	6		163		12		166		18		329	
01:45	4		164		3		225		7		389	
02:00	4	15	166	771	1	14	183	793	5	29	349	1.564
02:15	7		180		5		208		12		388	
02:30	2		207		4		208		6		415	
02:45	2		218		4		194		6		412	
03:00	5	11	256	1.081	1	9	222	982	6	20	478	2.063
03:15	4		289		5		222		9		511	
03:30	0		244		1		278		1		522	
03:45	2		292		2		260		4		552	
04:00	3	34	260	1,046	6	32	263	1,023	9	66	523	2,069
04:15	3		239		5		253		8		492	
04:30	12		266		7		268		19		534	
04:45	16		281		14		239		30		520	
05:00	13	114	324	1,385	33	148	270	991	46	262	594	2,376
05:15	26		370		27		226		53		596	
05:30	34		343		32		260		66		603	
05:45	41		348		56		235		97		583	
06:00	39	291	292	1,049	57	391	200	669	96	682	492	1,718
06:15	45		300		68		182		113		482	
06:30	80		251		102		142		182		393	
06:45	127		206		164		145		291		351	
07:00	148	724	158	557	136	855	172	518	284	1.579	330	1.075
07:15	174		154		231		130		405		284	
07:30	186		133		224		124		410		257	
07:45	216		112		264		92		480		204	
08:00	176	795	106	425	304	1.290	100	363	480	2.085	206	788
08:15	198		114		324		106		522		220	
08:30	193		120		322		83		515		203	
08:45	228		85		340		74		568		159	
09:00	179	754	73	306	246	894	124	363	425	1,648	197	669
09:15	199		70		206		108		405		178	
09:30	200		96		234		67		434		163	
09:45	176		67		208		64		384		131	
10:00	150	532	72	174	162	646	56	142	312	1,178	128	316
10:15	126		38		150		32		276		70	
10:30	136		35		164		32		300		67	
10:45	120		29		170		22		290		51	
11:00	108	555	15	58	165	738	30	89	273	1.293	45	147
11:15	138		19		164		25		302		44	
11:30	143		13		187		18		330		31	
11:45	166		11		222		16		388		27	
Totals	3.871		8.190		5.084		7.402		8.955		15.592	
Split%	43.2		52.5		56.8		47.5					

	EB		WB		Combined	
Day Totals	12,061		12.486		24,547	
Day Splits	49.1		50.9			

	EB AM	EB PM	WB AM	WB PM	Combined AM	Combined PM
Peak Hour	08:45	05:00	08:00	03:30	08:00	05:00
Volume	806	1.385	1.290	1.054	2.085	2.376
Factor	0.88	0.94	0.95	0.95	0.92	0.99

Transportation Studies, Inc.

2640 Walnut Avenue, Suite H
Tustin, CA. 92780

Location	: BONITA CANYON DRIVE	Site:	IRVINE
Segment	: W/O ANTEATER/SHADY CANYON	Date:	11/18/15
Client	: STANTEC	Day:	Wednesday

Interval	EB				WB				Combined			
Begin	AM		PM		AM		PM		AM		PM	
12:00	8	31	178	819	13	43	194	796	21	74	372	1,615
12:15	9		211		11		182		20		393	
12:30	5		206		8		230		13		436	
12:45	9		224		11		190		20		414	
01:00	4	17	213	1.062	8	24	204	939	12	41	417	2.001
01:15	3		248		3		274		6		522	
01:30	8		319		8		237		16		556	
01:45	2		282		5		224		7		506	
02:00	3	14	220	908	2	10	175	827	5	24	395	1.735
02:15	7		210		1		210		8		420	
02:30	3		242		4		220		7		462	
02:45	1		236		3		222		4		458	
03:00	3	13	242	1.252	3	13	238	1.017	6	26	480	2.269
03:15	6		362		4		287		10		649	
03:30	2		312		2		252		4		564	
03:45	2		336		4		240		6		576	
04:00	3	28	292	1,299	4	32	230	1,053	7	60	522	2,352
04:15	3		312		8		270		11		582	
04:30	12		358		5		284		17		642	
04:45	10		337		15		269		25		606	
05:00	15	99	388	1,558	28	152	282	1,161	43	251	670	2,719
05:15	28		464		25		284		53		748	
05:30	24		360		40		275		64		635	
05:45	32		346		59		320		91		666	
06:00	38	263	316	1.024	54	376	272	960	92	639	588	1.984
06:15	39		268		66		268		105		536	
06:30	82		225		100		238		182		463	
06:45	104		215		156		182		260		397	
07:00	134	818	204	655	152	920	177	603	286	1.738	381	1.258
07:15	176		168		228		150		404		318	
07:30	228		162		264		150		492		312	
07:45	280		121		276		126		556		247	
08:00	280	1.294	118	508	488	1.604	112	400	768	2.898	230	908
08:15	318		130		447		104		765		234	
08:30	361		146		332		82		693		228	
08:45	335		114		337		102		672		216	
09:00	221	812	126	392	272	981	104	358	493	1,793	230	750
09:15	222		80		241		102		463		182	
09:30	208		110		254		78		462		188	
09:45	161		76		214		74		375		150	
10:00	186	735	86	204	166	650	62	172	352	1,385	148	376
10:15	173		46		160		36		333		82	
10:30	184		36		152		40		336		76	
10:45	192		36		172		34		364		70	
11:00	182	754	25	77	178	767	29	93	360	1.521	54	170
11:15	180		24		176		26		356		50	
11:30	195		12		204		20		399		32	
11:45	197		16		209		18		406		34	
Totals	4.878		9.758		5.572		8.379		10.450		18.137	
Split%	46.7		53.8		53.3		46.2					
Day Totals		14.636				13.951				28.587		
Day Splits		51.2				48.8						
Peak Hour	08:00		05:00		08:00		05:00		08:00		05:00	
Volume	1.294		1.558		1.604		1.161		2.898		2.719	
Factor	0.90		0.84		0.82		0.91		0.94		0.91	

Transportation Studies, Inc.

2640 Walnut Avenue, Suite H
Tustin, CA. 92780

Location	: CULVER DRIVE	Site:	IRVINE
Segment	: N/O ANTEATER/SHADY CANYON	Date:	11/18/15
Client	: STANTEC		

Interval	NB				SB				Combined				Day:	Wednesday
Begin	AM		PM		AM		PM		AM		PM			
12:00	8	32	134	611	14	42	134	597	22	74	268	1,208		
12:15	9		149		13		144		22		293			
12:30	6		154		7		166		13		320			
12:45	9		174		8		153		17		327			
01:00	4	18	154	713	7	20	137	661	11	38	291	1,374		
01:15	3		167		3		183		6		350			
01:30	9		189		6		180		15		369			
01:45	2		203		4		161		6		364			
02:00	2	11	168	690	2	11	130	607	4	22	298	1,297		
02:15	6		168		2		148		8		316			
02:30	2		180		5		172		7		352			
02:45	1		174		2		157		3		331			
03:00	2	10	148	793	3	10	156	684	5	20	304	1,477		
03:15	6		213		3		204		9		417			
03:30	1		206		1		160		2		366			
03:45	1		226		3		164		4		390			
04:00	4	29	228	920	4	23	151	743	8	52	379	1,663		
04:15	3		234		6		187		9		421			
04:30	11		208		3		205		14		413			
04:45	11		250		10		200		21		450			
05:00	14	84	274	1,033	20	118	186	833	34	202	460	1,866		
05:15	24		303		18		211		42		514			
05:30	21		232		31		210		52		442			
05:45	25		224		49		226		74		450			
06:00	30	202	214	730	39	306	225	759	69	508	439	1,489		
06:15	34		210		60		210		94		420			
06:30	70		158		79		172		149		330			
06:45	68		148		128		152		196		300			
07:00	92	666	135	471	124	601	135	468	216	1,267	270	939		
07:15	148		117		154		102		302		219			
07:30	190		131		146		128		336		259			
07:45	236		88		177		103		413		191			
08:00	175	825	84	388	306	1,011	96	329	481	1,836	180	717		
08:15	198		100		252		88		450		188			
08:30	218		108		226		69		444		177			
08:45	234		96		227		76		461		172			
09:00	157	595	95	313	181	718	72	301	338	1,313	167	614		
09:15	168		68		178		96		346		164			
09:30	154		86		195		69		349		155			
09:45	116		64		164		64		280		128			
10:00	142	568	64	153	112	489	51	147	254	1,057	115	300		
10:15	130		37		131		28		261		65			
10:30	130		28		124		34		254		62			
10:45	166		24		122		34		288		58			
11:00	148	598	23	68	124	548	22	74	272	1,146	45	142		
11:15	146		22		126		24		272		46			
11:30	144		10		146		15		290		25			
11:45	160		13		152		13		312		26			
Totals	3,638		6,883		3,897		6,203		7,535		13,086			
Split%	48.3		52.6		51.7		47.4							
Day Totals		10,521				10,100				20,621				
Day Splits		51.0				49.0								
Peak Hour	07:45		04:45		08:00		05:15		08:00		04:45			
Volume	827		1,059		1,011		872		1,836		1,866			
Factor	0.88		0.87		0.83		0.96		0.95		0.91			

Transportation Studies, Inc.
2640 Walnut Avenue, Suite H
Tustin, CA. 92780

City: IRVINE
N-S- Direction: PELTASON DRIVE
E-W Direction: CAMPUS DRIVE

File Name : H1511046
Site Code : 00000000
Start Date : 11/18/2015
Page No : 1

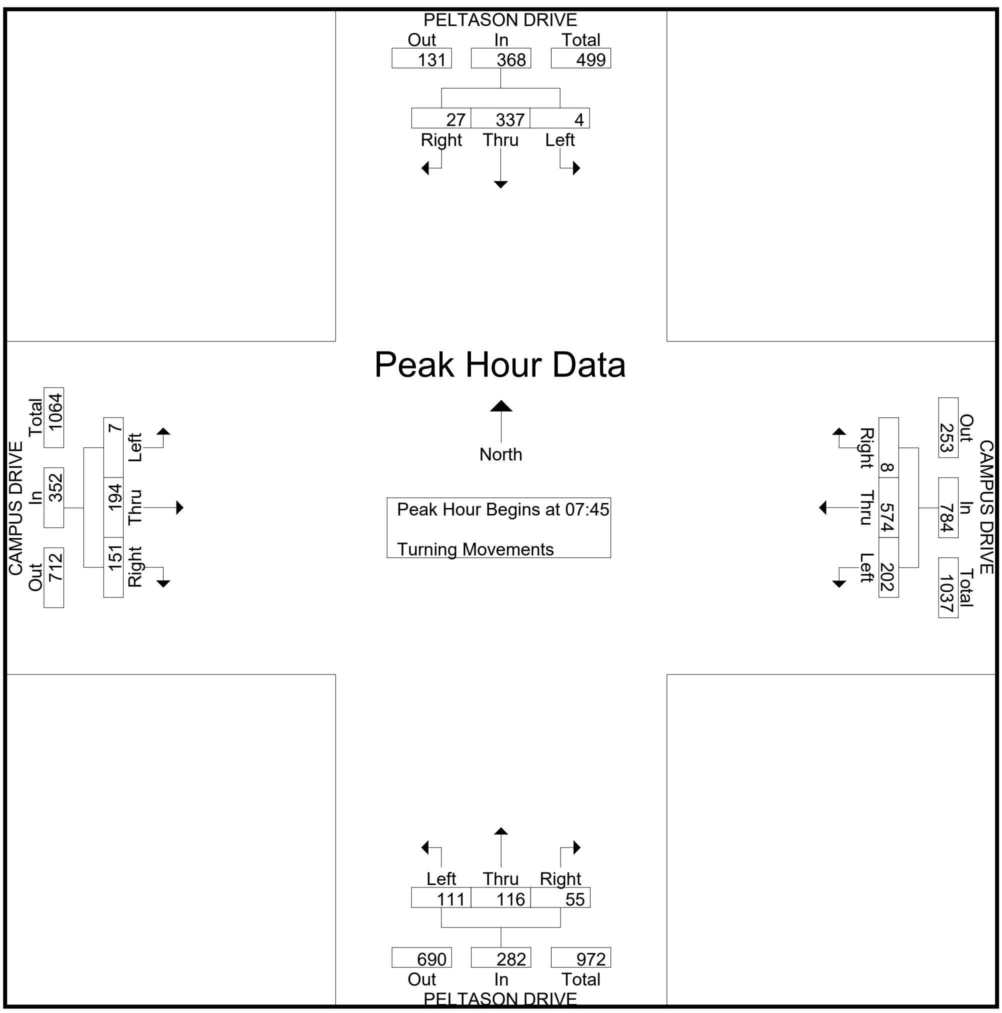
Groups Printed- Turning Movements

	PELTASON DRIVE Southbound			CAMPUS DRIVE Westbound			PELTASON DRIVE Northbound			CAMPUS DRIVE Eastbound			
Start Time	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Int. Total
07:00	1	17	0	1	45	8	3	12	7	16	41	3	154
07:15	4	45	1	2	74	18	11	17	17	22	43	2	256
07:30	2	64	3	1	100	29	26	17	19	58	51	2	372
07:45	7	137	1	2	153	63	12	31	25	60	59	2	552
Total	14	263	5	6	372	118	52	77	68	156	194	9	1334
08:00	8	60	0	1	168	48	13	34	29	25	40	3	429
08:15	6	64	3	3	111	41	12	27	30	27	48	0	372
08:30	6	76	0	2	142	50	18	24	27	39	47	2	433
08:45	6	105	0	2	135	60	12	24	25	48	64	1	482
Total	26	305	3	8	556	199	55	109	111	139	199	6	1716
16:00	4	22	3	2	91	16	42	71	32	30	125	5	443
16:15	0	24	4	4	107	25	32	45	37	33	116	4	431
16:30	11	45	5	2	122	29	38	76	40	48	120	4	540
16:45	3	49	1	4	139	37	57	67	50	42	167	11	627
Total	18	140	13	12	459	107	169	259	159	153	528	24	2041
17:00	7	35	10	2	111	15	55	142	77	51	191	11	707
17:15	6	31	2	2	142	33	55	108	69	34	164	6	652
17:30	5	31	4	4	120	19	30	75	47	40	194	6	575
17:45	11	35	4	2	147	34	27	82	51	47	138	7	585
Total	29	132	20	10	520	101	167	407	244	172	687	30	2519
Grand Total	87	840	41	36	1907	525	443	852	582	620	1608	69	7610
Apprch %	9	86.8	4.2	1.5	77.3	21.3	23.6	45.4	31	27	70	3	
Total %	1.1	11	0.5	0.5	25.1	6.9	5.8	11.2	7.6	8.1	21.1	0.9	

Transportation Studies, Inc.
2640 Walnut Avenue, Suite H
Tustin, CA. 92780

File Name : H1511046
Site Code : 00000000
Start Date : 11/18/2015

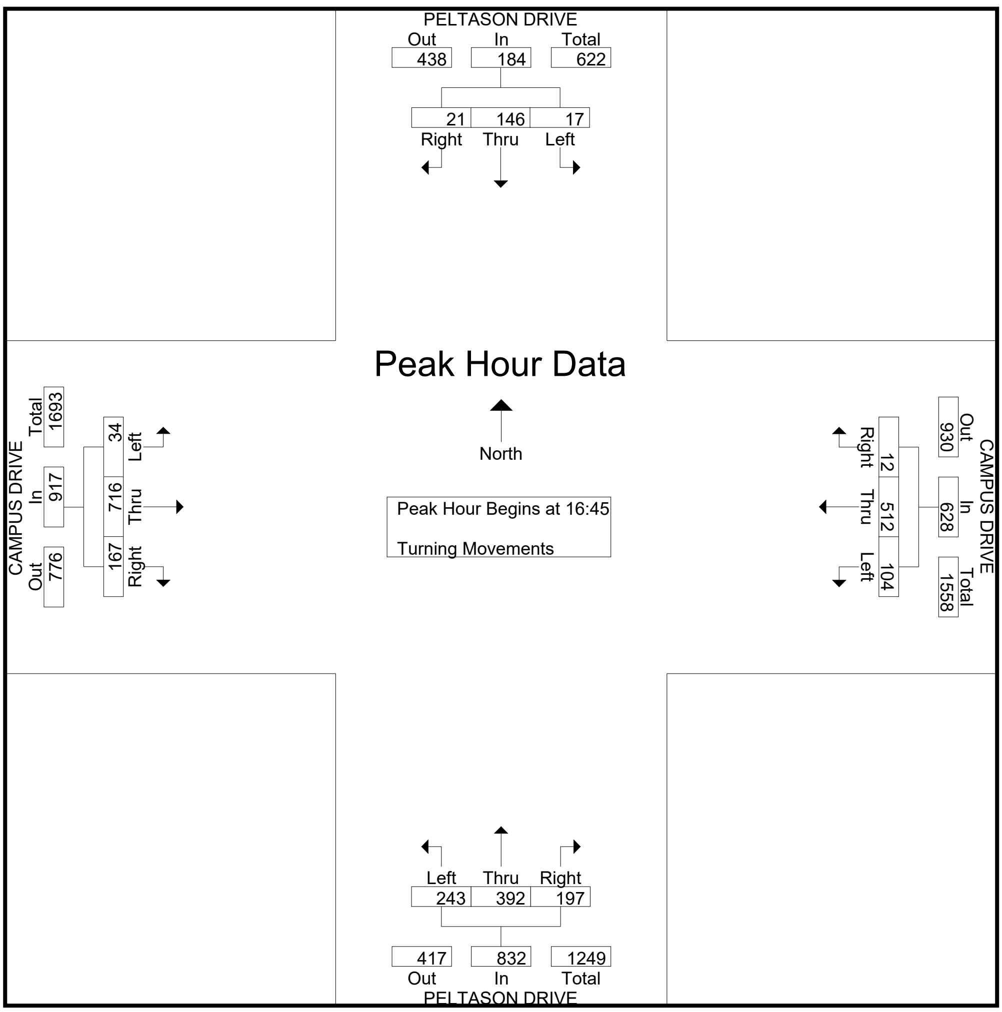
	PELTASON DRIVE Southbound				CAMPUS DRIVE Westbound				PELTASON DRIVE Northbound				CAMPUS DRIVE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:45																	
07:45	7	**137**	1	**145**	2	153	**63**	**218**	12	31	25	68	**60**	**59**	2	**121**	**552**
08:00	**8**	60	0	68	1	**168**	48	217	13	**34**	29	**76**	25	40	**3**	68	429
08:15	6	64	**3**	73	**3**	111	41	155	12	27	**30**	69	27	48	0	75	372
08:30	6	76	0	82	2	142	50	194	**18**	24	27	69	39	47	2	88	433
Total Volume	27	337	4	368	8	574	202	784	55	116	111	282	151	194	7	352	1786
% App. Total	7.3	91.6	1.1		1	73.2	25.8		19.5	41.1	39.4		42.9	55.1	2		
PHF	.844	.615	.333	.634	.667	.854	.802	.899	.764	.853	.925	.928	.629	.822	.583	.727	.809



Transportation Studies, Inc.
2640 Walnut Avenue, Suite H
Tustin, CA. 92780

File Name : H1511046
Site Code : 00000000
Start Date : 11/18/2015
Page No : 3

	PELTASON DRIVE Southbound				CAMPUS DRIVE Westbound				PELTASON DRIVE Northbound				CAMPUS DRIVE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 16:45																	
16:45	3	**49**	1	**53**	**4**	139	**37**	**180**	**57**	67	50	174	42	167	**11**	220	627
17:00	**7**	35	**10**	52	2	111	15	128	55	**142**	**77**	**274**	**51**	191	11	**253**	**707**
17:15	6	31	2	39	2	**142**	33	177	55	108	69	232	34	164	6	204	652
17:30	5	31	4	40	4	120	19	143	30	75	47	152	40	**194**	6	240	575
Total Volume	21	146	17	184	12	512	104	628	197	392	243	832	167	716	34	917	2561
% App. Total	11.4	79.3	9.2		1.9	81.5	16.6		23.7	47.1	29.2		18.2	78.1	3.7		
PHF	.750	.745	.425	.868	.750	.901	.703	.872	.864	.690	.789	.759	.819	.923	.773	.906	.906



City: IRVINE
N-S- Direction: CALIFORNIA AVENUE
E-W Direction: CAMPUS DRIVE

File Name : H1511047
Site Code : 00000000
Start Date : 11/18/2015
Page No : 1

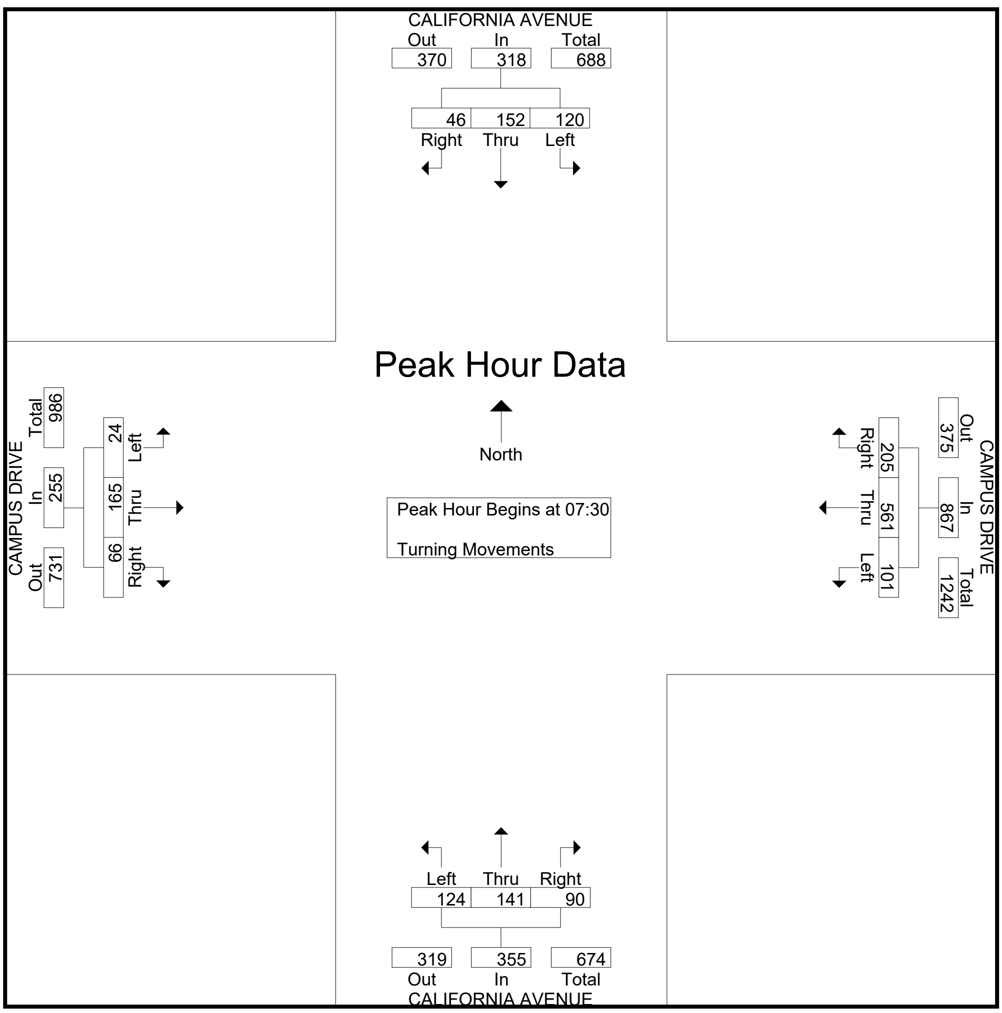
Groups Printed- Turning Movements

	CALIFORNIA AVENUE Southbound			CAMPUS DRIVE Westbound			CALIFORNIA AVENUE Northbound			CAMPUS DRIVE Eastbound			
Start Time	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Int. Total
07:00	4	13	9	9	42	13	6	10	17	10	35	3	171
07:15	5	24	30	10	61	10	11	17	13	15	44	9	249
07:30	10	27	53	58	117	21	49	34	34	11	50	5	469
07:45	17	50	39	100	152	32	30	32	37	25	46	7	567
Total	36	114	131	177	372	76	96	93	101	61	175	24	1456
08:00	8	46	10	36	186	34	7	35	20	16	30	4	432
08:15	11	29	18	11	106	14	4	40	33	14	39	8	327
08:30	12	23	16	7	149	20	9	38	32	19	25	6	356
08:45	7	19	7	12	144	20	6	33	40	26	34	7	355
Total	38	117	51	66	585	88	26	146	125	75	128	25	1470
16:00	5	42	25	9	84	17	30	49	30	30	99	18	438
16:15	4	45	30	13	94	20	14	38	30	34	93	21	436
16:30	10	43	27	19	95	14	13	65	18	29	97	19	449
16:45	8	43	22	23	109	25	12	47	49	48	127	29	542
Total	27	173	104	64	382	76	69	199	127	141	416	87	1865
17:00	9	50	22	7	90	15	11	27	26	65	150	23	495
17:15	7	44	36	19	121	37	21	48	44	45	154	22	598
17:30	1	55	27	16	84	30	20	52	52	51	145	18	551
17:45	12	43	11	10	129	32	23	47	38	49	125	27	546
Total	29	192	96	52	424	114	75	174	160	210	574	90	2190
Grand Total	130	596	382	359	1763	354	266	612	513	487	1293	226	6981
Apprch %	11.7	53.8	34.5	14.5	71.2	14.3	19.1	44	36.9	24.3	64.5	11.3	
Total %	1.9	8.5	5.5	5.1	25.3	5.1	3.8	8.8	7.3	7	18.5	3.2	

Transportation Studies, Inc.
2640 Walnut Avenue, Suite H
Tustin, CA. 92780

File Name : H1511047
Site Code : 00000000
Start Date : 11/18/2015
Page No : 2

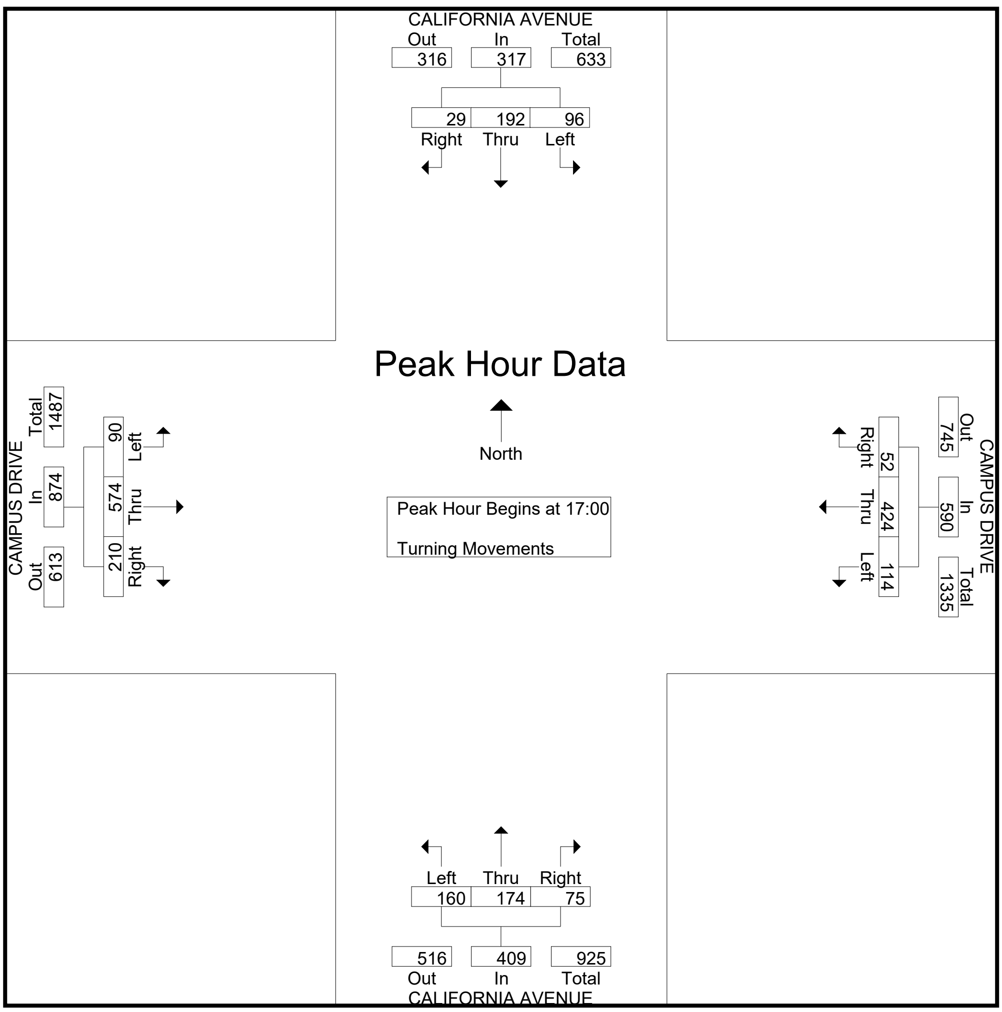
	CALIFORNIA AVENUE Southbound				CAMPUS DRIVE Westbound				CALIFORNIA AVENUE Northbound				CAMPUS DRIVE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30																	
07:30	10	27	**53**	90	58	117	21	196	**49**	34	34	**117**	11	**50**	5	66	469
07:45	**17**	**50**	39	**106**	**100**	152	32	**284**	30	32	**37**	99	**25**	46	7	**78**	**567**
08:00	8	46	10	64	36	**186**	**34**	256	7	35	20	62	16	30	4	50	432
08:15	11	29	18	58	11	106	14	131	4	**40**	33	77	14	39	**8**	61	327
Total Volume	46	152	120	318	205	561	101	867	90	141	124	355	66	165	24	255	1795
% App. Total	14.5	47.8	37.7		23.6	64.7	11.6		25.4	39.7	34.9		25.9	64.7	9.4		
PHF	.676	.760	.566	.750	.513	.754	.743	.763	.459	.881	.838	.759	.660	.825	.750	.817	.791



Transportation Studies, Inc.
2640 Walnut Avenue, Suite H
Tustin, CA. 92780

File Name : H1511047
Site Code : 00000000
Start Date : 11/18/2015
Page No : 3

	CALIFORNIA AVENUE Southbound				CAMPUS DRIVE Westbound				CALIFORNIA AVENUE Northbound				CAMPUS DRIVE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 17:00																	
17:00	9	50	22	81	7	90	15	112	11	27	26	64	**65**	150	23	**238**	495
17:15	7	44	**36**	**87**	**19**	121	**37**	**177**	21	48	44	113	45	**154**	22	221	**598**
17:30	1	**55**	27	83	16	84	30	130	20	**52**	**52**	**124**	51	145	18	214	551
17:45	**12**	43	11	66	10	**129**	32	171	**23**	47	38	108	49	125	**27**	201	546
Total Volume	29	192	96	317	52	424	114	590	75	174	160	409	210	574	90	874	2190
% App. Total	9.1	60.6	30.3		8.8	71.9	19.3		18.3	42.5	39.1		24	65.7	10.3		
PHF	.604	.873	.667	.911	.684	.822	.770	.833	.815	.837	.769	.825	.808	.932	.833	.918	.916



Transportation Studies, Inc.
2640 Walnut Avenue, Suite H
Tustin, CA. 92780

City: IRVINE
N-S- Direction: CULVER DRIVE
E-W Direction: CAMPUS DRIVE

File Name : H1511048
Site Code : 00000000
Start Date : 11/18/2015
Page No : 1

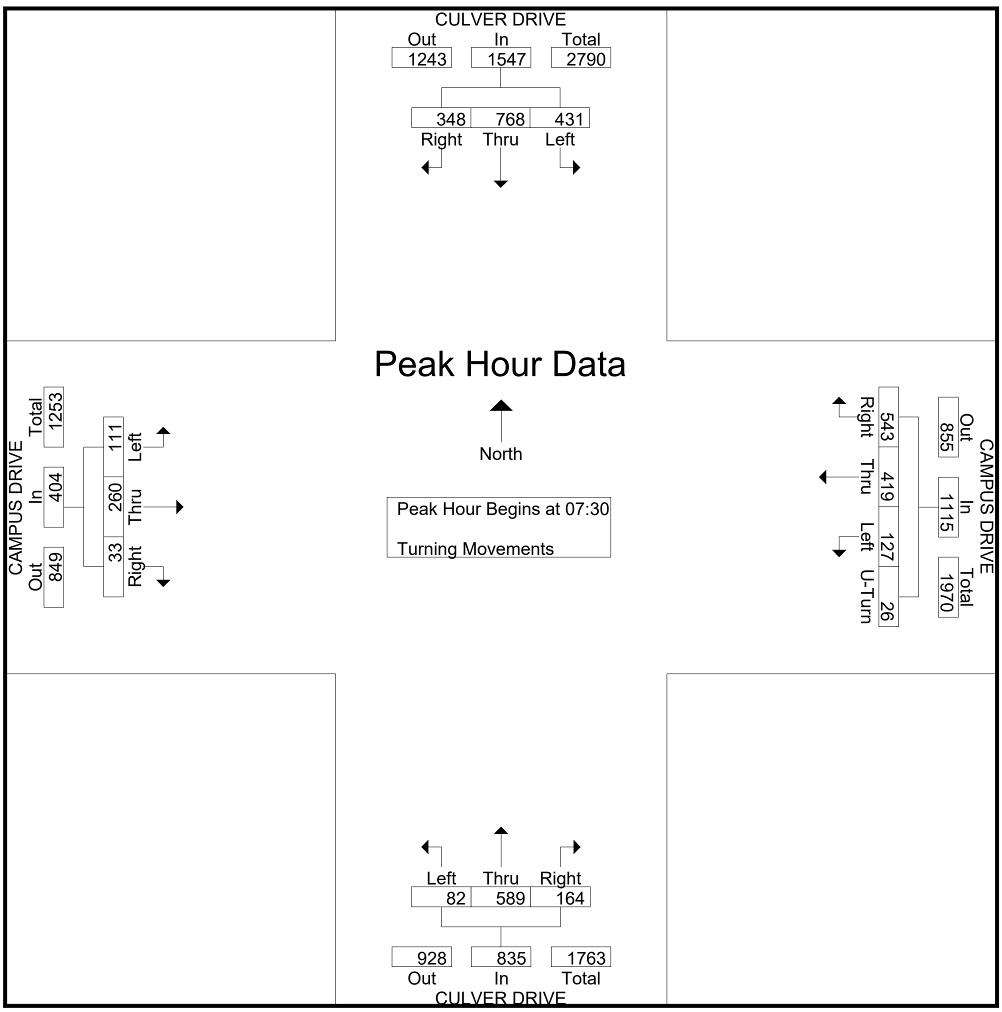
Groups Printed- Turning Movements

	CULVER DRIVE Southbound			CAMPUS DRIVE Westbound				CULVER DRIVE Northbound			CAMPUS DRIVE Eastbound			
Start Time	Right	Thru	Left	Right	Thru	Left	U-Turn	Right	Thru	Left	Right	Thru	Left	Int. Total
07:00	27	120	32	49	39	11	1	12	82	4	8	22	8	415
07:15	32	126	69	85	52	14	2	32	105	5	9	48	19	598
07:30	100	121	154	145	76	25	5	69	117	17	9	121	38	997
07:45	138	175	148	154	125	38	11	58	170	22	4	80	41	1164
Total	297	542	403	433	292	88	19	171	474	48	30	271	106	3174
08:00	56	265	71	157	154	39	10	19	131	23	8	23	15	971
08:15	54	207	58	87	64	25	0	18	171	20	12	36	17	769
08:30	62	210	44	82	86	16	0	12	207	21	9	22	21	792
08:45	95	183	49	96	67	20	0	17	215	26	10	20	15	813
Total	267	865	222	422	371	100	10	66	724	90	39	101	68	3345
16:00	52	162	59	74	57	22	0	24	196	11	18	62	73	810
16:15	62	162	76	67	53	18	0	23	195	17	15	70	49	807
16:30	60	160	66	65	52	10	2	27	217	19	15	75	44	812
16:45	66	159	87	69	58	17	0	28	236	22	12	81	62	897
Total	240	643	288	275	220	67	2	102	844	69	60	288	228	3326
17:00	71	183	90	57	40	18	1	23	211	22	18	69	79	882
17:15	69	186	63	52	54	25	0	37	286	37	28	114	87	1038
17:30	62	220	65	41	55	24	0	34	217	22	20	104	72	936
17:45	87	180	69	60	48	16	0	33	161	30	18	83	59	844
Total	289	769	287	210	197	83	1	127	875	111	84	370	297	3700
Grand Total	1093	2819	1200	1340	1080	338	32	466	2917	318	213	1030	699	13545
Apprch %	21.4	55.1	23.5	48	38.7	12.1	1.1	12.6	78.8	8.6	11	53	36	
Total %	8.1	20.8	8.9	9.9	8	2.5	0.2	3.4	21.5	2.3	1.6	7.6	5.2	

Transportation Studies, Inc.
2640 Walnut Avenue, Suite H
Tustin, CA. 92780

File Name : H1511048
Site Code : 00000000
Start Date : 11/18/2015
Page No : 2

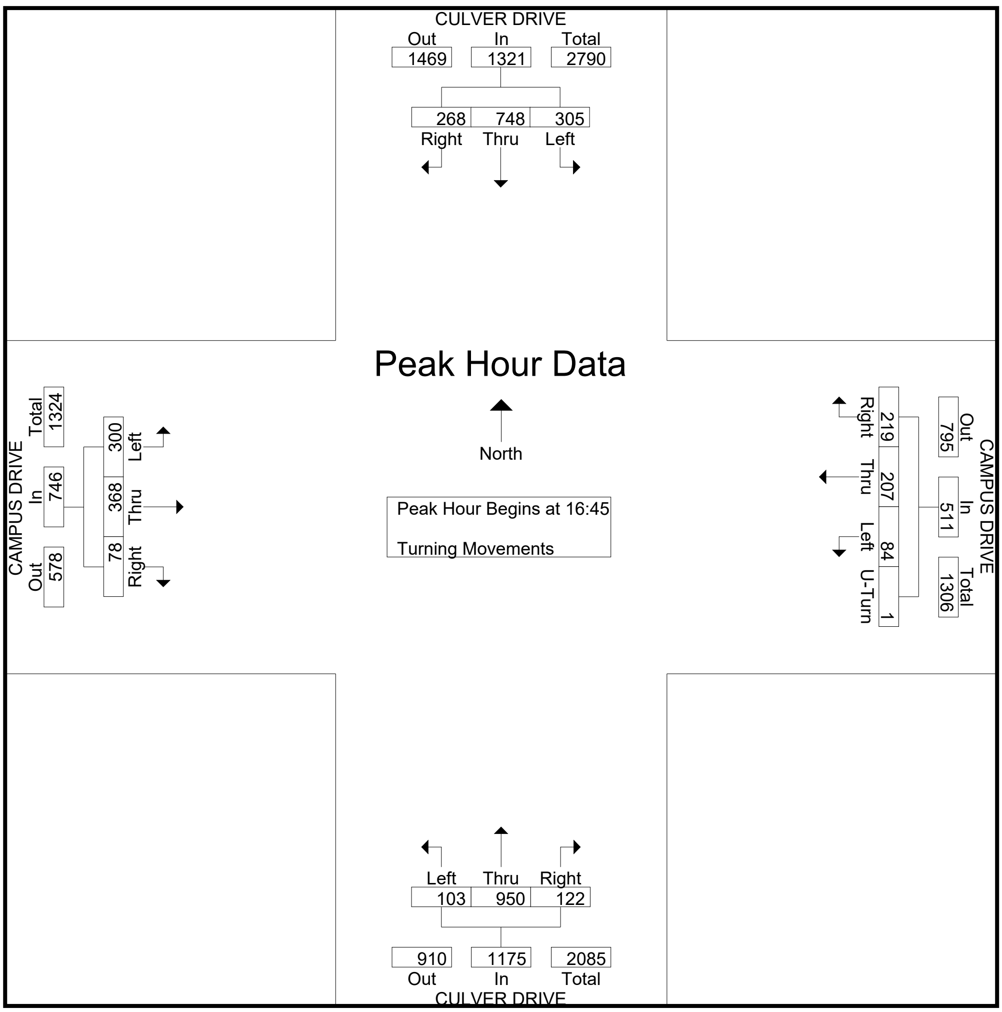
	CULVER DRIVE Southbound				CAMPUS DRIVE Westbound					CULVER DRIVE Northbound				CAMPUS DRIVE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1																		
Peak Hour for Entire Intersection Begins at 07:30																		
07:30	100	121	154	375	145	76	25	5	251	69	117	17	203	9	121	38	168	997
07:45	**138**	175	148	**461**				**11**	328	58	170	22	**250**			**41**	125	**1164**
08:00	**56**	**265**	71	392	**157**	**154**	**39**	10	**360**	**19**	**131**	**23**	173	8	23	15	46	971
08:15	54	207	58	319	87	64	25	0	176	18	**171**	20	209	**12**	36	17	65	769
Total Volume	348	768	431	1547	543	419	127	26	1115	164	589	82	835	33	260	111	404	3901
% App. Total	22.5	49.6	27.9		48.7	37.6	11.4	2.3		19.6	70.5	9.8		8.2	64.4	27.5		
PHF	.630	.725	.700	.839	.865	.680	.814	.591	.774	.594	.861	.891	.835	.688	.537	.677	.601	.838



Transportation Studies, Inc.
2640 Walnut Avenue, Suite H
Tustin, CA. 92780

File Name : H1511048
Site Code : 00000000
Start Date : 11/18/2015
Page No : 3

	CULVER DRIVE Southbound				CAMPUS DRIVE Westbound					CULVER DRIVE Northbound				CAMPUS DRIVE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1																		
Peak Hour for Entire Intersection Begins at 16:45																		
16:45	66	159	87	312	69	58	17	0	144	28	236	22	286	12	81	62	155	897
17:00	71	183	**90**	344	57	40	18	**1**	116	23	211	22	256	18	69	79	166	882
17:15	69	186	63	318	52	54	**25**	0	131	**37**	**286**	**37**	**360**	**28**	**114**	**87**	**229**	**1038**
17:30	**62**	**220**	65	**347**	**41**	**55**	**24**	**0**	**120**	**34**	**217**	**22**	**273**	**20**	**104**	**72**	**196**	**936**
Total Volume	268	748	305	1321	219	207	84	1	511	122	950	103	1175	78	368	300	746	3753
% App. Total	20.3	56.6	23.1		42.9	40.5	16.4	0.2		10.4	80.9	8.8		10.5	49.3	40.2		
PHF	.944	.850	.847	.952	.793	.892	.840	.250	.887	.824	.830	.696	.816	.696	.807	.862	.814	.904



Transportation Studies, Inc.
2640 Walnut Avenue, Suite H
Tustin, CA. 92780

City: IRVINE
N-S- Direction: PELTASON DRIVE
E-W Direction: ANTEATER DRIVE

File Name : H1511049
Site Code : 00000000
Start Date : 11/18/2015
Page No : 1

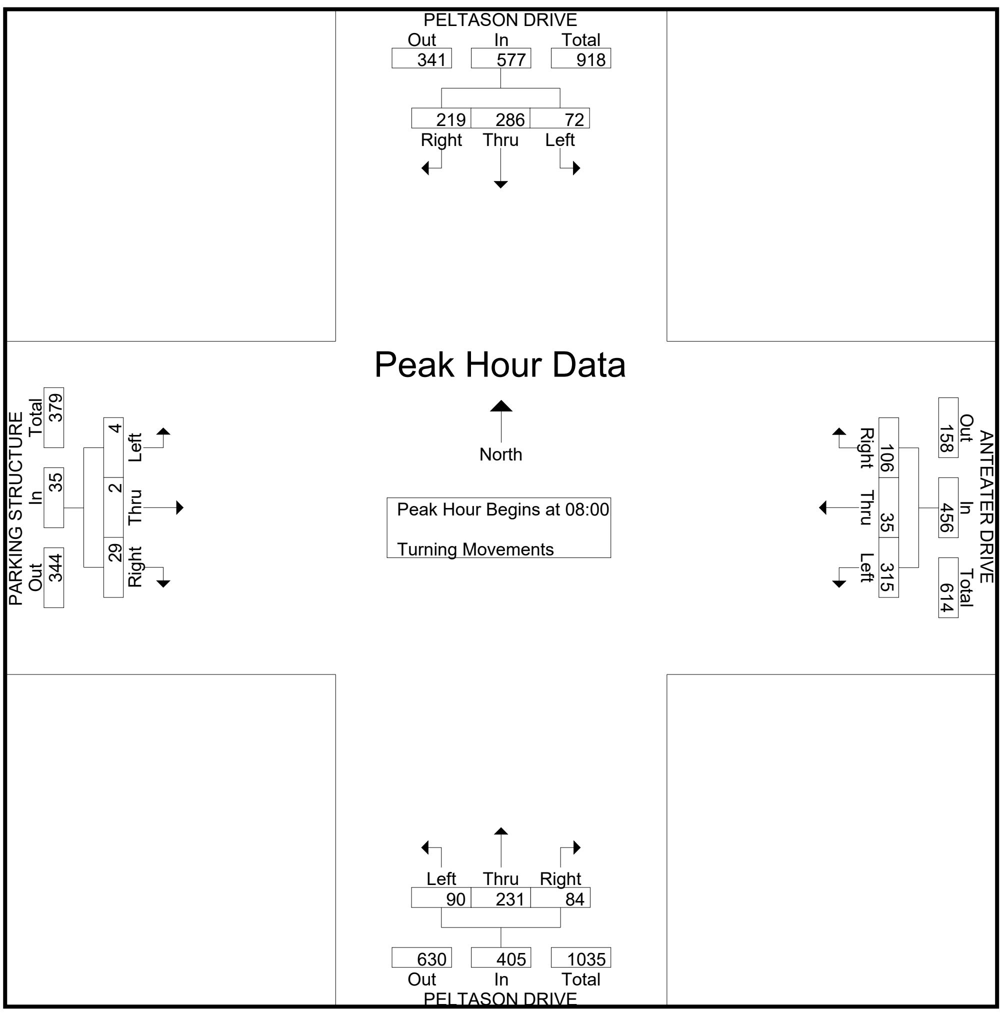
Groups Printed- Turning Movements

	PELTASON DRIVE Southbound			ANTEATER DRIVE Westbound			PELTASON DRIVE Northbound			PARKING STRUCTURE Eastbound			
Start Time	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Int. Total
07:00	11	25	4	4	2	28	9	26	9	2	0	2	122
07:15	21	34	7	10	1	39	17	42	13	3	0	0	187
07:30	61	50	20	16	13	44	14	55	20	2	1	2	298
07:45	79	92	22	17	16	61	19	64	26	2	0	2	400
Total	172	201	53	47	32	172	59	187	68	9	1	6	1007
08:00	43	70	15	15	8	67	30	65	7	1	0	1	322
08:15	34	60	18	33	5	91	18	65	15	4	1	1	345
08:30	55	67	20	27	6	77	17	52	26	8	1	1	357
08:45	87	89	19	31	16	80	19	49	42	16	0	1	449
Total	219	286	72	106	35	315	84	231	90	29	2	4	1473
16:00	8	48	26	24	3	31	32	63	2	15	6	31	289
16:15	10	46	28	18	2	34	25	59	2	10	8	26	268
16:30	26	60	29	16	6	30	58	69	10	12	8	31	355
16:45	33	99	30	19	3	67	55	75	13	25	7	46	472
Total	77	253	113	77	14	162	170	266	27	62	29	134	1384
17:00	12	78	59	31	6	47	80	115	2	28	28	82	568
17:15	7	70	32	30	0	45	62	118	0	17	13	77	471
17:30	8	47	40	18	4	21	68	112	6	13	6	34	377
17:45	8	65	41	16	1	35	61	96	4	14	4	37	382
Total	35	260	172	95	11	148	271	441	12	72	51	230	1798
Grand Total	503	1000	410	325	92	797	584	1125	197	172	83	374	5662
Apprch %	26.3	52.3	21.4	26.8	7.6	65.7	30.6	59	10.3	27.3	13.2	59.5	
Total %	8.9	17.7	7.2	5.7	1.6	14.1	10.3	19.9	3.5	3	1.5	6.6	

Transportation Studies, Inc.
2640 Walnut Avenue, Suite H
Tustin, CA. 92780

File Name : H1511049
Site Code : 00000000
Start Date : 11/18/2015
Page No : 2

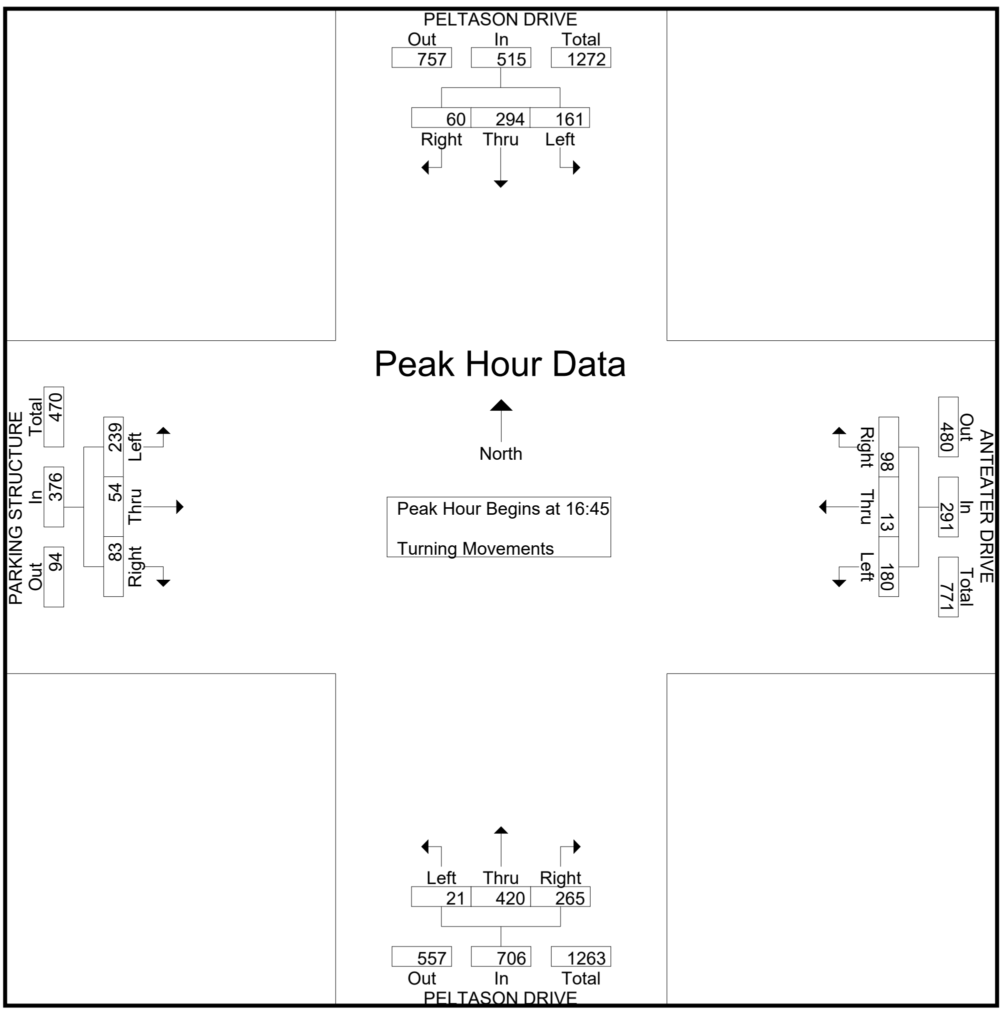
	PELTASON DRIVE Southbound				ANTEATER DRIVE Westbound				PELTASON DRIVE Northbound				PARKING STRUCTURE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00																	
08:00	43	70	15	128	15	8	67	90	**30**	**65**	7	102	1	0	**1**	2	322
08:15	34	60	18	112	**33**	5	**91**	**129**	18	65	15	98	4	**1**	1	6	345
08:30	55	67	**20**	142	27	6	77	110	17	52	26	95	8	1	1	10	357
08:45	**87**	**89**	19	**195**	31	**16**	80	127	19	49	**42**	**110**	**16**	0	1	**17**	**449**
Total Volume	219	286	72	577	106	35	315	456	84	231	90	405	29	2	4	35	1473
% App. Total	38	49.6	12.5		23.2	7.7	69.1		20.7	57	22.2		82.9	5.7	11.4		
PHF	.629	.803	.900	.740	.803	.547	.865	.884	.700	.888	.536	.920	.453	.500	1.00	.515	.820



Transportation Studies, Inc.
2640 Walnut Avenue, Suite H
Tustin, CA. 92780

File Name : H1511049
Site Code : 00000000
Start Date : 11/18/2015
Page No : 3

	PELTASON DRIVE Southbound				ANTEATER DRIVE Westbound				PELTASON DRIVE Northbound				PARKING STRUCTURE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 16:45																	
16:45	**33**	**99**	30	**162**	19	3	**67**	**89**	55	75	**13**	143	25	7	46	78	472
17:00	12	78	**59**	149	**31**	**6**	47	84	**80**	115	2	**197**	**28**	**28**	**82**	**138**	**568**
17:15	7	70	32	109	30	0	45	75	62	**118**	0	180	17	13	77	107	471
17:30	8	47	40	95	18	4	21	43	68	112	6	186	13	6	34	53	377
Total Volume	60	294	161	515	98	13	180	291	265	420	21	706	83	54	239	376	1888
% App. Total	11.7	57.1	31.3		33.7	4.5	61.9		37.5	59.5	3		22.1	14.4	63.6		
PHF	.455	.742	.682	.795	.790	.542	.672	.817	.828	.890	.404	.896	.741	.482	.729	.681	.831



Transportation Studies, Inc.
2640 Walnut Avenue, Suite H
Tustin, CA. 92780

City: IRVINE
N-S- Direction: GABRIELINO DRIVE
E-W Direction: CALIFORNIA AVENUE

File Name : H1511050
Site Code : 00000000
Start Date : 11/17/2015

Groups Printed- Turning Movements

	GABRIELINO DRIVE Southbound			CALIFORNIA AVENUE Westbound			GABRIELINO DRIVE Northbound			CALIFORNIA AVENUE Eastbound			
Start Time	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Int. Total
07:00	1	4	4	0	8	34	1	10	0	2	7	0	71
07:15	0	1	2	3	4	11	10	2	0	1	18	0	52
07:30	3	2	12	2	11	8	22	12	0	1	30	2	105
07:45	3	3	3	3	17	11	11	4	2	2	16	1	76
Total	7	10	21	8	40	64	44	28	2	6	71	3	304
08:00	2	3	3	7	12	8	10	7	1	2	17	4	76
08:15	1	2	4	3	11	8	7	6	4	0	13	1	60
08:30	2	1	2	2	10	11	11	10	2	0	15	8	74
08:45	3	2	1	2	13	14	9	10	3	0	15	8	80
Total	8	8	10	14	46	41	37	33	10	2	60	21	290
16:00	1	5	1	2	10	9	8	3	1	1	12	2	55
16:15	1	3	0	2	9	6	10	2	1	0	8	3	45
16:30	4	15	2	2	13	7	8	4	1	1	13	4	74
16:45	5	13	0	3	9	10	12	5	2	1	4	3	67
Total	11	36	3	9	41	32	38	14	5	3	37	12	241
17:00	6	9	4	2	15	10	13	3	2	4	9	6	83
17:15	3	4	4	3	20	7	7	1	0	1	12	2	64
17:30	5	12	3	1	21	12	10	6	0	0	10	1	81
17:45	4	10	1	0	24	10	10	4	1	0	8	2	74
Total	18	35	12	6	80	39	40	14	3	5	39	11	302
Grand Total	44	89	46	37	207	176	159	89	20	16	207	47	1137
Apprch %	24.6	49.7	25.7	8.8	49.3	41.9	59.3	33.2	7.5	5.9	76.7	17.4	
Total %	3.9	7.8	4	3.3	18.2	15.5	14	7.8	1.8	1.4	18.2	4.1	

Transportation Studies, Inc.
2640 Walnut Avenue, Suite H
Tustin, CA. 92780

File Name : H1511050
Site Code : 00000000
Start Date : 11/17/2015
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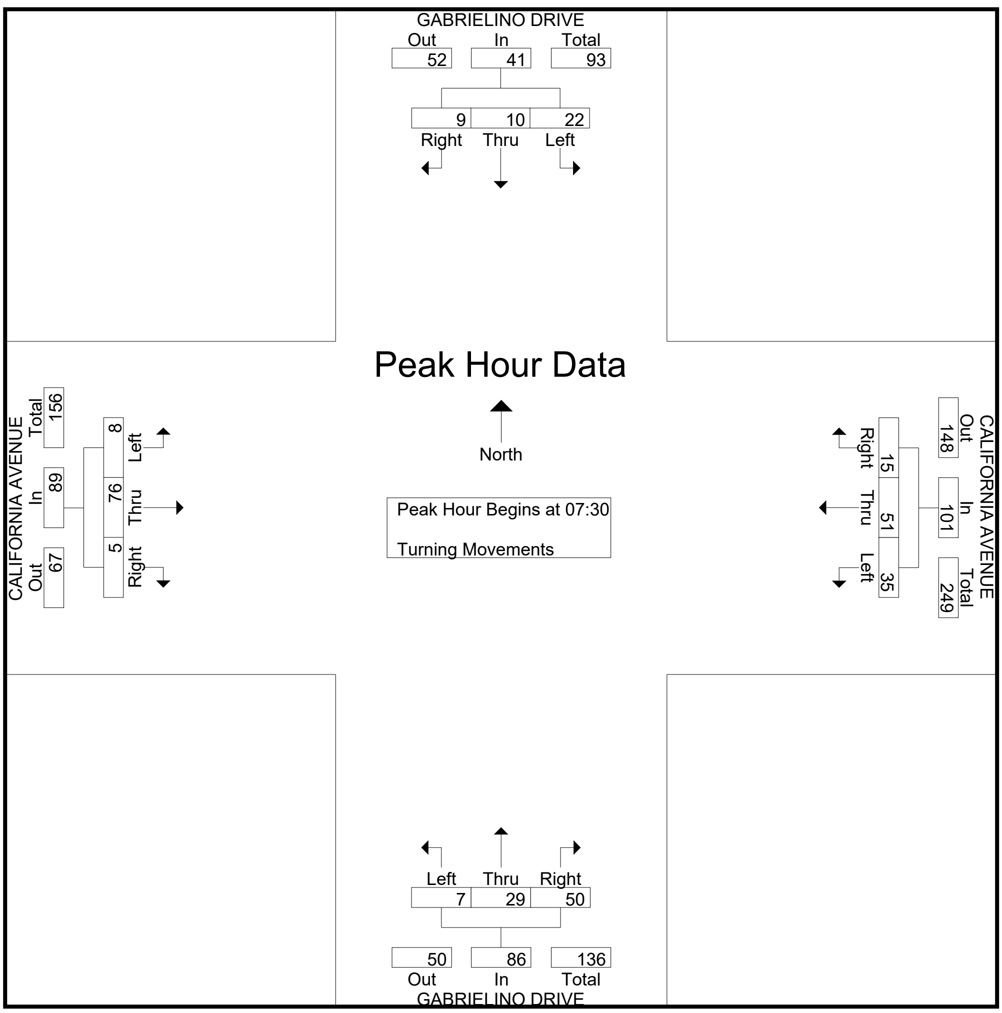
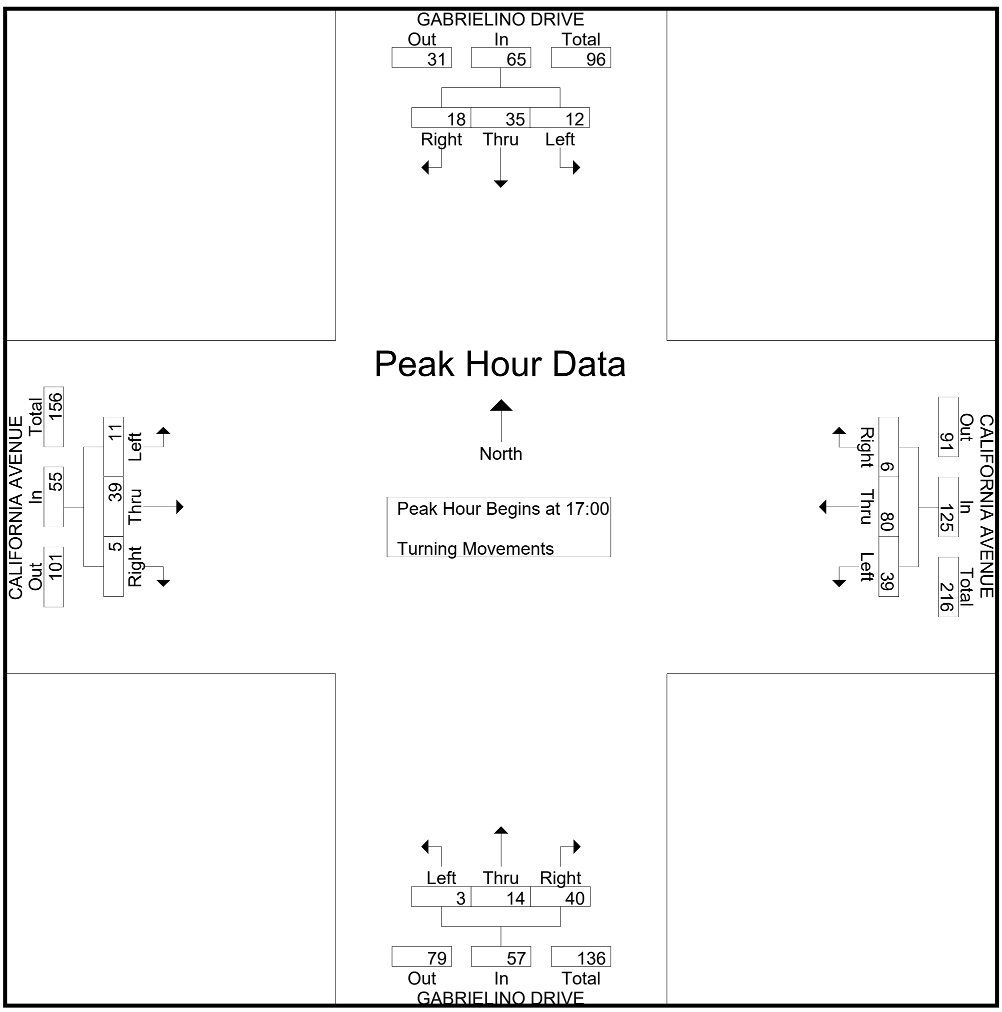
	GABRIELINO DRIVE Southbound				CALIFORNIA AVENUE Westbound				GABRIELINO DRIVE Northbound				CALIFORNIA AVENUE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30																	
07:30	**3**	2	**12**	**17**	2	11	8	21	**22**	**12**	0	**34**	1	**30**	2	**33**	**105**
07:45	3	**3**	3	9	3	**17**	**11**	**31**	11	4	2	17	**2**	16	1	19	76
08:00	2	3	3	8	**7**	12	8	27	10	7	1	18	2	17	**4**	23	76
08:15	1	2	4	7	3	11	8	22	7	6	**4**	17	0	13	1	14	60
Total Volume	9	10	22	41	15	51	35	101	50	29	7	86	5	76	8	89	317
% App. Total	22	24.4	53.7		14.9	50.5	34.7		58.1	33.7	8.1		5.6	85.4	9		
PHF	.750	.833	.458	.603	.536	.750	.795	.815	.568	.604	.438	.632	.625	.633	.500	.674	.755



Transportation Studies, Inc.
2640 Walnut Avenue, Suite H
Tustin, CA. 92780

File Name : H1511050
Site Code : 00000000
Start Date : 11/17/2015
Page No : 3

	GABRIELINO DRIVE Southbound				CALIFORNIA AVENUE Westbound				GABRIELINO DRIVE Northbound				CALIFORNIA AVENUE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 17:00																	
17:00	**6**	9	**4**	19	2	15	10	27	**13**	3	**2**	**18**	**4**	9	**6**	**19**	**83**
17:15	3	4	4	11	**3**	20	7	30	7	1	0	8	1	**12**	2	15	64
17:30	5	**12**	3	**20**	1	21	**12**	**34**	10	**6**	0	16	0	10	1	11	81
17:45	4	10	1	15	0	**24**	10	34	10	4	1	15	0	8	2	10	74
Total Volume	18	35	12	65	6	80	39	125	40	14	3	57	5	39	11	55	302
% App. Total	27.7	53.8	18.5		4.8	64	31.2		70.2	24.6	5.3		9.1	70.9	20		
PHF	.750	.729	.750	.813	.500	.833	.813	.919	.769	.583	.375	.792	.313	.813	.458	.724	.910



Transportation Studies, Inc.
2640 Walnut Avenue, Suite H
Tustin, CA. 92780

City: IRVINE
N-S- Direction: CALIFORNIA AVENUE
E-W Direction: ANTEATER DRIVE

File Name : H1511051
Site Code : 00000000
Start Date : 11/18/2015
Page No : 1

Groups Printed- Turning Movements

	CALIFORNIA AVENUE Southbound			ANTEATER DRIVE Westbound			CALIFORNIA AVENUE Northbound			ANTEATER DRIVE Eastbound			
Start Time	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Int. Total
07:00	7	15	3	0	12	24	11	4	0	1	6	3	86
07:15	14	8	5	7	17	15	24	9	1	1	13	8	122
07:30	14	9	8	10	38	9	51	38	1	0	20	16	214
07:45	24	16	13	14	45	21	27	18	1	4	17	8	208
Total	59	48	29	31	112	69	113	69	3	6	56	35	630
08:00	25	14	27	16	41	27	36	9	1	0	19	18	233
08:15	25	9	10	12	67	23	14	9	3	0	10	13	195
08:30	24	6	9	11	53	12	19	10	1	0	12	13	170
08:45	31	4	9	15	61	16	17	11	3	1	23	13	204
Total	105	33	55	54	222	78	86	39	8	1	64	57	802
16:00	46	15	19	7	20	11	16	13	0	2	58	30	237
16:15	18	16	14	2	24	12	19	13	0	0	27	11	156
16:30	27	15	13	7	16	13	22	6	0	0	43	35	197
16:45	36	12	15	11	30	16	9	12	0	1	41	23	206
Total	127	58	61	27	90	52	66	44	0	3	169	99	796
17:00	27	9	20	16	32	17	19	18	1	5	79	38	281
17:15	24	20	22	15	29	15	27	13	1	3	60	34	263
17:30	20	10	20	14	15	19	17	8	0	2	59	33	217
17:45	18	18	19	16	18	22	11	11	1	5	41	28	208
Total	89	57	81	61	94	73	74	50	3	15	239	133	969
Grand Total	380	196	226	173	518	272	339	202	14	25	528	324	3197
Apprch %	47.4	24.4	28.2	18	53.8	28.2	61.1	36.4	2.5	2.9	60.2	36.9	
Total %	11.9	6.1	7.1	5.4	16.2	8.5	10.6	6.3	0.4	0.8	16.5	10.1	

Transportation Studies, Inc.
2640 Walnut Avenue, Suite H
Tustin, CA. 92780

File Name : H1511051
Site Code : 00000000
Start Date : 11/18/2015
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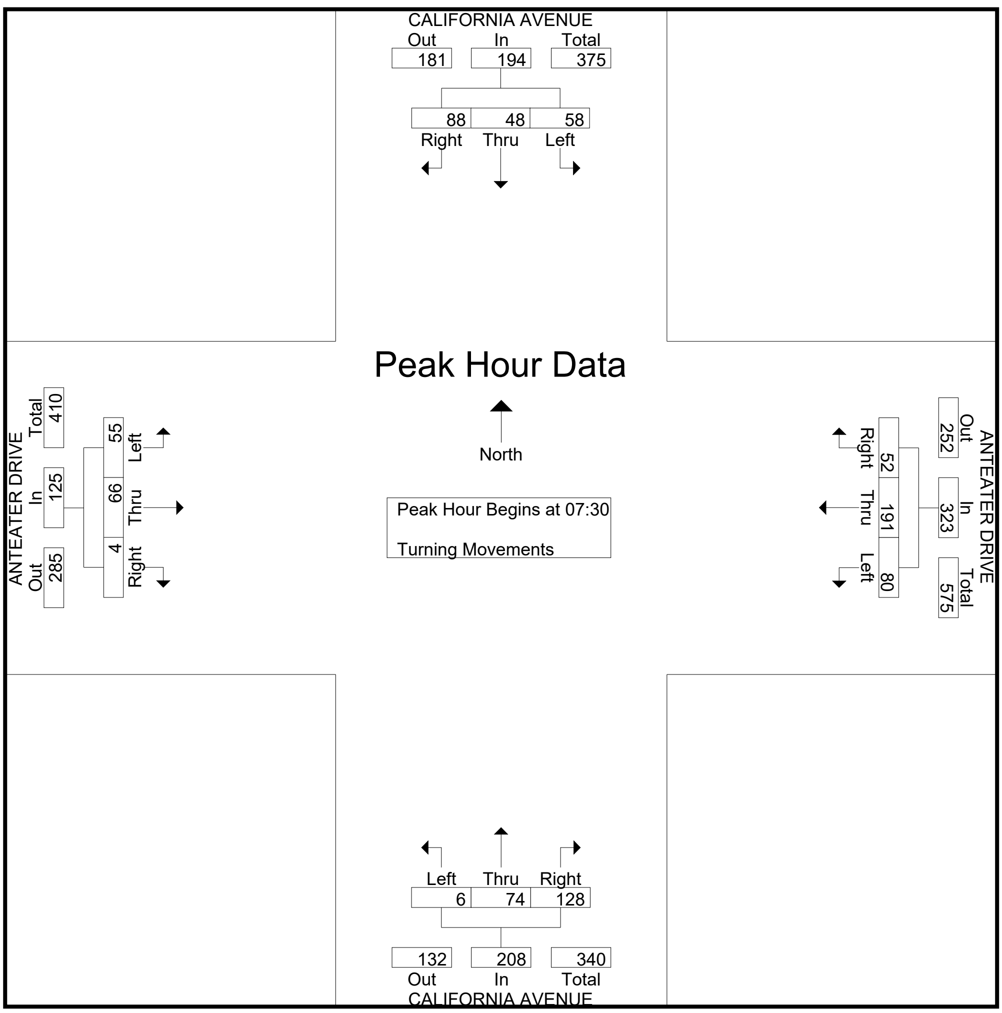
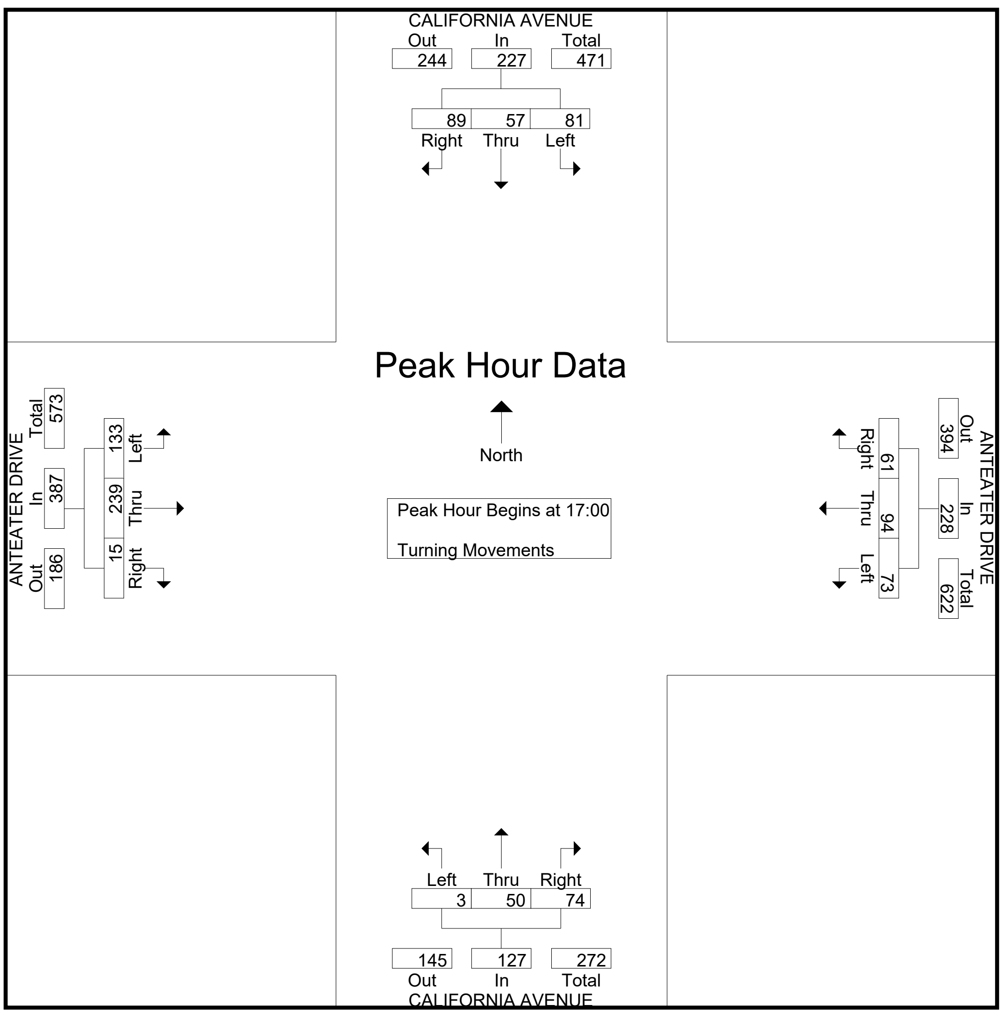
	CALIFORNIA AVENUE Southbound				ANTEATER DRIVE Westbound				CALIFORNIA AVENUE Northbound				ANTEATER DRIVE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30																	
07:30	14	9	8	31	10	38	9	57	**51**	**38**	1	**90**	0	**20**	16	36	214
07:45	24	**16**	13	53	14	45	21	80	27	18	1	46	**4**	17	8	29	208
08:00	**25**	14	**27**	**66**	**16**	41	**27**	84	36	9	1	46	0	19	**18**	**37**	**233**
08:15	25	9	10	44	12	**67**	23	**102**	14	9	**3**	26	0	10	13	23	195
Total Volume	88	48	58	194	52	191	80	323	128	74	6	208	4	66	55	125	850
% App. Total	45.4	24.7	29.9		16.1	59.1	24.8		61.5	35.6	2.9		3.2	52.8	44		
PHF	.880	.750	.537	.735	.813	.713	.741	.792	.627	.487	.500	.578	.250	.825	.764	.845	.912



Transportation Studies, Inc.
2640 Walnut Avenue, Suite H
Tustin, CA. 92780

File Name : H1511051
Site Code : 00000000
Start Date : 11/18/2015
Page No : 3

	CALIFORNIA AVENUE Southbound				ANTEATER DRIVE Westbound				CALIFORNIA AVENUE Northbound				ANTEATER DRIVE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 17:00																	
17:00	**27**	9	20	56	**16**	**32**	17	**65**	19	**18**	**1**	38	**5**	**79**	**38**	**122**	**281**
17:15	24	**20**	**22**	**66**	15	29	15	59	**27**	13	1	**41**	3	60	34	97	263
17:30	20	10	20	50	14	15	19	48	17	8	0	25	2	59	33	94	217
17:45	18	18	19	55	16	18	**22**	56	11	11	1	23	5	41	28	74	208
Total Volume	89	57	81	227	61	94	73	228	74	50	3	127	15	239	133	387	969
% App. Total	39.2	25.1	35.7		26.8	41.2	32		58.3	39.4	2.4		3.9	61.8	34.4		
PHF	.824	.713	.920	.860	.953	.734	.830	.877	.685	.694	.750	.774	.750	.756	.875	.793	.862



Transportation Studies, Inc.
2640 Walnut Avenue, Suite H
Tustin, CA. 92780

City: IRVINE
N-S- Direction: SR-73 SB RAMPS
E-W Direction: BONITA CANYON DRIVE

File Name : H1511052
Site Code : 00000000
Start Date : 11/17/2015
Page No : 1

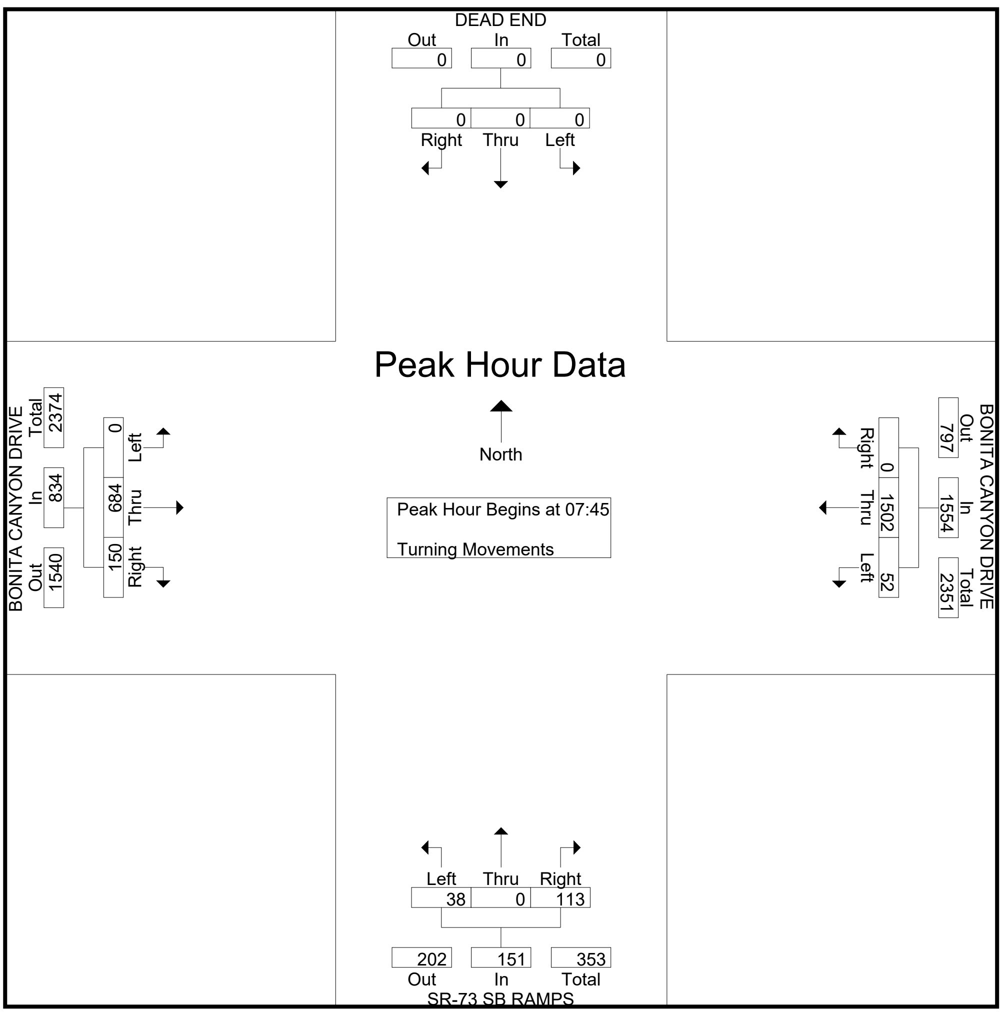
Groups Printed- Turning Movements

	DEAD END Southbound			BONITA CANYON DRIVE Westbound			SR-73 SB RAMPS Northbound			BONITA CANYON DRIVE Eastbound			
Start Time	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Int. Total
07:00	0	0	0	0	184	7	15	0	4	32	116	0	358
07:15	0	0	0	0	278	11	19	0	11	55	155	0	529
07:30	0	0	0	0	313	8	28	0	11	34	165	0	559
07:45	0	0	0	0	337	18	30	0	5	42	207	0	639
Total	0	0	0	0	1112	44	92	0	31	163	643	0	2085
08:00	0	0	0	0	386	16	35	0	11	40	177	0	665
08:15	0	0	0	0	378	9	20	0	14	36	152	0	609
08:30	0	0	0	0	401	9	28	0	8	32	148	0	626
08:45	0	0	0	0	356	11	20	0	10	16	166	0	579
Total	0	0	0	0	1521	45	103	0	43	124	643	0	2479
16:00	0	0	0	0	238	18	27	0	13	80	226	0	602
16:15	0	0	0	0	186	9	30	0	13	97	224	0	559
16:30	0	0	0	0	216	16	36	0	18	86	212	0	584
16:45	0	0	0	0	233	16	49	0	21	113	252	0	684
Total	0	0	0	0	873	59	142	0	65	376	914	0	2429
17:00	0	0	0	0	225	40	45	0	20	126	267	0	723
17:15	0	0	0	0	218	28	55	0	15	151	317	0	784
17:30	0	0	0	0	217	20	53	0	23	110	302	0	725
17:45	0	0	0	0	230	30	48	0	17	96	261	0	682
Total	0	0	0	0	890	118	201	0	75	483	1147	0	2914
Grand Total	0	0	0	0	4396	266	538	0	214	1146	3347	0	9907
Apprch %	0	0	0	0	94.3	5.7	71.5	0	28.5	25.5	74.5	0	
Total %	0	0	0	0	44.4	2.7	5.4	0	2.2	11.6	33.8	0	

Transportation Studies, Inc.
2640 Walnut Avenue, Suite H
Tustin, CA. 92780

File Name : H1511052
Site Code : 00000000
Start Date : 11/17/2015
Page No : 2

	DEAD END				BONITA CANYON DRIVE				SR-73 SB RAMPS				BONITA CANYON DRIVE				
	Southbound				Westbound				Northbound				Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:45																	
07:45	0	0	0	0	0	337	**18**	355	30	0	5	35	**42**	**207**	0	**249**	639
08:00	0	0	0	0	0	386	16	402	**35**	0	11	**46**	40	177	0	217	**665**
08:15	0	0	0	0	0	378	9	387	20	0	**14**	34	36	152	0	188	609
08:30	0	0	0	0	0	**401**	9	**410**	28	0	8	36	32	148	0	180	626
Total Volume	0	0	0	0	0	1502	52	1554	113	0	38	151	150	684	0	834	2539
% App. Total	0	0	0		0	96.7	3.3		74.8	0	25.2		18	82	0		
PHF	.000	.000	.000	.000	.000	.936	.722	.948	.807	.000	.679	.821	.893	.826	.000	.837	.955



Transportation Studies, Inc.
2640 Walnut Avenue, Suite H
Tustin, CA. 92780

File Name : H1511052
Site Code : 00000000
Start Date : 11/17/2015
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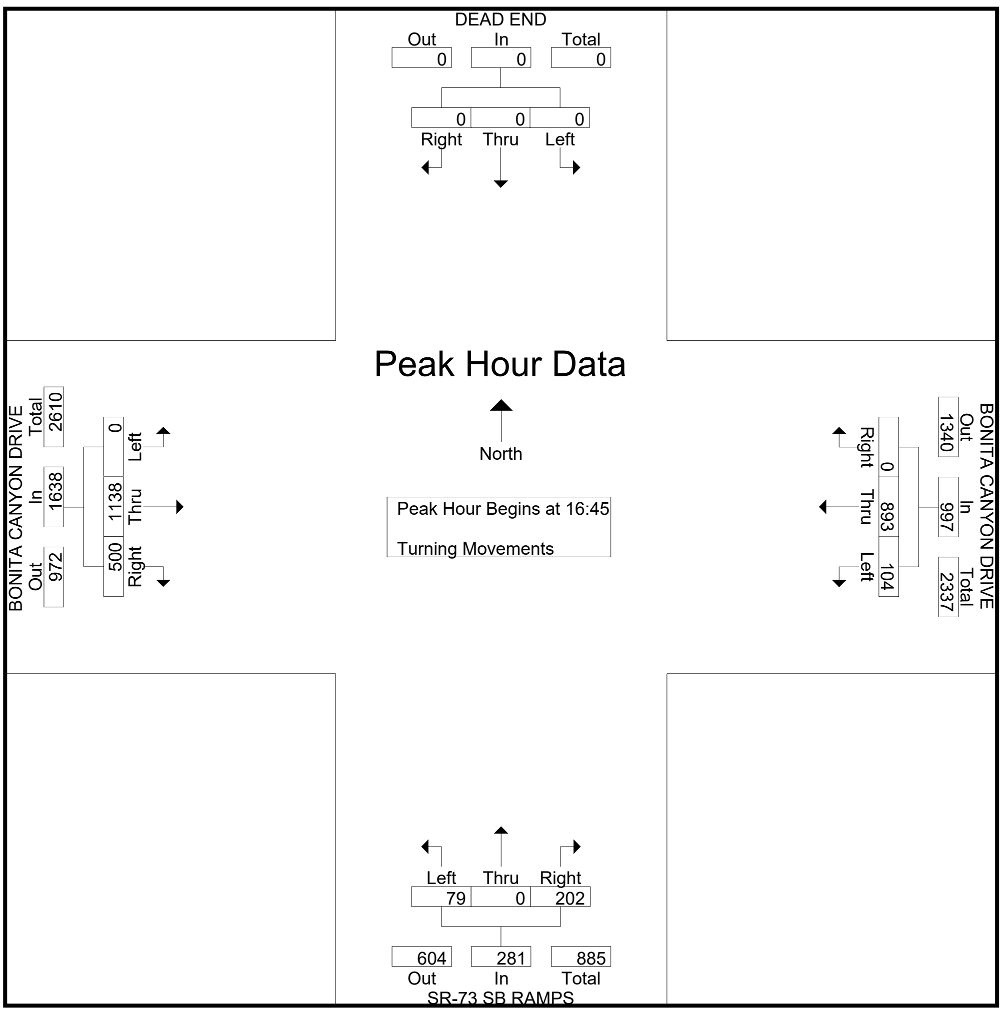
	DEAD END Southbound				BONITA CANYON DRIVE Westbound				SR-73 SB RAMPS Northbound				BONITA CANYON DRIVE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 16:45																	
16:45	0	0	0	0	0	**233**	16	249	49	0	21	70	113	252	0	365	684
17:00	0	0	0	0	0	225	**40**	**265**	45	0	20	65	126	267	0	393	723
17:15	0	0	0	0	0	218	28	246	**55**	0	15	70	**151**	**317**	0	**468**	**784**
17:30	0	0	0	0	0	217	20	237	53	0	**23**	**76**	110	302	0	412	725
Total Volume	0	0	0	0	0	893	104	997	202	0	79	281	500	1138	0	1638	2916
% App. Total	0	0	0		0	89.6	10.4		71.9	0	28.1		30.5	69.5	0		
PHF	.000	.000	.000	.000	.000	.958	.650	.941	.918	.000	.859	.924	.828	.897	.000	.875	.930



Transportation Studies, Inc.
2640 Walnut Avenue, Suite H
Tustin, CA. 92780

City: IRVINE
N-S- Direction: SR-73 NB RAMPS
E-W Direction: BONITA CANYON DRIVE

File Name : H1511053
Site Code : 00000000
Start Date : 11/17/2015
Page No : 1

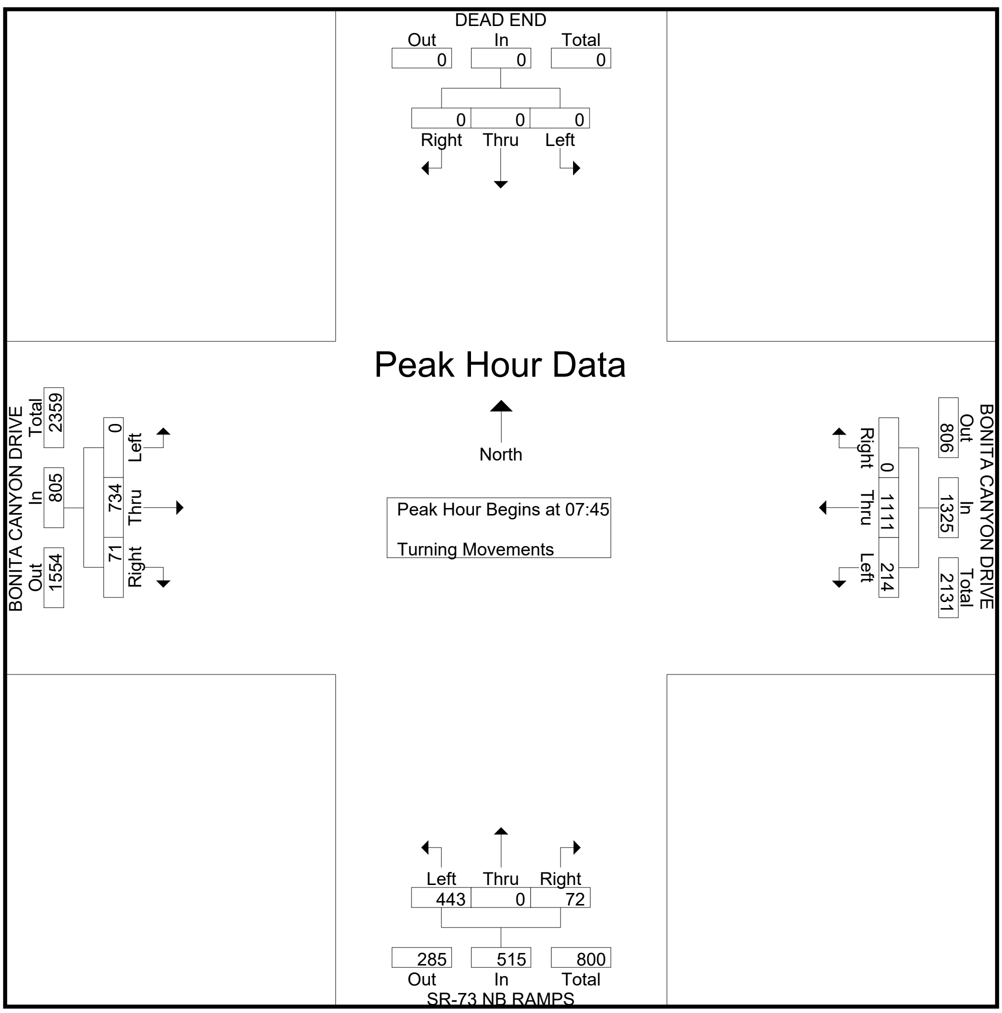
Groups Printed- Turning Movements

	DEAD END Southbound			BONITA CANYON DRIVE Westbound			SR-73 NB RAMPS Northbound			BONITA CANYON DRIVE Eastbound			
Start Time	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Int. Total
07:00	0	0	0	0	142	25	6	0	48	10	121	0	352
07:15	0	0	0	0	211	28	10	0	74	11	139	0	473
07:30	0	0	0	0	239	45	11	0	84	10	216	0	605
07:45	0	0	0	0	229	63	14	0	112	19	208	0	645
Total	0	0	0	0	821	161	41	0	318	50	684	0	2075
08:00	0	0	0	0	296	53	18	0	113	17	186	0	683
08:15	0	0	0	0	293	61	11	0	96	16	182	0	659
08:30	0	0	0	0	293	37	29	0	122	19	158	0	658
08:45	0	0	0	0	254	48	14	0	106	13	167	0	602
Total	0	0	0	0	1136	199	72	0	437	65	693	0	2602
16:00	0	0	0	0	221	15	4	0	33	8	237	0	518
16:15	0	0	0	0	175	11	3	0	29	9	227	0	454
16:30	0	0	0	0	208	18	3	0	27	4	250	0	510
16:45	0	0	0	0	205	19	1	0	32	2	321	0	580
Total	0	0	0	0	809	63	11	0	121	23	1035	0	2062
17:00	0	0	0	0	240	19	7	0	29	11	295	0	601
17:15	0	0	0	0	200	17	4	0	37	6	346	0	610
17:30	0	0	0	0	215	9	7	0	35	8	327	0	601
17:45	0	0	0	0	204	15	9	0	51	7	333	0	619
Total	0	0	0	0	859	60	27	0	152	32	1301	0	2431
Grand Total	0	0	0	0	3625	483	151	0	1028	170	3713	0	9170
Apprch %	0	0	0	0	88.2	11.8	12.8	0	87.2	4.4	95.6	0	
Total %	0	0	0	0	39.5	5.3	1.6	0	11.2	1.9	40.5	0	

Transportation Studies, Inc.
2640 Walnut Avenue, Suite H
Tustin, CA. 92780

File Name : H1511053
Site Code : 00000000
Start Date : 11/17/2015
Page No : 2

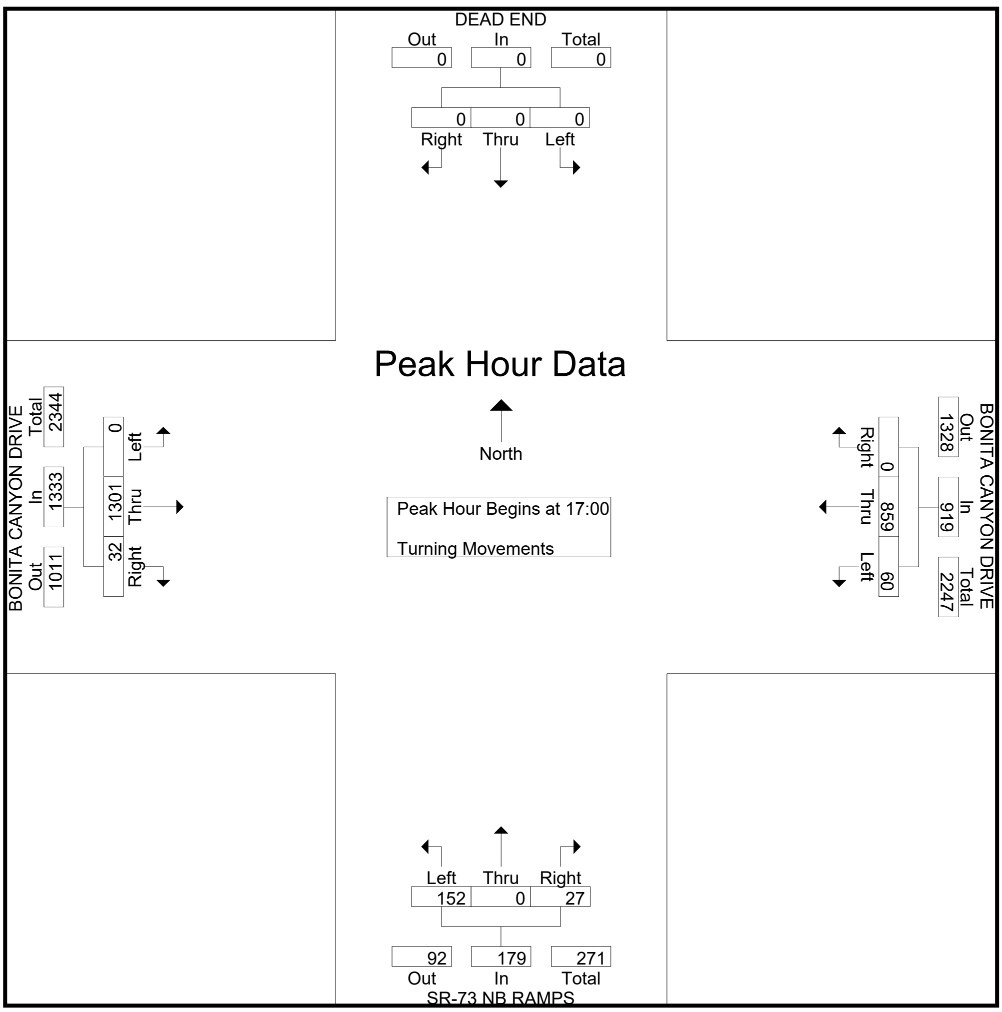
	DEAD END				BONITA CANYON DRIVE				SR-73 NB RAMPS				BONITA CANYON DRIVE				
	Southbound				Westbound				Northbound				Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:45																	
07:45	0	0	0	0	0	229	**63**	292	14	0	112	126	**19**	**208**	0	**227**	645
08:00	0	0	0	0	0	**296**	53	349	18	0	113	131	17	186	0	203	**683**
08:15	0	0	0	0	0	293	61	**354**	11	0	96	107	16	182	0	198	659
08:30	0	0	0	0	0	293	37	330	**29**	0	**122**	**151**	19	158	0	177	658
Total Volume	0	0	0	0	0	1111	214	1325	72	0	443	515	71	734	0	805	2645
% App. Total	0	0	0		0	83.8	16.2		14	0	86		8.8	91.2	0		
PHF	.000	.000	.000	.000	.000	.938	.849	.936	.621	.000	.908	.853	.934	.882	.000	.887	.968



Transportation Studies, Inc.
2640 Walnut Avenue, Suite H
Tustin, CA. 92780

File Name : H1511053
Site Code : 00000000
Start Date : 11/17/2015

	DEAD END				BONITA CANYON DRIVE				SR-73 NB RAMPS				BONITA CANYON DRIVE				
	Southbound				Westbound				Northbound				Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 17:00																	
17:00	0	0	0	0	0	**240**	**19**	**259**	7	0	29	36	**11**	295	0	306	601
17:15	0	0	0	0	0	200	17	217	4	0	37	41	6	**346**	0	**352**	610
17:30	0	0	0	0	0	215	9	224	7	0	35	42	8	327	0	335	601
17:45	0	0	0	0	0	204	15	219	**9**	0	**51**	**60**	7	333	0	340	**619**
Total Volume	0	0	0	0	0	859	60	919	27	0	152	179	32	1301	0	1333	2431
% App. Total	0	0	0		0	93.5	6.5		15.1	0	84.9		2.4	97.6	0		
PHF	.000	.000	.000	.000	.000	.895	.789	.887	.750	.000	.745	.746	.727	.940	.000	.947	.982



Transportation Studies, Inc.
2640 Walnut Avenue, Suite H
Tustin, CA. 92780

City: IRVINE
N-S- Direction: NEWPORT COAST DRIVE
E-W Direction: BONITA CANYON DRIVE

File Name : H1511054
Site Code : 00000000
Start Date : 11/17/2015
Page No : 1

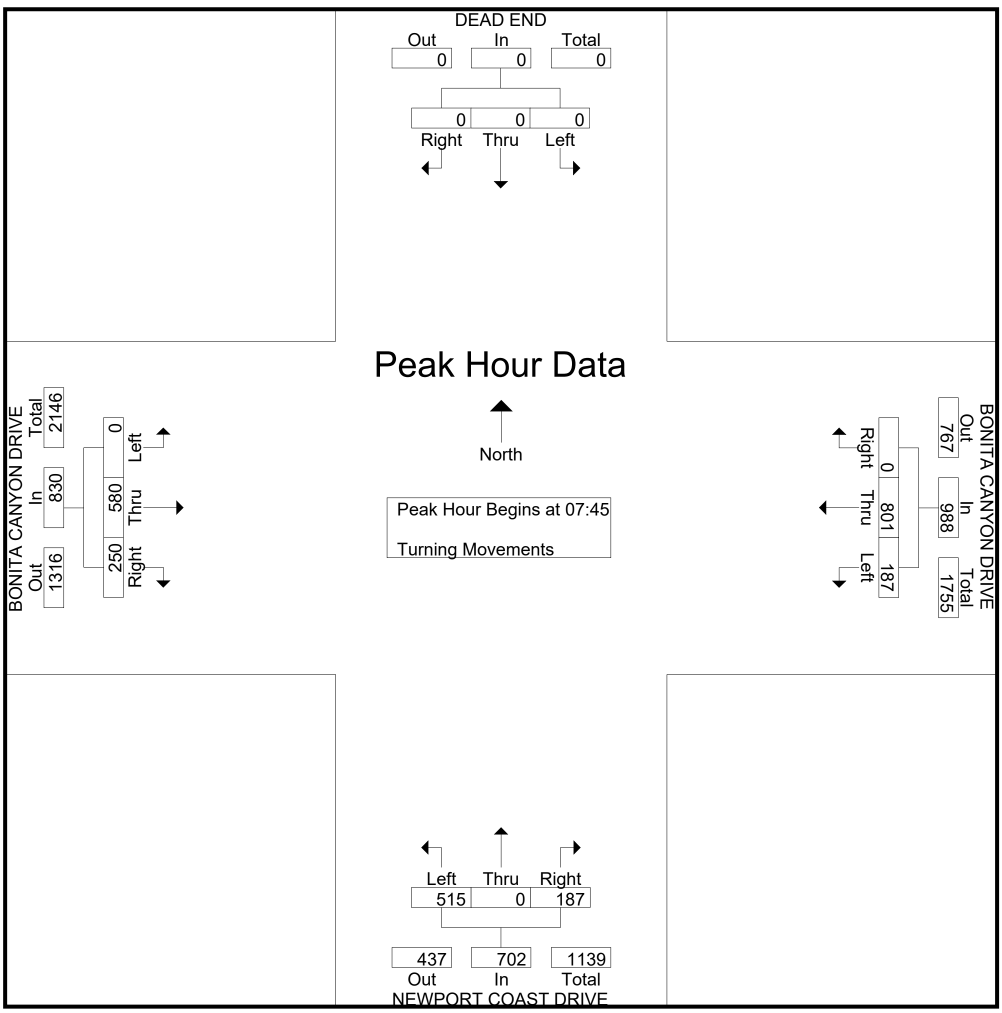
Groups Printed- Turning Movements

	DEAD END Southbound			BONITA CANYON DRIVE Westbound			NEWPORT COAST DRIVE Northbound			BONITA CANYON DRIVE Eastbound			
Start Time	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Int. Total
07:00	0	0	0	0	87	28	21	0	75	51	79	0	341
07:15	0	0	0	0	130	32	37	0	117	51	103	0	470
07:30	0	0	0	0	137	57	50	0	134	68	147	0	593
07:45	0	0	0	0	184	56	50	0	114	74	158	0	636
Total	0	0	0	0	538	173	158	0	440	244	487	0	2040
08:00	0	0	0	0	216	58	43	0	133	64	151	0	665
08:15	0	0	0	0	198	38	39	0	138	63	135	0	611
08:30	0	0	0	0	203	35	55	0	130	49	136	0	608
08:45	0	0	0	0	178	31	30	0	129	49	136	0	553
Total	0	0	0	0	795	162	167	0	530	225	558	0	2437
16:00	0	0	0	0	112	41	38	0	101	73	153	0	518
16:15	0	0	0	0	135	46	33	0	78	55	176	0	523
16:30	0	0	0	0	156	37	46	0	66	70	166	0	541
16:45	0	0	0	0	141	55	37	0	89	102	226	0	650
Total	0	0	0	0	544	179	154	0	334	300	721	0	2232
17:00	0	0	0	0	154	61	34	0	94	76	212	0	631
17:15	0	0	0	0	142	56	27	0	83	74	273	0	655
17:30	0	0	0	0	157	63	34	0	68	70	236	0	628
17:45	0	0	0	0	153	49	26	0	62	88	242	0	620
Total	0	0	0	0	606	229	121	0	307	308	963	0	2534
Grand Total	0	0	0	0	2483	743	600	0	1611	1077	2729	0	9243
Apprch %	0	0	0	0	77	23	27.1	0	72.9	28.3	71.7	0	
Total %	0	0	0	0	26.9	8	6.5	0	17.4	11.7	29.5	0	

Transportation Studies, Inc.
2640 Walnut Avenue, Suite H
Tustin, CA. 92780

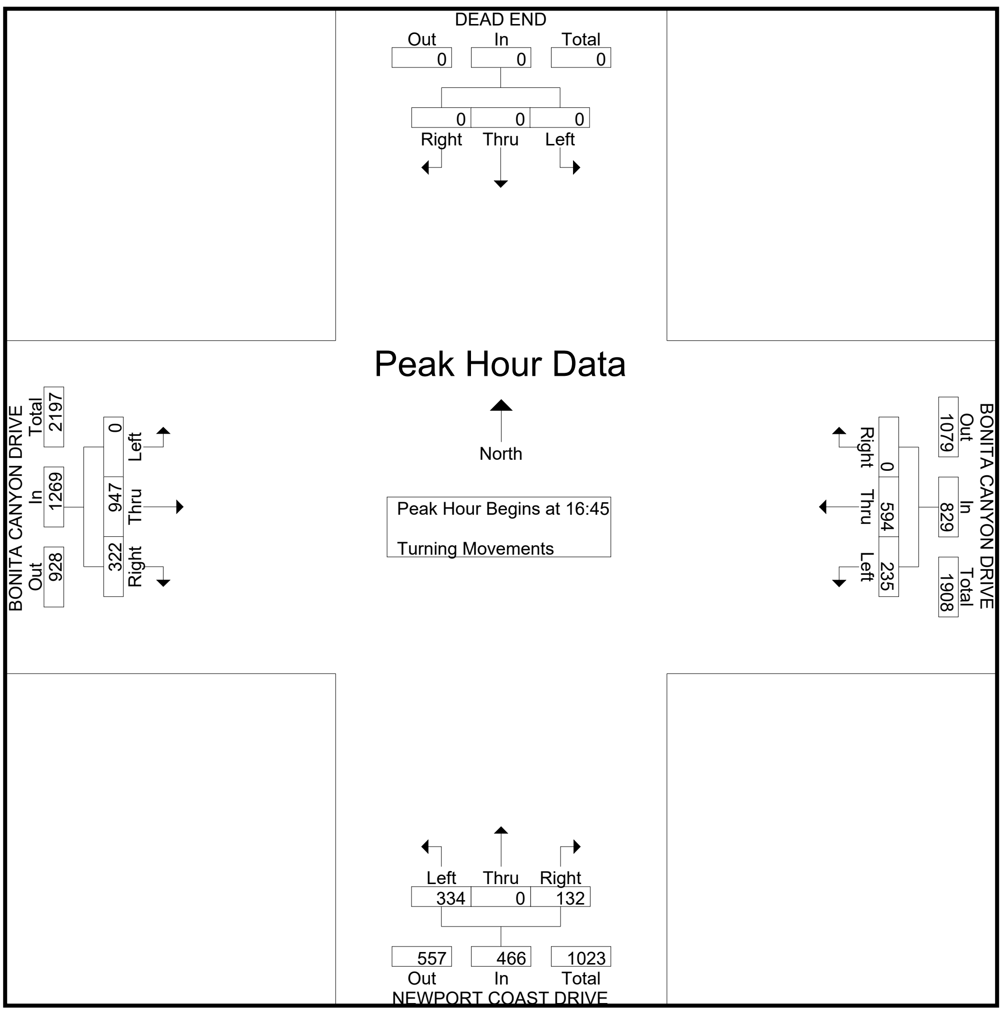
File Name : H1511054
Site Code : 00000000
Start Date : 11/17/2015
Page No : 2

	DEAD END Southbound				BONITA CANYON DRIVE Westbound				NEWPORT COAST DRIVE Northbound				BONITA CANYON DRIVE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:45																	
07:45	0	0	0	0	0	184	56	240	50	0	114	164	**74**	**158**	0	**232**	636
08:00	0	0	0	0	0	**216**	**58**	**274**	43	0	133	176	64	151	0	215	**665**
08:15	0	0	0	0	0	198	38	236	39	0	**138**	177	63	135	0	198	611
08:30	0	0	0	0	0	203	35	238	**55**	0	130	**185**	49	136	0	185	608
Total Volume	0	0	0	0	0	801	187	988	187	0	515	702	250	580	0	830	2520
% App. Total	0	0	0		0	81.1	18.9		26.6	0	73.4		30.1	69.9	0		
PHF	.000	.000	.000	.000	.000	.927	.806	.901	.850	.000	.933	.949	.845	.918	.000	.894	.947



File Name : H1511054
Site Code : 00000000
Start Date : 11/17/2015
Page No : 3

	DEAD END Southbound				BONITA CANYON DRIVE Westbound				NEWPORT COAST DRIVE Northbound				BONITA CANYON DRIVE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 16:45																	
16:45	0	0	0	0	0	141	55	196	**37**	0	89	126	**102**	226	0	328	650
17:00	0	0	0	0	0	154	61	215	34	0	**94**	**128**	76	212	0	288	631
17:15	0	0	0	0	0	142	56	198	27	0	83	110	74	**273**	0	**347**	**655**
17:30	0	0	0	0	0	**157**	**63**	**220**	34	0	68	102	70	236	0	306	628
Total Volume	0	0	0	0	0	594	235	829	132	0	334	466	322	947	0	1269	2564
% App. Total	0	0	0		0	71.7	28.3		28.3	0	71.7		25.4	74.6	0		
PHF	.000	.000	.000	.000	.000	.946	.933	.942	.892	.000	.888	.910	.789	.867	.000	.914	.979



Transportation Studies, Inc.
2640 Walnut Avenue, Suite H
Tustin, CA. 92780

City: IRVINE
N-S- Direction: TURTLE RIDGE
E-W Direction: BONITA CANYON DRIVE

File Name : H1511055
Site Code : 00000000
Start Date : 11/17/2015
Page No : 1

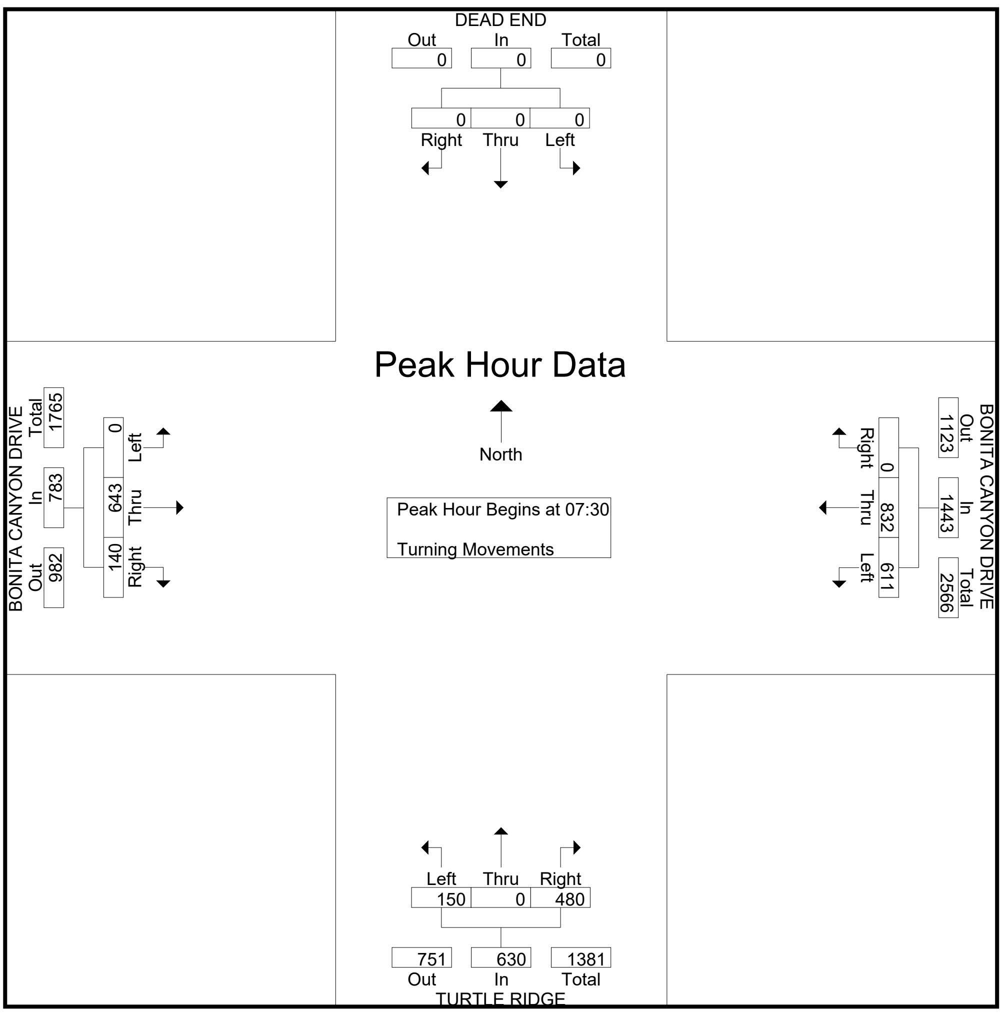
Groups Printed- Turning Movements

	DEAD END Southbound			BONITA CANYON DRIVE Westbound			TURTLE RIDGE Northbound			BONITA CANYON DRIVE Eastbound			
Start Time	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Int. Total
07:00	0	0	0	0	109	52	42	0	14	7	87	0	311
07:15	0	0	0	0	161	76	61	0	13	25	108	0	444
07:30	0	0	0	0	170	132	110	0	31	50	157	0	650
07:45	0	0	0	0	217	124	114	0	34	32	163	0	684
Total	0	0	0	0	657	384	327	0	92	114	515	0	2089
08:00	0	0	0	0	222	212	106	0	48	33	180	0	801
08:15	0	0	0	0	223	143	150	0	37	25	143	0	721
08:30	0	0	0	0	197	70	125	0	46	13	160	0	611
08:45	0	0	0	0	205	79	82	0	30	28	132	0	556
Total	0	0	0	0	847	504	463	0	161	99	615	0	2689
16:00	0	0	0	0	164	79	126	0	27	21	171	0	588
16:15	0	0	0	0	139	80	98	0	16	28	182	0	543
16:30	0	0	0	0	156	86	108	0	41	23	194	0	608
16:45	0	0	0	0	151	93	98	0	45	28	237	0	652
Total	0	0	0	0	610	338	430	0	129	100	784	0	2391
17:00	0	0	0	0	187	107	118	0	27	24	220	0	683
17:15	0	0	0	0	192	87	109	0	24	53	255	0	720
17:30	0	0	0	0	168	92	129	0	31	29	237	0	686
17:45	0	0	0	0	183	93	82	0	24	31	241	0	654
Total	0	0	0	0	730	379	438	0	106	137	953	0	2743
Grand Total	0	0	0	0	2844	1605	1658	0	488	450	2867	0	9912
Apprch %	0	0	0	0	63.9	36.1	77.3	0	22.7	13.6	86.4	0	
Total %	0	0	0	0	28.7	16.2	16.7	0	4.9	4.5	28.9	0	

Transportation Studies, Inc.
2640 Walnut Avenue, Suite H
Tustin, CA. 92780

File Name : H1511055
Site Code : 00000000
Start Date : 11/17/2015
Page No : 2

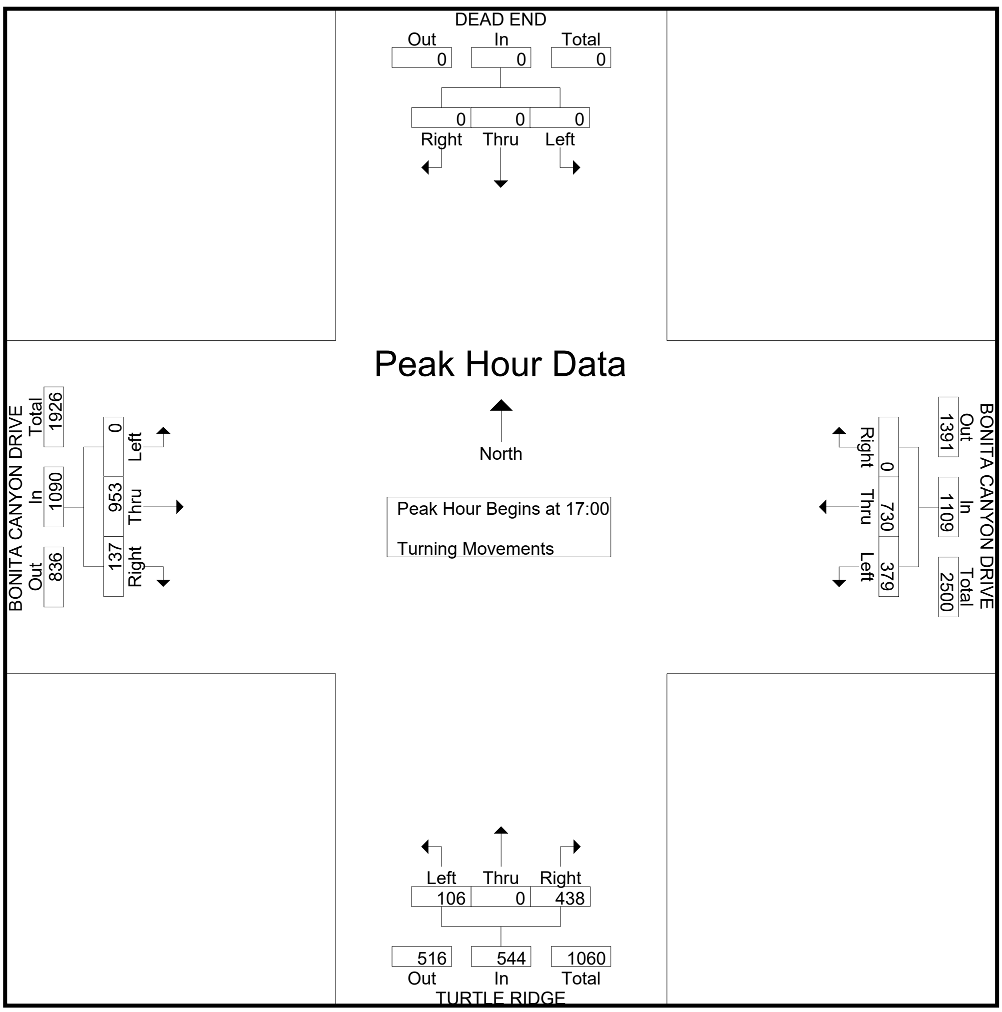
	DEAD END				BONITA CANYON DRIVE				TURTLE RIDGE				BONITA CANYON DRIVE				
	Southbound				Westbound				Northbound				Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30																	
07:30	0	0	0	0	0	170	132	302	110	0	31	141	**50**	157	0	207	650
07:45	0	0	0	0	0	217	124	341	114	0	34	148	32	163	0	195	684
08:00	0	0	0	0	0	222	**212**	**434**	106	0	**48**	154	33	**180**	0	**213**	**801**
08:15	0	0	0	0	0	**223**	143	366	**150**	0	37	**187**	25	143	0	168	721
Total Volume	0	0	0	0	0	832	611	1443	480	0	150	630	140	643	0	783	2856
% App. Total	0	0	0		0	57.7	42.3		76.2	0	23.8		17.9	82.1	0		
PHF	.000	.000	.000	.000	.000	.933	.721	.831	.800	.000	.781	.842	.700	.893	.000	.919	.891



Transportation Studies, Inc.
2640 Walnut Avenue, Suite H
Tustin, CA. 92780

File Name : H1511055
Site Code : 00000000
Start Date : 11/17/2015
Page No : 3

	DEAD END Southbound				BONITA CANYON DRIVE Westbound				TURTLE RIDGE Northbound				BONITA CANYON DRIVE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 17:00																	
17:00	0	0	0	0	0	187	**107**	**294**	118	0	27	145	24	220	0	244	683
17:15	0	0	0	0	0	**192**	87	279	109	0	24	133	**53**	**255**	0	**308**	**720**
17:30	0	0	0	0	0	168	92	260	**129**	0	**31**	**160**	29	237	0	266	686
17:45	0	0	0	0	0	183	93	276	82	0	24	106	31	241	0	272	654
Total Volume	0	0	0	0	0	730	379	1109	438	0	106	544	137	953	0	1090	2743
% App. Total	0	0	0		0	65.8	34.2		80.5	0	19.5		12.6	87.4	0		
PHF	.000	.000	.000	.000	.000	.951	.886	.943	.849	.000	.855	.850	.646	.934	.000	.885	.952



Transportation Studies, Inc.
2640 Walnut Avenue, Suite H
Tustin, CA. 92780

City: IRVINE
N-S- Direction: CULVER DRIVE
E-W Direction: ANTEATER DR / SHADY CYN

File Name : H1511056
Site Code : 00000000
Start Date : 11/17/2015
Page No : 1

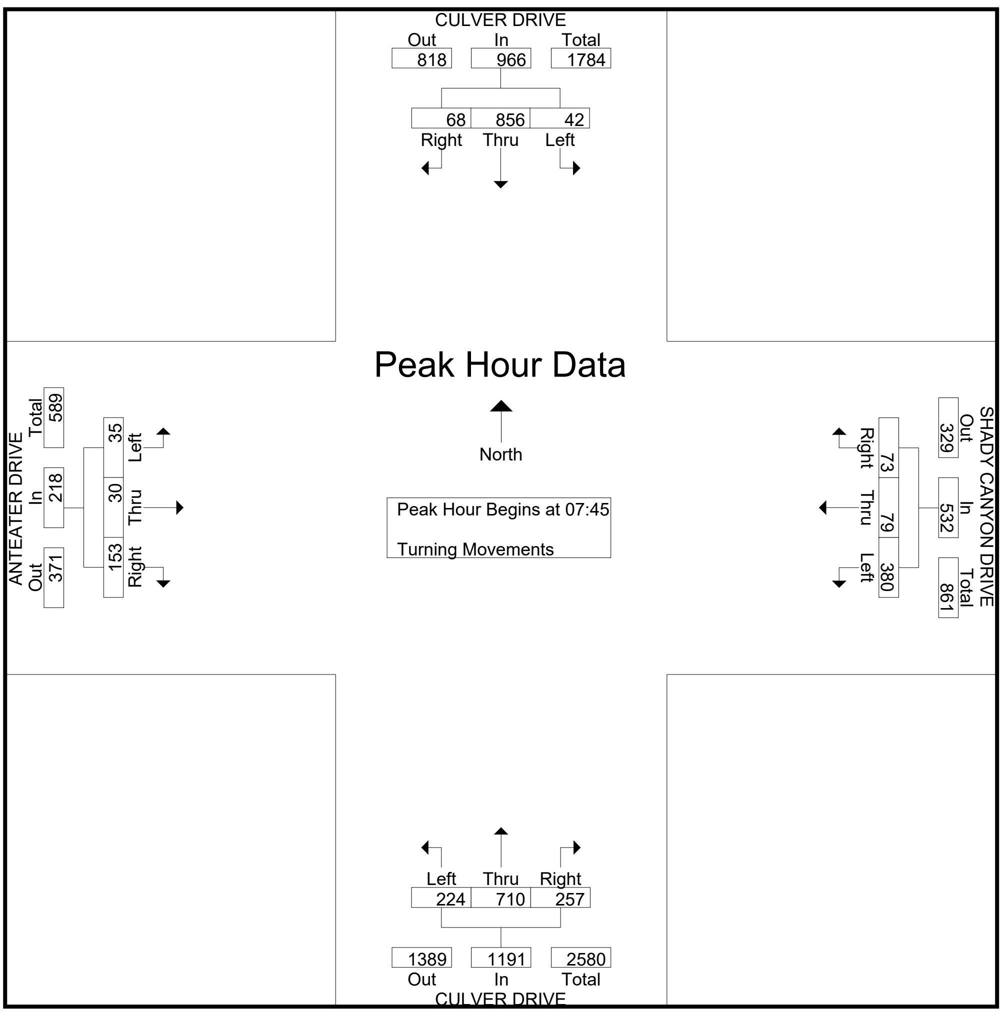
Groups Printed- Turning Movements

	CULVER DRIVE Southbound			SHADY CANYON DRIVE Westbound			CULVER DRIVE Northbound			ANTEATER DRIVE Eastbound			
Start Time	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Int. Total
07:00	21	97	6	8	0	34	22	90	19	19	4	4	324
07:15	8	156	5	6	9	76	29	110	21	16	11	8	455
07:30	14	157	9	21	14	102	34	170	30	41	27	31	650
07:45	16	210	14	34	29	120	61	144	48	35	6	10	727
Total	59	620	34	69	52	332	146	514	118	111	48	53	2156
08:00	20	252	10	12	16	110	73	183	38	68	11	8	801
08:15	14	209	10	13	18	96	59	163	68	24	5	4	683
08:30	18	185	8	14	16	54	64	220	70	26	8	13	696
08:45	25	187	6	16	17	64	39	137	40	31	9	8	579
Total	77	833	34	55	67	324	235	703	216	149	33	33	2759
16:00	9	138	11	9	8	45	70	181	23	38	17	17	566
16:15	9	159	10	12	10	48	62	165	28	32	13	8	556
16:30	9	151	10	8	10	33	70	197	32	33	20	14	587
16:45	17	161	10	18	7	49	70	200	25	40	28	20	645
Total	44	609	41	47	35	175	272	743	108	143	78	59	2354
17:00	15	179	9	6	7	41	92	195	36	51	30	23	684
17:15	8	200	18	11	6	60	99	190	28	42	33	12	707
17:30	9	154	9	5	11	35	100	200	31	46	40	16	656
17:45	12	110	11	3	5	44	94	162	24	34	22	16	537
Total	44	643	47	25	29	180	385	747	119	173	125	67	2584
Grand Total	224	2705	156	196	183	1011	1038	2707	561	576	284	212	9853
Apprch %	7.3	87.7	5.1	14.1	13.2	72.7	24.1	62.9	13	53.7	26.5	19.8	
Total %	2.3	27.5	1.6	2	1.9	10.3	10.5	27.5	5.7	5.8	2.9	2.2	

Transportation Studies, Inc.
2640 Walnut Avenue, Suite H
Tustin, CA. 92780

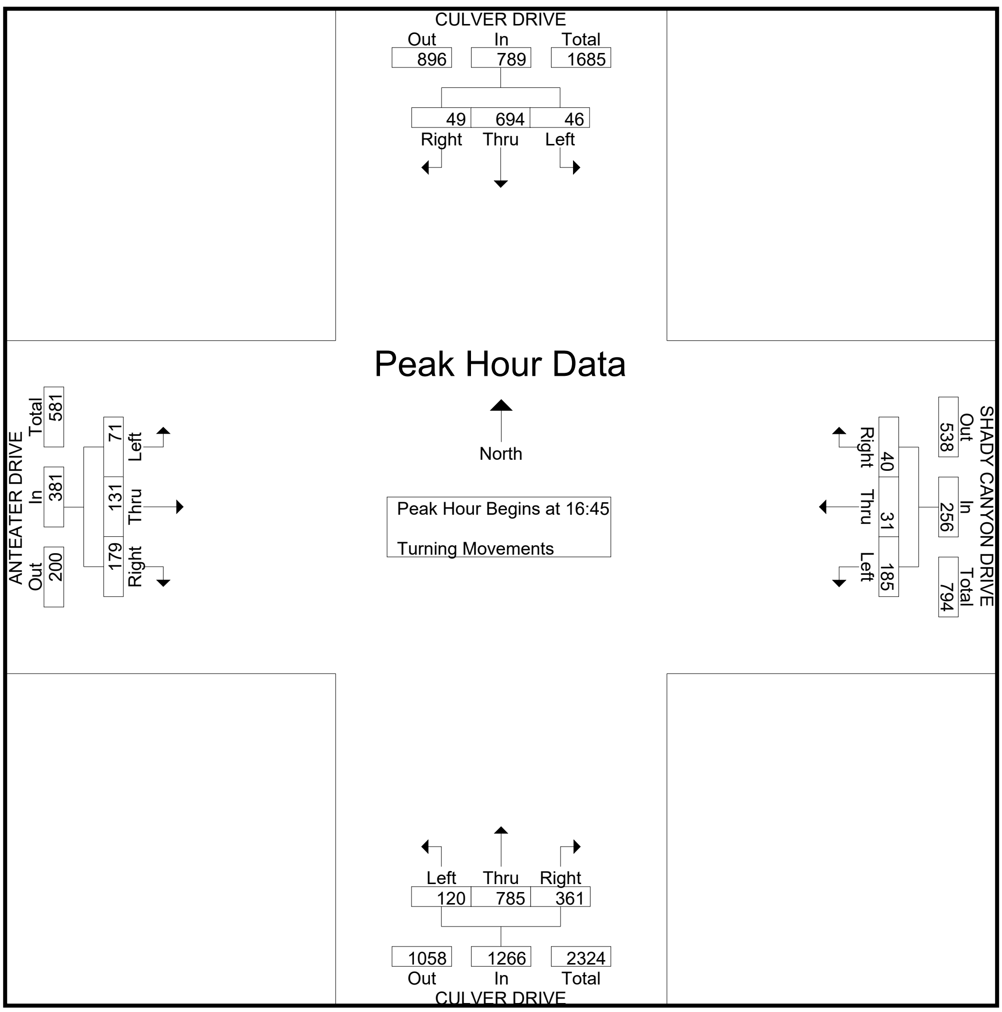
File Name : H1511056
Site Code : 00000000
Start Date : 11/17/2015
Page No : 2

	CULVER DRIVE Southbound				SHADY CANYON DRIVE Westbound				CULVER DRIVE Northbound				ANTEATER DRIVE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:45																	
07:45	16	210	**14**	240	**34**	**29**	**120**	**183**	61	144	48	253	35	6	10	51	727
08:00	**20**	**252**	10	**282**	12	16	110	138	**73**	183	38	294	**68**	**11**	8	**87**	**801**
08:15	14	209	10	233	13	18	96	127	59	163	68	290	24	5	4	33	683
08:30	18	185	8	211	14	16	54	84	64	**220**	**70**	**354**	26	8	**13**	47	696
Total Volume	68	856	42	966	73	79	380	532	257	710	224	1191	153	30	35	218	2907
% App. Total	7	88.6	4.3		13.7	14.8	71.4		21.6	59.6	18.8		70.2	13.8	16.1		
PHF	.850	.849	.750	.856	.537	.681	.792	.727	.880	.807	.800	.841	.563	.682	.673	.626	.907



File Name : H1511056
Site Code : 00000000
Start Date : 11/17/2015
Page No : 3

	CULVER DRIVE Southbound				SHADY CANYON DRIVE Westbound				CULVER DRIVE Northbound				ANTEATER DRIVE Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 16:45																	
16:45	**17**	161	10	188	**18**	7	49	74	70	**200**	25	295	40	28	20	88	645
17:00	15	179	9	203	6	7	41	54	92	195	**36**	323	**51**	30	**23**	**104**	684
17:15	8	**200**	**18**	**226**	11	6	**60**	**77**	99	190	28	317	42	33	12	87	**707**
17:30	9	154	9	172	5	**11**	35	51	**100**	200	31	**331**	46	**40**	16	102	656
Total Volume	49	694	46	789	40	31	185	256	361	785	120	1266	179	131	71	381	2692
% App. Total	6.2	88	5.8		15.6	12.1	72.3		28.5	62	9.5		47	34.4	18.6		
PHF	.721	.868	.639	.873	.556	.705	.771	.831	.903	.981	.833	.956	.877	.819	.772	.916	.952



Transportation Studies, Inc.
2640 Walnut Avenue, Suite H
Tustin, CA. 92780

City: IRVINE
N-S- Direction: NEWPORT COAST DRIVE
E-W Direction: TURTLE RIDGE

File Name : h1511057
Site Code : 00000000
Start Date : 11/17/2015
Page No : 1

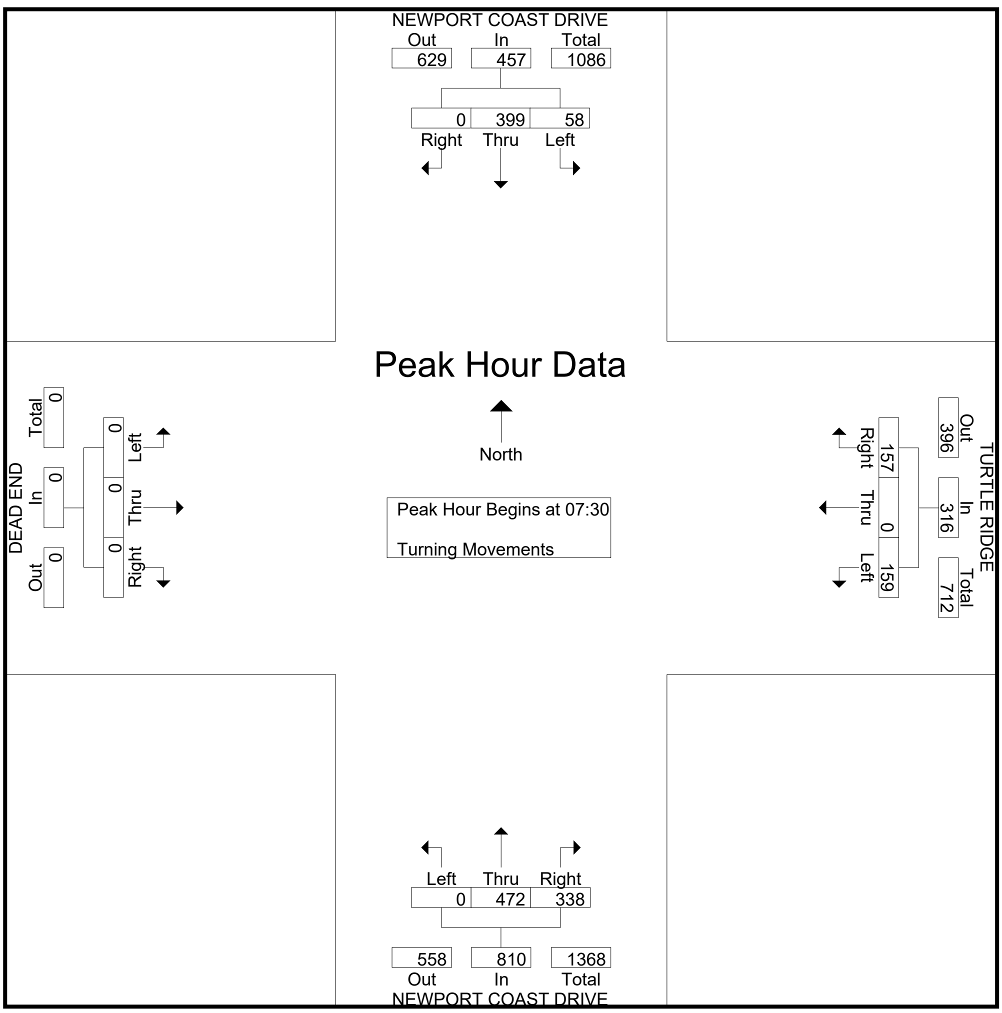
Groups Printed- Turning Movements

	NEWPORT COAST DRIVE Southbound			TURTLE RIDGE Westbound			NEWPORT COAST DRIVE Northbound			DEAD END Eastbound			
Start Time	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Int. Total
07:00	0	57	6	19	0	22	32	79	0	0	0	0	215
07:15	0	82	10	31	0	26	46	115	0	0	0	0	310
07:30	0	113	9	43	0	46	80	128	0	0	0	0	419
07:45	0	106	17	28	0	57	94	105	0	0	0	0	407
Total	0	358	42	121	0	151	252	427	0	0	0	0	1351
08:00	0	104	14	35	0	31	86	126	0	0	0	0	396
08:15	0	76	18	51	0	25	78	113	0	0	0	0	361
08:30	0	56	9	30	0	38	68	126	0	0	0	0	327
08:45	0	83	4	41	0	37	79	102	0	0	0	0	346
Total	0	319	45	157	0	131	311	467	0	0	0	0	1430
16:00	0	97	18	11	0	31	74	138	0	0	0	0	369
16:15	0	72	21	8	0	49	50	110	0	0	0	0	310
16:30	0	70	30	12	0	57	71	107	0	0	0	0	347
16:45	0	110	37	8	0	51	58	106	0	0	0	0	370
Total	0	349	106	39	0	188	253	461	0	0	0	0	1396
17:00	0	78	32	16	0	48	72	105	0	0	0	0	351
17:15	0	81	37	9	0	41	85	107	0	0	0	0	360
17:30	0	76	37	15	0	54	77	87	0	0	0	0	346
17:45	0	85	31	12	0	48	62	66	0	0	0	0	304
Total	0	320	137	52	0	191	296	365	0	0	0	0	1361
Grand Total	0	1346	330	369	0	661	1112	1720	0	0	0	0	5538
Apprch %	0	80.3	19.7	35.8	0	64.2	39.3	60.7	0	0	0	0	
Total %	0	24.3	6	6.7	0	11.9	20.1	31.1	0	0	0	0	

Transportation Studies, Inc.
2640 Walnut Avenue, Suite H
Tustin, CA. 92780

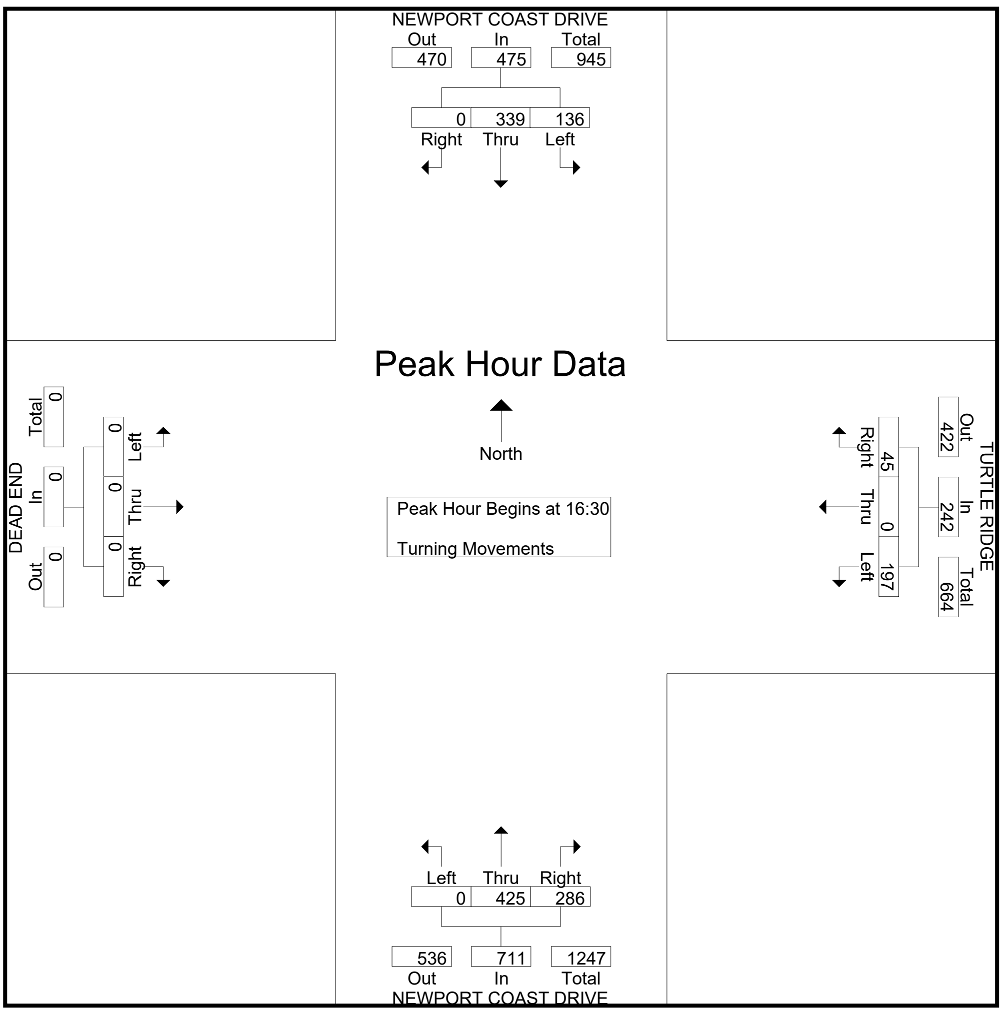
File Name : h1511057
Site Code : 00000000
Start Date : 11/17/2015
Page No : 2

	NEWPORT COAST DRIVE Southbound				TURTLE RIDGE Westbound				NEWPORT COAST DRIVE Northbound				DEAD END Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30																	
07:30	0	**113**	9	122	43	0	46	**89**	80	**128**	0	208	0	0	0	0	**419**
07:45	0	106	17	**123**	28	0	**57**	85	**94**	105	0	199	0	0	0	0	407
08:00	0	104	14	118	35	0	31	66	86	126	0	**212**	0	0	0	0	396
08:15	0	76	**18**	94	**51**	0	25	76	78	113	0	191	0	0	0	0	361
Total Volume	0	399	58	457	157	0	159	316	338	472	0	810	0	0	0	0	1583
% App. Total	0	87.3	12.7		49.7	0	50.3		41.7	58.3	0		0	0	0		
PHF	.000	.883	.806	.929	.770	.000	.697	.888	.899	.922	.000	.955	.000	.000	.000	.000	.945



File Name : h1511057
Site Code : 00000000
Start Date : 11/17/2015
Page No : 3

	NEWPORT COAST DRIVE Southbound				TURTLE RIDGE Westbound				NEWPORT COAST DRIVE Northbound				DEAD END Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 16:30																	
16:30	0	70	30	100	12	0	**57**	**69**	71	**107**	0	178	0	0	0	0	347
16:45	0	**110**	**37**	**147**	8	0	51	59	58	106	0	164	0	0	0	0	**370**
17:00	0	78	32	110	**16**	0	48	64	72	105	0	177	0	0	0	0	351
17:15	0	81	37	118	9	0	41	50	**85**	107	0	**192**	0	0	0	0	360
Total Volume	0	339	136	475	45	0	197	242	286	425	0	711	0	0	0	0	1428
% App. Total	0	71.4	28.6		18.6	0	81.4		40.2	59.8	0		0	0	0		
PHF	.000	.770	.919	.808	.703	.000	.864	.877	.841	.993	.000	.926	.000	.000	.000	.000	.965



Transportation Studies, Inc.
2640 Walnut Avenue, Suite H
Tustin, CA. 92780

City: IRVINE
N-S- Direction: NEWPORT COAST DRIVE
E-W Direction: SR-73 NB RAMPS

File Name : H1511058
Site Code : 00000000
Start Date : 11/17/2015
Page No : 1

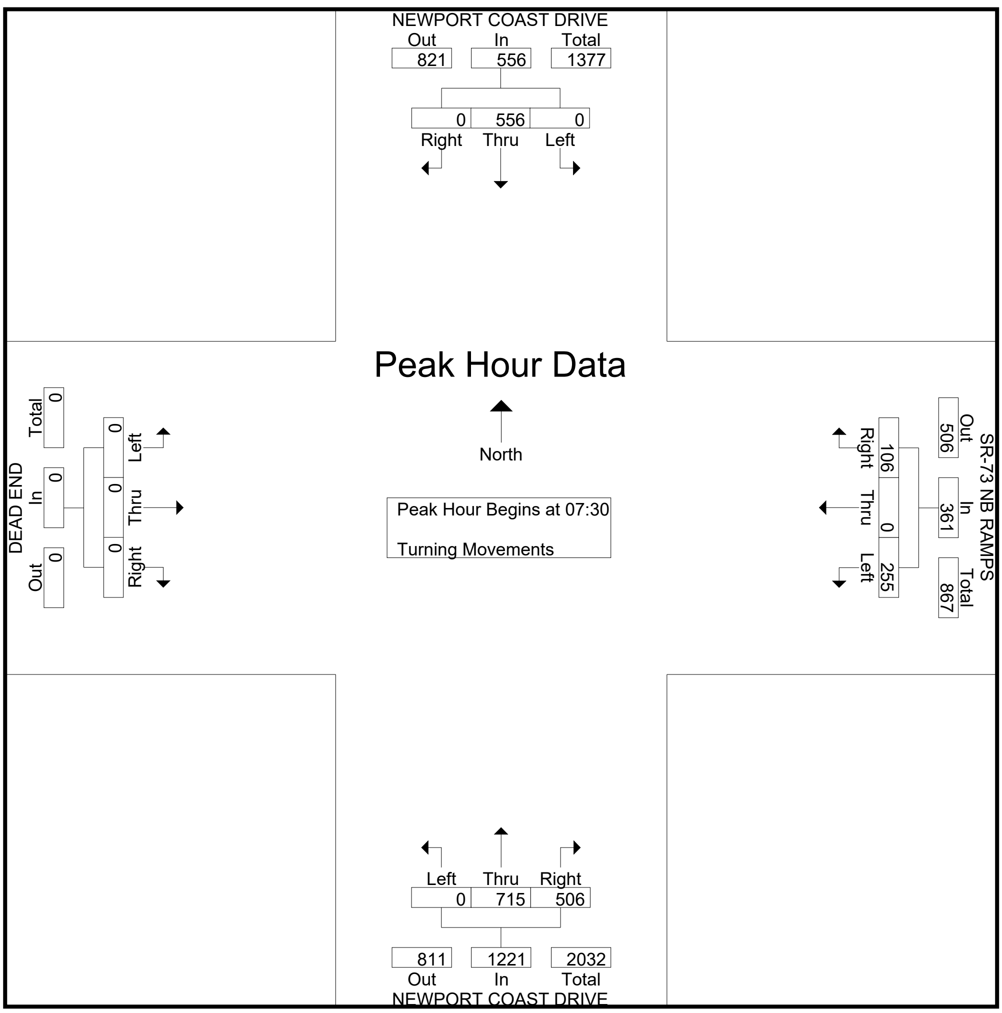
Groups Printed- Turning Movements

	NEWPORT COAST DRIVE Southbound			SR-73 NB RAMPS Westbound			NEWPORT COAST DRIVE Northbound			DEAD END Eastbound			
Start Time	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Int. Total
07:00	0	74	0	12	0	35	70	87	0	0	0	0	278
07:15	0	110	0	12	0	47	108	156	0	0	0	0	433
07:30	0	145	0	39	0	68	132	179	0	0	0	0	563
07:45	0	177	0	22	0	76	117	174	0	0	0	0	566
Total	0	506	0	85	0	226	427	596	0	0	0	0	1840
08:00	0	127	0	21	0	43	132	198	0	0	0	0	521
08:15	0	107	0	24	0	68	125	164	0	0	0	0	488
08:30	0	105	0	27	0	65	139	192	0	0	0	0	528
08:45	0	104	0	17	0	58	121	141	0	0	0	0	441
Total	0	443	0	89	0	234	517	695	0	0	0	0	1978
16:00	0	130	0	9	0	36	55	216	0	0	0	0	446
16:15	0	131	0	8	0	35	49	145	0	0	0	0	368
16:30	0	115	0	12	0	28	56	155	0	0	0	0	366
16:45	0	167	0	14	0	33	38	151	0	0	0	0	403
Total	0	543	0	43	0	132	198	667	0	0	0	0	1583
17:00	0	129	0	11	0	41	40	183	0	0	0	0	404
17:15	0	127	0	16	0	40	41	162	0	0	0	0	386
17:30	0	134	0	17	0	36	34	151	0	0	0	0	372
17:45	0	136	0	10	0	46	32	118	0	0	0	0	342
Total	0	526	0	54	0	163	147	614	0	0	0	0	1504
Grand Total	0	2018	0	271	0	755	1289	2572	0	0	0	0	6905
Apprch %	0	100	0	26.4	0	73.6	33.4	66.6	0	0	0	0	
Total %	0	29.2	0	3.9	0	10.9	18.7	37.2	0	0	0	0	

Transportation Studies, Inc.
2640 Walnut Avenue, Suite H
Tustin, CA. 92780

File Name : H1511058
Site Code : 00000000
Start Date : 11/17/2015
Page No : 2

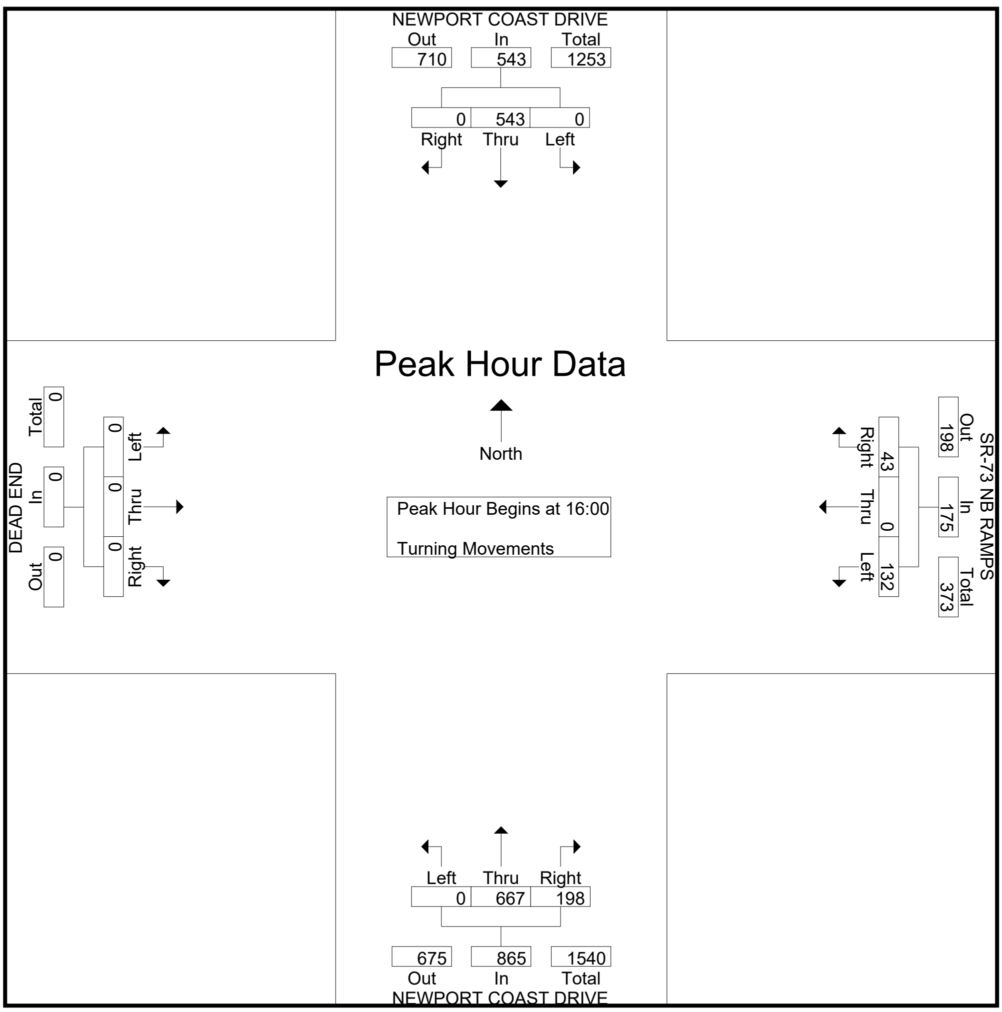
	NEWPORT COAST DRIVE Southbound				SR-73 NB RAMPS Westbound				NEWPORT COAST DRIVE Northbound				DEAD END Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30																	
07:30	0	145	0	145	**39**	0	68	**107**	**132**	179	0	311	0	0	0	0	563
07:45	0	**177**	0	**177**	22	0	**76**	98	117	174	0	291	0	0	0	0	**566**
08:00	0	127	0	127	21	0	43	64	132	**198**	0	**330**	0	0	0	0	521
08:15	0	107	0	107	24	0	68	92	125	164	0	289	0	0	0	0	488
Total Volume	0	556	0	556	106	0	255	361	506	715	0	1221	0	0	0	0	2138
% App. Total	0	100	0		29.4	0	70.6		41.4	58.6	0		0	0	0		
PHF	.000	.785	.000	.785	.679	.000	.839	.843	.958	.903	.000	.925	.000	.000	.000	.000	.944



Transportation Studies, Inc.
2640 Walnut Avenue, Suite H
Tustin, CA. 92780

File Name : H1511058
Site Code : 00000000
Start Date : 11/17/2015
Page No : 3

	NEWPORT COAST DRIVE Southbound				SR-73 NB RAMPS Westbound				NEWPORT COAST DRIVE Northbound				DEAD END Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 16:00																	
16:00	0	130	0	130	9	0	**36**	45	55	**216**	0	**271**	0	0	0	0	**446**
16:15	0	131	0	131	8	0	35	43	49	145	0	194	0	0	0	0	368
16:30	0	115	0	115	12	0	28	40	**56**	155	0	211	0	0	0	0	366
16:45	0	**167**	0	**167**	**14**	0	33	**47**	38	151	0	189	0	0	0	0	403
Total Volume	0	543	0	543	43	0	132	175	198	667	0	865	0	0	0	0	1583
% App. Total	0	100	0		24.6	0	75.4		22.9	77.1	0		0	0	0		
PHF	.000	.813	.000	.813	.768	.000	.917	.931	.884	.772	.000	.798	.000	.000	.000	.000	.887



Appendix B ICU CALCULATION WORKSHEETS

INTERSECTION CAPACITY UTILIZATION

Peak hour intersection volume/capacity ratios are calculated by means of intersection capacity utilization (ICU) values.

The procedure is based on the critical movement methodology, and shows the amount of capacity utilized by each critical move. A capacity of 1,700 vehicles per hour (VPH) per lane is assumed together with a .05 clearance interval for City of Irvine intersections, and a capacity of 1,600 VPH is assumed for the City of Newport Beach intersection. A "de-facto" right-turn lane is used in the ICU calculation for cases where a curb lane is wide enough to separately serve both through and right-turn traffic (i.e., with a width of 19 feet from curb to outside of through-lane with parking prohibited during peak periods). Such lanes are treated the same as striped right-turn lanes during the ICU calculations, but they are denoted on the ICU calculation worksheets using the letter "d" in place of a numerical entry for right-turn lanes.

The methodology also incorporates a check for right-turn capacity utilization. Both right-turn-on-green (RTOG) and right-turn-on-red (RTOR) capacity availability are calculated and checked against the total right-turn capacity need. If insufficient capacity is available, then an adjustment is made to the total capacity utilization value. The following example shows how this adjustment is made.

Example for Northbound Right

1. Right-Turn-On-Green (RTOG)

    If NBT is critical move, then:

        RTOG = V/C (NBT)

    Otherwise,

        RTOG = V/C (NBL) + V/C (SBT) - V/C (SBL)

2. Right-Turn-On-Red (RTOR)

    If WBL is critical move, then:

        RTOR = V/C (WBL)

    Otherwise,

        RTOR = V/C (EBL) + V/C (WBT) - V/C (EBT)

3. Right-Turn Overlap Adjustment

If the northbound right is assumed to overlap with the adjacent westbound left, adjustments to the RTOG and RTOR values are made as follows:

RTOG = RTOG + V/C (WBL)

RTOR = RTOR - V/C (WBL)

4. Total Right-Turn Capacity (RTC) Availability for NBR

RTC = RTOG + factor x RTOR

Where factor = RTOR saturation flow factor (75%)

Right-turn adjustment is then as follows:

Additional ICU = V/C (NBR) - RTC

A zero or negative value indicates that adequate capacity is available and no adjustment is necessary. A positive value indicates that the available RTOR and RTOG capacity does not adequately accommodate the right-turn V/C; therefore, the right-turn is essentially considered to be a critical movement. In such cases, the right-turn adjustment is noted on the ICU worksheet and it is included in the total capacity utilization value. When it is determined that a right-turn adjustment is required for more than one right-turn movement, the word "multi" is printed on the worksheet instead of an actual right-turn movement reference, and the right-turn adjustments are cumulatively added to the total capacity utilization value. In such cases, further operational evaluation is typically carried out to determine if under actual operational conditions, the critical right-turns would operate simultaneously, and therefore a right-turn adjustment credit should be applied.

Shared Lane V/C Methodology

For intersection approaches where shared usage of a lane is permitted by more than one turn movement (e.g., left/through, through/right, left/through/right), the individual turn volumes are evaluated to determine whether dedication of the shared lane is warranted to any one given turn movement. The following example demonstrates how this evaluation is carried out:

Example for Shared Left/Through Lane

1. Average Lane Volume (ALV)

$$\text{ALV} = \frac{\text{Left-Turn Volume + Through Volume}}{\text{Total Left + Through Approach Lanes (including shared lane)}}$$

2. ALV for Each Approach

$$\text{ALV (Left)} = \frac{\text{Left-Turn Volume}}{\text{Left Approach Lanes (including shared lane)}}$$

$$\text{ALV (Through)} = \frac{\text{Through Volume}}{\text{Through Approach Lanes (including shared lane)}}$$

3. Lane Dedication is Warranted

If ALV (Left) is greater than ALV, then full dedication of the shared lane to the left-turn approach is warranted. Left-turn and through V/C ratios for this case are calculated as follows:

$$\text{V/C (Left)} = \frac{\text{Left-Turn Volume}}{\text{Left Approach Capacity (including shared lane)}}$$

$$\text{V/C (Through)} = \frac{\text{Through Volume}}{\text{Through Approach Capacity (excluding shared lane)}}$$

Similarly, if ALV (Through) is greater than ALV then full dedication to the through approach is warranted, and left-turn and through V/C ratios are calculated as follows:

$$\text{V/C (Left)} = \frac{\text{Left-Turn Volume}}{\text{Left Approach Capacity (excluding shared lane)}}$$

$$\text{V/C (Through)} = \frac{\text{Through Volume}}{\text{Through Approach Capacity (including shared lane)}}$$

4. Lane Dedication is not Warranted

If ALV (Left) and ALV (Through) are both less than ALV, the left/through lane is assumed to be truly shared and each left, left/through or through approach lane carries an evenly distributed volume of traffic equal to ALV. A combined left/through V/C ratio is calculated as follows:

$$\text{V/C (Left/Through)} = \frac{\text{Left-Turn Volume + Through Volume}}{\text{Total Left + Through Approach Capacity (including shared lane)}}$$

This V/C (Left/Through) ratio is assigned as the V/C (Through) ratio for the critical movement analysis and ICU summary listing.

If split phasing has not been designated for this approach, the relative proportion of V/C (Through) that is attributed to the left-turn volume is estimated as follows:

If approach has more than one left-turn lane (including shared lane), then:

V/C (Left) = V/C (Through)

If approach has only one left-turn lane (shared lane), then:

$$\text{V/C (Left)} = \frac{\text{Left-Turn Volume}}{\text{Single Approach Lane Capacity}}$$

If this left-turn movement is determined to be a critical movement, the V/C (Left) value is posted in brackets on the ICU summary printout.

These same steps are carried out for shared through/right lanes. If full dedication of a shared through/right lane to the right-turn movement is warranted, the right-turn V/C value calculated in step three is checked against the RTOR and RTOG capacity availability if the option to include right-turns in the V/C ratio calculations is selected. If the V/C value that is determined using the shared lane methodology described here is reduced due to RTOR and RTOG capacity availability, the V/C value for the through/right lanes is posted in brackets.

When an approach contains more than one shared lane (e.g., left/through and through/right), steps one and two listed above are carried out for the three turn movements combined. Step four is carried out if dedication is not warranted for either of the shared lanes. If dedication of one of the shared lanes is warranted to one movement or another, step three is carried out for the two movements involved, and then steps one through four are repeated for the two movements involved in the other shared lane.

1. E Peltason/Berkeley & Campus

Existing

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1700	111	.07*	243	.14*
NBT	2	3400	116	.03	392	.12
NBR	d	1700	55	.03	197	.12
SBL	1	1700	4	.00	17	.01
SBT	2	3400	337	.10*	146	.04*
SBR	d	1700	27	.02	21	.01
EBL	1	1700	7	.00	34	.02
EBT	2	3400	194	.06*	716	.21*
EBR	d	1700	151	.09	167	.10
WBL	1	1700	202	.12*	104	.06*
WBT	2	3400	574	.17	512	.15
WBR	d	1700	8	.00	12	.01
Clearance Interval				.05*		.05*
TOTAL CAPACITY UTILIZATION				**.40**		**.50**

Existing + Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1700	120	.07*	254	.15*
NBT	2	3400	116	.03	392	.12
NBR	d	1700	55	.03	197	.12
SBL	1	1700	4	.00	17	.01
SBT	2	3400	337	.10*	146	.04*
SBR	d	1700	27	.02	21	.01
EBL	1	1700	7	.00	34	.02
EBT	2	3400	194	.06*	728	.21*
EBR	d	1700	151	.09	174	.10
WBL	1	1700	202	.12*	104	.06*
WBT	2	3400	589	.17	530	.16
WBR	d	1700	8	.00	12	.01
Clearance Interval				.05*		.05*
TOTAL CAPACITY UTILIZATION				**.40**		**.51**

LRDP Buildout

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1700	70	.04*	220	.13*
NBT	2	3400	80	.02	450	.13
NBR	d	1700	110	.06	310	.18
SBL	1	1700	20	.01	50	.03
SBT	2	3400	260	.08*	190	.06*
SBR	d	1700	30	.02	40	.02
EBL	1	1700	10	.01*	40	.02
EBT	2	3400	270	.08	900	.26*
EBR	d	1700	80	.05	170	.10
WBL	1	1700	230	.14	140	.08*
WBT	2	3400	750	.22*	780	.23
WBR	d	1700	20	.01	20	.01
Clearance Interval				.05*		.05*
TOTAL CAPACITY UTILIZATION				**.40**		**.58**

2. California & Campus

Existing

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1700	124	.07*	160	.09*
NBT	2	3400	141	.07	174	.07
NBR	0	0	90		75	
SBL	1	1700	120	.07	96	.06
SBT	1	1700	152	.09*	192	.11*
SBR	1	1700	46	.03	29	.02
EBL	1	1700	24	.01*	90	.05
EBT	2	3400	165	.05	574	.17*
EBR	d	1700	66	.04	210	.12
WBL	1	1700	101	.06	114	.07*
WBT	2	3400	561	.17*	424	.12
WBR	d	1700	205	.12	52	.03
Clearance Interval				.05*		.05*
TOTAL CAPACITY UTILIZATION				**.39**		**.49**

Existing + Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1700	139	.08*	178	.10*
NBT	2	3400	180	.08	221	.09
NBR	0	0	90		75	
SBL	1	1700	120	.07	96	.06
SBT	1	1700	153	.09*	224	.13*
SBR	1	1700	46	.03	29	.02
EBL	1	1700	24	.01*	90	.05
EBT	2	3400	165	.05	574	.17*
EBR	d	1700	66	.04	222	.13
WBL	1	1700	101	.06	114	.07*
WBT	2	3400	561	.17*	424	.12
WBR	d	1700	205	.12	52	.03
Clearance Interval				.05*		.05*
TOTAL CAPACITY UTILIZATION				**.40**		**.52**

LRDP Buildout

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1700	190	.11*	320	.19*
NBT	2	3400	130	.07	340	.15
NBR	0	0	120		180	
SBL	1	1700	130	.08	150	.09
SBT	1	1700	210	.12*	250	.15*
SBR	1	1700	70	.04	40	.02
EBL	1	1700	30	.02*	110	.06
EBT	2	3400	270	.08	810	.24*
EBR	d	1700	110	.06	300	.18
WBL	1	1700	140	.08	130	.08*
WBT	2	3400	600	.18*	540	.16
WBR	d	1700	160	.09	50	.03
Clearance Interval				.05*		.05*
TOTAL CAPACITY UTILIZATION				**.48**		**.71**

3. Culver & Campus

Existing

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1700	82	.05*	103	.06
NBT	3	5100	589	.12	950	.19*
NBR	d	1700	164	.10	122	.07
SBL	2	3400	431	.13	305	.09*
SBT	2	3400	768	.23*	748	.22
SBR	1	1700	348	.20	268	.16
EBL	2	3400	111	.03	300	.09
EBT	2	3400	260	.09*	368	.13*
EBR	0	0	33		78	
WBL	1	1700	153	.09*	85	.05*
WBT	2	3400	419	.12	207	.06
WBR	1	1700	543	.32	219	.13
Right Turn Adjustment			WBR	.02*		
Clearance Interval				.05*		.05*

Note: Assumes Right-Turn Overlap for SBR WBR

TOTAL CAPACITY UTILIZATION .53 .51

Existing + Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1700	82	.05*	103	.06
NBT	3	5100	599	.12	963	.19*
NBR	d	1700	168	.10	127	.07
SBL	2	3400	431	.13	305	.09*
SBT	2	3400	768	.23*	757	.22
SBR	1	1700	348	.20	268	.16
EBL	2	3400	111	.03	300	.09
EBT	2	3400	260	.09*	368	.13*
EBR	0	0	33		78	
WBL	1	1700	153	.09*	89	.05*
WBT	2	3400	419	.12	207	.06
WBR	1	1700	543	.32	219	.13
Right Turn Adjustment			WBR	.02*		
Clearance Interval				.05*		.05*

Note: Assumes Right-Turn Overlap for SBR WBR

TOTAL CAPACITY UTILIZATION .53 .51

LRDP Buildout

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1700	90	.05*	110	.06*
NBT	3	5100	740	.15	860	.17
NBR	d	1700	180	.11	120	.07
SBL	2	3400	440	.13	520	.15
SBT	2	3400	800	.24*	930	.27*
SBR	1	1700	360	.21	320	.19
EBL	2	3400	150	.04	410	.12
EBT	2	3400	340	.11*	540	.20*
EBR	0	0	30		130	
WBL	1	1700	250	.15*	60	.04*
WBT	2	3400	720	.21	250	.07
WBR	1	1700	500	.29	270	.16
Clearance Interval				.05*		.05*

Note: Assumes Right-Turn Overlap for SBR WBR

TOTAL CAPACITY UTILIZATION .60 .62

4. Anteater & E Peltason

Existing

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1700	315	.19*	180	.11*
NBT	1	1700	35	.02	13	.01
NBR	1	1700	106	.06	98	.06
SBL	1	1700	4	.00	239	.14
SBT	1	1700	2	.02*	54	.08*
SBR	0	0	29		83	
EBL	1	1700	90	.05*	21	.01
EBT	1	1700	231	.14	420	.25*
EBR	1	1700	84	.05	265	.16
WBL	1	1700	72	.04	161	.09*
WBT	2	3400	286	.15*	294	.10
WBR	0	0	219		60	
Clearance Interval				.05*		.05*
TOTAL CAPACITY UTILIZATION				**.46**		**.58**

Existing + Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1700	327	.19*	194	.11*
NBT	1	1700	35	.02	13	.01
NBR	1	1700	115	.07	109	.06
SBL	1	1700	4	.00	239	.14
SBT	1	1700	2	.02*	54	.08*
SBR	0	0	29		83	
EBL	1	1700	90	.05*	21	.01
EBT	1	1700	231	.14	420	.25*
EBR	1	1700	84	.05	272	.16
WBL	1	1700	72	.04	168	.10*
WBT	2	3400	286	.15*	294	.10
WBR	0	0	219		60	
Clearance Interval				.05*		.05*
TOTAL CAPACITY UTILIZATION				**.46**		**.59**

LRDP Buildout

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1700	220	.13*	240	.14*
NBT	1	1700	40	.02	10	.01
NBR	1	1700	460	.27	360	.21
SBL	1	1700	20	.01	280	.16
SBT	1	1700	10	.01*	50	.11*
SBR	0	0	10		130	
EBL	1	1700	80	.05*	20	.01
EBT	2	3400	90	.03	620	.20*
EBR	0	0	10		50	
WBL	1	1700	50	.03	460	.27*
WBT	2	3400	500	.21*	210	.08
WBR	0	0	230		70	
Clearance Interval				.05*		.05*
TOTAL CAPACITY UTILIZATION				**.45**		**.77**

7. **SR-73 SB & Bonita Canyon**

Existing

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3200	38	.01*	79	.02*
NBT	0	0	0		0	
NBR	1	1600	113	.07	202	.13
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	1	1600	0	.00	0	.00
EBT	2	3200	684	.21	1138	.36*
EBR	1	1600	150	.09	500	.31
WBL	2	3200	52	.02	104	.03*
WBT	3	4800	1502	.31*	893	.19
WBR	0	0	0		0	
Right Turn Adjustment			NBR	.06*	NBR	.11*
TOTAL CAPACITY UTILIZATION				**.38**		**.52**

Existing + Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3200	38	.01*	79	.02*
NBT	0	0	0		0	
NBR	1	1600	114	.07	232	.15
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	1	1600	0	.00	0	.00
EBT	2	3200	684	.21	1150	.36*
EBR	1	1600	150	.09	500	.31
WBL	2	3200	55	.02	108	.03*
WBT	3	4800	1517	.32*	911	.19
WBR	0	0	0		0	
Right Turn Adjustment			NBR	.06*	NBR	.13*
TOTAL CAPACITY UTILIZATION				**.39**		**.54**

LRDP Buildout

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3200	40	.01*	90	.03*
NBT	0	0	0		0	
NBR	1	1600	490	.31	450	.28
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	1	1600	0	.00	0	.00
EBT	2	3200	600	.19	750	.23*
EBR	1	1600	80	.05	360	.23
WBL	2	3200	90	.03	180	.06*
WBT	3	4800	1180	.25*	820	.17
WBR	0	0	0		0	
Right Turn Adjustment			NBR	.30*	NBR	.25*
TOTAL CAPACITY UTILIZATION				**.56**		**.57**

8. SR-73 NB & Bonita Canyon

Existing

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3400	443	.13*	152	.04*
NBT	0	0	0		0	
NBR	1	1700	72	.04	27	.02
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	2	3400	734	.22	1301	.38*
EBR	1	1700	71	.04	32	.02
WBL	2	3400	214	.06	60	.02*
WBT	2	3400	1111	.33*	859	.25
WBR	0	0	0		0	
Clearance Interval				.05*		.05*
TOTAL CAPACITY UTILIZATION				**.51**		**.49**

Existing + Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3400	443	.13*	152	.04*
NBT	0	0	0		0	
NBR	1	1700	72	.04	27	.02
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	2	3400	735	.22	1343	.40*
EBR	1	1700	71	.04	32	.02
WBL	2	3400	250	.07	103	.03*
WBT	2	3400	1129	.33*	881	.26
WBR	0	0	0		0	
Clearance Interval				.05*		.05*
TOTAL CAPACITY UTILIZATION				**.51**		**.52**

LRDP Buildout

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3400	390	.11*	120	.04*
NBT	0	0	0		0	
NBR	1	1700	60	.04	50	.03
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	2	3400	950	.28*	1420	.42*
EBR	1	1700	110	.06	50	.03
WBL	2	3400	410	.12*	230	.07*
WBT	2	3400	1010	.30	860	.25
WBR	0	0	0		0	
Clearance Interval				.05*		.05*
TOTAL CAPACITY UTILIZATION				**.56**		**.58**

9. Newport Coast & Bonita Canyon

Existing

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3400	515	.15*	334	.10*
NBT	0	0	0		0	
NBR	1	1700	187	.11	132	.08
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	2	3400	580	.17	947	.28*
EBR	1	1700	250	.15	322	.19
WBL	2	3400	187	.06	235	.07*
WBT	2	3400	801	.24*	594	.17
WBR	0	0	0		0	
Clearance Interval				.05*		.05*
TOTAL CAPACITY UTILIZATION				**.44**		**.50**

Existing + Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3400	515	.15*	334	.10*
NBT	0	0	0		0	
NBR	1	1700	187	.11	132	.08
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	2	3400	581	.17	989	.29*
EBR	1	1700	250	.15	322	.19
WBL	2	3400	187	.06	235	.07*
WBT	2	3400	855	.25*	659	.19
WBR	0	0	0		0	
Clearance Interval				.05*		.05*
TOTAL CAPACITY UTILIZATION				**.45**		**.51**

LRDP Buildout

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3400	800	.24*	530	.16*
NBT	0	0	0		0	
NBR	1	1700	230	.14	210	.12
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	2	3400	520	.15*	930	.27*
EBR	1	1700	540	.32	550	.32
WBL	2	3400	230	.07*	320	.09*
WBT	2	3400	660	.19	620	.18
WBR	0	0	0		0	
Clearance Interval				.05*		.05*
TOTAL CAPACITY UTILIZATION				**.51**		**.57**

10. Turtle Ridge & Bonita Canyon

Existing

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1700	150	.09*	106	.06*
NBT	0	0	0		0	
NBR	2	3400	480	.14	438	.13
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	2	3400	643	.19*	953	.28*
EBR	d	1700	140	.08	137	.08
WBL	2	3400	611	.18*	379	.11*
WBT	2	3400	832	.24	730	.21
WBR	0	0	0		0	
Clearance Interval				.05*		.05*

Note: Assumes Right-Turn Overlap for NBR

TOTAL CAPACITY UTILIZATION .51 .50

Existing + Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1700	150	.09*	106	.06*
NBT	0	0	0		0	
NBR	2	3400	480	.14	440	.13
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	2	3400	644	.19*	995	.29*
EBR	d	1700	140	.08	137	.08
WBL	2	3400	611	.18*	379	.11*
WBT	2	3400	886	.26	795	.23
WBR	0	0	0		0	
Clearance Interval				.05*		.05*

Note: Assumes Right-Turn Overlap for NBR

TOTAL CAPACITY UTILIZATION .51 .51

LRDP Buildout

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	1	1700	190	.11*	140	.08*
NBT	0	0	0		0	
NBR	2	3400	670	.20	580	.17
SBL	0	0	0		0	
SBT	0	0	0		0	
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	2	3400	640	.19*	860	.25*
EBR	d	1700	150	.09	230	.14
WBL	2	3400	660	.19*	750	.22*
WBT	2	3400	790	.23	750	.22
WBR	0	0	0		0	
Clearance Interval				.05*		.05*

Note: Assumes Right-Turn Overlap for NBR

TOTAL CAPACITY UTILIZATION .54 .60

11. Anteater/Shady Canyon & Culver/Bonita Canyon_(

Existing

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3400	380	.11*	185	.05*
NBT	1	1700	70	.08	35	.04
NBR	0	0	73		40	
SBL	1	1700	40	.02	71	.04
SBT	2	3400	35	.01*	131	.04*
SBR	1	1700	180	.11	179	.11
EBL	2	3400	195	.06*	135	.04
EBT	2	3400	710	.21	785	.23*
EBR	1	1700	257	.15	361	.21
WBL	1	1700	42	.02	46	.03*
WBT	2	3400	856	.25*	694	.20
WBR	1	1700	60	.04	55	.03
Right Turn Adjustment			SBR	.05*	SBR	.02*
Clearance Interval				.05*		.05*
TOTAL CAPACITY UTILIZATION				**.53**		**.42**

Existing + Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3400	380	.11*	185	.05
NBT	1	1700	70	.08	37	.05*
NBR	0	0	73		40	
SBL	1	1700	55	.03	89	.05*
SBT	2	3400	38	.01*	135	.04
SBR	1	1700	234	.14	244	.14
EBL	2	3400	196	.06*	180	.05
EBT	2	3400	710	.21	785	.23*
EBR	1	1700	257	.15	361	.21
WBL	1	1700	42	.02	46	.03*
WBT	2	3400	856	.25*	694	.20
WBR	1	1700	60	.04	67	.04
Right Turn Adjustment			SBR	.08*	SBR	.04*
Clearance Interval				.05*		.05*
TOTAL CAPACITY UTILIZATION				**.56**		**.45**

LRDP Buildout

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	2	3400	50	.01	80	.02
NBT	1	1700	30	.11*	130	.31*
NBR	0	0	150		400	
SBL	1	1700	380	.22*	200	.12*
SBT	2	3400	100	.03	30	.01
SBR	1	1700	70	.04	30	.02
EBL	2	3400	30	.01	40	.01
EBT	2	3400	820	.24*	910	.27*
EBR	1	1700	100	.06	50	.03
WBL	1	1700	300	.18*	150	.09*
WBT	2	3400	910	.27	890	.26
WBR	1	1700	230	.14	290	.17
Clearance Interval				.05*		.05*
TOTAL CAPACITY UTILIZATION				**.80**		**.84**

12. Newport Coast & Turtle Ridge

Existing

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	2	3400	472	.14*	425	.13*
NBR	1	1700	338	.20	286	.17
SBL	1	1700	58	.03*	136	.08*
SBT	2	3400	399	.12	339	.10
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	2	3400	159	.05*	197	.06*
WBT	0	0	0		0	
WBR	1	1700	157	.09	45	.03
Right Turn Adjustment			Multi	.04*		
Clearance Interval				.05*		.05*
TOTAL CAPACITY UTILIZATION				**.31**		**.32**

Existing + Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	2	3400	472	.14*	425	.13*
NBR	1	1700	338	.20	288	.17
SBL	1	1700	58	.03*	136	.08*
SBT	2	3400	399	.12	339	.10
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	2	3400	159	.05*	197	.06*
WBT	0	0	0		0	
WBR	1	1700	157	.09	45	.03
Right Turn Adjustment			Multi	.04*		
Clearance Interval				.05*		.05*
TOTAL CAPACITY UTILIZATION				**.31**		**.32**

LRDP Buildout

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	2	3400	780	.23*	620	.18*
NBR	1	1700	500	.29	370	.22
SBL	1	1700	90	.05*	150	.09*
SBT	2	3400	710	.21	610	.18
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	2	3400	210	.06*	510	.15*
WBT	0	0	0		0	
WBR	1	1700	200	.12	80	.05
Right Turn Adjustment			Multi	.03*		
Clearance Interval				.05*		.05*
TOTAL CAPACITY UTILIZATION				**.42**		**.47**

13. Newport Coast & SR-73 NB

Existing

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	2	3400	715	.21*	667	.20*
NBR	f		506		198	
SBL	0	0	0		0	
SBT	2	3400	556	.16	543	.16
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	1.5		255		132	
WBT	0	3400	0	.11*	0	.05*
WBR	0.5		106		43	
Clearance Interval				.05*		.05*
TOTAL CAPACITY UTILIZATION				**.37**		**.30**

Existing + Project

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	2	3400	715	.21*	667	.20*
NBR	f		506		198	
SBL	0	0	0		0	
SBT	2	3400	556	.16	543	.16
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	1.5		255		132	
WBT	0	3400	0	.11*	0	.05*
WBR	0.5		106		45	
Clearance Interval				.05*		.05*
TOTAL CAPACITY UTILIZATION				**.37**		**.30**

LRDP Buildout

	LANES	CAPACITY	AM PK HOUR VOL	AM PK HOUR V/C	PM PK HOUR VOL	PM PK HOUR V/C
NBL	0	0	0		0	
NBT	2	3400	1110	.33*	770	.23
NBR	f		0		0	
SBL	0	0	0		0	
SBT	2	3400	810	.24	1210	.36*
SBR	0	0	0		0	
EBL	0	0	0		0	
EBT	0	0	0		0	
EBR	0	0	0		0	
WBL	1.5		200		130	
WBT	0	3400	0	.09*	0	.07*
WBR	0.5		110		100	
Clearance Interval				.05*		.05*
TOTAL CAPACITY UTILIZATION				**.47**		**.48**

Appendix C HCM DELAY CALCULATION WORKSHEETS

Intersection	
Intersection Delay, s/veh	8.1
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	8	76	5	0	35	51	15	0	7	29	50
Future Vol, veh/h	0	8	76	5	0	35	51	15	0	7	29	50
Peak Hour Factor	0.92	0.76	0.76	0.76	0.92	0.76	0.76	0.76	0.92	0.76	0.76	0.76
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	11	100	7	0	46	67	20	0	9	38	66
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	8.2	8.3	7.9
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	8%	9%	35%	54%
Vol Thru, %	34%	85%	50%	24%
Vol Right, %	58%	6%	15%	22%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	86	89	101	41
LT Vol	7	8	35	22
Through Vol	29	76	51	10
RT Vol	50	5	15	9
Lane Flow Rate	113	117	133	54
Geometry Grp	1	1	1	1
Degree of Util (X)	0.133	0.144	0.163	0.069
Departure Headway (Hd)	4.235	4.44	4.418	4.606
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	849	809	813	779
Service Time	2.253	2.459	2.438	2.627
HCM Lane V/C Ratio	0.133	0.145	0.164	0.069
HCM Control Delay	7.9	8.2	8.3	8
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.5	0.5	0.6	0.2

Intersection				
Intersection Delay, s/veh				
Intersection LOS				

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	22	10	9
Future Vol, veh/h	0	22	10	9
Peak Hour Factor	0.92	0.76	0.76	0.76
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	29	13	12
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	8
HCM LOS	A

Lane

Intersection	
Intersection Delay, s/veh	10.8
Intersection LOS	B

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	55	66	4	0	80	191	52	0	6	74	128
Future Vol, veh/h	0	55	66	4	0	80	191	52	0	6	74	128
Peak Hour Factor	0.92	0.91	0.91	0.91	0.92	0.91	0.91	0.91	0.92	0.91	0.91	0.91
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	60	73	4	0	88	210	57	0	7	81	141
Number of Lanes	0	1	1	1	0	1	1	1	0	1	1	1

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	3	3	3
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	3	3	3
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	3	3	3
HCM Control Delay	10.6	11.5	10.3
HCM LOS	B	B	B

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Vol Left, %	100%	0%	0%	100%	0%	0%	100%	0%	0%	100%	0%
Vol Thru, %	0%	100%	0%	0%	100%	0%	0%	100%	0%	0%	100%
Vol Right, %	0%	0%	100%	0%	0%	100%	0%	0%	100%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	6	74	128	55	66	4	80	191	52	58	48
LT Vol	6	0	0	55	0	0	80	0	0	58	0
Through Vol	0	74	0	0	66	0	0	191	0	0	48
RT Vol	0	0	128	0	0	4	0	0	52	0	0
Lane Flow Rate	7	81	141	60	73	4	88	210	57	64	53
Geometry Grp	8	8	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.013	0.147	0.228	0.12	0.134	0.007	0.164	0.362	0.088	0.125	0.096
Departure Headway (Hd)	7.026	6.526	5.826	7.152	6.652	5.952	6.716	6.216	5.516	7.044	6.544
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	509	549	615	500	537	599	534	577	648	508	546
Service Time	4.778	4.278	3.578	4.911	4.411	3.711	4.463	3.963	3.263	4.796	4.296
HCM Lane V/C Ratio	0.014	0.148	0.229	0.12	0.136	0.007	0.165	0.364	0.088	0.126	0.097
HCM Control Delay	9.9	10.4	10.3	10.9	10.4	8.8	10.8	12.5	8.8	10.8	10
HCM Lane LOS	A	B	B	B	B	A	B	B	A	B	A
HCM 95th-tile Q	0	0.5	0.9	0.4	0.5	0	0.6	1.6	0.3	0.4	0.3

Intersection				
Intersection Delay, s/veh				
Intersection LOS				

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	58	48	88
Future Vol, veh/h	0	58	48	88
Peak Hour Factor	0.92	0.91	0.91	0.91
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	64	53	97
Number of Lanes	0	1	1	1

Approach	SB
Opposing Approach	NB
Opposing Lanes	3
Conflicting Approach Left	WB
Conflicting Lanes Left	3
Conflicting Approach Right	EB
Conflicting Lanes Right	3
HCM Control Delay	10.1
HCM LOS	B

Lane	SBLn3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	684	150	52	1502	38	113
Future Volume (veh/h)	684	150	52	1502	38	113
Number	4	14	3	8	5	12
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	743	54	57	1633	41	36
Adj No. of Lanes	2	1	2	3	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	1864	834	208	3559	258	119
Arrive On Green	0.53	0.53	0.06	0.70	0.07	0.07
Sat Flow, veh/h	3632	1583	3442	5253	3442	1583
Grp Volume(v), veh/h	743	54	57	1633	41	36
Grp Sat Flow(s),veh/h/ln	1770	1583	1721	1695	1721	1583
Q Serve(g_s), s	4.5	0.6	0.6	5.0	0.4	0.8
Cycle Q Clear(g_c), s	4.5	0.6	0.6	5.0	0.4	0.8
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1864	834	208	3559	258	119
V/C Ratio(X)	0.40	0.06	0.27	0.46	0.16	0.30
Avail Cap(c_a), veh/h	2192	981	581	4582	1938	892
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	5.0	4.1	15.9	2.4	15.4	15.5
Incr Delay (d2), s/veh	0.1	0.0	0.7	0.1	0.3	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	2.2	0.3	0.3	2.3	0.2	0.4
LnGrp Delay(d),s/veh	5.2	4.2	16.6	2.4	15.7	17.0
LnGrp LOS	A	A	B	A	B	B
Approach Vol, veh/h	797			1690	77	
Approach Delay, s/veh	5.1			2.9	16.3	
Approach LOS	A			A	B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4				8
Phs Duration (G+Y+Rc), s		6.7	6.2	22.7				28.9
Change Period (Y+Rc), s		4.0	4.0	4.0				4.0
Max Green Setting (Gmax), s		20.0	6.0	22.0				32.0
Max Q Clear Time (g_c+I1), s		2.8	2.6	6.5				7.0
Green Ext Time (p_c), s		0.2	0.0	12.2				17.7

Intersection Summary	
HCM 2010 Ctrl Delay	4.0
HCM 2010 LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	734	71	214	1111	443	72
Future Volume (veh/h)	734	71	214	1111	443	72
Number	4	14	3	8	5	12
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	798	23	233	1208	482	24
Adj No. of Lanes	2	1	2	2	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	1440	644	376	2153	714	328
Arrive On Green	0.41	0.41	0.11	0.61	0.21	0.21
Sat Flow, veh/h	3632	1583	3442	3632	3442	1583
Grp Volume(v), veh/h	798	23	233	1208	482	24
Grp Sat Flow(s),veh/h/ln	1770	1583	1721	1770	1721	1583
Q Serve(g_s), s	7.5	0.4	2.8	8.8	5.6	0.5
Cycle Q Clear(g_c), s	7.5	0.4	2.8	8.8	5.6	0.5
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1440	644	376	2153	714	328
V/C Ratio(X)	0.55	0.04	0.62	0.56	0.68	0.07
Avail Cap(c_a), veh/h	1663	744	666	2673	1522	700
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	9.9	7.7	18.5	5.1	15.9	13.9
Incr Delay (d2), s/veh	0.3	0.0	1.7	0.2	1.1	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	3.7	0.2	1.4	4.3	2.7	0.2
LnGrp Delay(d),s/veh	10.2	7.8	20.1	5.3	17.0	13.9
LnGrp LOS	B	A	C	A	B	B
Approach Vol, veh/h	821			1441	506	
Approach Delay, s/veh	10.1			7.7	16.8	
Approach LOS	B			A	B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4				8
Phs Duration (G+Y+Rc), s		13.0	8.7	21.7				30.4
Change Period (Y+Rc), s		4.0	4.0	4.0				4.0
Max Green Setting (Gmax), s		19.2	8.4	20.4				32.8
Max Q Clear Time (g_c+I1), s		7.6	4.8	9.5				10.8
Green Ext Time (p_c), s		1.4	0.2	8.2				13.8

Intersection Summary		
HCM 2010 Ctrl Delay		10.1
HCM 2010 LOS		B

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	255	106	715	506	0	556
Future Volume (veh/h)	255	106	715	506	0	556
Number	3	18	2	12	1	6
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
Adj Sat Flow, veh/h/ln	1863	1900	1863	1863	0	1863
Adj Flow Rate, veh/h	293	0	777	0	0	604
Adj No. of Lanes	2	1	2	1	0	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	0	2	2	0	2
Cap, veh/h	470	214	2486	1112	0	2486
Arrive On Green	0.13	0.00	0.70	0.00	0.00	0.70
Sat Flow, veh/h	3548	1615	3632	1583	0	3725
Grp Volume(v), veh/h	293	0	777	0	0	604
Grp Sat Flow(s),veh/h/ln	1774	1615	1770	1583	0	1770
Q Serve(g_s), s	3.8	0.0	4.1	0.0	0.0	3.0
Cycle Q Clear(g_c), s	3.8	0.0	4.1	0.0	0.0	3.0
Prop In Lane	1.00	1.00		1.00	0.00	
Lane Grp Cap(c), veh/h	470	214	2486	1112	0	2486
V/C Ratio(X)	0.62	0.00	0.31	0.00	0.00	0.24
Avail Cap(c_a), veh/h	1319	600	2486	1112	0	2486
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	19.9	0.0	2.7	0.0	0.0	2.6
Incr Delay (d2), s/veh	1.4	0.0	0.3	0.0	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.9	0.0	2.1	0.0	0.0	1.5
LnGrp Delay(d),s/veh	21.2	0.0	3.1	0.0	0.0	2.8
LnGrp LOS	C		A			A
Approach Vol, veh/h	293		777			604
Approach Delay, s/veh	21.2		3.1			2.8
Approach LOS	C		A			A

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2				6		8
Phs Duration (G+Y+Rc), s		38.0				38.0		10.4
Change Period (Y+Rc), s		4.0				4.0		4.0
Max Green Setting (Gmax), s		34.0				34.0		18.0
Max Q Clear Time (g_c+I1), s		6.1				5.0		5.8
Green Ext Time (p_c), s		9.5				9.6		0.8

Intersection Summary		
HCM 2010 Ctrl Delay		6.2
HCM 2010 LOS		A

Notes

User approved volume balancing among the lanes for turning movement.

Intersection	
Intersection Delay, s/veh	7.9
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	11	39	5	0	39	80	6	0	3	14	40
Future Vol, veh/h	0	11	39	5	0	39	80	6	0	3	14	40
Peak Hour Factor	0.92	0.91	0.91	0.91	0.92	0.91	0.91	0.91	0.92	0.91	0.91	0.91
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	12	43	5	0	43	88	7	0	3	15	44
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	7.7	8.2	7.4
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	5%	20%	31%	18%
Vol Thru, %	25%	71%	64%	54%
Vol Right, %	70%	9%	5%	28%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	57	55	125	65
LT Vol	3	11	39	12
Through Vol	14	39	80	35
RT Vol	40	5	6	18
Lane Flow Rate	63	60	137	71
Geometry Grp	1	1	1	1
Degree of Util (X)	0.07	0.072	0.162	0.086
Departure Headway (Hd)	4.051	4.368	4.247	4.319
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	889	825	832	834
Service Time	2.054	2.368	2.335	2.321
HCM Lane V/C Ratio	0.071	0.073	0.165	0.085
HCM Control Delay	7.4	7.7	8.2	7.7
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.2	0.2	0.6	0.3

Intersection				
Intersection Delay, s/veh				
Intersection LOS				

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	12	35	18
Future Vol, veh/h	0	12	35	18
Peak Hour Factor	0.92	0.91	0.91	0.91
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	13	38	20
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	7.7
HCM LOS	A

Lane

Intersection	
Intersection Delay, s/veh	12.5
Intersection LOS	B

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	133	239	15	0	73	94	61	0	3	50	74
Future Vol, veh/h	0	133	239	15	0	73	94	61	0	3	50	74
Peak Hour Factor	0.92	0.86	0.86	0.86	0.92	0.86	0.86	0.86	0.92	0.86	0.86	0.86
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	155	278	17	0	85	109	71	0	3	58	86
Number of Lanes	0	1	1	1	0	1	1	1	0	1	1	1

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	3	3	3
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	3	3	3
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	3	3	3
HCM Control Delay	14.5	11.2	10.9
HCM LOS	B	B	B

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Vol Left, %	100%	0%	0%	100%	0%	0%	100%	0%	0%	100%	0%
Vol Thru, %	0%	100%	0%	0%	100%	0%	0%	100%	0%	0%	100%
Vol Right, %	0%	0%	100%	0%	0%	100%	0%	0%	100%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	3	50	74	133	239	15	73	94	61	81	57
LT Vol	3	0	0	133	0	0	73	0	0	81	0
Through Vol	0	50	0	0	239	0	0	94	0	0	57
RT Vol	0	0	74	0	0	15	0	0	61	0	0
Lane Flow Rate	3	58	86	155	278	17	85	109	71	94	66
Geometry Grp	8	8	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.008	0.118	0.158	0.302	0.504	0.028	0.175	0.21	0.123	0.197	0.13
Departure Headway (Hd)	7.823	7.323	6.623	7.032	6.532	5.832	7.423	6.923	6.223	7.544	7.044
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	455	486	537	509	550	610	480	515	572	473	506
Service Time	5.617	5.117	4.417	4.806	4.306	3.606	5.208	4.708	4.008	5.33	4.83
HCM Lane V/C Ratio	0.007	0.119	0.16	0.305	0.505	0.028	0.177	0.212	0.124	0.199	0.13
HCM Control Delay	10.7	11.1	10.7	12.9	15.8	8.8	11.8	11.6	9.9	12.2	10.9
HCM Lane LOS	B	B	B	B	C	A	B	B	A	B	B
HCM 95th-tile Q	0	0.4	0.6	1.3	2.8	0.1	0.6	0.8	0.4	0.7	0.4

Intersection				
Intersection Delay, s/veh				
Intersection LOS				

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	81	57	89
Future Vol, veh/h	0	81	57	89
Peak Hour Factor	0.92	0.86	0.86	0.86
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	94	66	103
Number of Lanes	0	1	1	1

Approach	SB
Opposing Approach	NB
Opposing Lanes	3
Conflicting Approach Left	WB
Conflicting Lanes Left	3
Conflicting Approach Right	EB
Conflicting Lanes Right	3
HCM Control Delay	11.2
HCM LOS	B

Lane	SBLn3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1138	500	104	893	79	202
Future Volume (veh/h)	1138	500	104	893	79	202
Number	4	14	3	8	5	12
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	1237	173	113	971	86	57
Adj No. of Lanes	2	1	2	3	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	1860	832	302	3609	335	154
Arrive On Green	0.53	0.53	0.09	0.71	0.10	0.10
Sat Flow, veh/h	3632	1583	3442	5253	3442	1583
Grp Volume(v), veh/h	1237	173	113	971	86	57
Grp Sat Flow(s),veh/h/ln	1770	1583	1721	1695	1721	1583
Q Serve(g_s), s	10.6	2.4	1.3	2.8	1.0	1.4
Cycle Q Clear(g_c), s	10.6	2.4	1.3	2.8	1.0	1.4
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1860	832	302	3609	335	154
V/C Ratio(X)	0.67	0.21	0.37	0.27	0.26	0.37
Avail Cap(c_a), veh/h	2048	916	456	4108	1535	706
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	7.2	5.2	17.8	2.2	17.3	17.5
Incr Delay (d2), s/veh	0.7	0.1	0.8	0.0	0.4	1.5
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	1.1	0.6	1.3	0.5	0.7
LnGrp Delay(d),s/veh	7.9	5.4	18.6	2.2	17.7	19.0
LnGrp LOS	A	A	B	A	B	B
Approach Vol, veh/h	1410			1084	143	
Approach Delay, s/veh	7.6			3.9	18.2	
Approach LOS	A			A	B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4				8
Phs Duration (G+Y+Rc), s		8.0	7.6	25.8				33.4
Change Period (Y+Rc), s		4.0	4.0	4.0				4.0
Max Green Setting (Gmax), s		18.5	5.5	24.0				33.5
Max Q Clear Time (g_c+I1), s		3.4	3.3	12.6				4.8
Green Ext Time (p_c), s		0.3	0.1	9.2				18.7

Intersection Summary	
HCM 2010 Ctrl Delay	6.7
HCM 2010 LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1301	32	60	859	152	27
Future Volume (veh/h)	1301	32	60	859	152	27
Number	4	14	3	8	5	12
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	1414	13	65	934	165	7
Adj No. of Lanes	2	1	2	2	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	2038	912	212	2569	336	155
Arrive On Green	0.58	0.58	0.06	0.73	0.10	0.10
Sat Flow, veh/h	3632	1583	3442	3632	3442	1583
Grp Volume(v), veh/h	1414	13	65	934	165	7
Grp Sat Flow(s),veh/h/ln	1770	1583	1721	1770	1721	1583
Q Serve(g_s), s	12.8	0.2	0.8	4.5	2.1	0.2
Cycle Q Clear(g_c), s	12.8	0.2	0.8	4.5	2.1	0.2
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	2038	912	212	2569	336	155
V/C Ratio(X)	0.69	0.01	0.31	0.36	0.49	0.05
Avail Cap(c_a), veh/h	2265	1013	418	3007	1405	646
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	6.8	4.1	20.3	2.3	19.4	18.5
Incr Delay (d2), s/veh	0.8	0.0	0.8	0.1	1.1	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	6.3	0.1	0.4	2.1	1.0	0.1
LnGrp Delay(d),s/veh	7.6	4.1	21.1	2.4	20.5	18.6
LnGrp LOS	A	A	C	A	C	B
Approach Vol, veh/h	1427			999	172	
Approach Delay, s/veh	7.6			3.6	20.4	
Approach LOS	A			A	C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4				8
Phs Duration (G+Y+Rc), s		8.4	6.8	30.1				36.9
Change Period (Y+Rc), s		4.0	4.0	4.0				4.0
Max Green Setting (Gmax), s		18.5	5.5	29.0				38.5
Max Q Clear Time (g_c+I1), s		4.1	2.8	14.8				6.5
Green Ext Time (p_c), s		0.4	0.0	11.3				20.9

Intersection Summary			
HCM 2010 Ctrl Delay			6.9
HCM 2010 LOS			A

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	132	43	667	198	0	543
Future Volume (veh/h)	132	43	667	198	0	543
Number	3	18	2	12	1	6
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
Adj Sat Flow, veh/h/ln	1863	1900	1863	1863	0	1863
Adj Flow Rate, veh/h	96	0	725	0	0	590
Adj No. of Lanes	2	1	2	1	0	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	0	2	2	0	2
Cap, veh/h	262	119	2708	1211	0	2708
Arrive On Green	0.07	0.00	0.77	0.00	0.00	0.77
Sat Flow, veh/h	3548	1615	3632	1583	0	3725
Grp Volume(v), veh/h	96	0	725	0	0	590
Grp Sat Flow(s),veh/h/ln	1774	1615	1770	1583	0	1770
Q Serve(g_s), s	1.3	0.0	3.0	0.0	0.0	2.3
Cycle Q Clear(g_c), s	1.3	0.0	3.0	0.0	0.0	2.3
Prop In Lane	1.00	1.00		1.00	0.00	
Lane Grp Cap(c), veh/h	262	119	2708	1211	0	2708
V/C Ratio(X)	0.37	0.00	0.27	0.00	0.00	0.22
Avail Cap(c_a), veh/h	1000	455	2708	1211	0	2708
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	21.9	0.0	1.7	0.0	0.0	1.6
Incr Delay (d2), s/veh	0.9	0.0	0.2	0.0	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.0	1.5	0.0	0.0	1.1
LnGrp Delay(d),s/veh	22.7	0.0	2.0	0.0	0.0	1.8
LnGrp LOS	C		A			A
Approach Vol, veh/h	96		725			590
Approach Delay, s/veh	22.7		2.0			1.8
Approach LOS	C		A			A

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2				6		8
Phs Duration (G+Y+Rc), s		42.0				42.0		7.7
Change Period (Y+Rc), s		4.0				4.0		4.0
Max Green Setting (Gmax), s		38.0				38.0		14.0
Max Q Clear Time (g_c+I1), s		5.0				4.3		3.3
Green Ext Time (p_c), s		9.3				9.4		0.2

Intersection Summary	
HCM 2010 Ctrl Delay	3.3
HCM 2010 LOS	A

Notes
User approved volume balancing among the lanes for turning movement.

Intersection	
Intersection Delay, s/veh	8.1
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	8	76	5	0	35	51	15	0	7	29	50
Future Vol, veh/h	0	8	76	5	0	35	51	15	0	7	29	50
Peak Hour Factor	0.92	0.76	0.76	0.76	0.92	0.76	0.76	0.76	0.92	0.76	0.76	0.76
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	11	100	7	0	46	67	20	0	9	38	66
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	8.2	8.3	7.9
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	8%	9%	35%	54%
Vol Thru, %	34%	85%	50%	24%
Vol Right, %	58%	6%	15%	22%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	86	89	101	41
LT Vol	7	8	35	22
Through Vol	29	76	51	10
RT Vol	50	5	15	9
Lane Flow Rate	113	117	133	54
Geometry Grp	1	1	1	1
Degree of Util (X)	0.133	0.144	0.163	0.069
Departure Headway (Hd)	4.235	4.44	4.418	4.606
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	849	809	813	779
Service Time	2.253	2.459	2.438	2.627
HCM Lane V/C Ratio	0.133	0.145	0.164	0.069
HCM Control Delay	7.9	8.2	8.3	8
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.5	0.5	0.6	0.2

Intersection				
Intersection Delay, s/veh				
Intersection LOS				

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	22	10	9
Future Vol, veh/h	0	22	10	9
Peak Hour Factor	0.92	0.76	0.76	0.76
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	29	13	12
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	8
HCM LOS	A

Lane

Intersection	
Intersection Delay, s/veh	11.1
Intersection LOS	B

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	55	66	4	0	80	212	109	0	6	74	128
Future Vol, veh/h	0	55	66	4	0	80	212	109	0	6	74	128
Peak Hour Factor	0.92	0.91	0.91	0.91	0.92	0.91	0.91	0.91	0.92	0.91	0.91	0.91
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	60	73	4	0	88	233	120	0	7	81	141
Number of Lanes	0	1	1	1	0	1	1	1	0	1	1	1

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	3	3	3
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	3	3	3
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	3	3	3
HCM Control Delay	10.9	11.8	10.7
HCM LOS	B	B	B

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Vol Left, %	100%	0%	0%	100%	0%	0%	100%	0%	0%	100%	0%
Vol Thru, %	0%	100%	0%	0%	100%	0%	0%	100%	0%	0%	100%
Vol Right, %	0%	0%	100%	0%	0%	100%	0%	0%	100%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	6	74	128	55	66	4	80	212	109	59	48
LT Vol	6	0	0	55	0	0	80	0	0	59	0
Through Vol	0	74	0	0	66	0	0	212	0	0	48
RT Vol	0	0	128	0	0	4	0	0	109	0	0
Lane Flow Rate	7	81	141	60	73	4	88	233	120	65	53
Geometry Grp	8	8	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.013	0.152	0.236	0.123	0.138	0.008	0.165	0.405	0.185	0.131	0.099
Departure Headway (Hd)	7.238	6.738	6.038	7.349	6.849	6.149	6.763	6.263	5.563	7.254	6.754
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	493	530	592	487	521	579	529	573	643	493	529
Service Time	5.001	4.501	3.801	5.116	4.616	3.916	4.517	4.017	3.317	5.018	4.518
HCM Lane V/C Ratio	0.014	0.153	0.238	0.123	0.14	0.007	0.166	0.407	0.187	0.132	0.1
HCM Control Delay	10.1	10.7	10.7	11.2	10.7	9	10.9	13.2	9.6	11.1	10.3
HCM Lane LOS	B	B	B	B	B	A	B	B	A	B	B
HCM 95th-tile Q	0	0.5	0.9	0.4	0.5	0	0.6	2	0.7	0.4	0.3

Intersection				
Intersection Delay, s/veh				
Intersection LOS				

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	59	48	88
Future Vol, veh/h	0	59	48	88
Peak Hour Factor	0.92	0.91	0.91	0.91
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	65	53	97
Number of Lanes	0	1	1	1

Approach	SB
Opposing Approach	NB
Opposing Lanes	3
Conflicting Approach Left	WB
Conflicting Lanes Left	3
Conflicting Approach Right	EB
Conflicting Lanes Right	3
HCM Control Delay	10.4
HCM LOS	B

Lane	SBLn3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	684	150	55	1517	38	114
Future Volume (veh/h)	684	150	55	1517	38	114
Number	4	14	3	8	5	12
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	743	54	60	1649	41	37
Adj No. of Lanes	2	1	2	3	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	1861	832	216	3562	260	119
Arrive On Green	0.53	0.53	0.06	0.70	0.08	0.08
Sat Flow, veh/h	3632	1583	3442	5253	3442	1583
Grp Volume(v), veh/h	743	54	60	1649	41	37
Grp Sat Flow(s),veh/h/ln	1770	1583	1721	1695	1721	1583
Q Serve(g_s), s	4.5	0.6	0.6	5.1	0.4	0.8
Cycle Q Clear(g_c), s	4.5	0.6	0.6	5.1	0.4	0.8
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1861	832	216	3562	260	119
V/C Ratio(X)	0.40	0.06	0.28	0.46	0.16	0.31
Avail Cap(c_a), veh/h	2181	976	578	4557	1928	887
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	5.1	4.2	16.0	2.4	15.4	15.6
Incr Delay (d2), s/veh	0.1	0.0	0.7	0.1	0.3	1.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.2	0.3	0.3	2.3	0.2	0.4
LnGrp Delay(d),s/veh	5.2	4.2	16.7	2.5	15.7	17.1
LnGrp LOS	A	A	B	A	B	B
Approach Vol, veh/h	797			1709	78	
Approach Delay, s/veh	5.2			3.0	16.4	
Approach LOS	A			A	B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4				8
Phs Duration (G+Y+Rc), s		6.7	6.2	22.8				29.0
Change Period (Y+Rc), s		4.0	4.0	4.0				4.0
Max Green Setting (Gmax), s		20.0	6.0	22.0				32.0
Max Q Clear Time (g_c+I1), s		2.8	2.6	6.5				7.1
Green Ext Time (p_c), s		0.2	0.0	12.3				17.8

Intersection Summary		
HCM 2010 Ctrl Delay		4.0
HCM 2010 LOS		A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	735	71	250	1129	443	72
Future Volume (veh/h)	735	71	250	1129	443	72
Number	4	14	3	8	5	12
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	799	23	272	1227	482	24
Adj No. of Lanes	2	1	2	2	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	1422	636	420	2173	708	326
Arrive On Green	0.40	0.40	0.12	0.61	0.21	0.21
Sat Flow, veh/h	3632	1583	3442	3632	3442	1583
Grp Volume(v), veh/h	799	23	272	1227	482	24
Grp Sat Flow(s),veh/h/ln	1770	1583	1721	1770	1721	1583
Q Serve(g_s), s	7.7	0.4	3.3	9.1	5.7	0.5
Cycle Q Clear(g_c), s	7.7	0.4	3.3	9.1	5.7	0.5
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1422	636	420	2173	708	326
V/C Ratio(X)	0.56	0.04	0.65	0.56	0.68	0.07
Avail Cap(c_a), veh/h	1627	728	652	2617	1489	685
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	10.3	8.1	18.6	5.1	16.3	14.2
Incr Delay (d2), s/veh	0.4	0.0	1.7	0.2	1.2	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	3.8	0.2	1.7	4.3	2.8	0.2
LnGrp Delay(d),s/veh	10.6	8.1	20.3	5.3	17.4	14.3
LnGrp LOS	B	A	C	A	B	B
Approach Vol, veh/h	822			1499	506	
Approach Delay, s/veh	10.5			8.0	17.3	
Approach LOS	B			A	B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4				8
Phs Duration (G+Y+Rc), s		13.1	9.4	21.8				31.2
Change Period (Y+Rc), s		4.0	4.0	4.0				4.0
Max Green Setting (Gmax), s		19.2	8.4	20.4				32.8
Max Q Clear Time (g_c+I1), s		7.7	5.3	9.7				11.1
Green Ext Time (p_c), s		1.4	0.3	8.1				13.8

Intersection Summary	
HCM 2010 Ctrl Delay	10.4
HCM 2010 LOS	B

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	255	106	715	506	0	556
Future Volume (veh/h)	255	106	715	506	0	556
Number	3	18	2	12	1	6
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
Adj Sat Flow, veh/h/ln	1863	1900	1863	1863	0	1863
Adj Flow Rate, veh/h	293	0	777	0	0	604
Adj No. of Lanes	2	1	2	1	0	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	0	2	2	0	2
Cap, veh/h	470	214	2486	1112	0	2486
Arrive On Green	0.13	0.00	0.70	0.00	0.00	0.70
Sat Flow, veh/h	3548	1615	3632	1583	0	3725
Grp Volume(v), veh/h	293	0	777	0	0	604
Grp Sat Flow(s),veh/h/ln	1774	1615	1770	1583	0	1770
Q Serve(g_s), s	3.8	0.0	4.1	0.0	0.0	3.0
Cycle Q Clear(g_c), s	3.8	0.0	4.1	0.0	0.0	3.0
Prop In Lane	1.00	1.00		1.00	0.00	
Lane Grp Cap(c), veh/h	470	214	2486	1112	0	2486
V/C Ratio(X)	0.62	0.00	0.31	0.00	0.00	0.24
Avail Cap(c_a), veh/h	1319	600	2486	1112	0	2486
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	19.9	0.0	2.7	0.0	0.0	2.6
Incr Delay (d2), s/veh	1.4	0.0	0.3	0.0	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.9	0.0	2.1	0.0	0.0	1.5
LnGrp Delay(d),s/veh	21.2	0.0	3.1	0.0	0.0	2.8
LnGrp LOS	C		A			A
Approach Vol, veh/h	293		777			604
Approach Delay, s/veh	21.2		3.1			2.8
Approach LOS	C		A			A

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2				6		8
Phs Duration (G+Y+Rc), s		38.0				38.0		10.4
Change Period (Y+Rc), s		4.0				4.0		4.0
Max Green Setting (Gmax), s		34.0				34.0		18.0
Max Q Clear Time (g_c+I1), s		6.1				5.0		5.8
Green Ext Time (p_c), s		9.5				9.6		0.8

Intersection Summary	
HCM 2010 Ctrl Delay	6.2
HCM 2010 LOS	A

Notes

User approved volume balancing among the lanes for turning movement.

Intersection	
Intersection Delay, s/veh	7.8
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	11	39	5	0	39	80	6	0	3	14	40
Future Vol, veh/h	0	11	39	5	0	39	80	6	0	3	14	40
Peak Hour Factor	0.92	0.91	0.91	0.91	0.92	0.91	0.91	0.91	0.92	0.91	0.91	0.91
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	12	43	5	0	43	88	7	0	3	15	44
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	7.7	8.2	7.4
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	5%	20%	31%	18%
Vol Thru, %	25%	71%	64%	55%
Vol Right, %	70%	9%	5%	27%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	57	55	125	67
LT Vol	3	11	39	12
Through Vol	14	39	80	37
RT Vol	40	5	6	18
Lane Flow Rate	63	60	137	74
Geometry Grp	1	1	1	1
Degree of Util (X)	0.071	0.073	0.162	0.088
Departure Headway (Hd)	4.054	4.364	4.25	4.323
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	888	824	831	833
Service Time	2.057	2.374	2.341	2.328
HCM Lane V/C Ratio	0.071	0.073	0.165	0.089
HCM Control Delay	7.4	7.7	8.2	7.7
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.2	0.2	0.6	0.3

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	12	37	18
Future Vol, veh/h	0	12	37	18
Peak Hour Factor	0.92	0.91	0.91	0.91
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	13	41	20
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	7.7
HCM LOS	A

Lane

Intersection	
Intersection Delay, s/veh	14.3
Intersection LOS	B

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	133	254	15	0	73	119	130	0	3	50	74
Future Vol, veh/h	0	133	254	15	0	73	119	130	0	3	50	74
Peak Hour Factor	0.92	0.86	0.86	0.86	0.92	0.86	0.86	0.86	0.92	0.86	0.86	0.86
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	155	295	17	0	85	138	151	0	3	58	86
Number of Lanes	0	1	1	1	0	1	1	1	0	1	1	1

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	3	3	3
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	3	3	3
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	3	3	3
HCM Control Delay	17.3	12.5	11.8
HCM LOS	C	B	B

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Vol Left, %	100%	0%	0%	100%	0%	0%	100%	0%	0%	100%	0%
Vol Thru, %	0%	100%	0%	0%	100%	0%	0%	100%	0%	0%	100%
Vol Right, %	0%	0%	100%	0%	0%	100%	0%	0%	100%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	3	50	74	133	254	15	73	119	130	128	57
LT Vol	3	0	0	133	0	0	73	0	0	128	0
Through Vol	0	50	0	0	254	0	0	119	0	0	57
RT Vol	0	0	74	0	0	15	0	0	130	0	0
Lane Flow Rate	3	58	86	155	295	17	85	138	151	149	66
Geometry Grp	8	8	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.008	0.13	0.175	0.328	0.586	0.031	0.186	0.284	0.281	0.334	0.14
Departure Headway (Hd)	8.542	8.042	7.342	7.641	7.141	6.441	7.885	7.385	6.685	8.086	7.586
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	419	446	488	472	505	556	456	487	538	445	473
Service Time	6.292	5.792	5.092	5.38	4.88	4.18	5.625	5.125	4.425	5.827	5.327
HCM Lane V/C Ratio	0.007	0.13	0.176	0.328	0.584	0.031	0.186	0.283	0.281	0.335	0.14
HCM Control Delay	11.4	12	11.7	14.1	19.5	9.4	12.4	13	12	14.8	11.6
HCM Lane LOS	B	B	B	B	C	A	B	B	B	B	B
HCM 95th-tile Q	0	0.4	0.6	1.4	3.7	0.1	0.7	1.2	1.1	1.4	0.5

Intersection				
Intersection Delay, s/veh				
Intersection LOS				

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	128	57	89
Future Vol, veh/h	0	128	57	89
Peak Hour Factor	0.92	0.86	0.86	0.86
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	149	66	103
Number of Lanes	0	1	1	1

Approach	SB
Opposing Approach	NB
Opposing Lanes	3
Conflicting Approach Left	WB
Conflicting Lanes Left	3
Conflicting Approach Right	EB
Conflicting Lanes Right	3
HCM Control Delay	13
HCM LOS	B

Lane	SBLn3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1150	500	108	911	79	232
Future Volume (veh/h)	1150	500	108	911	79	232
Number	4	14	3	8	5	12
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	1250	173	117	990	86	89
Adj No. of Lanes	2	1	2	3	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	1850	828	305	3592	356	164
Arrive On Green	0.52	0.52	0.09	0.71	0.10	0.10
Sat Flow, veh/h	3632	1583	3442	5253	3442	1583
Grp Volume(v), veh/h	1250	173	117	990	86	89
Grp Sat Flow(s),veh/h/ln	1770	1583	1721	1695	1721	1583
Q Serve(g_s), s	11.0	2.5	1.3	3.0	1.0	2.2
Cycle Q Clear(g_c), s	11.0	2.5	1.3	3.0	1.0	2.2
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1850	828	305	3592	356	164
V/C Ratio(X)	0.68	0.21	0.38	0.28	0.24	0.54
Avail Cap(c_a), veh/h	2019	903	450	4050	1514	696
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	7.4	5.4	18.1	2.3	17.3	17.9
Incr Delay (d2), s/veh	0.8	0.1	0.8	0.0	0.3	2.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.4	1.1	0.7	1.4	0.5	1.1
LnGrp Delay(d),s/veh	8.2	5.5	18.9	2.3	17.7	20.7
LnGrp LOS	A	A	B	A	B	C
Approach Vol, veh/h	1423			1107	175	
Approach Delay, s/veh	7.9			4.0	19.2	
Approach LOS	A			A	B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4				8
Phs Duration (G+Y+Rc), s		8.4	7.7	26.0				33.7
Change Period (Y+Rc), s		4.0	4.0	4.0				4.0
Max Green Setting (Gmax), s		18.5	5.5	24.0				33.5
Max Q Clear Time (g_c+I1), s		4.2	3.3	13.0				5.0
Green Ext Time (p_c), s		0.4	0.1	9.0				18.9

Intersection Summary		
HCM 2010 Ctrl Delay		7.1
HCM 2010 LOS		A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1343	32	103	881	152	27
Future Volume (veh/h)	1343	32	103	881	152	27
Number	4	14	3	8	5	12
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	1460	13	112	958	165	7
Adj No. of Lanes	2	1	2	2	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	2012	900	281	2602	327	150
Arrive On Green	0.57	0.57	0.08	0.74	0.10	0.10
Sat Flow, veh/h	3632	1583	3442	3632	3442	1583
Grp Volume(v), veh/h	1460	13	112	958	165	7
Grp Sat Flow(s),veh/h/ln	1770	1583	1721	1770	1721	1583
Q Serve(g_s), s	14.3	0.2	1.5	4.6	2.1	0.2
Cycle Q Clear(g_c), s	14.3	0.2	1.5	4.6	2.1	0.2
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	2012	900	281	2602	327	150
V/C Ratio(X)	0.73	0.01	0.40	0.37	0.50	0.05
Avail Cap(c_a), veh/h	2180	975	402	2894	1352	622
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	7.5	4.4	20.5	2.3	20.2	19.4
Incr Delay (d2), s/veh	1.1	0.0	0.9	0.1	1.2	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	7.2	0.1	0.7	2.2	1.1	0.1
LnGrp Delay(d),s/veh	8.6	4.4	21.4	2.4	21.5	19.5
LnGrp LOS	A	A	C	A	C	B
Approach Vol, veh/h	1473			1070	172	
Approach Delay, s/veh	8.6			4.3	21.4	
Approach LOS	A			A	C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4				8
Phs Duration (G+Y+Rc), s		8.5	7.8	30.8				38.6
Change Period (Y+Rc), s		4.0	4.0	4.0				4.0
Max Green Setting (Gmax), s		18.5	5.5	29.0				38.5
Max Q Clear Time (g_c+I1), s		4.1	3.5	16.3				6.6
Green Ext Time (p_c), s		0.4	0.1	10.5				21.5

Intersection Summary	
HCM 2010 Ctrl Delay	7.7
HCM 2010 LOS	A

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	132	45	667	198	0	543
Future Volume (veh/h)	132	45	667	198	0	543
Number	3	18	2	12	1	6
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
Adj Sat Flow, veh/h/ln	1863	1900	1863	1863	0	1863
Adj Flow Rate, veh/h	97	0	725	0	0	590
Adj No. of Lanes	2	1	2	1	0	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	0	2	2	0	2
Cap, veh/h	263	120	2707	1211	0	2707
Arrive On Green	0.07	0.00	0.76	0.00	0.00	0.76
Sat Flow, veh/h	3548	1615	3632	1583	0	3725
Grp Volume(v), veh/h	97	0	725	0	0	590
Grp Sat Flow(s),veh/h/ln	1774	1615	1770	1583	0	1770
Q Serve(g_s), s	1.3	0.0	3.0	0.0	0.0	2.3
Cycle Q Clear(g_c), s	1.3	0.0	3.0	0.0	0.0	2.3
Prop In Lane	1.00	1.00		1.00	0.00	
Lane Grp Cap(c), veh/h	263	120	2707	1211	0	2707
V/C Ratio(X)	0.37	0.00	0.27	0.00	0.00	0.22
Avail Cap(c_a), veh/h	1000	455	2707	1211	0	2707
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	21.9	0.0	1.7	0.0	0.0	1.6
Incr Delay (d2), s/veh	0.9	0.0	0.2	0.0	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	0.0	1.5	0.0	0.0	1.1
LnGrp Delay(d),s/veh	22.7	0.0	2.0	0.0	0.0	1.8
LnGrp LOS	C		A			A
Approach Vol, veh/h	97		725			590
Approach Delay, s/veh	22.7		2.0			1.8
Approach LOS	C		A			A

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2				6		8
Phs Duration (G+Y+Rc), s		42.0				42.0		7.7
Change Period (Y+Rc), s		4.0				4.0		4.0
Max Green Setting (Gmax), s		38.0				38.0		14.0
Max Q Clear Time (g_c+I1), s		5.0				4.3		3.3
Green Ext Time (p_c), s		9.3				9.4		0.2

Intersection Summary	
HCM 2010 Ctrl Delay	3.3
HCM 2010 LOS	A

Notes

User approved volume balancing among the lanes for turning movement.

Intersection	
Intersection Delay, s/veh	8.4
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	10	80	10	0	40	60	20	0	10	30	60
Future Vol, veh/h	0	10	80	10	0	40	60	20	0	10	30	60
Peak Hour Factor	0.92	0.76	0.76	0.76	0.92	0.76	0.76	0.76	0.92	0.76	0.76	0.76
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	13	105	13	0	53	79	26	0	13	39	79
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	8.4	8.6	8.2
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	10%	10%	33%	50%
Vol Thru, %	30%	80%	50%	25%
Vol Right, %	60%	10%	17%	25%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	100	100	120	40
LT Vol	10	10	40	20
Through Vol	30	80	60	10
RT Vol	60	10	20	10
Lane Flow Rate	132	132	158	53
Geometry Grp	1	1	1	1
Degree of Util (X)	0.158	0.164	0.196	0.069
Departure Headway (Hd)	4.322	4.49	4.468	4.7
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	830	799	804	762
Service Time	2.346	2.516	2.493	2.729
HCM Lane V/C Ratio	0.159	0.165	0.197	0.07
HCM Control Delay	8.2	8.4	8.6	8.1
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.6	0.6	0.7	0.2

Intersection				
Intersection Delay, s/veh				
Intersection LOS				

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	20	10	10
Future Vol, veh/h	0	20	10	10
Peak Hour Factor	0.92	0.76	0.76	0.76
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	26	13	13
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	8.1
HCM LOS	A

Lane

Intersection	
Intersection Delay, s/veh	11.7
Intersection LOS	B

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	140	60	10	0	10	190	160	0	40	120	30
Future Vol, veh/h	0	140	60	10	0	10	190	160	0	40	120	30
Peak Hour Factor	0.92	0.91	0.91	0.91	0.92	0.91	0.91	0.91	0.92	0.91	0.91	0.91
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	154	66	11	0	11	209	176	0	44	132	33
Number of Lanes	0	1	1	1	0	1	1	1	0	1	1	1

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	3	3	3
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	3	3	3
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	3	3	3
HCM Control Delay	12.2	12	11.3
HCM LOS	B	B	B

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Vol Left, %	100%	0%	0%	100%	0%	0%	100%	0%	0%	100%	0%
Vol Thru, %	0%	100%	0%	0%	100%	0%	0%	100%	0%	0%	100%
Vol Right, %	0%	0%	100%	0%	0%	100%	0%	0%	100%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	40	120	30	140	60	10	10	190	160	70	10
LT Vol	40	0	0	140	0	0	10	0	0	70	0
Through Vol	0	120	0	0	60	0	0	190	0	0	10
RT Vol	0	0	30	0	0	10	0	0	160	0	0
Lane Flow Rate	44	132	33	154	66	11	11	209	176	77	11
Geometry Grp	8	8	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.09	0.252	0.057	0.309	0.123	0.018	0.021	0.375	0.281	0.159	0.021
Departure Headway (Hd)	7.385	6.885	6.185	7.225	6.725	6.025	6.958	6.458	5.758	7.424	6.924
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	484	520	576	495	530	590	513	555	621	482	515
Service Time	5.159	4.659	3.959	5	4.5	3.8	4.725	4.225	3.525	5.199	4.699
HCM Lane V/C Ratio	0.091	0.254	0.057	0.311	0.125	0.019	0.021	0.377	0.283	0.16	0.021
HCM Control Delay	10.9	12	9.3	13.2	10.5	8.9	9.9	13.1	10.8	11.6	9.8
HCM Lane LOS	B	B	A	B	B	A	A	B	B	B	A
HCM 95th-tile Q	0.3	1	0.2	1.3	0.4	0.1	0.1	1.7	1.1	0.6	0.1

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	70	10	100
Future Vol, veh/h	0	70	10	100
Peak Hour Factor	0.92	0.91	0.91	0.91
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	77	11	110
Number of Lanes	0	1	1	1

Approach	SB
Opposing Approach	NB
Opposing Lanes	3
Conflicting Approach Left	WB
Conflicting Lanes Left	3
Conflicting Approach Right	EB
Conflicting Lanes Right	3
HCM Control Delay	10.9
HCM LOS	B

Lane	SBLn3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	600	80	90	1180	40	490
Future Volume (veh/h)	600	80	90	1180	40	490
Number	4	14	3	8	5	12
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	652	-22	98	1283	43	446
Adj No. of Lanes	2	1	2	3	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	1286	575	256	2633	1108	510
Arrive On Green	0.36	0.00	0.07	0.52	0.32	0.32
Sat Flow, veh/h	3632	1583	3442	5253	3442	1583
Grp Volume(v), veh/h	652	-22	98	1283	43	446
Grp Sat Flow(s),veh/h/ln	1770	1583	1721	1695	1721	1583
Q Serve(g_s), s	7.2	0.0	1.4	8.1	0.4	13.3
Cycle Q Clear(g_c), s	7.2	0.0	1.4	8.1	0.4	13.3
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1286	575	256	2633	1108	510
V/C Ratio(X)	0.51	-0.04	0.38	0.49	0.04	0.88
Avail Cap(c_a), veh/h	1560	698	414	3261	1379	634
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	12.4	0.0	22.0	7.8	11.6	16.0
Incr Delay (d2), s/veh	0.3	0.0	0.9	0.1	0.0	11.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.5	0.0	0.7	3.7	0.2	7.2
LnGrp Delay(d),s/veh	12.7	0.0	22.9	7.9	11.6	27.0
LnGrp LOS	B		C	A	B	C
Approach Vol, veh/h	630			1381	489	
Approach Delay, s/veh	13.2			9.0	25.7	
Approach LOS	B			A	C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4				8
Phs Duration (G+Y+Rc), s		20.1	7.7	22.1				29.8
Change Period (Y+Rc), s		4.0	4.0	4.0				4.0
Max Green Setting (Gmax), s		20.0	6.0	22.0				32.0
Max Q Clear Time (g_c+I1), s		15.3	3.4	9.2				10.1
Green Ext Time (p_c), s		0.8	0.1	9.0				13.0

Intersection Summary	
HCM 2010 Ctrl Delay	13.3
HCM 2010 LOS	B

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	950	110	410	1010	390	60
Future Volume (veh/h)	950	110	410	1010	390	60
Number	4	14	3	8	5	12
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	1033	66	446	1098	424	11
Adj No. of Lanes	2	1	2	2	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	1424	637	575	2309	623	287
Arrive On Green	0.40	0.40	0.17	0.65	0.18	0.18
Sat Flow, veh/h	3632	1583	3442	3632	3442	1583
Grp Volume(v), veh/h	1033	66	446	1098	424	11
Grp Sat Flow(s),veh/h/ln	1770	1583	1721	1770	1721	1583
Q Serve(g_s), s	11.8	1.2	6.0	7.5	5.5	0.3
Cycle Q Clear(g_c), s	11.8	1.2	6.0	7.5	5.5	0.3
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1424	637	575	2309	623	287
V/C Ratio(X)	0.73	0.10	0.78	0.48	0.68	0.04
Avail Cap(c_a), veh/h	1503	672	602	2416	1375	633
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	12.1	9.0	19.2	4.2	18.4	16.2
Incr Delay (d2), s/veh	1.7	0.1	6.1	0.2	1.3	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	6.1	0.6	3.3	3.6	2.7	0.1
LnGrp Delay(d),s/veh	13.8	9.0	25.2	4.4	19.7	16.3
LnGrp LOS	B	A	C	A	B	B
Approach Vol, veh/h	1099			1544	435	
Approach Delay, s/veh	13.5			10.4	19.6	
Approach LOS	B			B	B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4				8
Phs Duration (G+Y+Rc), s		12.7	12.0	23.3				35.3
Change Period (Y+Rc), s		4.0	4.0	4.0				4.0
Max Green Setting (Gmax), s		19.2	8.4	20.4				32.8
Max Q Clear Time (g_c+I1), s		7.5	8.0	13.8				9.5
Green Ext Time (p_c), s		1.2	0.1	5.5				15.3

Intersection Summary			
HCM 2010 Ctrl Delay			12.8
HCM 2010 LOS			B

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	200	110	1110	500	0	810
Future Volume (veh/h)	200	110	1110	500	0	810
Number	3	18	2	12	1	6
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
Adj Sat Flow, veh/h/ln	1863	1900	1863	1863	0	1863
Adj Flow Rate, veh/h	238	0	1207	0	0	880
Adj No. of Lanes	2	1	2	1	0	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	0	2	2	0	2
Cap, veh/h	403	183	2540	1136	0	2540
Arrive On Green	0.11	0.00	0.72	0.00	0.00	0.72
Sat Flow, veh/h	3548	1615	3632	1583	0	3725
Grp Volume(v), veh/h	238	0	1207	0	0	880
Grp Sat Flow(s),veh/h/ln	1774	1615	1770	1583	0	1770
Q Serve(g_s), s	3.0	0.0	6.9	0.0	0.0	4.4
Cycle Q Clear(g_c), s	3.0	0.0	6.9	0.0	0.0	4.4
Prop In Lane	1.00	1.00		1.00	0.00	
Lane Grp Cap(c), veh/h	403	183	2540	1136	0	2540
V/C Ratio(X)	0.59	0.00	0.48	0.00	0.00	0.35
Avail Cap(c_a), veh/h	1348	614	2540	1136	0	2540
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	20.0	0.0	2.9	0.0	0.0	2.5
Incr Delay (d2), s/veh	1.4	0.0	0.6	0.0	0.0	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	0.0	3.4	0.0	0.0	2.2
LnGrp Delay(d),s/veh	21.3	0.0	3.5	0.0	0.0	2.9
LnGrp LOS	C		A			A
Approach Vol, veh/h	238		1207			880
Approach Delay, s/veh	21.3		3.5			2.9
Approach LOS	C		A			A

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2				6		8
Phs Duration (G+Y+Rc), s		38.0				38.0		9.4
Change Period (Y+Rc), s		4.0				4.0		4.0
Max Green Setting (Gmax), s		34.0				34.0		18.0
Max Q Clear Time (g_c+I1), s		8.9				6.4		5.0
Green Ext Time (p_c), s		15.1				16.0		0.6

Intersection Summary		
HCM 2010 Ctrl Delay		5.1
HCM 2010 LOS		A

Notes

User approved volume balancing among the lanes for turning movement.

Intersection	
Intersection Delay, s/veh	8.5
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	20	50	10	0	50	110	10	0	10	20	60
Future Vol, veh/h	0	20	50	10	0	50	110	10	0	10	20	60
Peak Hour Factor	0.92	0.91	0.91	0.91	0.92	0.91	0.91	0.91	0.92	0.91	0.91	0.91
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	22	55	11	0	55	121	11	0	11	22	66
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	8.2	9	7.9
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	11%	25%	29%	20%
Vol Thru, %	22%	62%	65%	50%
Vol Right, %	67%	12%	6%	30%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	90	80	170	100
LT Vol	10	20	50	20
Through Vol	20	50	110	50
RT Vol	60	10	10	30
Lane Flow Rate	99	88	187	110
Geometry Grp	1	1	1	1
Degree of Util (X)	0.119	0.112	0.235	0.139
Departure Headway (Hd)	4.329	4.598	4.533	4.548
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	828	779	792	789
Service Time	2.356	2.629	2.56	2.575
HCM Lane V/C Ratio	0.12	0.113	0.236	0.139
HCM Control Delay	7.9	8.2	9	8.3
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.4	0.4	0.9	0.5

Intersection				
Intersection Delay, s/veh				
Intersection LOS				

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	20	50	30
Future Vol, veh/h	0	20	50	30
Peak Hour Factor	0.92	0.91	0.91	0.91
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	22	55	33
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	8.3
HCM LOS	A

Lane

Intersection	
Intersection Delay, s/veh	18.3
Intersection LOS	C

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Traffic Vol, veh/h	0	100	280	90	0	20	100	100	0	20	70	50
Future Vol, veh/h	0	100	280	90	0	20	100	100	0	20	70	50
Peak Hour Factor	0.92	0.86	0.86	0.86	0.92	0.86	0.86	0.86	0.92	0.86	0.86	0.86
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	116	326	105	0	23	116	116	0	23	81	58
Number of Lanes	0	1	1	1	0	1	1	1	0	1	1	1

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	3	3	3
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	3	3	3
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	3	3	3
HCM Control Delay	21.4	13.7	13
HCM LOS	C	B	B

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Vol Left, %	100%	0%	0%	100%	0%	0%	100%	0%	0%	100%	0%
Vol Thru, %	0%	100%	0%	0%	100%	0%	0%	100%	0%	0%	100%
Vol Right, %	0%	0%	100%	0%	0%	100%	0%	0%	100%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	20	70	50	100	280	90	20	100	100	230	60
LT Vol	20	0	0	100	0	0	20	0	0	230	0
Through Vol	0	70	0	0	280	0	0	100	0	0	60
RT Vol	0	0	50	0	0	90	0	0	100	0	0
Lane Flow Rate	23	81	58	116	326	105	23	116	116	267	70
Geometry Grp	8	8	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.06	0.198	0.13	0.268	0.704	0.206	0.058	0.274	0.251	0.611	0.15
Departure Headway (Hd)	9.264	8.764	8.064	8.283	7.783	7.083	8.985	8.485	7.785	8.228	7.728
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	386	409	443	434	462	505	398	422	459	439	463
Service Time	7.044	6.544	5.844	6.043	5.543	4.843	6.76	6.26	5.56	5.989	5.489
HCM Lane V/C Ratio	0.06	0.198	0.131	0.267	0.706	0.208	0.058	0.275	0.253	0.608	0.151
HCM Control Delay	12.6	13.7	12.1	14.1	27.1	11.7	12.3	14.5	13.2	23.2	11.9
HCM Lane LOS	B	B	B	B	D	B	B	B	B	C	B
HCM 95th-tile Q	0.2	0.7	0.4	1.1	5.4	0.8	0.2	1.1	1	4	0.5

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Traffic Vol, veh/h	0	230	60	220
Future Vol, veh/h	0	230	60	220
Peak Hour Factor	0.92	0.86	0.86	0.86
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	267	70	256
Number of Lanes	0	1	1	1

Approach	SB
Opposing Approach	NB
Opposing Lanes	3
Conflicting Approach Left	WB
Conflicting Lanes Left	3
Conflicting Approach Right	EB
Conflicting Lanes Right	3
HCM Control Delay	19
HCM LOS	C

Lane	SBLn3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	750	360	180	820	90	450
Future Volume (veh/h)	750	360	180	820	90	450
Number	4	14	3	8	5	12
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	815	21	196	891	98	326
Adj No. of Lanes	2	1	2	3	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	1408	630	334	2944	871	401
Arrive On Green	0.40	0.40	0.10	0.58	0.25	0.25
Sat Flow, veh/h	3632	1583	3442	5253	3442	1583
Grp Volume(v), veh/h	815	21	196	891	98	326
Grp Sat Flow(s),veh/h/ln	1770	1583	1721	1695	1721	1583
Q Serve(g_s), s	8.6	0.4	2.6	4.3	1.0	9.2
Cycle Q Clear(g_c), s	8.6	0.4	2.6	4.3	1.0	9.2
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1408	630	334	2944	871	401
V/C Ratio(X)	0.58	0.03	0.59	0.30	0.11	0.81
Avail Cap(c_a), veh/h	1782	797	397	3575	1336	615
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	11.2	8.8	20.6	5.1	13.7	16.7
Incr Delay (d2), s/veh	0.4	0.0	1.6	0.1	0.1	4.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.1	0.2	1.3	2.0	0.5	4.5
LnGrp Delay(d),s/veh	11.6	8.8	22.2	5.2	13.7	21.6
LnGrp LOS	B	A	C	A	B	C
Approach Vol, veh/h	836			1087	424	
Approach Delay, s/veh	11.5			8.3	19.8	
Approach LOS	B			A	B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4				8
Phs Duration (G+Y+Rc), s		16.1	8.6	23.0				31.6
Change Period (Y+Rc), s		4.0	4.0	4.0				4.0
Max Green Setting (Gmax), s		18.5	5.5	24.0				33.5
Max Q Clear Time (g_c+I1), s		11.2	4.6	10.6				6.3
Green Ext Time (p_c), s		0.9	0.1	8.4				12.8

Intersection Summary	
HCM 2010 Ctrl Delay	11.5
HCM 2010 LOS	B

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1420	50	230	860	120	50
Future Volume (veh/h)	1420	50	230	860	120	50
Number	4	14	3	8	5	12
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
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	1543	32	250	935	130	32
Adj No. of Lanes	2	1	2	2	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	1979	886	368	2645	311	143
Arrive On Green	0.56	0.56	0.11	0.75	0.09	0.09
Sat Flow, veh/h	3632	1583	3442	3632	3442	1583
Grp Volume(v), veh/h	1543	32	250	935	130	32
Grp Sat Flow(s),veh/h/ln	1770	1583	1721	1770	1721	1583
Q Serve(g_s), s	16.8	0.4	3.4	4.5	1.8	0.9
Cycle Q Clear(g_c), s	16.8	0.4	3.4	4.5	1.8	0.9
Prop In Lane		1.00	1.00		1.00	1.00
Lane Grp Cap(c), veh/h	1979	886	368	2645	311	143
V/C Ratio(X)	0.78	0.04	0.68	0.35	0.42	0.22
Avail Cap(c_a), veh/h	2081	931	384	2763	1291	594
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	8.5	4.9	21.2	2.1	21.2	20.8
Incr Delay (d2), s/veh	1.9	0.0	4.5	0.1	0.9	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.4	0.2	1.9	2.1	0.9	0.4
LnGrp Delay(d),s/veh	10.4	4.9	25.7	2.2	22.1	21.6
LnGrp LOS	B	A	C	A	C	C
Approach Vol, veh/h	1575			1185	162	
Approach Delay, s/veh	10.3			7.2	22.0	
Approach LOS	B			A	C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2	3	4				8
Phs Duration (G+Y+Rc), s		8.5	9.3	31.6				40.9
Change Period (Y+Rc), s		4.0	4.0	4.0				4.0
Max Green Setting (Gmax), s		18.5	5.5	29.0				38.5
Max Q Clear Time (g_c+I1), s		3.8	5.4	18.8				6.5
Green Ext Time (p_c), s		0.4	0.0	8.8				22.3

Intersection Summary	
HCM 2010 Ctrl Delay	9.7
HCM 2010 LOS	A

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	130	100	770	200	0	1210
Future Volume (veh/h)	130	100	770	200	0	1210
Number	3	18	2	12	1	6
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
Adj Sat Flow, veh/h/ln	1863	1900	1863	1863	0	1863
Adj Flow Rate, veh/h	151	0	837	0	0	1315
Adj No. of Lanes	2	1	2	1	0	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	0	2	2	0	2
Cap, veh/h	310	141	2669	1194	0	2669
Arrive On Green	0.09	0.00	0.75	0.00	0.00	0.75
Sat Flow, veh/h	3548	1615	3632	1583	0	3725
Grp Volume(v), veh/h	151	0	837	0	0	1315
Grp Sat Flow(s),veh/h/ln	1774	1615	1770	1583	0	1770
Q Serve(g_s), s	2.0	0.0	3.8	0.0	0.0	7.3
Cycle Q Clear(g_c), s	2.0	0.0	3.8	0.0	0.0	7.3
Prop In Lane	1.00	1.00		1.00	0.00	
Lane Grp Cap(c), veh/h	310	141	2669	1194	0	2669
V/C Ratio(X)	0.49	0.00	0.31	0.00	0.00	0.49
Avail Cap(c_a), veh/h	986	449	2669	1194	0	2669
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	21.9	0.0	2.0	0.0	0.0	2.4
Incr Delay (d2), s/veh	1.2	0.0	0.3	0.0	0.0	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	0.0	1.9	0.0	0.0	3.7
LnGrp Delay(d),s/veh	23.1	0.0	2.3	0.0	0.0	3.1
LnGrp LOS	C		A			A
Approach Vol, veh/h	151		837			1315
Approach Delay, s/veh	23.1		2.3			3.1
Approach LOS	C		A			A

Timer	1	2	3	4	5	6	7	8
Assigned Phs		2				6		8
Phs Duration (G+Y+Rc), s		42.0				42.0		8.4
Change Period (Y+Rc), s		4.0				4.0		4.0
Max Green Setting (Gmax), s		38.0				38.0		14.0
Max Q Clear Time (g_c+I1), s		5.8				9.3		4.0
Green Ext Time (p_c), s		18.2				17.1		0.3

Intersection Summary		
HCM 2010 Ctrl Delay		4.1
HCM 2010 LOS		A

Notes

User approved volume balancing among the lanes for turning movement.

APPENDIX E

CEQA Notices

UNIVERSITY OF CALIFORNIA, IRVINE

BERKELEY • DAVIS • IRVINE • LOS ANGELES • MERCED • RIVERSIDE • SAN DIEGO • SAN FRANCISCO SANTA BARBARA • SANTA CRUZ

Environmental Planning and Sustainability

4199 Campus Drive, Suite 380
Irvine, CA 92697-2325
(949) 824-6316

NOTICE OF INTENT TO ADOPT A MITIGATED NEGATIVE DECLARATION

Project Title: University Hills Area 11 Faculty and Staff Housing
Project Location: University of California, Irvine
Lead Agency: University of California, Irvine
County: Orange

In accordance with the University of California Procedures for Implementation of the California Environmental Quality Act (CEQA) and State CEQA Guidelines, an Initial Study for the University Hills Area 11 Faculty and Staff Housing project was prepared by the University of California, Irvine (University), and it was determined that a Mitigated Negative Declaration is the appropriate level of analysis.

The project site is located on 34.2 acres in the University's East Sector and bound by California Avenue to the north, Anteater Drive to the east, Bonita Canyon Drive to the south, and University Hills Area 10 to the west. The proposed project would construct approximately 300 affordable housing units (85 for-sale, clustered-detached homes; 75 for-sale, standard lot homes; and up to 140 rental, attached townhomes) to be occupied by University faculty and staff. Development of the project site would include approximately 29.2 acres of neighborhood use and associated infrastructure, including one acre of combined park space at the north and southeast portions of the project site, roadways, sidewalks, and street parking. The remaining acreage consists of landscaped slopes and common areas, including a 50-foot landscape buffer on the southern edge of the project site.

The project has been analyzed in the Draft Initial Study/Mitigated Negative Declaration (Draft IS/MND) and determined that, with the incorporation of mitigation, it will not have a significant effect on the environment. The document is available at: http://www.eps.uci.edu/EnvironmentalPlanning/index.html. Hard copies of the Draft IS/MND and referenced documents are available for review during business hours at the University of California, Irvine's Office of Environmental Planning and Sustainability. Comments will be received March 23, 2016 through April 22, 2016.

E-mail comments to hashimol@uci.edu or mail to:

Lindsey Hashimoto, Associate Planner
Office of Environmental Planning and Sustainability
University of California, Irvine
380 University Tower, Irvine, CA 92697

The Draft IS/MND, along with comments received during the public review period, will be considered by The Regents in conjunction with project approval. If adopted by the University, the Draft IS/MND will be finalized.

Richard Demerjian, Director

Print Form

Appendix C

Notice of Completion & Environmental Document Transmittal

Mail to: State Clearinghouse, P.O. Box 3044, Sacramento, CA 95812-3044 (916) 445-0613
For Hand Delivery/Street Address: 1400 Tenth Street, Sacramento, CA 95814

SCH #

Project Title: University Hills Area 11 Faculty and Staff Housing

Lead Agency: University of California, Irvine — Contact Person: Richard Demerjian, Director
Mailing Address: 380 University Tower, Irvine, CA 92697 — Phone: (949) 824-7058
City: Irvine — Zip: 92697 — County: Orange

Project Location: County: Orange — City/Nearest Community: Irvine/University Hills
Cross Streets: Anteater Drive and Bonita Canyon Drive — Zip Code: 92697
Longitude/Latitude (degrees, minutes and seconds): 33 ° 38 ′ 9.61 ″ N / -117 ° 49 ′ 50.89 ″ W Total Acres: 34.2
Assessor's Parcel No.: ____ Section: ____ Twp.: ____ Range: ____ Base: ____
Within 2 Miles: State Hwy #: SR-73 and I-405 — Waterways: ____
Airports: ____ Railways: ____ Schools: Tarbut V'Torah/Vista Ver

Document Type:

CEQA: ☐ NOP ☐ Early Cons ☐ Neg Dec ☒ Mit Neg Dec ☐ Draft EIR ☐ Supplement/Subsequent EIR (Prior SCH No.) ____ Other: ____

NEPA: ☐ NOI ☐ EA ☐ Draft EIS ☐ FONSI

Other: ☐ Joint Document ☐ Final Document ☐ Other: ____

Local Action Type:

☐ General Plan Update ☐ General Plan Amendment ☐ General Plan Element ☐ Community Plan
☐ Specific Plan ☐ Master Plan ☐ Planned Unit Development ☐ Site Plan
☐ Rezone ☐ Prezone ☐ Use Permit ☐ Land Division (Subdivision, etc.)
☐ Annexation ☐ Redevelopment ☐ Coastal Permit ☒ Other: Design Approval

Development Type:

☒ Residential: Units 300 Acres 29.2
☐ Office: Sq.ft. ____ Acres ____ Employees ____
☐ Commercial: Sq.ft. ____ Acres ____ Employees ____
☐ Industrial: Sq.ft. ____ Acres ____ Employees ____
☐ Educational: ____
☐ Recreational: ____
☐ Water Facilities: Type ____ MGD ____
☐ Transportation: Type ____
☐ Mining: Mineral ____
☐ Power: Type ____ MW ____
☐ Waste Treatment: Type ____ MGD ____
☐ Hazardous Waste: Type ____
☐ Other: ____

Project Issues Discussed in Document:

☒ Aesthetic/Visual
☐ Agricultural Land
☒ Air Quality
☒ Archeological/Historical
☒ Biological Resources
☐ Coastal Zone
☒ Drainage/Absorption
☐ Economic/Jobs
☐ Fiscal
☒ Flood Plain/Flooding
☒ Forest Land/Fire Hazard
☒ Geologic/Seismic
☐ Minerals
☒ Noise
☒ Population/Housing Balance
☒ Public Services/Facilities
☒ Recreation/Parks
☒ Schools/Universities
☒ Septic Systems
☒ Sewer Capacity
☒ Soil Erosion/Compaction/Grading
☒ Solid Waste
☒ Toxic/Hazardous
☒ Traffic/Circulation
☒ Vegetation
☒ Water Quality
☒ Water Supply/Groundwater
☒ Wetland/Riparian
☒ Growth Inducement
☒ Land Use
☒ Cumulative Effects
☒ Other: Greenhouse Gas

Present Land Use/Zoning/General Plan Designation:
UC Irvine is not subject to local zoning requirements. Permitted uses in the 2007 LRDP allow faculty and staff housing.

Project Description: *(please use a separate page if necessary)*
The proposed project would construct approximately 300 affordable housing units (85 for-sale, clustered-detached homes; 75 for-sale, standard lot homes; and up to 140 rental, attached townhomes) to be occupied by University of California, Irvine (University) faculty and staff. The project site encompasses approximately 34.2 acres in the University's East Sector. Development of the project site would include approximately 29.2 acres of neighborhood use and associated infrastructure, including one acre of combined park space at the north and southeast portions of the project site, roadways, sidewalks, and street parking. The remaining acreage consists of landscaped slopes and common areas, including a 50-foot landscape buffer on the southern edge of the project site.

Note: The State Clearinghouse will assign identification numbers for all new projects. If a SCH number already exists for a project (e.g. Notice of Preparation or previous draft document) please fill in.

Revised 2010

Reviewing Agencies Checklist

Lead Agencies may recommend State Clearinghouse distribution by marking agencies below with and "**X**".
If you have already sent your document to the agency please denote that with an "**S**".

	Air Resources Board		Office of Historic Preservation
	Boating & Waterways, Department of		Office of Public School Construction
	California Emergency Management Agency		Parks & Recreation, Department of
	California Highway Patrol		Pesticide Regulation, Department of
S	Caltrans District # 12		Public Utilities Commission
	Caltrans Division of Aeronautics	S	Regional WQCB # 8
	Caltrans Planning		Resources Agency
	Central Valley Flood Protection Board		Resources Recycling and Recovery, Department of
	Coachella Valley Mtns. Conservancy		S.F. Bay Conservation & Development Comm.
	Coastal Commission		San Gabriel & Lower L.A. Rivers & Mtns. Conservancy
	Colorado River Board		San Joaquin River Conservancy
	Conservation, Department of		Santa Monica Mtns. Conservancy
	Corrections, Department of		State Lands Commission
	Delta Protection Commission		SWRCB: Clean Water Grants
	Education, Department of		SWRCB: Water Quality
	Energy Commission		SWRCB: Water Rights
S	Fish & Game Region # 5		Tahoe Regional Planning Agency
	Food & Agriculture, Department of	S	Toxic Substances Control, Department of
	Forestry and Fire Protection, Department of	S	Water Resources, Department of
	General Services, Department of		
	Health Services, Department of		Other:
	Housing & Community Development		Other:
X	Native American Heritage Commission		

Local Public Review Period (to be filled in by lead agency)

Starting Date March 23, 2016 Ending Date April 22, 2016

Lead Agency (Complete if applicable):

Consulting Firm:
Address:
City/State/Zip:
Contact:
Phone:

Applicant: University of California, Irvine
Address: 380 University Tower
City/State/Zip: Irvine, CA 92697-2325
Phone: (949) 824-7058

Signature of Lead Agency Representative: **Date:** 3.22.16

Authority cited: Section 21083, Public Resources Code. Reference: Section 21161, Public Resources Code.

NOTICE OF INTENT
TO ADOPT A MITIGATED NEGATIVE DECLARATION

UNIVERSITY HILLS AREA 11 FACULTY AND STAFF HOUSING

UNIVERSITY OF CALIFORNIA, IRVINE

In accordance with the University of California Procedures for Implementation of the California Environmental Quality Act (CEQA) and State CEQA Guidelines, an Initial Study for the University Hills Area 11 Faculty and Staff Housing project was prepared by the University of California, Irvine (University), and it was determined that a Mitigated Negative Declaration is the appropriate level of analysis.

The proposed project would construct approximately 300 affordable housing units (85 for-sale, clustered-detached homes; 75 for-sale, standard lot homes; and up to 140 rental, attached townhomes) to be occupied by University faculty and staff. The project site encompasses approximately 34.2 acres in the University's East Sector. Development of the project site would include approximately 29.2 acres of neighborhood use and associated infrastructure, including one acre of combined park space at the north and southeast portions of the project site, roadways, sidewalks, and street parking. The remaining acreage consists of landscaped slopes and common areas, including a 50-foot landscape buffer on the southern edge of the project site.

The project has been analyzed in the Draft Initial Study/Mitigated Negative Declaration (Draft IS/MND) and determined that, with the incorporation of mitigation, it will not have a significant effect on the environment. The document is available at: http://www.eps.uci.edu/EnvironmentalPlanning/index.html. The 30-day public review period will begin March 23, 2016 through April 22, 2016. Comments may be e-mailed to hashimol@uci.edu or written comments mailed to Lindsey Hashimoto, Associate Planner, University of California, Irvine, Office of Environmental Planning and Sustainability, 380 University Tower, Irvine, CA 92697. If you have any questions regarding the project, please call (949) 824-7058.

Published: Orange County Register March 23, 2016 R-509 10148181

Print Form

Notice of Determination

Appendix D

To:

☒ Office of Planning and Research

U.S. Mail:	*Street Address:*
P.O. Box 3044	1400 Tenth St., Rm 113
Sacramento, CA 95812-3044	Sacramento, CA 95814

☐ County Clerk
County of: ______________________
Address: ______________________
____

From:

Public Agency: University of California, Irvine
Address: 4199 Campus Drive, Suite 380
Irvine, CA 92627
Contact: Richard Demerjian
Phone: (949) 824-7058

Lead Agency (if different from above):
____
Address: ______________________
____
Contact: ______________________
Phone: ______________________

SUBJECT: Filing of Notice of Determination in compliance with Section 21108 or 21152 of the Public Resources Code.

State Clearinghouse Number (if submitted to State Clearinghouse): 2016031075

Project Title: University Hills Area 11 Faculty and Staff Housing

Project Applicant: University of California, Irvine

Project Location (include county): Irvine, Orange County

Project Description:

The proposed project would construct approximately 300 affordable housing units (85 for-sale, clustered-detached homes; 75 for-sale, standard lot homes; and up to 140 rental, attached townhomes) to be occupied by University faculty and staff. Development of the project site would include approximately 29.2 acres of neighborhood use and associated infrastructure, including one acre of combined park space at the north and southeast portions of the project site, roadways, sidewalks, and street parking.

This is to advise that the University of California, Irvine has approved the above
(☒ Lead Agency or ☐ Responsible Agency)

described project on ______________ and has made the following determinations regarding the above
(date)
described project.

1. The project [☐ will ☒ will not] have a significant effect on the environment.
2. ☐ An Environmental Impact Report was prepared for this project pursuant to the provisions of CEQA.
   ☒ A Negative Declaration was prepared for this project pursuant to the provisions of CEQA.
3. Mitigation measures [☒ were ☐ were not] made a condition of the approval of the project.
4. A mitigation reporting or monitoring plan [☒ was ☐ was not] adopted for this project.
5. A statement of Overriding Considerations [☐ was ☒ was not] adopted for this project.
6. Findings [☒ were ☐ were not] made pursuant to the provisions of CEQA.

This is to certify that the final EIR with comments and responses and record of project approval, or the negative Declaration, is available to the General Public at:
4199 Campus Drive, Suite 380, Irvine, CA, 92627

Signature (Public Agency): ______________________ Title: ______________________

Date: ______________________ Date Received for filing at OPR: ______________________

Authority cited: Sections 21083, Public Resources Code.
Reference Section 21000-21174, Public Resources Code.

Revised 2011

APPENDIX F

Response to Comments

UNIVERSITY HILLS AREA 11 FACULTY AND STAFF HOUSING
30-DAY PUBLIC REVIEW
DRAFT IS/MND MAILING LIST

NOC Overnight Delivery

State Clearinghouse
Office of Planning & Research
1400 Tenth Street, Room 222
Sacramento, CA 95814

Via Certified Mail

Homeowner Representative Board, ICHA
14 Eliot Court
Irvine, CA 92617

Orange County Public Library
University Park Branch
4512 Sandburg Way
Irvine, CA 92612
City of Irvine

Community Development Dept.
P.O. Box 19575
Irvine, CA 92623-9575
Attn: Mr. Bill Jacobs

County of Orange
Planning & Development Services
300 N. Flower Street
Santa Ana, CA 92703

City of Newport Beach
Planning Department
3300 Newport Blvd.
Newport Beach, CA 92663

Orange County Transportation Authority
550 South Main Street
Orange, CA 92868

California Deptartment of Fish & Wildlife
3883 Ruffin Road
San Diego, CA 92123

U.S. Fish & Wildlife Service
Division of Ecological Services
2177 Salk Avenue, Suite 250
Carlsbad, CA 92008

Regional Water Quality Control Board - Santa Ana Region
3737 Main Street, Suite 500
Riverside, CA 92501-3348

U.S. Army Corps of Engineers
Los Angeles District
911 Wilshire Boulevard
Los Angeles, CA 90017

CA Department of Toxic Substances Control
5796 Corporate Avenue
Cypress, California 90630

South Coast Air Quality Management District
21865 East Copley Drive
Diamond Bar, CA 91765-4182

Southern California Association of Governments
818 West 7th Street, 12th Floor
Los Angeles, CA 90017

California Department of Transportation
District 12
3337 Michelson Drive, Suite 380
Irvine, CA 92612-1699

Orange County Fire Authority
P.O. Box 57115
Irvine, CA 92619-7115

Irvine Ranch Water District
15600 Sand Canyon Ave.
Irvine, CA 92618

Public Utilities Commission
320 W. 4th Street, Suite 500
Los Angeles, CA 90013

Irvine Unified School District
5050 Barranca Parkway
Irvine, CA 92604-4698

Transportation Corridor Agencies
125 Pacifica
Irvine, CA 92618-3304

Natural Reserve System
University of California
1111 Franklin St., 6th Floor
Oakland, CA 94607-5200

Irvine Apartment Communities Management Office
110 Innovation Drive
Irvine, CA 92617

Mariners Church
Attn: Terry Perrell, Facility Manager
5001 Newport Coast Drive Irvine California 92603

Tarbut V'Torah School
Attn: Derek Gavshon
5200 Bonita Canyon Road
Irvine, CA 92612

Merage Jewish Community Center of Orange County
1 Federation Way, Suite 200
Irvine CA 92603

University Hills Area 11 Faculty and Staff Housing

Draft Initial Study
Public Review/Response to Comments

Public Review

The Draft Initial Study/Mitigated Negative Declaration (IS/MND), along with a Notice of Completion (NOC) and Notice of Intent to Adopt a Mitigated Negative Declaration (NOI), were circulated for public review and comment from March 23, 2016 through April 22, 2016. Copies of the document were submitted to the State Clearinghouse; local agencies; UCI faculty, staff, and other members of the campus community; and additional interested groups and persons. On March 23, 2016, a notice regarding the availability of the Draft IS/MND was published in the Orange County Register. Copies of the distribution list and notices are provided in this appendix.

Comments and Responses

Written comments were submitted by the agencies listed below. The letters and the responses to comments are presented on the pages following the Draft IS/MND distribution list.

Comments Received During and After the Public Review Period

Commenting Agency	Dated	Received
City of Irvine	April 14, 2016	April 19, 2016
Orange County Public Works	April 20, 2016	April 28, 2016
Irvine Ranch Water District	April 29, 2016	May 2, 2016

CITY OF IRVINE
1971

Community Development
cityofirvine.org

City of Irvine, One Civic Center Plaza, P.O. Box 19575, Irvine, California 92623-9575
(949) 724-6000

April 14, 2016

Richard Demerjian
Director of Environmental Planning & Sustainability
380 University Tower
Irvine, CA 92697

Subject: Notice of Intent to Adopt Mitigated Negative Declaration for the University Hills Area 11 Faculty and Staff Housing located at UCI (East Sector)

Dear Mr. Demerjian:

Thank you for the opportunity to review the Initial Study/Mitigated Negative Declaration for the University Hills Area 11 Faculty and Staff Housing project—a 300 affordable housing unit development located on a 34.2 acre site in the University's East Sector. Staff has reviewed the project and has no comments.

If you have any questions, please contact me at 949-724-6364 or by email at jequina@cityofirvine.org.

Sincerely,

for

Justin Equina
Associate Planner

cc: Bill Jacobs, Principal Planner

Response to the City of Irvine

Comment 1: The City of Irvine comment letter indicated that the agency had no comments regarding the proposed project.

April 20, 2016 NCL-16-020

Ms. Lindsey Hashimoto, Associate Planner
Office of Environmental Planning and Sustainability
University of California, Irvine
380 University Tower
Irvine, CA 92697

Subject: Notice of Intent to Adopt a Mitigated Negative Declaration for University Hills Area 11 Faculty and Staff Housing

Dear Ms. Hashimoto,

The County of Orange has reviewed the Notice of Intent to Adopt a Mitigated Negative Declaration for University Hills Area 11 Faculty and Staff Housing and offers the following comments:

Flood Programs:

1. The watershed boundary crosses the proposed project area and the University Hills development area drains to two different regional Orange County Flood Control District (OCFCD) channels. The northern part of the project drains through the local drainage system to Sand Canyon Channel (OCFCD facility No. F15) and the southern part drains to Bonita channel (facility No. F04). The major diversion from one watershed to another caused by grading and construction of a new local storm system should be avoided and the justification for the proposed alterations (if any) should be provided. In addition, the proposed drainage pattern alterations should receive approval of affected property owners and Manager, Flood Program Support Division.

2. Page 4.8-5, item d) states: "The drainage system would be built to maintain and reduce the peak runoff from 25-year and 100-year storm events. Additional hydrologic analysis will be conducted as part of the final design process to specify all primary and secondary drainage control facilities required to satisfy flood control criteria." Since the proposed University Hills development is likely to increase the water surface runoff, the City of Irvine, as the local jurisdiction, should ensure that the local drainage system is suitable to convey the additional discharge and that the flow would not exceed the capacity of existing or planned storm water drainage system.

If you have any questions or need clarification please do not hesitate to contact Robert McClean at (714)647-3951 or Anna Brezezick at (714) 647-3989.

Sincerely,

Laree Alonso, Manager, Planning Division
OC Public Works Service Area/OC Development Services
300 North Flower Street
Santa Ana, California 92702-4048
Laree.alonso@ocpw.ocgov.com

cc: Mehdi Sobhani, Manager, OC Public Works, /Flood Programs

Response to the County of Orange

Comment 1: The proposed on-site watersheds would mimic the preexisting condition. The drainage system, as part of the project, would be designed so that the post construction run-off would be detained on-site and would not exceed the pre-construction run-off flows. Furthermore, the proposed storm drain improvement would not be constructed adjacent to an Orange County Flood Control District (OCFCD) facility. Therefore, because the proposed project would not increase peak flows, no adverse impacts to surrounding off-site drainage facilities would occur.

Comment 2: In 2008, an initial hydrologic capacity study was conducted and reviewed by the City of Irvine, which included the Bonita Creek hydrologic basin. The City generally agreed with the findings of the study, which is the framework being used to design the project's drainage system. The stormwater from the proposed project would be timed for when the Bonita channel is at lower levels during any given rain event. Furthermore, as discussed above, the proposed project would not increase peak flows and would not impact off-site drainage facilities. Engineering drawings and a memo will be sent to the City of Irvine's City Engineer, Mark Carroll, to show no change in flows will occur from the previous 2008 hydrologic capacity study.

IRVINE RANCH WATER DISTRICT

IRVINE RANCH WATER DISTRICT 15600 Sand Canyon Ave., P.O. Box 57000, Irvine, CA 92619-7000 (949) 453-5300

April 29, 2016

Lindsey Hashimoto
Associate Planner
Office of Environmental Planning & Sustainability
University of California, Irvine
380 University Tower
Irvine, CA 92697

Re: University Hills Area 11 Faculty and Staff Housing MND

Dear Ms. Hashimoto:

Irvine Ranch Water District (IRWD) has received and reviewed the Notice of Intent to adopt a Mitigated Negative Declaration for the University Hills Area 11 Faculty and Staff Housing Project. IRWD offers the following comment.

The proposed development is not currently included in IRWD's water demand and sewer flow projections. Therefore, IRWD will require University of California, Irvine to complete a study analyzing the impact of the proposed development on off-site (IRWD-owned) potable water, recycled water, and sewer systems. This study will verify if there is a need for any additionally off-site improvements to existing systems.

Thank you for the opportunity to review this MND. Please contact either the undersigned at (949) 453-5325 or Jo Ann Corey, Engineering Technician III, at (949) 453-5326 if you have any questions.

Sincerely,

FMSanchez

Fiona M. Sanchez
Director of Water Resources

cc: Eric Akiyoshi, IRWD
Jo Ann Corey, IRWD

Response to the Irvine Ranch Water District

Comment 1: The University's Office of Environmental Planning and Sustainability is currently in consultation with the Irvine Ranch Water District (IRWD) regarding the proposed project. This collaborative planning will address whether there is a need for additional off-site improvements to existing IRWD systems. If additional improvements are required, further environmental analysis will be conducted to address potential impacts.

APPENDIX G

Mitigation Monitoring and Reporting Program

Mitigation Measure		Responsible Party	Mitigation Timing	Monitoring and Reporting Procedure
Aes-1A	Prior to project design approval for future projects that implement the 2007 LRDP and are located in the South Campus, in the vicinity of Bonita Canyon Drive, UCI shall ensure that the projects include design features to minimize visual impacts from off-campus areas. These design features shall include, but are not limited to, the following: • A 50-foot wide (minimum) landscaped buffer located along the edge of the campus along the project frontage; • Building mass and/or proportions and exterior treatments and/or colors that are compatible with the surrounding development and visual character; and • Project landscape design that reduces visual impacts and integrates the project into the visual landscape.	ICHA/EPS	During design	ICHA to review during design EPS to confirm
Aes-2A	Prior to project design approval for future projects that implement the 2007 LRDP, UCI shall ensure that the projects include design features to minimize glare impacts. These design features shall include use of non-reflective exterior surfaces and low-reflectance glass (e.g., double or triple glazing glass, high technology glass, low-E glass, or equivalent materials with low reflectivity) on all project surfaces that could produce glare.	ICHA/EPS	During design	ICHA to review during design EPS to confirm
Aes-2B:	Prior to approval of construction documents for future projects that implement the 2007 LRDP, UCI shall approve an exterior lighting plan for each project. In accordance with UCI's Campus Standards and Design Criteria for outdoor lighting, the plan shall include, but not be limited to, the following design features: • Full-cutoff lighting fixtures to direct lighting to the specific location intended for illumination (e.g., roads, walkways, or recreation fields) and to minimize stray light spillover into adjacent residential areas, sensitive biological habitat, and other light-sensitive receptors; • Appropriate intensity of lighting to provide campus safety and security while minimizing light pollution and energy consumption; and • Shielding direct lighting within parking areas, parking structures, or roadways away from adjacent	ICHA/EPS	During design	ICHA to review during design EPS to confirm

	Mitigation Measure	Responsible Party	Mitigation Timing	Monitoring and Reporting Procedure
	residential areas, sensitive biological habitat, and other light-sensitive receptors through site configuration, grading, lighting design, or barriers such as earthen berms, walls, or landscaping.			
AQ-1	Prior to initiating construction, UCI shall ensure that the project construction contract includes a construction emissions mitigation plan, including measures compliant with SCAQMD Rule 403 (Fugitive Dust), to be implemented and supervised by the on-site construction supervisor, which shall include, but not be limited to, the following BMPs: i. During grading and site preparation activities, exposed soil areas shall be stabilized via frequent watering, non-toxic chemical stabilization, or equivalent measures at a rate to be determined by the on-site construction supervisor. ii. During windy days when fugitive dust can be observed leaving the construction site, additional applications of water shall be required at a rate to be determined by the onsite construction supervisor. iii. Disturbed areas designated for landscaping shall be prepared as soon as possible after completion of construction activities. iv. Areas of the construction site that will remain inactive for three months or longer following clearing, grubbing and/or grading shall receive appropriate BMP treatments (e.g., revegetation, mulching, covering with tarps, etc.) to prevent fugitive dust generation. v. All exposed soil or material stockpiles that will not be used within 3 days shall be enclosed, covered, or watered twice daily, or shall be stabilized with approved nontoxic chemical soil binders at a rate to be determined by the on-site construction supervisor. vi. Unpaved access roads shall be stabilized via frequent watering, non-toxic chemical stabilization, temporary paving, or equivalent measures at a rate to be determined by the on-site construction supervisor. vii. Trucks transporting materials to and from the site shall allow for at least two feet of freeboard (i.e., minimum vertical distance between the top of the load and the top of the trailer). Alternatively,	ICHA/EPS	During construction	ICHA to confirm with and monitor contractor EPS to confirm

Mitigation Measure			Responsible Party	Mitigation Timing	Monitoring and Reporting Procedure
		trucks transporting materials shall be covered.			
	viii.	Speed limit signs at 15 mph or less shall be installed on all unpaved roads within construction sites.			
	ix.	Where visible soil material is tracked onto adjacent public paved roads, the paved roads shall be swept and debris shall be returned to the construction site or transported off site for disposal.			
	x.	Wheel washers, dirt knock-off grates/mats, or equivalent measures shall be installed within the construction site where vehicles exit unpaved roads onto paved roads.			
	xi.	Diesel powered construction equipment shall be maintained in accordance with manufacturer's requirements, and shall be retrofitted with diesel particulate filters where available and practicable.			
	xii.	Heavy duty diesel trucks and gasoline powered equipment shall be turned off if idling is anticipated to last for more than 5 minutes.			
	xiii.	Where feasible, the construction contractor shall use alternatively fueled construction equipment, such as electric or natural gas-powered equipment or biofuel.			
	xiv.	Heavy construction equipment shall use low NOx diesel fuel to the extent that it is readily available at the time of construction.			
	xv.	To the extent feasible, construction activities shall rely on the campus's existing electricity infrastructure rather than electrical generators powered by internal combustion engines.			
	xvi.	The construction contractor shall develop a construction traffic management plan that includes the following:			
	xvii.	Scheduling heavy-duty truck deliveries to avoid peak traffic periods Consolidating truck deliveries.			
	xviii.	Where possible, the construction contractor shall provide a lunch shuttle or on-site lunch service for construction workers.			
	xix.	The construction contractor shall, to the extent possible, use pre-coated architectural materials that do not require painting. Water-based or low VOC coatings shall be used that are compliant with			

	Mitigation Measure	Responsible Party	Mitigation Timing	Monitoring and Reporting Procedure
	SCAQMD Rule 1113. Spray equipment with high transfer efficiency, such as the high volume-low pressure spray method, or manual coatings application shall be used to reduce VOC emissions to the extent possible. xx. Project constructions plans and specifications will include a requirement to define and implement a work program that would limit the emissions of reactive organic gases (ROG's) during the application of architectural coatings to the extent necessary to keep total daily ROG's for each project to below 75 pounds per day, or the current SCAQMD threshold, throughout that period of construction activity to the extent feasible. The specific program may include any combination of restrictions on the types of paints and coatings, application methods, and the amount of surface area coated as determined by the contractor. xxi. The construction contractor shall maintain signage along the construction perimeter with the name and telephone number of the individual in charge of implementing the construction emissions mitigation plan, and with the telephone number of the SCAQMD's complaint line. The contractor's representative shall maintain a log of any public complaints and corrective actions taken to resolve complaints.			
Bio-2A	Prior to initiating on-site construction for future projects in the east campus and west campus that implement the 2007 LRDP and that involve land clearing, grading, or similar land development activities adjacent to suitable habitat for the western burrowing owl (i.e., large open areas of nonnative grassland, ruderal (weedy) areas, and scrub habitat), UCI shall retain a qualified biologist to conduct a burrowing owl survey of the respective habitat areas within 300 feet of the approved limits of disturbance. If occupied burrows are detected from the survey, then they shall not be disturbed during the nesting season (February 1 through August 31) until the biologist verifies through noninvasive methods that either: (1) the birds have not begun egg-laying and incubation; or (2) juveniles from the occupied burrows are foraging independently and are capable of independent survival. If owls must be moved away from the disturbance area, passive relocation is preferable to trapping. A time period of at least one week is recommended to allow the owls to move and acclimate to alternate burrows. When destruction of occupied burrows is unavoidable, relocation burrows shall be created (by installing artificial burrows) at a ratio of 1:1 in suitable foraging habitat. The biologist shall document all findings and results in a report submitted to UCI.	ICHA/EPS	Prior to construction	ICHA to coordinate surveys and incorporate into construction documents EPS to confirm
Cul-1C	Prior to land clearing, grading, or similar land development activities for future projects that implement the	ICHA/EPS	During grading	On-site construction

	Mitigation Measure	Responsible Party	Mitigation Timing	Monitoring and Reporting Procedure
	2007 LRDP in areas of identified archaeological sensitivity, UCI shall retain a qualified archaeologist (and, if necessary, a culturally affiliated Native American) to monitor these activities. In the event of an unexpected archaeological discovery during grading, the on-site construction supervisor shall redirect work away from the location of the archaeological find. A qualified archaeologist shall oversee the evaluation and recovery of archaeological resources, in accordance with the procedures listed below, after which the on-site construction supervisor shall be notified and shall direct work to continue in the location of the archaeological find. A record of monitoring activity shall be submitted to UCI each month and at the end of monitoring. If an archaeological discovery is determined to be significant, the archaeologist shall prepare and implement a data recovery plan. The plan shall include, but not be limited to, the following measures: a. Perform appropriate technical analyses; b. File an resulting reports with South Coast Information Center; and c. Provide the recovered materials to an appropriate repository for curation, in consultation with a culturally-affiliated Native American.			supervisor to notify ICHA and EPS who will stop/direct work. Submit final report to EPS
Cul-4A	Prior to grading or excavation for future project that implement the 2007 LRDP and would excavate sedimentary rock material other than topsoil, UCI shall retain a qualified paleontology to monitor these activities. In the event fossils are discovered during grading, the on-site construction supervisor shall be notified and shall redirect work away from the location of the discovery. The recommendations of the paleontologist shall be implemented with respect to the evaluation and recovery of fossils, in accordance with mitigation measures Cul-4B and Cul-4C, after which the on-site construction supervisor shall be notified and shall direct work to continue in the location of the fossil discovery. A record of monitoring activity shall be submitted to UCI each month and ay the end of monitoring.	ICHA/EPS	During grading	On-site construction supervisor to notify UCIMC and EPS who will stop/direct work. Submit final report to EPS
Cul-4B	If the fossils are determined to be significant, then mitigation measure Cul-4C shall be implemented.	ICHA/EPS	At time of find	Submit documentation to EPS to report procedures were followed
Cul-4C	For significant fossils as determined by mitigation measure Cul-4B, the paleontologist shall prepare and implement a data recovery plan. The plan shall include, but not be limited to, the following measures:	ICHA/EPS	At time of find	Submit documentation to EPS to report

	Mitigation Measure	Responsible Party	Mitigation Timing	Monitoring and Reporting Procedure
	a. The paleontologist shall ensure that all significant fossils collected are cleaned, identified, catalogued, and permanently curated with an appropriate institution with a research interest in the materials (which may include UCI); b. The paleontologist shall ensure that specialty studies are completed, as appropriate, for any significant fossil collected; and c. The paleontologist shall ensure that curation of fossils are completed in consultation with UCI. A letter of acceptance from the curation institution shall be submitted to UCI.			procedures were followed and an attempt to house found fossils occurred
Haz-6A	Prior to initiating on-site construction for future projects that implement the 2007 LRDP and would involve a land or roadway closure, the construction contractor and/or UCI Design and Construction Services shall notify the UCI Fire Marshall. If determined necessary by the UCI Fire Marshal, local emergency services shall be notified of the lane or roadway closure by the Fire Marshall.	ICHA/EPS	Prior to construction	ICHA to record notification to the Fire Marshall EPS to confirm
Hyd-1A	As early as possible in the planning process of future projects that implement the 2007 LRDP and would result in land disturbance of 1 acre or greater, and for all development projects occurring on the North Campus in the watershed of the San Joaquin Freshwater Marsh, a qualified engineer shall complete a drainage study. Design features and other recommendations from the drainage study shall be incorporated into project development plans and construction documents. Design features shall be consistent with UCI's Storm Water Management Program, shall be operational at the time of project occupancy, and shall be maintained by UCI. At a minimum, all drainage studies required by this mitigation measure shall include, but not be limited to, the following design features: Site design that controls runoff discharge volumes and durations shall be utilized, where applicable and feasible, to maintain or reduce the peak runoff for the 10-year, 6-hour storm event in the post-development condition compared to the pre-development condition, or as defined by current water quality regulatory requirements. Measures that control runoff discharge volumes and durations shall be utilized, where applicable and feasible, on manufactured slopes and newly-graded drainage channels, such as energy dissipaters, revegetation (e.g., hydroseeding and/or plantings), and slope/channel stabilizers.	ICHA/EPS	During design	ICHA to incorporate findings into project design EPS to confirm

	Mitigation Measure	Responsible Party	Mitigation Timing	Monitoring and Reporting Procedure
Hyd-2A	Prior to initiating on-site construction for future projects that implement the 2007 LRDP, UCI shall approve an erosion control plan for project construction. The plan shall include, but not be limited to, the following applicable measures to protect downstream areas from sediment and other pollutants during site grading and construction: • Proper storage, use, and disposal of construction materials. • Removal of sediment from surface runoff before it leaves the site through the use of silt fences, gravel bags, fiber rolls or other similar measures around the site perimeter. • Protection of storm drain inlets on-site or downstream of the construction site through the use of gravel bags, fiber rolls, filtration inserts, or other similar measures. • Stabilization of cleared or graded slopes through the use of plastic sheeting, geotextile fabric, jute matting, tackifiers, hydro-mulching, revegetation (e.g., hydroseeding and/or plantings), or other similar measures. • Protection or stabilization of stockpiled soils through the use of tarping, plastic sheeting, tackifiers, or other similar measures. • Prevention of sediment tracked or otherwise transported onto adjacent roadways through use of gravel strips or wash facilities at exit areas (or equivalent measures). • Removal of sediment tracked or otherwise transported onto adjacent roadways through periodic street sweeping. • Maintenance of the above-listed sediment control, storm drain inlet protection, slope/stockpile stabilization measures.	ICHA/EPS	Prior to construction	ICHA erosion control plan and incorporate into construction documents EPS to confirm
Hyd-2B	Prior to project design approval for future projects that implement the 2007 LRDP and would result in land disturbance of 1 acre or more, the UCI shall ensure that the projects include the design features listed below, or their equivalent, in addition to those listed in mitigation measure Hyd-1A. Equivalent design features may be applied consistent with applicable MS4 permits (UCI's Storm Water Management Plan) at that time. All applicable design features shall be incorporated into project development plans and construction	ICHA/EPS	Prior to construction	ICHA erosion control plan and incorporate into construction documents

	Mitigation Measure	Responsible Party	Mitigation Timing	Monitoring and Reporting Procedure
	documents; shall be operational at the time of project occupancy; and shall be maintained by UCI. • All new storm drain inlets and catch basins within the project site shall be marked with prohibitive language and/or graphical icons to discourage illegal dumping per UCI standards. • Outdoor areas for storage of materials that may contribute pollutants to the storm water conveyance system shall be covered and protected by secondary containment. • Permanent trash container areas shall be enclosed to prevent off-site transport of trash, or drainage from open trash container areas shall be directed to the sanitary sewer system. • At least one treatment control is required for new parking areas or structures, or for any other new uses identified by UCI as having the potential to generate substantial pollutants. Treatment controls include, but are not limited to, detention basins, infiltration basins, wet ponds or wetlands, bio-swales, filtration devices/inserts at storm drain inlets, hydrodynamic separator systems, increased use of street sweepers, pervious pavement, native California plants and vegetation to minimize water usage, and climate controlled irrigation systems to minimize overflow. Treatment controls shall incorporate volumetric or flow-based design standards to mitigate (infiltrate, filter, or treat) storm water runoff, as appropriate.			EPS to confirm
NOI-1	The Project Applicant and/or Contractor shall implement the following noise-attenuating measures during construction of the proposed project: • Construction contracts specify that all construction equipment, fixed or mobile, shall be equipped with properly operating and maintained mufflers and other state required noise attenuation devices. • Property owners and occupants located within 200 feet of the project boundary shall be sent a notice, at least 15 days prior to commencement of construction of each phase, regarding the construction schedule of the proposed project. A sign, legible at a distance of 50 feet shall also be posted at the project construction site. All notices and signs shall indicate the dates and duration of construction activities, as well as provide a contact name and a telephone number where residents can inquire about the construction process and register complaints.	ICHA/EPS	During construction	ICHA to confirm with contractor and incorporate into construction documents EPS to confirm

	Mitigation Measure	Responsible Party	Mitigation Timing	Monitoring and Reporting Procedure
	• The Contractor shall provide evidence that a construction staff member will be designated as a Noise Disturbance Coordinator and will be present on-site during construction activities. The Noise Disturbance Coordinator shall be responsible for responding to any local complaints about construction noise. When a complaint is received, the Noise Disturbance Coordinator shall implement reasonable measures to resolve the complaint, as deemed acceptable by the Community Development Director (or designee). All notices that are sent to residential units immediately surrounding the construction site and all signs posted at the construction site shall include the contact name and the telephone number for the Noise Disturbance Coordinator. • Prior to issuance of any Grading or Building Permit, the Project Applicant shall demonstrate to the satisfaction of the Community Development Director (or designee) that construction noise reduction methods shall be used where feasible. These reduction methods include shutting off idling equipment, installing temporary acoustic barriers around stationary construction noise sources, maximizing the distance between construction equipment staging areas and occupied residential areas, and electric air compressors and similar power tools. • Construction haul routes shall be designed to avoid noise sensitive uses (e.g., residences, convalescent homes, etc.), to the extent feasible. • During construction, stationary construction equipment shall be placed such that emitted noise is directed away from sensitive noise receivers. • Construction activities shall not take place outside of the allowable hours specified by the City's *Municipal Code* Section 6-8-205(A) (7:00 a.m. and 7:00 p.m. on weekdays, and 9:00 a.m. and 6:00 p.m. on Saturdays; construction activities are not permitted on Sundays or legal holidays).			
NOI-2	During project plan review and prior to construction, UCI shall ensure that the project design includes the following project design features: • Specific window treatments, such as dual glazing (a minimum Sound Transmission Class rating of 32) and mechanical ventilation shall be utilized at all residential units fronting Bonita Canyon Drive.	ICHA/EPS	During design	ICHA to incorporate into project design EPS to confirm