

CITY OF MERCED
PLANNING & PERMITTING DIVISION

TYPE OF PROPOSAL: **General Plan Amendment #16-06/Zone Change #424/Planned Development Establishment #76**

INITIAL STUDY: #16-37

DATE RECEIVED: January 4, 2017 (date application determined to be complete)

LOCATION: South side of Yosemite Avenue at Lake Road

ASSESSOR'S PARCEL NUMBERS: 008-010-070 AND -071

(SEE ATTACHED PUBLIC HEARING NOTICE AND MAP AT ATTACHMENTS G AND H.)

Please forward any written comments by April 19, 2017 to:

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PROJECT DESCRIPTION

The project site consists of a 14.86 acre parcel (APN: 008-010-071) and a 2.39-acre portion of another parcel (APN: 008-010-070), for a combined total of 17.25 acres located on the south side of Yosemite Avenue at Lake Road (refer to the map at Attachment A). The project site has a Low Density (LD) General Plan designation. The 14.86 acre portion of the site is zoned R-1-6 and the 2.39 acre is zoned Planned Development (P-D) #52. The project involves a General Plan Amendment, Zone Change, and the Establishment of Planned Development (P-D) #76. The requested amendment to the General Plan would change the land use designation from Low Density Residential (LD) to High-Medium Density (HMD) and Neighborhood Commercial (CN). The requested Zone Change would change the zoning from R-1-6 to Planned Development (P-D) #76 for 14.86 acres and from P-D #52 to P-D #76 for 2.39 acres. The establishment of Planned Development (P-D) #76 would establish standards for development within P-D #76.

In addition to the General Plan Amendment, Zone Change, and Planned Development Establishment the project involves the construction of 225 multi-family residential units

designated as student housing, totaling 390,225 square feet of living area, a 13,700-square-foot clubhouse, 6,600 square feet of retail commercial (including a drive-thru restaurant), and associated parking (652 spaces). The student housing complex would include a network of walking and biking trails, outdoor recreation space, dog park, and a community bus stop. The site plan at Attachment B provides the layout of the 15 residential buildings, the clubhouse, commercial building, the parking areas, and other amenities.

The student housing apartment complex would include 15 individual buildings containing 47 bedrooms each. Below is the breakdown of the units within each building. There would be a total of 705 bedrooms within the complex.

# of Bedrooms	# of Units/Building	Total Bedrooms/Building
2	6	12
3	1	3
4	8	32
TOTAL		47

The proposed apartment complex would be gated. The main entrance located at the east edge of the property, aligning with Lake Road to the north. As currently proposed, an exit-only driveway is proposed about 280 feet from the western edge of the property. This driveway will likely be changed to allow full access turning movements and be moved further west.

Parking for the apartment units is proposed primarily along the southwest property line. Additional parking is proposed along the eastern property line and along the drive aisle in front of the clubhouse. A total of 652 parking spaces are proposed for the apartments. Separate parking (25 spaces) is proposed for the retail space outside of the gated area. Refer to the site plan at Attachment B for parking locations. The spaces along the southwest property line are located within a PG&E easement area. Therefore, no carports or other structures would be allowed in this area, unless PG&E authorizes them. Carports with solar panels are proposed for the parking spaces along the eastern property line.

A city-owned bicycle path is located in a 20-foot easement along the eastern property line. This bike path connects to the city-wide bike path system and provides connection to the bike path on the east side of Lake Road which leads to the UC Merced campus.

Project Location

The project site is located at the eastern edge of the City Limit. The site sits among mostly undeveloped land. However, there are 5 dwellings on large lots (1-acre or larger) to the north across Yosemite Avenue. The vacant land to the west has an approved tentative subdivision map that will expire in May 2019. Approximately 38 homes were built within this subdivision. The table on page 3 and the map at Attachment A identifies the surrounding uses:

Surrounding Land	Existing Use of Land	Zoning Designation	City General Plan Land Use Designation
North	Single Family Residential	Merced County	Rural Residential (RR)
South	Vacant	P-D #52	Low Density Residential (LD)
East	Vacant Ag Land	Merced County	Thoroughfare Commercial (CT)
West	Multi-family residential	R-4	n/a (not within the City's SOI/SUDP)

1. INITIAL FINDINGS

- A. The proposal is a project as defined by CEQA Guidelines Section 15378.
- B. The project is not a ministerial or emergency project as defined under CEQA Guidelines (Sections 15369 and 15369).
- C. The project is therefore discretionary and subject to CEQA (Section 15357).
- D. The project is not Categorically Exempt.
- E. The project is not Statutorily Exempt.
- F. Therefore, an Environmental Checklist has been required and filed.

2. CHECKLIST FINDINGS

- A. An on-site inspection was made by this reviewer on March 16, 2017.
- B. The checklist was prepared on March 16, 2017.
- C. The *Merced Vision 2030 General Plan* and its associated EIR (SCH# 2008071069) were certified in January 2012. The document comprehensively examined the potential environmental impacts that may occur as a result of build-out of the 28,576-acre Merced SUDP/SOI. For those significant environmental impacts (Loss of Agricultural Soils and Air Quality) for which no mitigation measures were available, the City adopted a Statement of Overriding Considerations (City Council Resolution #2011-63). This document herein incorporates by reference the *Merced Vision 2030 General Plan, the General Plan Program EIR* (SCH# 2008071069), and Resolution #2011-63.

As a subsequent development project within the SUDP/SOI, many potential environmental effects of the Project have been previously considered at the program level and addressed within the General Plan and associated EIR. (Copies of the General Plan and its EIR are available for review at the City of Merced Planning and Permitting Division, 678 West 18th Street, Merced, CA 95340.) As a second tier environmental document, Initial Study #16-37 plans to incorporate goals, policies, and implementing actions of the *Merced Vision 2030 General Plan*,

along with mitigation measures from the General Plan EIR, as mitigation for potential impacts of the Project.

Project-level environmental impacts and mitigation measures (if applicable) have been identified through site-specific review by City staff. This study also utilizes existing technical information contained in prior documents and incorporates this information into this study.

3. ENVIRONMENTAL IMPACTS:

Will the proposed project result in significant impacts in any of the listed categories? Significant impacts are those that are substantial, or potentially substantial, changes that may adversely affect the physical conditions within the area affected by the project including land, air, water, minerals, flora, fauna, ambient noise, and objects of historic or aesthetic significance. An economic or social change by itself shall not be considered a significant effect on the environment. A social or economic change related to a physical change may be considered in determining whether the physical change is significant. (Section 15372, State CEQA Guidelines. Appendix G of the Guidelines contains examples of possible significant effects.)

A narrative description of all “potentially significant,” “negative declaration: potentially significant unless mitigation incorporated,” and “less than significant impact” answers are provided within this Initial Study.

The California Supreme Court has clarified CEQA practice to limit the evaluation of environmental effects only to the impact of a proposed project on the environment, and not the effects of the environment on a project. Thus, adverse effects from existing environmental hazards on a proposed new use would not be assessed for CEQA purposes, and no environmental conclusions would be reached. No mitigation could be required. The exception to this general rule would be if the construction or operation of the proposed project modified a condition on the project site or affecting the project site in a way that caused new or increased environmental effects offsite, or if implementation of the project exacerbated an existing condition for offsite uses.

This revision of CEQA practice affects the following issue areas in this Initial Study:

C. Air Quality

Question 4-Exposure to Substantial Pollutant Concentrations

F. Geology and Soils

Question 1.a-Earthquake Faults

Question 1.b-Seismic Ground Shaking

Question 1.c-Ground Failure/Liquefaction

Question 1.d-Landslides

Question 4-Expansive Soils

G. Hazards and Hazardous Materials

Question 5-Public Airport Hazards

Question 6-Private Airport Hazards

Question 8-Wildland Fire Hazards

H. Hydrology and Water Quality

Question 7-Housing in Floodplain

Question 8-Structures in Floodplain

Question 9-Exposure to flood risk

Question 10-Inundation by seiche

K. Noise

Question 1-Expose Persons to Offsite Noise in Excess of Standards

Question 2-Expose Persons to Offsite Vibration

Question 5-Public Airport Noise

Question 6-Private Airport Noise

However, for many environmental hazards, local agencies such as the City of Merced impose requirements to avoid or reduce hazards. Similarly, local agencies have the ability to impose conditions of project approval to avoid or reduce hazardous conditions.

Previous Reviews

Expanded Initial Study (EIS) #02-27 was prepared for the Hunt Family Annexation of which the project is a part. This (EIS) was adopted by the City Council on January 21, 2003, and included a mitigation monitoring program (Attachment C).

A. Aesthetics

SETTING AND DESCRIPTION

The project site consists of vacant land totaling 17.25 acres. The site sits adjacent to ag land to the east and vacant residentially zoned property to the south and west. Across Yosemite Avenue to the north are single-family dwellings on large lots (one acre or larger). There is also ag land across Yosemite Avenue at the northeast corner of Yosemite Avenue and Lake Road. There are no trees on the site and the ground is relatively flat.

The proposed project would construct a 225-unit student housing apartment complex and a 6,600-square-foot retail building. The apartment buildings are 3-stories tall and the clubhouse building would be 2-stories tall. The retail building would be a single-story building and is proposed to include a restaurant with a drive-thru window.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
A. <u>Aesthetics.</u> Will the project:				
1) Have a substantial adverse effect on a scenic vista?				✓
2) Substantially damage scenic resources including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?				✓
3) Substantially degrade the existing visual character or quality of the site and its surrounding?			✓	
4) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?			✓	

1) **No Impact**

No designated scenic vistas exist on the project site or in the project area. Therefore, no impacts in this regard would occur either with the General Plan Amendment or Zone Change.

2) **No Impact**

There are no officially designated State Scenic Highways or Routes in the project vicinity. Therefore, the project would have no impact on scenic resources, such as rock outcroppings, trees, or historic buildings within a scenic highway.

3) **Less Than Significant Impact**

The proposed apartment and retail project would change the site from a vacant site to a fully developed site. The proposed 3-story apartment buildings would change the visual character, but change does not necessarily mean the visual character would be degraded. The proposed buildings are of high architectural quality and consistent with urban design. The buildings would be set back a minimum of 25 feet from Yosemite Avenue which will decrease the impact of the 3-story buildings on the residential uses across Yosemite Ave. In addition, the site would incorporate landscaping to enhance the character of the site. Based on these factors, this impact is considered to be less than significant.

4) **Less Than Significant**

Construction of the proposed project and offsite improvements would include new lighting on the buildings, throughout the apartment complex, and along Yosemite Avenue (street lights). This new lighting could be a source of light or glare that would affect views in the area, especially residential areas to the north of the project site. However, the City of Merced has adopted the California Green Building Standards Code as Section 17.07 of the Merced Municipal Code. As administered by the City, the Green Building Standards Code

prohibits the spillage of light from one lot to another. This would avoid any new glare effects for existing residents living north and west of the project site.

B. Agriculture Resources

SETTING AND DESCRIPTION

Merced County is among the largest agriculture producing Counties in California (ranked fifth), with a gross income of more than \$4.4 billion in 2014. The County's leading agriculture commodities include milk, almonds, cattle and calves, chickens, sweet potatoes, and tomatoes.

Prime farmland exists to the east and northeast of the project site. As part of the annexation process for this site in 2002, the impact to farmland was evaluated (refer to Expanded Initial Study #02-27). The result of this evaluation was that prime farmland would be impacted by the annexation and development of this property, but the General Plan EIR had already addressed this impact. The City had acknowledged this impact to farmland as significant and unavoidable and had adopted a Statement of Overriding Consideration (City Council Resolution #97-22).

Expanded Initial Study (EIS) #02-27 included a mitigation measure to address impacts to agriculture resources. This mitigation measure will apply to this project as well. Refer to Item 4 below.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
B. <u>Agriculture Resources.</u> Will the project:				
1) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and monitoring Program of the California Resources Agency, to non-agriculture?				✓
2) Conflict with existing zoning for agricultural use, or a Williamson Act contract?				✓
3) Involve other changes in the existing environment, which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use?				✓
4) Cause development of non-agricultural uses within 1,000 feet of agriculturally zoned property (Right-to-Farm)?		✓		

1) No Impact

The project site is located within the City Limits of Merced. The California Department of Conservation prepares Important Farmland Maps through its Farmlands Mapping and Monitoring Program (FMMP). The system of classifying areas is based on soil type and use. According to the 2014 Merced County Important Farmlands Map, the project site is

classified as “Farmland of Local Importance,” and would not convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance to a non-agriculture use. Therefore, there is no impact as a result of this project.

2) **No Impact**

There are no Williamson Act contract lands in this area and the land is not currently zoned for agriculture uses. Therefore, there is no impact.

3) **No Impact**

The proposed project would be constructed on vacant land that is not currently being used for farmland purposes. The proposed project does not include any components that would cause a change in the environment that would ultimately result in the conversion of farmland. It is expected that the nearby farmland would continue to be farmed in the future and any impact from the proposed development would be minor in nature. Therefore, this impact is considered to be less than significant.

4) **Less than Significant Impact with Mitigation**

As described above there is farmland adjacent to the site to the east and at the northeast corner of Yosemite Avenue and Lake Road which would be within 1,000 feet of the project site. The environmental review (Initial Study #02-27 for the Hunt Family Annexation) done at the time this site was annexed into the City analyzed impacts to farmland. The following mitigation measure was adopted by the City Council on January 21, 2003, and would apply to this project. Implementation of this mitigation measure would reduce potential impacts to a **less than significant** level.

Mitigation Measure B-1

A provision shall be recorded by the applicants/developer or successors, at time of sale of any residentially-zoned property within the project that lies within 1,000 feet of the external boundary of any non-project property which currently has an active agricultural operation (including 4-H projects), or has had an agricultural operation on it during the calendar year preceding the year within which the sale takes place. This provision shall notify the buyer(s) and any subsequent owner(s) of the possible inconvenience or discomfort of farming operations arising from the use of agricultural chemicals, including pesticides and fertilizers; as well as from the pursuit of agricultural operations including plowing, spraying, and harvesting which occasionally generate dust, smoke, noise, and odor, and the priority to which Merced County places on agricultural operations.

C. Air Quality

SETTING AND DESCRIPTION

The San Joaquin Valley Air Pollution Control District (SJVAPCD) will review the project to assess the impact to air quality and to establish acceptable mitigation measures. Hence, the City recognizes that additional mitigation measures may be applied to the development of the project. While the action of the SJVAPCD is independent of City reviews and actions, their process allows the City to review proposed mitigation measures that could affect project design and operation. Any proposed changes are subject to approval by the City.

The project is located in the San Joaquin Valley Air Basin (SJVAB), which occupies the southern half of the Central Valley and is approximately 250 miles in length and, on average, 35 miles in width. The Coast Range, which has an average elevation of 3,000 feet, serves as the western border of the SJVAB. The San Emigdio Mountains, part of the Coast Range, and the Tehachapi Mountains, part of the Sierra Nevada, are both located to the south of the SJVAB. The Sierra Nevada extends in a northwesterly direction and forms the eastern boundary of the SJVAB. The SJVAB is basically flat with a downward gradient to the northwest.

The climate of the SJVAB is strongly influenced by the presence of these mountain ranges. The mountain ranges to the west and south induce winter storms from the Pacific to release precipitation on the western slopes, producing a partial rain shadow over the valley. A rain shadow is defined as the region on the leeward side of the mountain where precipitation is noticeably less because moisture in the air is removed in the form of clouds and precipitation on the windward side. In addition, the mountain ranges block the free circulation of air to the east, resulting in the entrapment of stable air in the valley for extended periods during the cooler months.

Winter in the SJVAB is characterized as mild and fairly humid, and the summer is hot, dry, and cloudless. During the summer, a Pacific high-pressure cell is centered over the northeastern Pacific Ocean, resulting in stable meteorological conditions and a steady northwesterly wind.

Existing Ambient Air Quality

The California Air Resources Board (CARB) and the United States Environmental Protection Agency (EPA) currently focus on the following air pollutants as indicators of ambient air quality: Ozone (O₃), carbon monoxide (CO), nitrogen dioxide (NO₂), sulfur dioxide (SO₂), particulate matter (PM), and lead. Because these are the most prevalent air pollutants known to be deleterious to human health and extensive health-effects criteria documents are available, they are commonly referred to as “criteria air pollutants.”

The EPA has established primary and secondary National Ambient Air Quality Standard (NAAQS) for the following criteria air pollutants: O₃, CO, NO₂, SO₂, PM₁₀, fine particulate matter (PM_{2.5}), and lead. The primary standards protect the public health and the secondary standards protect the public welfare. In addition to the NAAQS, CARB has established California Ambient Air Quality Standard (CAAQS) for the following criteria air pollutants: sulfates, hydrogen sulfide, vinyl chloride, and visibility-reducing particulate matter. In most cases, the CAAQS are more stringent than the NAAQS.

Criteria air pollutant concentrations are measured at several monitoring stations in the SJVAB. From 1991 to present, there have been two monitoring stations within the City of Merced: S. Coffee Avenue and 2334 M Street. The table on page 10 summarizes the air quality data from these locations for the most recent years available.

Year	Merced - S. Coffee Avenue					Merced- 2334 M Street				
	State Ozone (1-Hr)	Federal Ozone (1-Hr)	State PM ₁₀ ¹	Federal PM ₁₀ ¹	Federal PM _{2.5} ²	State Ozone	Federal Ozone	State PM ₁₀ ¹	Federal PM ₁₀ ¹	Federal PM _{2.5} ²
2014	3	0	*	*	17.0	*	*	*	0	18.2
2013	5	0	*	*	16.1	*	*	*	0	35.5
2012	2	0	*	*	8.6	*	*	*	0	12.6
2011	2	0	*	*	21.4	*	*	49.0	0	6.6
2010	7	0	*	*	*	*	*	18.4	0	10.1
2009	0	0	*	*	*	*	*	32.5	0	25.1
2008	14	3	*	*	*	*	*	87.2	0	*
2007	5	0	*	*	*	*	*	36.5	0	3.3
2006	4	0	*	*	*	*	*	47.4	0	0
2005	6	0	*	*	*	*	*	29	0	0
2004	14	0	*	*	*	*	*	12.3	0	0
2003	54	0	*	*	*	*	*	44.4	*	*
2001	26	0	*	*	*	*	*	*	0	*
2000	32	0	*	*	*	*	*	69.6	0	*
1999	42	2	*	*	*	*	*	*	*	*
1998	37	3	*	*	*	*	*	*	*	*
1997	1	0	*	*	*	*	*	*	*	*
1996	44	1	*	*	*	*	*	*	*	*
1995	38	3	*	*	*	*	*	96.3	0	*
1994	31	0	*	*	*	*	*	60.8	0	*
1993	22	1	*	*	*	*	*	108.8	0	*
1992	39	0	*	*	*	*	*	138.8	0	*
1991	13	2	*	*	*	*	*	151.6	0	*
⁽¹⁾ Measurements of PM ₁₀ are made every sixth day. Data is the estimated number of days that the standard would have been exceeded had measurements been collected every day.										
⁽²⁾ Nation 1997 24-Hour PM ₁₀ Standard										
*There was insufficient (or no) data available to determine the value.										
Source: Air Resources Board Aerometric Data Analysis and Management System (ADAM)										

Both CARB and EPA use monitoring data to designate areas according to their attainment status for criteria air pollutants. The purpose of the designations is to identify those areas with air quality problems and thereby initiate planning efforts for improvement. The three basic designation categories are nonattainment, attainment, and unclassified. Unclassified is used in an area that cannot be classified on the basis of available information as meeting or not meeting the standards. In addition, the California designations include a subcategory of the nonattainment designation, called nonattainment-transitional. The nonattainment-transitional is given to nonattainment areas that are progressing and nearing attainment. Shown in the Table on page 11 are the Attainment Designations for the City of Merced for each of the criteria pollutants.

Table 3 Merced County Attainment Designation (Federal and State)		
Pollutant	Designation/Classification	
	Federal Standards	State Standards
Ozone - One Hour	No Federal Standard (See note below)	Nonattainment/ Severe
Ozone - Eight Hour	Nonattainment/ Extreme	Nonattainment
PM10 (Particulate Matter 10 micrometers in diameter)	Unclassified/Attainment	Nonattainment
PM2.5 (Particulate Matter 2.5 micrometers in diameter)	Nonattainment/ Serious	Nonattainment
Carbon Monoxide	Unclassified/Attainment	Unclassified
Nitrogen Dioxide	Unclassified/Attainment	Attainment
Pollutant	Designation/Classification	
	Federal Standards	State Standards
Sulfur Dioxide	Unclassified/Attainment	Attainment
Lead (Particulate)	Unclassified/Attainment	Attainment
Hydrogen Sulfide	*No Federal Standard*	Unclassified
Sulfates	*No Federal Standard*	Attainment
Visibility Reducing Particles	*No Federal Standard*	Unclassified
Note: The Federal One Hour Ozone national Ambient Air Quality Standard was revoked on June 15, 2005		

Source California Air Resources Board, 2009, U.S. EPA, 2009

The San Joaquin Valley Air Pollution Control District (SJVAPCD) attains and maintains air quality conditions in the Merced area through a comprehensive program of planning regulation, enforcement, technical innovation, and promotion of the understanding of air quality issues. The clean air strategy of the SJVAPCD includes the preparation of plans for the attainment of ambient air quality standards, adoption and enforcement of rules and regulations concerning sources of air pollution, and issuance of permits for stationary sources of air pollution. The SJVAPCD also inspects stationary sources of air pollution and responds to citizen complaints, monitors ambient air quality and meteorological conditions, and implements programs and regulations required by the Federal Clean Air Act (FCAA) and the California Clean Air Act (CCAA).

The Guide for Assessing and Mitigating Air Quality Impacts (GAMAQI) is an advisory document that provides lead agencies, consultants, and project applicants with uniform procedures for addressing air quality in environmental documents. The GAMAQI contains the following applicable components:

- Criteria and thresholds for determining whether a project may have a significant adverse air quality impact;
- Specific procedures and modeling protocols for quantifying and analyzing air quality impacts;
- Methods available to mitigate air quality impacts; and,
- Information for use in air quality assessments and EIR's that will be updated more frequently such as air quality data, regulatory setting, climate, topography, etc.

The SJVAPCD has also prepared the Air Quality Guidelines for General Plans (AQGGP) (revised June 2005) to provide local planning agencies with a comprehensive set of goals and policies that

will improve air quality if adopted in a general plan; to provide a guide to cities and counties for determining which goals and policies are appropriate in their particular community; and to provide justification and rationale for the goals and policies that will convince decision makers and the public that they are appropriate and necessary.

ISR – Indirect Source Review. The ISR Rule (Rule 9510) and the Administrative ISR Fee Rule (Rule 3180) are the result of state requirements outlined in the California Health and Safety Code, Section 40604 and the State Implementation Plan (SIP). The SIP's commitments are contained in the District's 2003 PM₁₀ and NO_x in order to reach the ambient air-pollution standards on schedule. The Plans identify growth and reductions in multiple source categories. The Plans quantify the reduction from current District rules and proposed rules, as well as state and federal regulations, and then model future emissions to determine if the District may reach attainment for applicable pollutants (<http://www.valleyair.org/ISR/ISROverview.html>).

The rule applies to new developments that are over a certain threshold size. Any of the following projects require an application to be submitted unless the projects have mitigated emissions of less than two tons per year each of NO_x and PM₁₀. Projects that are at least:

- 50 residential units;
- 2,000 square feet of commercial space;
- 9,000 square feet of educational space;
- 10,000 square feet of government space;
- 20,000 square feet of medical or recreational space;
- 25,000 square feet of light industrial space;
- 39,000 square feet of general office space;
- 100,000 square feet of heavy industrial space; or,
- 9,000 square feet of any land use not identified above.

Air Quality Plans. The SJVAPCD submitted the 1991 Air Quality Attainment Plan in compliance with the requirements set forth in the CCAA. In addition, the CCAA requires a triennial assessment of the extent of air quality improvements and emission reductions achieved through the use of control measures. As part of this assessment, the attainment plan must be reviewed and, if necessary, revised to correct for deficiencies in progress and to incorporate new data or projections. The CCAA requirement for a first triennial progress report and revisions of the 1991 Air Quality Attainment Plan was first fulfilled with the preparation and adoption of the 1995-1997 Triennial Progress Report and Plan Revision. Triennial reports were also prepared for 1997-2000 and 1999-2001 in compliance with the CCAA.

In an effort to reach attainment for ozone, the SJVAPCD has adopted and submitted several ozone and PM₁₀ plans in its planning history in an effort to reach attainment. In the most current effort to reach attainment for 8-hour ozone standards, the SJVAPCD submitted the 2007 Ozone Plan. This plan contains a comprehensive and exhaustive list of regulatory and incentive-based measures to reduce emissions of ozone and particulate matter precursors throughout the Valley. Additionally, this plan calls for major advancements in pollution control technologies for mobile and stationary sources of air pollution; and a significant increase in state and federal funding for incentive-based measures to create adequate reductions in emissions to bring the entire Valley into attainment with the federal ozone standard. The proposed plan calls for a 75% reduction in ozone-

forming oxides of nitrogen (NO_x) emissions. The SJVAPCD adopted the 2013 Plan for the Revoked 1-Hour Ozone Standard in September 2013.

Based on a decline in PM₁₀ emissions, the San Joaquin Valley became the first air basin classified as “serious nonattainment” to be reclassified by EPA as in “attainment” of the PM₁₀ standards. The SJVAPCD adopted the 2007 PM₁₀ Maintenance Plan to assure the San Joaquin Valley’s continued attainment of EPA’s PM₁₀ standard.

The San Joaquin Valley is classified as “serious” nonattainment for federal PM_{2.5} (fine particulate matter) standards. The adopted 2015 PM_{2.5} Plan addresses both the EPA’s annual PM_{2.5} standard of 15 micrograms per cubic meter (µg/m³) and 24-hour PM_{2.5} standard of 65 µg/m³, established in 1997. The 2012 PM_{2.5} Plan addresses EPA’s 24-hour PM_{2.5} standard of 35 ug/m³, which was established by EPA in 2006.

The SJVAPCD’s planning documents also identify voluntary strategies to further reduce air quality impacts in the San Joaquin Valley Air Basin (SJVAB). Included in these strategies are an enhanced California Environmental Quality Act (CEQA) program and the promotion of air quality elements or policies for General Plans in all SJVAB cities and counties. The SJVAPCD reviews and comments on CEQA documents and permit applications sent from SJVAB public agencies. Comments from the SJVAPCD include expert advice on level of significance, applicable rules and regulations, and suggested mitigation measures.

In addition to the above mentioned items, the SJVAPCD has submitted numerous plans with respect to ozone, PM₁₀, PM_{2.5}, and CO in compliance with the FCAA and CCAA.

Thresholds of Significance

With the adoption of the *Merced Vision 2030 General Plan*, parameters were established within by which future development projects would be reviewed and standards established for approval of projects.

The SJVAPCD has established thresholds of significance for determining environmental significance. These thresholds separate a project’s short-term emission from the long-term emissions. The short-term emissions are mainly related to the construction phase of a project, which are recognized to be short in duration. The long-term emissions are primarily related to the activities that will occur indefinitely as a result of project operations.

Impacts will be evaluated both on the basis of CEQA Appendix G criteria and SJVAPCD significance criteria.

In order, the impacts to be evaluated will be those involving construction, operations emissions of criteria pollutants [Particulate Matter (PM₁₀) and reactive organic gas precursors to ozone], and cumulative air quality impacts. Because the area is non-attainment for ozone and PM₁₀, a major criterion for review is whether the project will result in a net increase of pollutants impacting ozone precursor pollutants and of PM₁₀.

Where environmental impacts are found to be significant or potentially significant, mitigation measures are identified to mitigate or avoid significant environmental effects.

In addition to the site-specific mitigation measures adopted in the City’s General Plan, the City shall be required to implement reasonable, feasible management practices required by the San Joaquin Valley Air Pollution Control District (SJVAPCD), or any other federal or state air quality

regulatory agency for the purpose of mitigating any significant impacts from the emission of Particulate Matter, Fine Particulate matter, Reactive Organic Gases, Nitrogen oxide, and any other criteria air pollutant or precursor emanating from implementations of the City's General Plan.

Consistent with Appendix G of the CEQA Guidelines, the proposed project is considered to have a significant impact on the environment if it will:

- Conflict with or obstruct implementation of the applicable air quality plan;
- Violate any air quality standard or contribute substantially to an existing or projected air quality violation;
- Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors);
- Expose sensitive receptors to substantial pollutant concentrations; or,
- Create objectionable odors affecting a substantial number of people.

Thresholds Used for Odor Evaluation

While odors are considered to be offensive and seldom cause any physical harm to people, they certainly can be unpleasant and lead to considerable amounts of anguish to the public and often leads to complaints made to the local jurisdiction from the community. Any project with the potential to expose the community to offensive odors would be considered a significant impact. The GAMAQI states that an evaluation should be conducted for both of the following situations: 1) a potential source of objectionable odors is proposed for a location near existing sensitive receptors, and 2) sensitive receptors are proposed to be located near an existing source of objectionable odors.

Thresholds Used for Sensitive Receptors

One of the criteria for significance includes potential impacts of Hazardous Air Pollutants (HAPs) on sensitive receptors. The GAMAQI, Section 3, defines a sensitive receptor as a location where human populations (especially children, seniors, and sick persons) are present and where there is a reasonable expectation of continuous human exposure to pollutants. Examples of sensitive receptors include, but are not limited to: residential land uses, schools, hospitals, convalescent homes, and day care centers.

Examples of HAPs include emission of criteria or toxic air pollutants that have health effects (PM₁₀, ammonia, H₂S sulfur dioxide, etc.). Sensitive receptors would not be directly affected by emissions of regional pollutants such as ozone precursors (VOC and NO_x).

The potential for impacts to sensitive receptors can occur when a sensitive receptor is proposed near an existing source of HAPs that are increased by the proposed project; or, when a development that is a source of HAPs is proposed near sensitive receptors, including siting a source of HAPs near an undeveloped site, but designated as a sensitive receptor land use.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
C. <u>Air Quality.</u> Would the project:				
1) Conflict with or obstruct implementation of the applicable air quality plan?			✓	
2) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?			✓	
3) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?			✓	
4) Expose sensitive receptors to substantial pollutant concentrations?			✓	
5) Create objectionable odors affecting a substantial number of people?			✓	

IMPACT ANALYSIS

This impact analysis is based in part on the Air Quality and Greenhouse Gas Study for the University Village at Lake Project prepared by Rincon Consultants, Inc. Refer to Attachment D for this study.

The air quality analysis prepared by Rincon Consultants, Inc. conforms to the methodologies and thresholds recommended by the SJVAPCD's *Air Quality Thresholds of Significance-Criteria Pollutants*, pursuant to CEQA guidelines (SJVAPCD 2006-2012). The SJVAPCD references CEQA compliant air quality thresholds for emissions associated with both construction and operation of proposed projects.

The proposed project would involve a General Plan Amendment, Zone Change, and the establishment of Planned Development (P-D) #76 which would lead to the construction of 225 student housing units and 6,600 square feet of retail commercial space.

1) **Less Than Significant Impact**

According to the Air Quality and Greenhouse Gas Study found at Attachment D, the project would not conflict with the SJVAPCD's adopted Air Quality Management Plan (AQMP). The proposed mixed-use project includes the construction of 225 student housing units and 6,600 square feet of retail space. Based on the analysis found on Page 10 and 11 of Attachment D, the project would not conflict with the AQMP. This potential impact is **less than significant**.

2) Less Than Significant Impact

The proposed project would not violate any air quality standard or contribute substantially to an existing or projected air quality violation. The Air Quality and Greenhouse Gas Study for University Village at Lake Project, analyzed construction emissions and operational emissions. Table 4 on page 9 and Table 5 on page 10 of the study identify the level of emissions expected to be generated from this project for both construction and operational emissions. As shown in the tables and explained in the analysis, the project would not exceed any of the emission thresholds set by the SJVAPCD for RPG , NO_x , CO , SP_x , PM_{10} , and $\text{PM}_{2.5}$. Therefore the project's potential impacts would be **less than significant**.

3) Less than Significant Impact

SJVAPCD's CEQA Guidelines indicate that a violation of SJVAPCD's construction or operational thresholds of significance would result in a project level cumulative impact. The proposed change to the General Plan and Zoning designations would not create a situation that would exceed the threshold set by SJVAPCD, therefore, the cumulative effect would be **less than significant**.

4) Less than Significant Impact

The proposed project would not expose sensitive receptors to substantial pollutant concentration. The study found at Attachment D analyzed emissions from construction activity which were found to be within the threshold level set by the SJVAPCD. Refer to Table 4 on page 9 of the study. Additionally, all operational emissions were within the threshold levels set by the SJVAPCD.

Existing Toxic Air Contaminant Emissions

The California Supreme Court has clarified CEQA practice to limit the evaluation of environmental effects only to the impact of a proposed project on the environment, and not the effects of the environment on a project. The following discussion provides information regarding potential hazards from existing toxic air contaminant emissions. As directed by the Supreme Court, no environmental conclusions are made regarding this hazard. ARB has developed guidance recommending that sensitive land uses such as residences, daycare centers, and schools be located 500 feet or more from any roads with traffic volumes exceeding 50,000 vehicles/day (ARB 2005). According to the *Merced Vision 2030 General Plan*, Table 4.4, the existing traffic volume on this segment of Yosemite Avenue is approximately 7,550 Average Daily Trips (ADTs). By 2030, the ADTs for this segment is expected to increase to 29,600. This is still below the level of 50,000 set by ARB. This potential impact is **less than significant**.

5) Less Than Significant Impact

Implementation of the project may cause temporary odors resulting from diesel exhaust during construction equipment operation and truck activity. Although these emissions may be noticeable from time to time by adjacent receptors, they would be localized and are not likely to adversely affect people offsite resulting in confirmed odor complaints. Refer to page 10 of Attachment D for the analysis of objectionable odors. The study shows that any odor impacts would be a **less than significant** impact.

D. Biological Resources

SETTING AND DESCRIPTION

The project site, located at the City's eastern edge is a vacant parcel that was most recently used for farming activities. There are residential uses to the north and west and vacant land to the south designated for residential development. The property to the east and northeast are farmland areas.

The general project area is located in the Central California Valley eco-region (Omernik 1987). This eco-region is characterized by flat, intensively farmed plains with long, hot, dry summers and cool, wet winters (14-20 inches of precipitation per year). The Central California Valley eco-region includes the Sacramento Valley to the north, the San Joaquin Valley to the south, and it ranges between the Sierra Nevada Foothills to the east and the Coastal Range foothills to the west. Nearly half of the eco-region is actively farmed, and about three fourths of that farmed land is irrigated.

The project site does not contain any trees, creeks, or other wetland areas.

The biologic assessment conducted with the annexation of this site in 2002 made the following findings:

- There were no Swainson's hawks or burrowing owls occupying the Project site. It is considered unlikely that these species would nest in or near the site in the future.
- No kit fox were observed in the Project site or buffer areas around the site. In the opinion of the consultants (Moore Biological Consultants of Lodi), the fact that this site is substantially surrounded by development, both residential and agricultural would provide the strong basis for argument that any importance of this site to the species is approaching zero and mitigation is unwarranted.

The biological assessment done in 2002 revealed no evidence of the presence of any candidate, sensitive, or special status species or their habitats on the project site. According to the U.S. Fish and Wildlife Service Information for Planning and Conservation (IPaC) trust resource report, the site does not include any plant and/or animal species listed as threatened or endangered by the State of California or the Federal Government. Furthermore, the biological resources evaluation, prepared as part of the *Merced Vision 2030 General Plan Program Environmental Impact Report* (EIR), does not identify the project area as containing any seasonal or non-seasonal wetland or vernal pool areas. Given the adjacent, built-up, urban land uses and major roadways, no form of unique, rare or endangered species of plant and/or animal life could be sustained on the subject site.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
D. <u>Biological Resources.</u> Would the project:				
1) Have a substantial adverse effect, either directly or through habitat modification, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?				✓
2) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?			✓	
3) 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?				✓
4) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?				✓
5) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?			✓	
6) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?				✓

1) **No Impact**

The proposed project would not have any direct effects on animal life by changing the diversity of species, number of species, reducing the range of any rare or endangered species, introducing any new species, or leading to deterioration of existing fish or wildlife habitat. Although the *Merced Vision 2030 General Plan* identifies several species of plant and animal life that exist within the City's urban boundaries, the subject site does not contain any rare or endangered species of plant or animal life.

2) Less than Significant Impact

The proposed project would not have any direct effects on riparian habitat or any other sensitive natural community. The City General Plan identifies Bear, Black Rascal, Cottonwood, Miles, Fahrens, and Owens Creeks within the City's growth area. The subject site is approximately 400 feet from Black Rascal Creek. Black Rascal Creek is a Water of the U.S. under the jurisdiction of the U.S. Army Corps of Engineers (ACOE), the California Department of Fish and Wildlife (CDFW), and the Regional Water Quality Control Board. Any proposed "fill of that waterway would be subject to permits from ACOE, CDFW, and the Regional Water Quality Control Board. No such "fill" or disturbance of the waterway is proposed as part of this development. The City's General Plan requires the preservation of the creek in its natural state. No riparian habitat identified in CDFW or USFW plans are present on the project site. Therefore, the project would have a less than significant impact on riparian habitat.

3) No Impact

The project site would not have any direct effect on wetlands as no wetlands have been identified in the project area.

4) No Impact

The project would not have any adverse effects on any resident or migratory fish or wildlife species or with established native resident migratory wildlife corridor, or impede the use of native wildlife nursery sites. According to the biological assessment previously done on this site, there are no migratory corridors for fish or wildlife species or wildlife nursery sites due to the intense farming previously done on this site and the adjacent urban development.

5) Less Than Significant Impact

The project would not interfere with any local policies or ordinances protecting biological resources such as tree preservation policy or ordinance. The City requires the planting and maintenance of street trees along all streets and parking lot trees in parking lots but has no other tree preservation ordinances.

6) No Impact

The proposed project would not conflict with the provisions of a habitat conservation plan. There are no adopted Habitat Conservation Plans, Natural Conservation Community Plan, or other approved local, regional, or state Habitat Conservation Plan for the City of Merced or Merced County.

E. Cultural Resources

SETTING AND DESCRIPTION

The City of Merced area lies within the ethnographic territory of the Yokuts people. The Yokuts were members of the Penutian language family which held all of the Central Valley, San Francisco Bay Area, and the Pacific Coast from Marin County to near Point Sur.

Merced County was first explored by Gabriel Moraga in 1806, when he named the Merced River, "El Rio de Nuestra Senra de la Merced." Moraga's explorations were designed to locate

appropriate sites for an inland chain of missions. Moraga explored the region again in 1808 and 1810.

Archaeology

Archaeological sites are defined as locations containing significant levels of resources that identify human activity. Very little archaeological survey work has been conducted within the City or its surrounding areas. Creeks, drainage, and sloughs exist in the northern expansion area of the City, and Bear Creek and Cottonwood Creek pass through the developed area. Archaeological sites in the Central Valley are commonly located adjacent to waterways and represent potential for significant archaeological resources.

Paleontological sites are those that show evidence of pre-human existence. Quite frequently, they are small outcroppings visible on the earth's surface. While the surface outcroppings are important indications of paleontological resources, it is the geological formations that are the most important. There are no known sites within the project area known to contain paleontological resources of significance.

Historic Resources

In 1985, in response to community concerns over the loss of some of the City's historic resources, and the perceived threats to many remaining resources, a survey of historic buildings was undertaken in the City. The survey focused on pre-1941 districts, buildings, structures, and objects of historical, architectural, and cultural significance. The survey area included a roughly four square-mile area of the central portion of the City.

The National Register of Historic Places, the California Historical Landmarks List, and the California Inventory of Historic Resources identify several sites within the City of Merced. These sites are listed on the Merced Historical Site Survey and maintained by the Merced Historical Society. There are no listed historical sites on the Project site.

According to the environmental review conducted for the General Plan, there are no listed historical sites and no known locations within the project area that contain sites of paleontologic or archeological significance. The General Plan (Implementation Action SD-2.1.a) requires that the City utilize standard practices for preserving archeological materials that are unearthed during construction, as prescribed by the State Office of Historic Preservation.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
E. <u>Cultural Resources.</u> Would the project:				
1) Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?		✓		
2) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?		✓		

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
3) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?		✓		
4) Disturb any human remains, including those interred outside of formal cemeteries?			✓	

1) Less than Significant Impact with Mitigation

The project would not alter or destroy any known historic or archaeological site, building, structure, or object; nor would it alter or affect unique ethnic cultural values or restrict religious or sacred uses. According to the environmental review conducted for the General Plan, there are no listed historical sites and no known locations within the project area that contain sites of historical or archeological significance. The General Plan (Implementation Action SD-2.1.a) requires that the City utilize standard practices for preserving archeological materials that are unearthed during construction, as prescribed by the State Office of Historic Preservation. However, if an archaeological site is discovered the following mitigation measure would reduce possible impacts to a historic archaeological site to a **less than significant** level:

Mitigation Measure E-1:

If evidence of archaeological artifacts is discovered during construction, all operations within the area and adjacent to the discovered site shall halt until a qualified archaeologist determines the extent of significance of the site and mitigation/preservation of any artifacts.

2) Less than Significant Impact with Mitigation

The project would not alter or destroy any known prehistoric or archaeological site, building, structure, or object; nor would it alter or affect unique ethnic cultural values or restrict religious or sacred uses. According to the environmental review conducted for the General Plan, there are no listed historical sites and no known locations within the project area that contain sites of historical or archeological significance. The General Plan (Implementation Action SD-2.1.a) requires that the City utilize standard practices for preserving archeological materials that are unearthed during construction, as prescribed by the State Office of Historic Preservation. However, if an archaeological site is discovered the Mitigation Measure E-1 above would reduce impacts to a less than significant level.

3) Less than Significant Impact with Mitigation

The project would not alter or destroy any paleontological resource, site, or unique geological feature. According to the environmental review conducted for the General Plan, there are no listed historical sites and no known locations within the project area that contain sites of paleontological significance. The General Plan (Implementation Action SD-2.1.a) requires that the City utilize standard practices for preserving archeological materials that are unearthed during construction, as prescribed by the State Office of Historic Preservation. However, if a paleontological resource or unique geological feature

is discovered the Mitigation Measure below would reduce potential impacts to a **less than significant** level.

Mitigation Measure E-2

If evidence of a paleontological resource, site, or unique geological feature is discovered during construction, all operations within the area and adjacent to the discovered site shall halt until a qualified paleontologist or geologist determines the extent of significance of the site and the mitigation/preservation of any resources.

4) Less than Significant Impact

The proposed project would not disturb any known human remains, including those interred outside of formal cemeteries; nor would it alter or affect unique ethnic cultural values or restrict religious or sacred uses. There are no known cemeteries in the project area. Excavation of the site would be needed to construct the proposed project, so it is possible that human remains would be discovered. However, Section 7050.5 of the California Health and Safety Code requires that if human remains are discovered during the construction phase of a development, all work must stop in the immediate vicinity of the find and the County Coroner must be notified. If the remains are determined to be Native American, the Coroner will notify the Native American Heritage Commission, which in turn will inform a most likely descendant. The descendant will then recommend to the landowner the appropriate method for the disposition of the remains and any associated grave goods. Additionally, the City's General Plan (Implementation Action SD-2.1.a) requires that the City utilize standard practices for preserving archeological materials that are unearthed during construction, as prescribed by the State Office of Historic Preservation. By following the requirements of the Health and Safety Code and Compliance with the City's General Plan, this potential impact would be **less than significant**.

F. Geology and Soils

SETTING AND DESCRIPTION

The City of Merced is located approximately 150 miles southeast of San Francisco along the east side of the southern portion of the Great Valley Geomorphic Province, more commonly referred to as the San Joaquin Valley. The valley is a broad lowland bounded by the Sierra Nevada to the east and Coastal Ranges to the west. The San Joaquin Valley has been filled with a thick sequence of sedimentary deposits from Jurassic to recent age. A review of the geological map indicates that the area around Merced is primarily underlain by the Pleistocene Modesto and Riverbank Formations with Holocene alluvial deposits in the drainages. Miocene-Pliocene Mehrten and Pliocene Laguna Formation materials are present in outcrops on the east side of the SUDP/SOI. Modesto and Riverbank Formation deposits are characterized by sand and silt alluvium derived from weathering of rocks deposited east of the SUDP/SOI. The Laguna Formation is made up of consolidated gravel sand and silt alluvium and the Mehrten Formation is generally a well consolidated andesitic mudflow breccia conglomerate.

Faults and Seismicity

A fault, or a fracture in the crust of the earth along which rocks on one side have moved relative to those on the other side, are an indication of past seismic activity. It is assumed that those that have been active recently are the most likely to be active in the future, although even inactive faults may not be “dead.” “Potentially Active” faults are those that have been active during the past two million years or during the Quaternary Period. “Active” faults are those that have been active within the past 11,000 years. Earthquakes originate where movement or slippage occurs along an active fault. These movements generate shock waves that result in ground shaking.

Based on review of geologic maps and reports for the area, there are no known “active” or “potentially active” faults, or Alquist-Priolo Earthquake Fault Zones (formerly referred to as a Special Studies Zone) in the SUDP/SOI. In order to determine the distance of known active faults within 50 miles of the Site, the computer program EZ-FRISK was used in the General Plan update.

Soils

According to the USDA Natural Resources Conservation Service website, the soil on the site is a mix of Ryer clay loam, 0 to 2 percent slopes (RsA), Wyman clay loam, 0 to 3 percent slopes (WoA), and Yokohl clay loam, 0 to 3 percent slopes. Soil properties can influence the development of building sites, including site selection, structural design, construction, performance after construction, and maintenance. Soil properties that affect the load-supporting capacity of an area include depth to groundwater, ponding, flooding, subsidence, shrink-swell potential, and compressibility.

A geotechnical study was conducted of the site and a report prepared by Kleinfelder. This study, found at Attachment E was used as part of the evaluation of potential impacts of geology soils.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
F. <u>Geology and Soils.</u> Would the project:				
1) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:				
a) 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?			✓	
b) Strong seismic ground shaking?			✓	
c) Seismic-related ground failure, including liquefaction?			✓	
d) Landslides?			✓	

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
2) Result in substantial soil erosion or loss of topsoil?		✓		
3) 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 offsite landslide, lateral spreading, subsidence, liquefaction, or collapse?			✓	
4) 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?		✓		
5) 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?				✓

1) Less than Significant Impact

The project site is not located within a mapped fault hazard zone, and there is no record or evidence of faulting on the project site (City of Merced General Plan Figure 11.1). Because no faults underlie the project site, no people or structures would be exposed to substantial adverse effects related to earthquake rupture.

According to the City’s *Merced Vision 2030 General Plan EIR*, the probability of soil liquefaction occurring within the City of Merced is considered to be a low to moderate hazard; however, a detailed geotechnical engineering investigation would be required for the project in compliance with the California Building Code (CBC).

There would be no exposure to any geological hazards in the project area.

Ground shaking of moderate severity may be expected to be experienced on the project site during a large seismic event. All building permits are reviewed to ensure compliance with the California Building Code (CBC). In addition, the City enforces the provisions of the Alquist Priolo Special Study Zones Act that limit development in areas identified as having special seismic hazards. All new structures shall be designed and built in accordance with the standards of the California Building Code.

APPLICABLE GENERAL PLAN GOALS AND POLICIES

The City's *Merced Vision 2030 General Plan* contains policies that address seismic safety.

<i>Goal Area S-2: Seismic Safety:</i>	
Goal: Reasonable Safety for City Residents from the Hazards of Earthquake and Other Geologic Activity	
Policies	
S-2.1	Restrict urban development in all areas with potential ground failure characteristics.

The project would not expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving landslides.

Landslides generally occur on slopes of 15 percent or greater. The project site's topography is generally of slopes between 0 and 3 percent, which are considered insufficient to produce hazards other than minor sliding during seismic activity.

Therefore, no hazardous conditions related to seismic groundshaking would occur with the implementation of the project. Additionally, the implementation of the project would not lead to offsite effects related to hazards related to seismic groundshaking, nor would any existing offsite hazards be exacerbated.

2) **Less Than Significant Impact with Mitigation**

Construction associated with the proposed project could result in temporary soil erosion and the loss of top soil due to construction activities, including clearing, grading, site preparation activities, and installation of the proposed buildings and other improvements. The City of Merced enforces a Storm Water Management Program in compliance with the Federal Clean Water Act. All construction activities are required to comply with the City's Erosion and Sediment Control Ordinance (MMC §15.50.120.B), including the implementation of Best Management Practices (BMPs) to limit the discharge of sediment into natural waterways and storm water drainage facilities.

Mitigation Measures were adopted with EIS #02-27 for the annexation of this site. These mitigation measures would also apply to this project. Implementation of the following mitigation measures would reduce potential impacts to a **less than significant** level.

Mitigation Measure F-1

Prior to the approval of a tentative subdivision map or building permit, the City shall review plans for drainage and storm water run-off control systems and their component facilities to ensure that these systems are non-erosive in design.

Mitigation Measure F-2

Upon completion of phased construction, subsequent phases shall re-vegetate all exposed soil surfaces within 30 days, or as otherwise approved by the City, to minimize potential topsoil erosion. Reasonable alternatives to re-vegetation may be employed, especially during peak high temperature periods or to avoid negative impacts to nearby agricultural activities, subject to the approval of the City.

Mitigation Measure F-3

Projects under review shall be required to submit temporary erosion control plans for construction activities.

3) Less Than Significant Impact

The City of Merced is located in the Valley area of Merced County and is therefore less likely to experience landslides than other areas in the County. The probability of soil liquefaction actually taking place anywhere in the City of Merced is considered to be a low to moderate hazard. Soil types in the area are not conducive to liquefaction because they are either too coarse or too high in clay content. This conclusion is supported by the Geotechnical Study provided by Kleinfelder (Attachment E). According to the *Merced Vision 2030 General Plan* EIR, no significant free face failures were observed within the SUDP/SOI and the potential for lurch cracking and lateral spreading is, therefore, very low within the SUDP/SOI area.

4) Less than Significant with Mitigation

Expansive soils are those possessing clay particles that react to moisture changes by shrinking (when they dry) or swelling (when they become wet). Expansive soils can also consist of silty to sandy clay. The extent of shrinking and swelling is influenced by the environment, extent of wet or dry cycles, and by the amount of clay in the soil. This physical change in the soils can react unfavorably with building foundations, concrete walkways, swimming pools, roadways, and masonry walls.

The Geotechnical Study at Attachment E confirms the presence of expansive soils on the site. The study indicates soil at the site has a moderate expansion potential [Expansion Index (EI) of 49] for the near surface clay soils. This study recommends procedures for site grading to help reduce any risks from expansive soils.

Implementation of General Plan Policies, adherence to the Alquist-Priolo Act, and enforcement of the California Building Code (CBC) Standards would reduce the effect of this hazard on new buildings and infrastructure associated with the project. Additionally, the recommendations from the Geotechnical Study at Attachment E shall be implemented. The implementation of the following mitigation measures would reduce potential impacts to a **less than significant** level.

Mitigation Measure F-4

All recommendations for addressing expansive soils and site grading recommended in the Geotechnical Study prepared by Kleinfelder and found at Attachment E shall be implemented.

Mitigation Measure F-5

Building plans shall be reviewed by a registered engineer or other professional specializing in geo-technical assessments to ensure that the soils can support the load.

5) No Impact

The project site would not have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the

disposal of wastewater. However, the proposed project would be served by the City's sewer system. No new septic systems are allowed within the City Limits.

G. Hazards and Hazardous Materials

SETTING AND DESCRIPTION

Hazardous Materials

A substance may be considered hazardous due to a number of criteria, including toxicity, ignitability, corrosivity, or reactivity. The term "hazardous material" is defined in law as any material that, because of quantity, concentration, or physical, or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment.

Wildland and Urban Fire Hazards

Both urban and wildland fire hazard potential exists in the City of Merced and surrounding areas, creating the potential for injury, loss of life, and property damage. Urban fires primarily involve the uncontrolled burning of residential, commercial, or industrial structures due to human activities. Wildland fires affect grassland, brush or woodlands, and any structures on or near these fires. Such fires can result from either human made or natural causes.

Urban fires comprise the majority of fires in the City of Merced. The site is adjacent to undeveloped ag land which could be a source for a wildland fire. However, the City of Merced Fire Department has procedures in place to address the issue of wildland fires, so no additional mitigation would be necessary.

Airport Safety

The City of Merced is impacted by the presence of two airports-Merced Regional Airport, which is in the southwest corner of the City, and Castle Airport (the former Castle Air Force Base), located approximately eight miles northwest of the subject site.

The continued operation of the Merced Regional Airport involves various hazards to both flight (physical obstructions in the airspace or land use characteristics which affect flight safety) and safety on the ground (damage due to an aircraft accident). Growth is restricted around the Regional Airport in the southwest corner of the City due to the noise and safety hazards associated with the flight path.

Castle Airport also impacts the City. Portions of the northwest part of the City's SUDP/SOI and the incorporated City are within Castle's safety zones. The primary impact is due to noise (Zones C and D), though small areas have density restrictions (Zone B2). The military discontinued operations at Castle in 1995. One important criterion for determining the various zones is the noise factor. Military aircraft are designed solely for performance, whereas civilian aircraft have extensive design features to control noise.

A small private airstrip is located to the northeast of the site, east of the Fairfield Canal and north of Yosemite Avenue, approximately 2 to 3 miles away. This airstrip has a flight pattern that goes northwest/southeast, which does not fly over the project site.

Potential hazards to flight include physical obstructions and other land use characteristics that can affect flight safety, which include: visual hazards such as distracting lights, glare, and sources of

smoke; electronic interference with aircraft instruments or radio communications; and uses which may attract flocks of birds. In order to safeguard an airport's long-term usability, preventing encroachment of objects into the surrounding airspace is imperative.

According to the Merced County Airport Land Use Compatibility Plan, the project site is not located in any restricted safety zones for either airport, and no aircraft overflight, air safety, or noise concerns are identified.

Railroad

Hazardous materials are regularly shipped on the BNSF and SP/UP Railroad lines that pass through the City. While unlikely, an incident involving the derailment of a train could result in the spillage of cargo from the train in transporting. The spillage of hazardous materials could have devastating results. The City has little to no control over the types of materials shipped via the rail lines. There is also a safety concern for pedestrians along the tracks and vehicles utilizing at-grade crossings. The design and operation of at-grade crossings allows the City some control over rail-related hazards. Ensuring proper gate operation at the crossings is the most effective strategy to avoid collision and possible derailments. The BNSF Railroad is over 2 miles from the site and SP/UP is over 3 miles away.

Public Protection and Disaster Planning

Hospitals, ambulance companies, and fire districts provide medical emergency services. Considerable thought and planning have gone into efforts to improve responses to day-to-day emergencies and planning for a general disaster response capability.

The City's Emergency Plan and the County Hazardous Waste Management Plan both deal with detailed emergency response procedures under various conditions for hazardous material spills. The City also works with the State Department of Health Services to establish cleanup plans and to monitor the cleanup of known hazardous waste sites within the City.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
G. Hazards and Hazardous Materials. Would the project:				
1) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?			✓	
2) 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?			✓	
3) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?				✓

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
4) 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?			✓	
5) 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?			✓	
6) 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?			✓	
7) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?			✓	
8) 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?			✓	

1) **Less Than Significant Impact**

Construction activities associated with the proposed project would involve the use, storage, transport, and disposal of oil, gasoline, diesel fuel, paints, solvents, and other hazardous materials. Except for minor amounts of cleaning and swimming pool supplies, no hazardous materials are anticipated to be used at the site after construction. The project would be required to adhere to all applicable federal and state health and safety standards. Construction activity must also be in compliance with the California Occupational Safety and Health Administration regulations (Occupational Safety and Health Act of 1970). Compliance with these requirements would reduce the risk of hazards to the public to a **less than significant** level.

2) **Less Than Significant Impact**

Construction on the project site would be reviewed for the use of hazardous materials at the building permit stage. Implementation of Fire Department and Building Code regulations for hazardous materials, as well as implementation of federal and state requirements, would reduce any risk caused by a future use on the site from hazardous materials to a **less than significant** level.

APPLICABLE GENERAL PLAN GOALS AND POLICIES

The City of Merced *Vision 2030 General Plan* contains policies that address hazardous materials.

<i>Goal Area S-7: Hazardous Materials</i>	
Goal: Hazardous Materials Safety for City Residents	
Policies	
S-2.1	Prevent injuries and environmental contamination due to the uncontrolled release of hazardous materials.
Implementing Actions:	
7.1.a	Support Merced County in carrying out and enforcing the Merced County Hazardous Waste Management Plan.
7.1.b	Continue to update and enforce local ordinances regulating the permitted use and storage of hazardous gases, liquids, and solids.
7.1.d	Provide continuing training for hazardous materials enforcement and response personnel.

3) **No Impact**

A private K-8 school is located west of the site on Yosemite Avenue near McKee Road. The site is not within ¼ mile of this school. There are no other existing or proposed schools within ¼ mile of the site. Given the distance the existing school is from the site and the fact that no other schools are proposed within ¼ mile of the site, there is **no impact**.

4) **Less Than Significant Impact**

According to a California Department of Toxic Substances Control EnviroStor database search, the project site is not listed as a hazardous waste site. No project actions or operations would result in the release of hazardous materials that could affect the public or the environment, and no significant hazard to the public or the environment would result with project implementation. This potential impact is **less than significant**.

5) **Less than Significant Impact**

The project site is not located within two miles of any public airport and is not within any safety or overflight zone for either the Merced Regional Airport or the Castle Airport, and no public or private airfields are within two miles of the project area. A private airstrip is located approximately 2-3 miles northeast of the project site. However, the airstrip has a flight pattern that goes northwest/southeast which does not fly over the project site. Given its location, the private airstrip should not pose a hazard to the project site. This potential impact is **less than significant**.

6) **Less than Significant Impact**

The project site is located approximately 2-3 miles from a private airstrip. See discussion for Question 5 above for more information.

7) **Less Than Significant Impact**

The proposed project will not adversely affect any adopted emergency response plan or emergency evacuation plan. No additional impacts would result from the development of the project area over and above those already evaluated by the EIR prepared for the *Merced Vision 2030 General Plan*.

APPLICABLE GENERAL PLAN GOALS AND POLICIES:

The *Merced Vision 2030 General Plan* contains policies that address disaster preparedness.

<i>Goal Area S-1: Disaster Preparedness</i>	
Goal: General Disaster Preparedness	
Policies	
S-1.1	Develop and maintain emergency preparedness procedures for the City.
Implementing Actions:	
1.1.a	Keep up-to-date through annual review the City’s existing Emergency Plan and coordinate with the countywide Emergency Plan.
1.1.b	Prepare route capacity studies and determine evacuation procedures and routes for different types of disasters, including means for notifying residents of a need to evacuate because of a severe hazard as soon as possible.
7.1.d	Provide continuing training for hazardous materials enforcement and response personnel.

8) **Less than Significant Impact**

According to the EIR prepared for the *Merced Vision 2030 General Plan*, the risk for wildland fire within the City of Merced is minimal. According to the Cal Fire website, the Merced County Fire Hazard Severity Zone Map shows the project site is designated as a “Local Area of Responsibility” (LRA) with a Hazard Classification of “LRA Unzoned.”

The City of Merced Fire Department is the responsible agency for responding to fires at the subject site. The project site is located within Fire District #55, and is served by Station #55 located on 3520 Parsons Avenue (approximately 1 mile from the project site).

The site is adjacent to ag land that could be susceptible to wildland fires. However, the City of Merced Fire Department has procedures in place to address the issue of wildland fires, so no additional mitigation would be necessary. This potential impact is **less than significant**.

H. Hydrology and Water Quality

SETTING AND DESCRIPTION

Water Supplies and Facilities

The City’s water supply system consists of four elevated storage tanks with a combined storage capacity of approximately 1.4 million gallons, 22 wells and 14 pumping stations equipped with

variable speed pumps that attempt to maintain 45 to 50 psi (pounds per square inch) nominal water pressure. The City is required to meet State Health pressure requirements, which call for a minimum of 20 psi at every service connection under the annual peak hour condition and maintenance of the annual average day demand plus fire flow, whichever is stricter. The project site would be serviced by an existing 16-inch water main in Yosemite Avenue.

Storm Drainage/Flooding

In accordance with the adopted *City of Merced Standard Designs of Common Engineering Structures*, percolation/detention basins are designed to temporarily collect runoff so that it can be metered at acceptable rates into canals and streams that have limited capacity. Storm drain lines exist in Yosemite Avenue which would serve the site. The project would be required to adhere to the Post Construction Standards for compliance with the City’s Phase II MS4 permit issued by the state of California.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
H. <u>Hydrology and Water Quality.</u> Would the project:				
1) Violate any water quality standards or waste discharge requirements?			✓	
2) 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)?			✓	
3) 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 offsite?			✓	
4) 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 on- or offsite?			✓	
5) Create or contribute runoff water which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff?		✓		

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
6) Otherwise substantially degrade water quality?			✓	
7) 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?			✓	
8) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?			✓	
9) 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?			✓	
10) Inundation by seiche, tsunami, or mudflow?			✓	

1) **Less Than Significant Impact**

The project is not expected to violate any water quality standards or waste discharge requirements during construction or operation. In addition to compliance with standard construction provisions, the project shall be required to comply with the Draft Merced Storm Water Master Plan and the Storm Water Management Plan, and obtain all required permits for water discharge. During project operations, the City has developed requirements to minimize the impact to storm water quality caused by development and redevelopment. The increase in impervious areas caused by development can cause an increase in the type and quantity of pollutants in storm water runoff. Prior planning and design to minimize pollutants in runoff from these areas is an important component to storm water quality management. These standards are set forth in the City’s Post-Construction Standards Plan and provide guidance for post-construction design measures to ensure that stormwater quality is maintained. Compliance with these requirements and permits would reduce the impact to a **less than significant** level.

APPLICABLE GENERAL PLAN GOALS AND POLICIES:

The *Merced Vision 2030 General Plan* contains policies that address Water Quality and Storm Drainage.

<i>Goal Area P-5: Storm Drainage and Flood Control</i>	
Goal: An Adequate Storm Drainage Collection and Disposal System in Merced	
Policies	
P-5.1	Provide effective storm drainage facilities for future development.
P-5.2	Integrate drainage facilities with bike paths, sidewalks, recreation facilities, agricultural activities, groundwater recharge, and landscaping.

Implementing Actions:	
5.1.a	Continue to implement the City's Storm Water Master Plan and the Storm Water Management Plan and its control measures.
5.1.c	Continue to require all development to comply with the Storm Water Master Plan and any subsequent updates.

2) **Less Than Significant Impact**

The City of Merced is primarily dependent on groundwater sources that draw from the San Joaquin aquifer. The City has storage capacity of approximately 1.4 million gallons in four elevated storage tanks; 22 active well sites with one under construction, and 14 pumping stations, which provide service to meet peak hour urban level conditions and the average daily demand plus fire flows.

According to the City of Merced Draft Water Master Plan, the estimated average peak water demand in 2012 was 23.1 mgd.

The proposed project is estimated to use approximately 53,580 gallons of water per day. This would represent 0.23% of the estimated average daily water consumption in 2012. Although development of the site would restrict onsite recharge where new impervious surface areas are created, all alterations to groundwater flow would be captured and routed to the stormwater percolation ponds or pervious surfaces with no substantial net loss in recharge potential anticipated. This reduces this impact to a **less than significant** level.

3) **Less Than Significant Impact**

The proposed project would result in modifications to the existing drainage pattern on the site. The project will be designed to capture all surface water runoff onsite and then drain into the City's existing storm drainage system.

The project site is currently vacant and consists of pervious surfaces. The proposed project would create impervious surfaces over a large portion of the project site, thereby preventing precipitation from infiltrating and causing it to pond or runoff. However, stormwater flows would be contained on-site and piped or conveyed to the City's stormwater system, there would be no potential for increased erosion or sedimentation.

Developed storm drainage facilities in the area are adequate to handle this minor increase in flows. The project would not result in a substantial alteration of drainage in the area, and no offsite uses would be affected by the proposed changes. All potential impacts are **less than significant**.

4) **Less Than Significant Impact**

The proposed project would alter the existing drainage pattern of the site, but not in a manner that would result in flooding. The site is currently vacant and any construction on the site would alter the drainage pattern and reduce the absorption capability of the site. There are no streams or rivers that would be affected. All storm runoff would be captured onsite and conveyed through pipes to the City's stormwater system (an 18-inch storm drain line exists in Yosemite Avenue). Any changes to the site would drain into the City's existing storm drain system which would prevent any onsite or offsite flooding. This potential impact is **less than significant**.

5) **Less Than Significant Impact with Mitigation**

Construction on the site will drain into the City's existing storm drain system. The developer would be required to provide documentation showing the capacity exists within the existing lines and basin to serve this project. The following mitigation measure would ensure any impacts are reduced to a **less than** significant level.

Mitigation Measure H-1

Prior to the issuance of a building permit for this project, the applicant shall demonstrate to the City that storm drainage facilities are adequate to meet the Project demands and that improvements are consistent with the City's Storm Drainage Master Plan and the Post Construction Standards for the City's Phase II MS4 permit.

6) **Less Than Significant Impact**

The proposed project would not substantially degrade water quality. The proposed project would be served by the City's water system and all water runoff will be contained onsite then directed out to the City's storm drain system. The construction of the project would not affect the water quality and would not degrade water quality in the area. This potential impact is **less than significant**.

7) **Less than Significant Impact**

The Flood Insurance Rate Map shows the project within a Zone "X," areas determined to be outside the 0.2% chance floodplain (areas of minimal flood hazard) (Attachment F). Based on its location, the proposed project would not expose housing to flood hazards. Additionally, the implementation of the project would not lead to offsite effects of hazards posed by floods, nor would any existing offsite flood hazards be exacerbated.

In accordance with the City's General Plan Amendment #16-02 (policies related to protection from future local flood event), it has been determined that the Project site meets the criteria described in paragraph 2.3, "shallow flooding and local drainage" from the "Urban level of Flood Protection Summary Report." Accordingly, this finding means that the standard that will apply is the National FEMA Standard of Flood Protection (100-year Flood Event) and not the Urban Level of Flood Protection (200-year Flood Event). (QK Inc., March 9, 2017)

This potential impact is **less than significant**.

8) **Less than Significant Impact**

The proposed project would not place structures within a 100-year flood hazard area. Refer to Question 7 above. This potential impact is **less than significant**.

9) **Less than Significant Impact**

The proposed project would not 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. According to Figure 11.3 of the *Merced Vision 2030 General Plan*, the project site is outside the inundation area of the Yosemite Lake Dam and the Bear Reservoir Dam. In the case of dam failure, the General Plan Safety Element addresses local hazard response procedures. This potential impact is **less than significant**.

10) Less than Significant Impact

The proposed project is located approximately 80 miles from the Pacific Ocean, distant from any large lakes, and not within the inundation zones for Lake Yosemite or Bear Reservoir at an elevation ranging from approximately 173 feet above MSL. According to the City’s General Plan Safety Element, the City of Merced is not subject to inundation by tsunami, seiche, or mudflow. This potential impact is **less than significant**.

I. Land Use and Planning

SETTING AND DESCRIPTION

The project site is located within the City Limits of Merced and within its Specific Urban Development Plan and Sphere of Influence (SUDP/SOI).

SURROUNDING USES

Refer to Page 2 of this Initial Study and the map at Attachment A for the surrounding land uses.

Current Use

The project site is a total of 17.25 acres of vacant land located on the south side of Yosemite Avenue at Lake Road.

Project Characteristics

The applicant is requesting to change the General Plan designation from Low Density Residential (LD) to High-Medium Density Residential (HMD) and Neighborhood Commercial (CN) for 1.0 acre to allow for the construction of a mixed use development. The project includes 225 student housing units, a clubhouse and pool, and 6,600 square feet of retail commercial space.

The student housing component of the project includes 15 three-story buildings for a total of 390,225 square feet. The clubhouse would provide 13,700 square feet. A total of 652 parking spaces would be provided to serve the student housing units. The complex would include a network of walking and biking trails, outdoor recreation space, dog park and a community bus stop.

The proposed retail component includes 6,600 square feet of commercial retail space. The design of the retail space is such that it would accommodate a drive-thru use such as a fast-food restaurant or coffee shop. The project site plan is found at Attachment B.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
I. <u>Land Use and Planning.</u>				
Would the project:				
1) Physically divide an established community?			✓	

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
2) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to, the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?			✓	
3) Conflict with any applicable habitat conservation plan or natural community conservation plan?				✓

1) **Less than Significant Impact**

The project site is within the boundaries of the Merced City Limits. Although it is on the edge of the City Limits and adjacent to property that has not been annexed, it would not physically divide the community as it is already part of the City. This potential impact is **less than significant**.

2) **Less Than Significant Impact**

The site does not currently have the appropriate General Plan and Land Use designations for the proposed use. However, if the requested General Plan Amendment and Zone Change are approved, the site and future residential and retail uses would be consistent with the General Plan and Zoning designations. The requested change would not affect any plan adopted for the purpose of mitigating an environmental effect. All environmental effects caused by this project are being evaluated in this document and appropriate mitigation measures will be applied to address any negative effects on the environment. Therefore, this impact is **less than significant**.

3) **No Impact**

No Habitat Conservation Plans or Natural Community Conservation Plans have been adopted by the City of Merced. Therefore, there would be **no impact**.

J. Mineral Resources

SETTING AND DESCRIPTION

The City of Merced does not contain any mineral resources that require managed production according to the State Mining and Geology Board. Based on observed site conditions and review of geological maps for the area, economic deposits of precious or base metals are not expected to underlie the City of Merced or the project site. According to the California Geological Survey, Aggregate Availability in California - Map Sheet 52, Updated 2006, minor aggregate production occurs west and north of the City of Merced, but economic deposits of aggregate minerals are not mined within the immediate vicinity of the SUDP/SOI. Commercial deposits of oil and gas are not known to occur within the SUDP/SOI or immediate vicinity.

According to the Merced County General Plan Background Report (June 21, 2007), very few traditional hard rock mines exist in the County. The County’s mineral resources are almost all sand and gravel mining operations. Approximately 38 square miles of Merced County, in 10 aggregate resource areas (ARA), have been classified by the California Division of Mines and Geology for aggregate. The 10 identified resource areas contain an estimated 1.18 billion tons of concrete resources with approximately 574 million tons in Western Merced County and approximately 605 million tons in Eastern Merced County. Based on available production data and population projections, the Division of Mines and Geology estimated that 144 million tons of aggregate would be needed to satisfy the projected demand for construction aggregate in the County through the year 2049. The available supply of aggregate in Merced County substantially exceeds the current and projected demand.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
J. <u>Mineral Resources.</u> Would the project:				
1) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?				✓
2) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?				✓

1) No Impact

Based on observed site conditions and review of geological maps for the area, economic deposits of precious or base metals are not known to occur in the City of Merced or on the project site. Therefore implementation of the proposed project would have **no impact** on the availability of mineral resources or impact current or future mining operations.

2) No Impact

No Mineral Resource Zones or mineral resource recovery sites exist within the City of Merced or on the project site. Therefore implementation of the proposed project would have **no impact** on the availability of mineral resources or impact current of future mining operations.

K. Noise

SETTING AND DESCRIPTION

Potential noise impacts of the proposed project can be categorized as those resulting from construction and those from operational activities. Construction noise would have a short-term effect; operational noise would continue throughout the lifetime of the project. Construction associated with the development of the project would increase noise levels temporarily during construction. Operational noise associated with the development would occur intermittently with the continued operation of the proposed project.

Some land uses are considered more sensitive to noise levels than other uses. Sensitive land uses can include residences, schools, nursing homes, hospitals, and some public facilities, such as libraries. The noise level experienced at the receptor depends on the distance between the source and the receptor, the presence or absence of noise barriers and other shielding devices, and the amount of noise attenuation (lessening) provided by the intervening terrain. For line sources such as motor or vehicular traffic, noise decreases by about 3.0 to 4.5A –weighted decibels (dBA) for every doubling of the distance from the roadway.

Noise from Other Existing Sources

Vehicular noise from Yosemite Avenue would be the primary existing noise source at the project site. The nearest railroad corridor is 2 to 3 miles from the project site. A private airstrip is within 2 to 3 miles of the project site as well. According to the *Merced Vision 2030 General Plan, Noise Element, Table 10.2*, noise generated by traffic on Yosemite Avenue is 61.2 dB Ldn at 100 feet from the centerline of the roadway.

The distance to the 65 dB Ldn contour for Yosemite Avenue at the project's location is 55 feet to the centerline of the road, according to Table 10.2. The closest residential units on the site would be located approximately 85 feet from the centerline of the road.

According to the *Merced Vision 2030 General Plan*, noise exposure not exceeding 60 dB is considered to be a “normally acceptable” noise level for residential uses adjacent to Yosemite Avenue.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
K. Noise. Would the project result in:				
1) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?		✓		
2) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?			✓	
3) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?			✓	
4) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?			✓	

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
5) 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 levels?			✓	
6) 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?			✓	

1) **Less Than Significant with Mitigation**

Construction Noise

Construction of the project would temporarily increase noise levels in the area during the construction period. Therefore, the noise from construction may be steady for a few months and then cease all together. Construction activities, including site preparation and grading, building construction, and sidewalk and street improvements would be considered an intermittent noise impact throughout the construction period. These activities could result in various effects on sensitive receptors, depending on the presence of intervening barriers or other insulating materials. Although construction activities would likely occur only during daytime hours, construction noise could still be considered disruptive to local residents. The City of Merced does not have a noise ordinance, but past practice has been to allow construction activities during daylight hours (between 7:00 a.m. and 7:00 p.m.). The implementation of Mitigation Measures K-1 and K-2 would reduce this impact to a **less than significant level**.

Mitigation Measure K-1

Construction activities shall be limited to the hours of 7:00 a.m. to 7:00 p.m.

Mitigation Measure K-2

Construction equipment, compressors, and generators shall be fitted with heavy duty mufflers specifically designed to reduce noise impacts.

Operational Noise

Operational noise would be the main noise source expected from the proposed project. Traffic coming to and from the project site for the residential and retail uses would generate the most noise. However, it is anticipated that many of the students living in the apartments would use alternate means of transportation such as the bus that will serve the complex, the City bus system, or bicycles, which would reduce the noise generated by traffic. Vehicular traffic to the retail use would also be reduced by the fact that much of the

customer base for the proposed retail use would come from the tenants or students who are traveling by bus or bicycle to the UC Merced Campus.

Noise from tenants in the complex could also be a source of noise. The developer will have an onsite manager to address any noise issues on the site including loud music, noisy gatherings, or other noise that could be considered a nuisance to the surrounding area. Implementation of the project would not lead to continued offsite effects related to noise generated by the project. Given the reduction in traffic due to alternate transportation opportunities and the regulation of onsite activities by on-site management, this potential impact is **less than significant**.

Exposure of Project Residents to Existing Noise Sources

The California Supreme Court has clarified CEQA practice to limit the evaluation of environmental effects only to the impact of a proposed project on the environment, and not the effects of the environment on a project. The following discussion provides information regarding potential exposure to excess noise levels from existing transportation noise sources. As directed by the Supreme Court, no environmental conclusions are made regarding this hazard. As noted above, the City of Merced maintains noise standards for land uses exposed to transportation noise. According to the *Merced Vision 2030 General Plan, Noise Element*, the project site would not be exposed to noise levels in excess of those found to be normally acceptable for outdoor recreation areas. The *Noise Element* requires an interior noise level of 45 dB Ldn for a proposed residential use. Implementation of the following mitigation measure would ensure that the interior noise level meets City Standards and reduce this potential impact to a **less than significant level**.

Mitigation Measure K-3

Prior to the issuance of a building permit, the project applicant or any successor in interest, shall provide documentation showing the interior noise levels of the residential units would meet the City's interior standard of 45 dB Ldn..

2) Less Than Significant Impact

Implementation of the proposed project would not result in the generation of any groundborne vibration or noise. This is a **less than significant impact**.

3) Less Than Significant Impact

As noted above, operational noise would be expected from the proposed project. Any development on the site could be considered an increase in the ambient noise given the fact that the site is currently vacant. However, as explained above, the opportunities for alternative transportation methods and on-site management would reduce the potential impacts to a **less than significant** level.

4) Less Than Significant Impact

The project construction will cause temporary and periodic increases in the ambient noise levels. However, because the construction noise will only be temporary and the increase in noise generated from the site would be minimal, the impacts are **less than significant**.

5) **Less than Significant Impact**

The project is not located within the noise contours of any public airport. The project site is located approximately 5 miles from active areas of the Merced Regional Airport and approximately 8 miles from the Castle Airport. The project site is located within approximately 2 to 3 miles of a private airstrip. However, the airstrip has a flight pattern that goes northwest/southeast, which does not fly over the project site. Given its location, the private airstrip should not pose a hazard to the project development. Therefore, no population working or living at the site would be exposed to excessive levels of aircraft noise. This potential impact is **less than significant**.

6) **Less than Significant Impact**

See question #5 above.

L. Population and Housing

SETTING AND DESCRIPTION

The implementation of the proposed project would result in the construction of 225 student housing units, a club house, and other amenities related to the housing complex. In addition, the project would include the construction of a 6,600-square-foot retail commercial building.

The 225 student housing units would provide 705 furnished bedrooms. The complex would be comprised of 15 buildings with 47 bedrooms each.

Expected Population and Employment Growth

According to the State Department of Finance population estimates for 2016, the City of Merced's population was estimated to be 83,962. Population projections estimate that the Merced SUDP area will have a population of 159,900 by the Year 2030.

According to the *Merced Vision 2030 General Plan*, the City of Merced is expected to experience significant employment growth by the Year 2030.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
L. <u>Population and Housing.</u> Would the project:				
1) 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)?			✓	
2) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?				✓

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
3) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?				✓

1) Less Than Significant Impact

Temporary construction-related jobs would result due to the renovation and construction associated with the project, but it is unlikely that construction workers would need to relocate to Merced in order to work temporarily on the project site.

The implementation of the project would increase the population of the project site due to new housing units and a few job opportunities related to the retail use. However, the construction of the student housing project is in response to the increase in students attending UC Merced and not the catalyst for the population. It is expected that by 2020, an additional 3,500 students will be attending UC Merced. Therefore, additional housing is needed for the influx of students. Under the present zoning of R-1-6 and P-D 52, approximately 125 single-family dwelling units could be constructed. If each of these dwellings had four bedrooms, there would be approximately 500 bedrooms in the area. However, unlike the apartments, it's not unlikely that more than one person would occupy each of the bedrooms which could increase the number of people in the area by an additional 25 to 50% which would bring the expected population in the area near what the population would be for the proposed project. In addition, due to the location of the site, it is likely that any housing built in this area would, at least in part, be rented to students. Based on these factors, this potential impact would be **less than significant**.

2) No Impact

The project site is vacant. No housing would be displaced as a result of this project. There is **no impact**.

3) No Impact

The project site is vacant. No housing would be displaced as a result of this project. There is **no impact**.

M. Public Services

SETTING AND DESCRIPTION

Fire Protection

The City of Merced Fire Department provides fire protection, rescue, and emergency medical services from five fire stations throughout the urban area. Fire Station #55 is located on Parsons Avenue just south of Yosemite Avenue, approximately one mile from the site. This Station would serve the proposed project.

Police Protection

The City of Merced Police Department provides police protection for the entire City. The Police Department employs a mixture of sworn officers, non-sworn officer positions (clerical, etc.), and unpaid volunteers (VIP). The service standard used for planning future police facilities is approximately 1.37 sworn officers per 1,000 population, per the Public Facilities Financing Plan.

Schools

The public school system in Merced is served by three districts: 1) Merced City School District (elementary and middle schools); 2) Merced Union High School District (MUHSD); and, 3) Weaver Union School District (serving a small area in the southeastern part of the City with elementary schools). The districts include various elementary schools, middle (junior high) schools, and high schools. The Project site falls within the Merced City School District and Merced Union High School District (MUHSD).

As the City grows, new schools will need to be built to serve our growing population. According to the Development Fee Justification Study for the MUHSD, Merced City Schools students are generated by new multi-family development at the following rate:

Commercial/Industrial Category	Elementary (K-8) (Students per 1,000 sq.ft.)	High School (9-12) (Students per 1,000 sq.ft.)
Retail	0.13	0.038
Restaurants	0.00	0.157
Offices	0.28	0.048
Services	0.06	0.022
Wholesale/Warehouse	0.19	0.016
Industrial	0.30	0.147
Multi-Family	0.559 (per unit)	0.109 (per unit)

Based on the table above, the proposed change in use from low density residential to high density residential would normally result in an increase in the number of students expected to be generated. Based on the rates above, the proposed 225 units would generate 126 K-8 students and 25 high school students. The 6,600 square feet of retail space would generate 0.86 K-8 students and 0.25 high school students. However, the proposed project is being constructed to serve students of UC Merced and Merced Junior College. Its unlikely that families would be occupying the proposed units. Therefore the number of students generated for K-12 schools would be minimal.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
M. <u>Public Services.</u> Would the project:				
1) 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 following public services:				
a) Fire Protection?			✓	
b) Police Protection?			✓	
c) Schools?			✓	
d) Parks?			✓	
e) Other Public Facilities?			✓	

1) **Less Than Significant**

a) Fire Protection

The project site is located within Fire District #5 and would be served by Fire Station #55, located at 3520 Parsons Avenue (approximately one mile from the project site). The response from this station would meet the desired response time of 4 to 6 minutes, citywide, 90 percent of the time, within the financial constraints of the City. The proposed change in land use designation would not affect fire protection services, and no new or modified fire facilities would be needed. Any changes to the building or site would be required to meet all requirements of the California Fire Code and the Merced Municipal Code. Compliance with these requirements would reduce any future impacts to a less than significant level.

At the time a building permit is issued, the developer would be required to pay Public Facility Impact Fees (PFIF). A portion of this fee goes to cover the cities costs for fire protection such as fire stations, etc. In addition, the developer would be required to annex into the City's Community Facilities District for Services (CFD #2003-2). This would result in an assessment paid with property taxes in which a portion of the tax would go to pay for fire protection services. Compliance with all Fire, Building, and Municipal Code requirements as well as payment of the Public Facility Impact Fees, and annexation into the City's CFD for services would reduce any potential impacts to a **less than significant level**.

b) Police Protection

The site would be served by the City Police Department. The proposed change in use from Low Density Residential (single family) to High-Medium Residential (multi-family) could result in more calls to the site due to the increase number of units on the site. However, all housing provided by the project would be supervised by on-site management. Additionally, the complex would be gated to provide security to the site and only allow access to the tenants and their guests. For this reason, implementation of the proposed project would not require any new or modified police facilities.

The same requirements for paying Public Facility Impact Fees and annexation into the City's Community Facilities District for Services (CFD #2003-2) would apply with a portion of the fees and taxes collected going toward the costs for police protection. Therefore, this potential impact is reduced to a **less than significant** level.

c) Schools

Based on the table and discussion provided in the "Settings and Description" section above, the proposed General Plan Amendment would be unlikely to generate additional students to the school system. However, as appropriate, the developer would be required to pay all fees due under the Leroy F. Greene School Facilities Act of 1988. Once these fees are paid, the satisfaction of the developer of his statutory fee under California Government Code §65995 is deemed "full and complete mitigation" of school impacts. This potential impact is **less than significant**.

d) Parks

Richard Bernasconi Park is located less than a mile west of the site. Development of the project may increase the use of neighborhood or regional parks. However, the development includes several amenities for outdoor recreation. The development includes a swimming pool and spa, a community plaza, a dog park, and basketball court. All buildings and amenities are connected by a network of sidewalks.

Payment of the fees required under the Public Facilities Financing Program (PFIF) as described above would be required at time of building permit issuance to help fund future parks and maintenance of existing parks as well as the payment of fees in lieu of land dedication for future parks would be required at the building permit stage. The proposed amenities onsite and the payment of fees would reduce this potential impact to **less than significant**.

e) Other Public Facilities

The development of the project could impact the maintenance of public facilities and could generate impacts to other governmental services. Payment of the fees required under the Public Facilities Financing Program (PFIF) as described above would mitigate these impacts to a **less than significant** level.

N. Recreation

SETTING AND DESCRIPTION

The City of Merced has a well-developed network of parks and recreation facilities. Four City parks and recreation facilities are located within a one-mile radius of the project site.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
N. Recreation. Would the project:				
1) Increase the use of neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?			✓	
2) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?				✓

1) **Less the Significant Impact**

Development of the project may increase the use of neighborhood or regional parks. However, payment of the required development fees at the building permit stage along with the amenities on site would reduce the potential impacts to a **less than significant** level.

2) **No Impact**

The project is not responsible for the construction or expansion of any recreational facilities.

O. Transportation/Traffic

SETTING AND DESCRIPTION

The project site is located on the south side of Yosemite Avenue (divided arterial, special street section with 90-foot right-of-way) at Lake Road (collector street). The project proposes a main driveway access to line up with Lake Road to the north and an exit-only driveway near the western edge of the project site. However, it is likely the western-most driveway will be changed to allow full turning movements and may be moved to the western edge of the project site. The proposed apartment complex would be gated with gates at both the main entrance and the secondary entrance.

The project provides bicycle parking and a shuttle service for tenants. In addition, there is a bus stop located near the site for The Bus (the local bus service) and Cat Tracks (the UC Merced bus service). This existing stop may be moved east along the project frontage. In either location, it is

within walking distance of the proposed project. The student housing complex would also provide a dedicated shuttle service to both the UC Merced and Merced College Campuses.

Yosemite Avenue is an east-west arterial that runs from North Highway 59 east to its terminus at Arboleda Drive (County). Portions of Yosemite Avenue are 2 lanes and in some areas the roadway has 4 lanes. As a condition of approval of the Tentative Map for the Moraga Subdivision just west of the project site, Yosemite Avenue from Lake Road to McKee was widened to 4 lanes.

Lake Road is a 2 lane north-south collector road extending from Yosemite Avenue to its northern terminus at Lake Yosemite. Lake Road becomes a local access road in the future. Campus Parkway replaces its function for through access. Lake Road currently provides primary access to the UC Merced campus.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
O. <u>Transportation/Traffic.</u> Would the project:				
1) Cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e. result in a substantial increase in either vehicle trips, the volume to capacity ratio on roads, or congestion at intersections)?			✓	
2) Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roadways?			✓	
3) 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?			✓	
4) Substantially increase hazards due to a design feature (e.g. sharp curves or dangerous intersections) or incompatible uses (e.g. farm equipment)?			✓	
5) Result in inadequate emergency access?			✓	
6) Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g. bus turnouts, bicycle racks)?			✓	

1) Less Than Significant Impact with Mitigation

The proposed project would increase the traffic on the adjacent roadway system. The site is currently vacant. Therefore, any development on the site would increase traffic in the area. The Expanded Initial Study (EIS #02-27) prepared for the Hunt Family Annexation,

which included this site, anticipated single-family homes at this site. The change to allow student housing and retail would increase the traffic in the area. However, the proposed project is providing measures to help reduce traffic related impacts. These measures include a shuttle service for the tenants and bicycle parking to help encourage alternate means of transportation. Additionally, there is a bus stop nearby which will encourage tenants to use the bus system rather than drive their own vehicles.

Given the fact that the residential component of the project is for students, it is likely that many of the residents may not have a vehicle. Additionally, given the close proximity of the site to the UC and Merced College Campuses, it is likely that many students would commute by bicycle, walking or via the bus system.

The Institute of Transportation Engineers (ITE) Trip Generation Rates Manual (9th Edition) is used to estimate the number of trips generated by a particular use. The ITE Manual doesn't provide a trip generation rate for student housing, therefore, the rate for apartments has been used. This rate estimates 6.65 average daily trips per unit resulting in a total of 1,496 Average Daily Trips (ADT's) for the student housing component of the project.

For the retail portion of the project, it is assumed the use would be some kind of fast-food restaurant with a drive-thru. The rate used for the retail was 496.12 per 1,000 square feet. This calculation resulted in 3,274 ADT's for the retail component of the project site.

Trip generation rates can be reduced by applying a "pass-by" reduction. Pass-by trips are traffic already on the way from an origin to a primary destination that make an intermediate stop at the site while passing by on an adjacent street. Pass-by trips are considered existing traffic because they would have been passing by the site regardless of the new development. Pass-by trips make up a large share of the trip generation for convenience stores, gas station, and restaurants. In this case, we applied a 40% pass-by rate for the retail portion of the project (see table on the next page).

A certain number of residential trips can be reduced due to the dedicated shuttle service provided by the student housing complex. This reduction would account for the number of residents who would use the dedicated shuttle going to the UC Merced and Merced College Campuses or the City's bus service rather than personal vehicles. A 15% reduction is assumed for transit use (see the table on the next page).

A certain number of trips generated within a mixed-use development such as the one proposed can be reduced due to internal capture. Internal capture are trips estimated as part of the total trip generation of each individual land use within multi-use developments, but are trips between on land use and another land use on the same site (e.g., between residential and retail or restaurant). Internal capture trips can be made on the site by walking or by vehicles using internal roadways without using the major street system and, thus, can be subtracted from the total site trip generation. 25% and 10% internal capture reduction was applied to the student housing and commercial components of the project respectively (see the table on the next page).

Land Use	Number of Units/ Square Feet	Vehicle Trips		
		AM Peak	PM Peak	ADT's
Student Housing	225 units	115	140	1496
Retail (Fast Food with drive-thru)	6,600 s.f.	326	223	3274
Total Unadjusted Trips		441	363	4,770
Student Housing Trip Reduction	15% Transit & 25% Internal	-46	-56	-598
Retail Trip Reduction	40% Pass-By 12% Internal	-169	-116	-1703
Total Adjusted Student Housing Trips		69	84	898
Total Adjusted Retail Trips		156	107	1,571
Total Adjusted Trips for Project		225	191	2,469

The Expanded Initial Study prepared for the Hunt Family Annexation (EIS #02-27) considered the “worst case scenario” for the average number of trips generated by the project. At the time of annexation, the project site was designated as Low Density Residential. The total trips estimated for the annexation area was estimated to be 10,393 (using the average rate of 9.57 trips/unit). Given the fact that the number of housing units actually constructed, or that have a Tentative Subdivision Map (TSM) approved, is 730 units. The EIS assumed the number of housing units to be 1,086 as a “worst case scenario.” Based on this, the total number of single-family dwellings built or mapped is 356 units less than what was originally proposed.

In comparing the number of ADT's projected by the EIS for the Hunt Family Annexation to the total number of trips estimated for the number of actual units built and mapped plus the proposed project, the number of trips would be less than what was analyzed in EIS #02-27.

Trip Comparison

	Units	ADT's
Assumed Project in EIS #02-27	1086	10,393
Constructed/Mapped/Approved TSM	730	6,986
Proposed Project	225	2,469
Total – Constructed/Mapped/Approved TSM plus Proposed Project	955	9,455

As a condition of approval and agreed upon by the developer, the proposed project would install a traffic signal at the intersection of the Project Entrance and Lake Road. This signal would help mitigate impacts resulting from an increase in traffic in this area.

The quality of traffic operating conditions is rated by Level of Service (LOS) Categories A through F (“A” being the best). LOS A indicates free-flow traffic conditions with little or no delay. LOS F represents over-saturated conditions where traffic flows exceed capacity resulting in long queues and delays. The City of Merced has adopted LOS D as the standard for streets to operate at an acceptable level. According to Table 4.4 of the *Merced Vision 2030 General Plan*, Yosemite Avenue from Parson/Gardner to Campus Parkway is operating at a Level of Service (LOS) D. At the projected buildout of the General Plan area, this segment of Yosemite Avenue would continue to operate at an LOS D. Considering the table above showing that the number of trips generated by the actual number of units constructed plus the mapped and approved lots plus the project is less than the number used to analyze the “worst case scenario” in EIS #02-27, Yosemite Avenue would continue to operate at LOS D with the proposed project being built.

Because Lake Road is a collector road, the City does not have trip generation data in the General Plan. However, EIS #02-27 stated that “Lake Road carries traffic volumes of about 600 vehicles per day.” A traffic study prepared for this project shows the intersection of Yosemite Avenue and Lake Road operates at LOS A during peak a.m. and p.m. hours.

Given that the EIS found this traffic impact to be less than significant with a mitigation measure requiring payment of the City’s Public Facilities Impact Fees prior to the issuance of a building permit and the fact that a traffic signal would be installed at Yosemite Avenue and Lake Road, it is reasonable to assume based on the above analysis, the potential impact from the proposed project would also be mitigated by the payment of fees to a **less than significant level**.

Mitigation Measure O-1

The project shall pay all fees as required under the City’s Public Facilities Impact Fee Program prior to issuance of a certificate of occupancy for any building.

2) Less Than Significant Impact

As described above, the proposed project would increase the traffic in the area. However, the level of service for the adjacent roadways would remain within LOS D. Therefore, this potential impact would be **less than significant**.

3) Less Than Significant Impact

The project will not result in any changes to air traffic patterns. This project is a mixed-use development that would not 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 risk. This potential impact is **less than significant**.

4) Less Than Significant Impact

The project will not increase hazards due to a design feature or incompatible uses. In fact, the installation of a traffic signal at the intersection of the Project Entrance and Lake Road would help reduce hazards in the area. This potential impact is **less than significant**.

5) **Less Than Significant Impact**

The project site includes two access points from Yosemite Avenue. The developer has worked with the Fire Department to ensure sufficient access is provided both to the site and throughout the site. This potential impact is **less than significant**.

6) **Less Than Significant Impact**

The project will not conflict with any policies, plans, or programs supporting alternative transportation. The project includes bicycle parking, a dedicated shuttle service to UC Merced and Merced College, as well as being located within walking distance of a City bus stop. This potential impact is **less than significant**.

P. Utilities and Service Systems

SETTING AND DESCRIPTION

Water

The City's water system is composed of 22 groundwater production wells located throughout the City, approximately 350 miles of main lines, and 4 water tower tanks for storage. Well pump operators ensure reliability and adequate system pressure at all times to satisfy customer demand. Diesel powered generators help maintain uninterrupted operations during power outages. The City of Merced water system delivered more than 24 million gallons of drinking water per day in 2013 to approximately 20,733 residential, commercial, and industrial customer locations. The City is required to meet State Health pressure requirements, which call for a minimum of 20 psi at every service connection under the annual peak hour condition and maintenance of the annual average daily demand plus fire flow, whichever is stricter. The City of Merced Water Division is operated by the Public Works Department.

The City of Merced's wells have an average depth of 414 feet and range in depth from 161 feet to 800 feet. The depth of these wells would suggest that the City of Merced is primarily drawing water from a deep aquifer associated with the Mehrten geological formation. Increasing urban demand and associated population growth, along with an increased shift by agricultural users from surface water to groundwater and prolonged drought have resulted in declining groundwater levels due to overdraft. This condition was recognized by the City of Merced and the Merced Irrigation District (MID) in 1993, at which time the two entities began a two-year planning process to ensure a safe and reliable water supply for Eastern Merced County through the year 2030. Integrated Regional Water Planning continues today through various efforts.

Wastewater

Wastewater (sanitary sewer) collection and treatment in the Merced urban area is provided by the City of Merced. The wastewater collection system handles wastewater generated by residential, commercial, and industrial uses in the City.

The City Wastewater Treatment Plant (WWTP), located in the southwest part of the City about two miles south of the airport, has been periodically expanded and upgraded to meet the needs of the City's growing population and new industry. The City's wastewater treatment facility has a capacity of 11.5 million gallons per day (mgd); with an average flow in 2006, of 8.5 mgd. The City has recently completed an expansion project to increase capacity to 12 mgd and upgrade to tertiary treatment with the addition of filtration and ultraviolet disinfection. Future improvements

would add another 8 mgd in capacity (in increments of 4 mgd), for a total of 20 mgd. This design capacity can support a population of approximately 174,000. The collection system will also need to be expanded as development occurs.

Treated effluent is disposed of in several ways depending on the time of year. Most of the treated effluent (75% average) is discharged to Hartley Slough throughout the year. The remaining treated effluent is delivered to a land application area and the on-site City-owned wetland area south of the treatment plant.

Storm Drainage

The Draft *City of Merced Storm Drainage Master Plan* addresses the collection and disposal of surface water runoff in the City’s SUDP. The study addresses both the collection and disposal of storm water. Systems of storm drain pipes and catch basins are laid out, sized, and costed in the plan to serve present and projected urban land uses.

It is the responsibility of the developer to ensure that utilities, including storm water and drainage facilities, are installed in compliance with City regulations and other applicable regulations. Necessary arrangements with the utility companies or other agencies will be made for such installation, according to the specifications of the governing agency and the City (Ord. 1342 § 2 (part), 1980: prior code § 25.21(f)). The disposal system is mainly composed of MID facilities, including water distribution canals and laterals, drains, and natural channels that traverse the area.

The City of Merced has been involved in developing a Storm Water Management Plan (SWMP) to fulfill requirements of storm water discharges from Small Municipal Separate Storm Sewer System (MS4) operators in accordance with Section 402(p) of the Federal Clean Water Act (CWA). The SWMP was developed to also comply with General Permit Number CAS000004, Water Quality Order No. 2003-0005-DWQ.

Solid Waste

The City of Merced is served by the Highway 59 Landfill and the Highway 59 Compost Facility, located at 6040 North Highway 59, one and one-half miles north of Old Lake Road. The County of Merced is the contracting agency for landfill operations and maintenance, as the facilities are owned by the Merced County Association of Governments. The City of Merced provides services for all refuse pick-up within the City limits and franchise hauling companies collect in the unincorporated areas. In addition to these two landfill sites, there is one private disposal facility, the Flintkote County Disposal Site, at SR 59 and the Merced River. This site is restricted to concrete and earth material.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
P. <u>Utilities and Service Systems.</u> Would the project:				
1) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?			✓	

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
2) 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?			✓	
3) 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?			✓	
4) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?			✓	
5) 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?			✓	
6) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?			✓	
7) Comply with federal, state, and local statutes and regulations related to solid waste?			✓	

1) **Less Than Significant Impact**

The project site would be served by City sewer system. There is sufficient capacity for serving this project and other future developments within the City of Merced. This potential impact is **less than significant**,

2) **Less Than Significant Impact**

The City's current water and wastewater system is capable of handling this project and other future developments within the City of Merced. There is an existing sewer line in Via Moraga approximately 0.1 mile away from the site. The project would be required to extend the main line to their site and across the entire frontage of their property (approximately 1,000 feet). However, this extension would be done within an existing roadway and no significant environmental impacts would result from the extension of the line. A water line currently exists in Yosemite Avenue along the property frontage. No new construction for water facilities would be required. This potential impact is **less than significant**.

3) **Less Than Significant Impact**

The project would be required to provide storm drainage facilities that would capture storm water onsite and be routed to the City’s storm drain system. There are existing storm drain lines in Yosemite Avenue which are sufficient to serve this development. No new facilities or expansions of existing facilities are needed. This potential impact is **less than significant**.

4) **Less Than Significant Impact**

As explained above, no new water facilities are needed for this project. The existing water system is sufficient to serve the development. Potential impacts are **less than significant**.

5) **Less Than Significant Impact**

Refer to item 2 above.

6) **Less Than Significant Impact**

The City of Merced uses the Highway 59 Landfill. Sufficient capacity is available to serve the future project. According to the *Merced Vision 2030 General Plan DEIR*, the landfill has capacity to serve the City through 2030. Potential impacts are **less than significant**.

7) **Less Than Significant Impact**

All construction on the site would be required to comply with all local, state, and federal regulations regarding solid waste, including recycling. Potential impacts are **less than significant**.

Q. Mandatory Findings of Significance

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
Q. <u>Mandatory Findings of Significance.</u> Would the project:				
1) 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, 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?			✓	

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
2) Have impacts that are individually limited, but cumulatively considerable? (“Cumulatively considerable” means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probably future projects.)			✓	
3) Have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?			✓	

1) **Less Than Significant Impact**

As previously discussed in this document, the project does not have the potential to adversely affect biological resources or cultural resources because such resources are lacking on the project site, and any potential impacts would be avoided with implementation of the mitigation measures and other applicable codes identified in this report. Also, the project would not significantly change the existing urban setting of the project area. Thus, this impact would be **less than significant**.

2) **Less Than Significant Impact**

The Program Environmental Impact Report conducted for the *Merced Vision 2030 General Plan, the General Plan Program EIR* (SCH# 2008071069), has recognized that future development and build-out of the SUDP/SOI will result in cumulative and unavoidable impacts in the areas of Air Quality and Loss of Agricultural Soils. In conjunction with this conclusion, the City has adopted a Statement of Overriding Considerations for these impacts (Resolution #2011-63) which is herein incorporated by reference.

The certified General Plan EIR addressed and analyzed cumulative impacts resulting from changing agricultural use to urban uses. No new or unaddressed cumulative impacts will result from the project that have not previously been considered by the certified General Plan EIR or by the Statement of Overriding Considerations, or mitigated by this Expanded Initial Study. This Initial Study does not disclose any new and/or feasible mitigation measures which would lessen the unavoidable and significant cumulative impacts.

The analysis of impacts associated with the development of the proposed General Plan Amendment and Zone Change would contribute to the cumulative air quality and agricultural impacts identified in the General Plan EIR. In the case of air quality, emissions from the proposed project would be less than significant, and with respect to agricultural resources, those were addressed with Expanded Initial Study (EIS) #02-27 for the Hunt Annexation. The nature and extent of these impacts, however, falls within the parameters of impacts previously analyzed in the General Plan EIR. No individual or cumulative impacts will be created by the Project that have not previously been considered at the program level by the General Plan EIR or mitigated by this Initial Study.

3) **Less Than Significant Impact**

Development anticipated by the *Merced Vision 2030 General Plan* will have significant adverse effects on human beings. These include the incremental degradation of air quality in the San Joaquin Basin, the loss of prime agricultural soils, the incremental increase in traffic, and the increased demand on natural resources, public services, and facilities. However, consistent with the provisions of CEQA previously identified, the analysis of the proposed Esperanza project is limited to those impacts which are peculiar to the project site or which were not previously identified as significant effects in the prior EIR. The previously-certified General Plan EIR and the Statement of Overriding Considerations addressed those cumulative impacts; hence, there is no requirement to address them again as part of this project.

This previous EIR concluded that these significant adverse impacts are accounted for in the mitigation measures incorporated into the General Plan EIR. In addition, a Statement of Overriding Considerations was adopted by City Council Resolution #2011-63 that indicates that the significant impacts associated with development of the General Plan project are offset by the benefits that will be realized in providing necessary jobs for residents of the City. The analysis and mitigation of impacts have been detailed in the Environmental Impact Report prepared for the *Merced Vision 2030 General Plan*, which is incorporated into this document by reference.

While this issue was addressed and resolved with the General Plan EIR in an abundance of caution, in order to fulfill CEQA's mandate to fully disclose potential environmental consequences of projects, this analysis is considered herein. However, as a full disclosure document, this issue is repeated in abbreviated form for purposes of disclosure, even though it was resolved as a part of the General Plan.

Potential impacts associated with the Project's development have been described in this Initial Study. All impacts were determined to be less than significant.

R. Greenhouse Gas Emissions

SETTING AND DESCRIPTION

The issue of project-generated Greenhouse Gas (GHG) Emissions is a reflection of the larger concern of Global Climate Change. While GHG emissions can be evaluated on a project level, overall, the issue reflects a more regional or global concern. CEQA requires all projects to discuss a project's GHG contributions. However, from the standpoint of CEQA, GHG impacts on global climate change are inherently cumulative. The quantity of GHGs that it takes to ultimately result in climate change is not precisely known; however, it can safely be assumed that existing conditions do not measurably contribute to a noticeable incremental change in the global climate.

An Air Quality and Greenhouse Gas study for this project was prepared by Rincon (Attachment D). The study analyzed the emissions associated with the proposed project construction and operations. Refer to this study for the regulatory setting.

To determine the proposed project GHG emissions, the following scenarios were calculated:

- Evaluation of construction emissions.
 - Evaluation of Indirect Emissions
 - Direct Emissions from Mobile Combustion
-

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
R. <u>Greenhouse Gas Emissions.</u> Would the project:				
1) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?		✓		
2) Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases?			✓	

1) **Less Than Significant Impact with Mitigation**

Construction of the proposed project would generate GHG emissions through onsite use of heavy duty construction equipment and offsite vehicle trips made by construction workers and haul/delivery trucks that would travel to and from the project site. Operational emissions would also be generated once the construction phase has been completed. The Greenhouse Gas study analyzed both construction and operational emissions. Based on the study's analysis, the project would result in a total of approximately 2,412 metric tons of CO_{2e} (see table below) which equates to a GHG emission efficiency of 3.4 metric tons of CO_{2e} per the total project population. In order to obtain this result, specific mitigation measures were included in the CalEEMod analysis (Appendix B of the Air Quality and Greenhouse Gas study at Attachment D). Implementation of the mitigation measures identified in Appendix B would reduce the GHG emission efficiency below the threshold of 4.41 metric tons of CO_{2e} annually. Therefore, this potential impact would be **less than significant with mitigation**.

Combined Greenhouse Gas Emissions Summary	
Emission Source	Project Annual Emissions
Construction (amortized)	29 metric tons CO _{2e}
<u>Operational:</u>	
Area	4 metric tons CO _{2e}
Energy (electricity and natural gas)	289 metric tons CO _{2e}
Solid Waste	23 metric tons CO _{2e}
Water	48 metric tons CO _{2e}
Mobile	2,019 metric tons CO _{2e}
Total	2,412 metric tons CO_{2e}

Mitigation Measure R-1:

The project shall comply with all mitigation measures outlined in Appendix B of the Greenhouse Gas Study prepared for this project (Attachment D).

2) **Less Than Significant Impact**

As described in the attached Greenhouse Gas Study, the proposed project would not conflict with any applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases. The proposed project would support many of the goals identified in the City's Climate Action Plan. The project would help reduce vehicle miles traveled by providing bicycle parking, an on-site shuttle service, improved pedestrian access, and improved access to public transit. The proposed project would also generate electricity with the installation of solar panels. As such, the potential impacts would be **less than significant**.

4. ENVIRONMENTAL DETERMINATION

On the basis of this initial environmental evaluation:

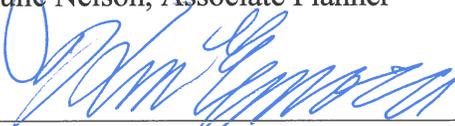
I find that the project could have a significant effect on the environment, and that a MITIGATED NEGATIVE DECLARATION HAS BEEN PREPARED for

 X public review.

March 28, 2017



Julie Nelson, Associate Planner



Kim Espinosa, Planning Manager
Environmental Coordinator
City of Merced

Distributed for Public Review: March 30, 2017

5. PREPARERS OF THE INITIAL STUDY

LEAD AGENCY

City of Merced
Planning & Permitting Division
678 West 18th Street
Merced, CA 95340
(209) 385-6967
Julie Nelson, Associate Planner

ATTACHMENTS:

- A) Location Map
 - B) Site Plan
 - C) Mitigation Monitoring Program for EIS #02-27
 - D) Air Quality and Greenhouse Gas Study
 - E) Geotechnical Study
 - F) Flood Map
 - G) Public Hearing Notice
 - H) Public Hearing Notice Map
-

LOCATION MAP
University Village - Lake
GPA #16-06/AC #424/P-D Establishment #76



HATCH

PERCH SEAL

SURF

ATLANTIC

LAKE

Rural Residential

Ag Land

YOSEMITE

EXPLORADOR

Subject Site

Low Density Residential

URDANETA

Low Density Residential

Ag Land

MALASPINA

GABRIEL

VIA MORAGA

WHITEWATER

NARVAEZ

MAGELLAN

BONIFACIO

DE SOTO

Park

JARDIN

VALDEZ

AVILES

PACHECO

WHITEWATER

WINDSONG

MARINER

OAK CREEK

FREESTONE

SUNSTONE

CREEKVIEW

RIVER ROCK

WILLOW RUN

CREEKVIEW

BLACK RASCAL BP

FALLBROOK

ATTACHMENT A

Legend 
 City Limit

DATE	10/15/2015
PROJECT	UNIVERSITY VILLAGE AT LAKE
DRAWN BY	JAY BLATTER
CHECKED BY	JAY BLATTER
SCALE	AS SHOWN
PROJECT NO.	15000000
SHEET NO.	1
TITLE	SITE PLAN

SHEET CONTENTS
SITE PLAN & PROJECT STATISTICS

PROJECT DIRECTORY

OWNER
FAGUNDES DAIRY, GP
UNIVERSITY VILLAGE MERCED, LLC
A CALIFORNIA LIMITED LIABILITY COMPANY
P.O. BOX 2717
MERCED, CA 95344

CONTACT: JOHN PETERSON
T 805.324.0800
EMAIL: john@petersonassoc.com

ARCHITECT
HOCHHAUSER BLATTER
122 E. ARRELLAGA ST.
SANTA BARBARA, CA 93101

CONTACT: JAY BLATTER
T 805.962.2746
EMAIL: jay@hochhauser.com

APPLICANT
UNIVERSITY VILLAGE MERCED, LLC
A CALIFORNIA LIMITED LIABILITY COMPANY
P.O. BOX 2717
MERCED, CA 95344

CONTACT: JOHN HEWITT
T 816.712.5777
EMAIL: john@universityplanning.com

ENGINEERS
GRI, INC.
122 E. ARRELLAGA ST.
MERCED, CA 95346

CONTACT: DESMOND JOHNSTON
T 209.724.2086
EMAIL: Des.Johnston@grinc.com

PROJECT STATISTICS

PROJECT: UNIVERSITY VILLAGE AT LAKE
WMSD USE DEVELOPMENT
UNIVERSITY VILLAGE AT LAKE ROAD
MERCED, CA 95340

PARCEL 1: 647,664 SQ. FT. (14.86 ACRES)
PARCEL 2 (WEST): 103,793 SQ. FT. (2.39 ACRES)
TOTAL AREA: 751,457 SQ. FT. (17.25 ACRES)

COMMERCIAL/RETAIL: 6,600 SQ. FT. (ONE STOREY)

CLUBHOUSE: 10,700 SQ. FT. (TWO STOREY)

RESIDENTIAL BUILDINGS: 390,225 SQ. FT. (10 BUILDINGS @ 39,023 SQ. FT. EACH)

RESIDENTIAL UNITS BLDG:
1 - 2-BEDROOM UNITS
1 - 3-BEDROOM UNITS
8 - 4-BEDROOM UNITS

TOTAL NO.:
5 X 18 = 90
5 X 18 = 90
5 X 18 = 90
228 RESIDENTIAL UNITS

COMMERCIAL/RETAIL PARKING:
50 SPACES
2 SPACES
52 SPACES

RESIDENTIAL PARKING:
500 SPACES
100 SPACES
600 SPACES

PROJECT DESCRIPTION

UNIVERSITY VILLAGE AT LAKE is a proposal mixed use development located on a 17.25 acre site that fronts Yosemite Avenue and Lake Road. The project includes:

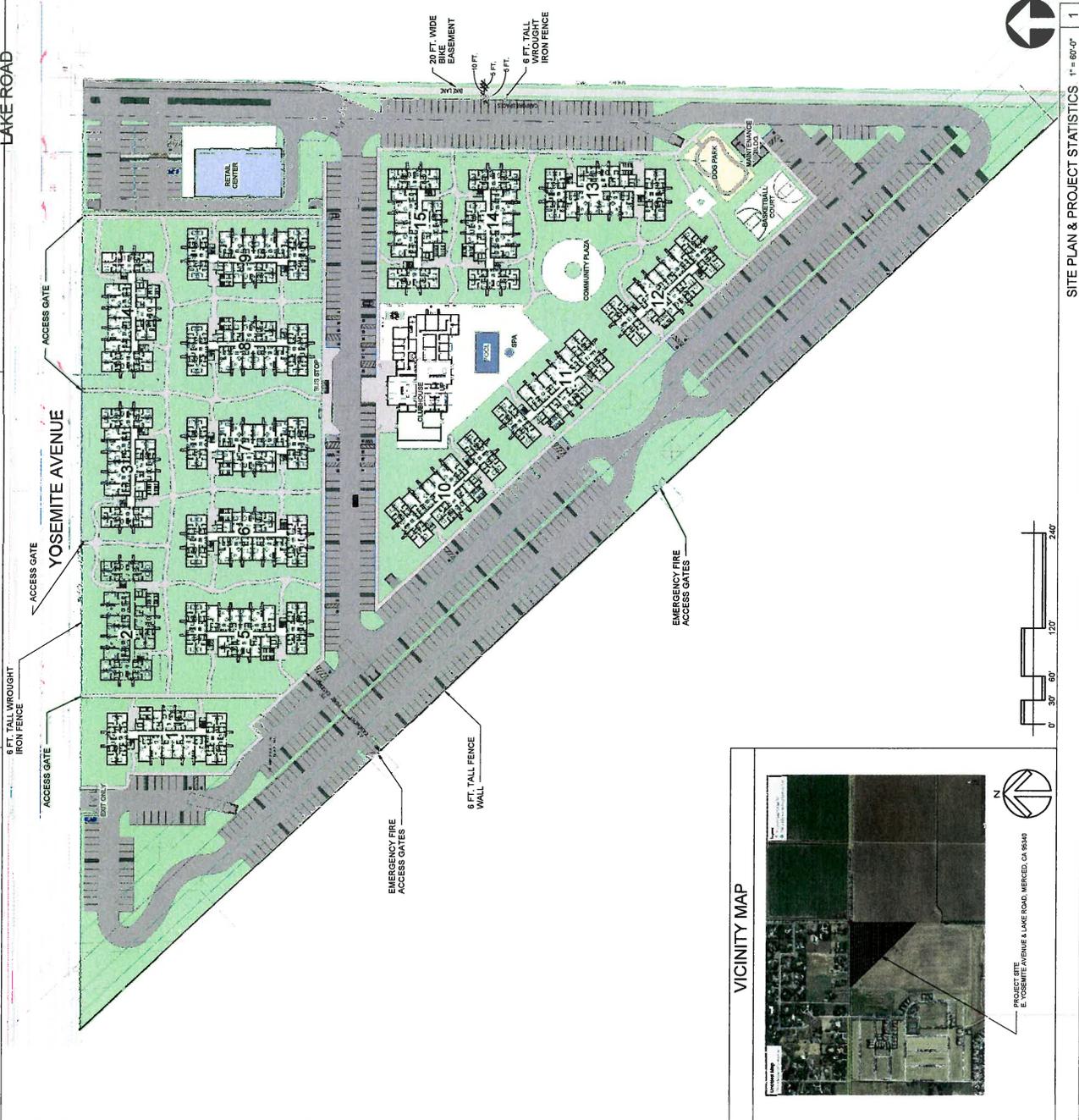
- A 228 unit student housing village that includes 16 three story residential buildings, and a 137,000 SF two story clubhouse and a network of walking and biking trails, outdoor pedestrian linkages to the residential development.
- An approximate 6,600 SF commercial retail space located along Yosemite Avenue, with pedestrian linkages to the residential development.

The project master plan is based on sustainable and green principles of design as follows:

- The landscape palette will incorporate drought tolerant, indigenous plantings to minimize water use.
- Individual building designs incorporate open and naturally ventilated circulation spaces.
- Energy efficient mechanical and plumbing systems.
- Opportunities for photovoltaic panels to be connected to individual building electric systems.
- Solar shading devices to minimize heat gain on south and west facing facades.
- Secure bicycle storage to encourage use of bicycles in lieu of automobiles.
- Use of sustainable materials and finishes that facilitate both natural ventilation and daylight.
- Outdoor terraces and balconies.
- Non-toxic, non V.O.C. finish materials.
- Use of energy efficient lighting fixtures.
- LED or other energy efficient lighting fixtures.

SHEET INDEX

A1.1 SITE PLAN AND STATISTICS
A2.1 RESIDENTIAL BUILDING FLOOR PLANS
A2.2 COMMERCIAL/RETAIL FLOOR PLANS
A2.3 3D VIEWS OF RESIDENTIAL BUILDING
A2.4 3D VIEWS OF MASTER SITE PLAN
A2.5 AERIAL 3D VIEWS OF VARIOUS RESIDENTIAL/COMMERCIAL AREAS



SITE PLAN & PROJECT STATISTICS 1" = 60'-0"

1

**EXPANDED INITIAL STUDY #02-27
for
HUNT FAMILY ANNEXATION TO THE
CITY OF MERCED**

Appendix A
Mitigation Monitoring Program

MITIGATION MONITORING CONTENTS

This mitigation monitoring program includes a brief discussion of the legal basis and purpose of the mitigation monitoring program, a key to understanding the monitoring matrix, a discussion of noncompliance complaints, and the mitigation monitoring matrix itself.

LEGAL BASIS AND PURPOSE OF THE MITIGATION MONITORING PROGRAM

Public Resource Code (PRC) 21081.6 requires public agencies to adopt mitigation monitoring or reporting programs whenever certifying an environmental impact report or mitigated negative declaration. This requirement facilitates implementation of all mitigation measures adopted through the California Environmental Quality Act (CEQA) process.

The City of Merced has adopted its own "Mitigation Monitoring and Reporting Program" (MMC 19.28). The City's program was developed in accordance with the advisory publication, *Tracking CEQA Mitigation Measures*, from the Governor's Office of Planning and Research.

As required by MMC 19.28.050, the following findings are made:

- 1) The requirements of the adopted mitigation monitoring program for the Hunt Family shall run with the real property that is the subject of a General Plan Amendment/Annexation to the City of Merced. Successive owners, heirs, and assigns of this real property are bound to comply with all of the requirements of the adopted program.
- 2) Prior to any lease, sale, transfer, or conveyance of any portion of the subject real property, the applicant shall provide a copy of the adopted program to the prospective lessee, buyer, transferee, or one to whom the conveyance is made.

MITIGATION MONITORING PROCEDURES

In most cases, mitigation measures can be monitored through the City's construction plan approval/plan check process. When the approved project plans and specifications, with mitigation measures, are submitted to the City Development Services Department, a copy of the monitoring checklist will be attached to the submittal. The Hunt Family Annexation Mitigation Monitoring Checklist will be filled out upon project approval with mitigation measures required. As project plans and specifications are checked, compliance with each mitigation measure can be reviewed.

EXHIBIT A
Planning Commissioner Resolution #2707
ATTACHMENT C

In instances where mitigation requires on-going monitoring, the Mitigation Monitoring Checklist will be used until monitoring is no longer necessary. The Development Services Department will be required to file periodic reports on how the implementation of various mitigation measures is progressing or is being maintained. Department staff may be required to conduct periodic inspections to assure compliance. In some instances, outside agencies and/or consultants may be required to conduct necessary periodic inspections as part of the mitigation monitoring program. Fees may be imposed per MMC 19.28.070 for the cost of implementing the monitoring program.

GENERAL PLAN MITIGATION MEASURES

As a second tier environmental document, the *Expanded Initial Study for Hunt Family Annexation to the City of Merced* incorporates some mitigation measures adopted as part of the *Merced Vision 2015 General Plan Program Environmental Impact Report* (SCH# 95082050), as mitigation for potential impacts of the Project. Therefore, following the Hunt Family Annexation Mitigation Monitoring Checklist (starting on page A-11) is a list of these relevant General Plan mitigation measures along with the General Plan Mitigation Monitoring Checklists (Forms A and B) to be used to verify that the General Plan mitigation measures have been met.

NONCOMPLIANCE COMPLAINTS

Any person or agency may file a complaint asserting noncompliance with the mitigation measures associated with the project. The complaint shall be directed to the Director of Development Services in written form providing specific information on the asserted violation. The Director of Development Services shall cause an investigation and determine the validity of the complaint. If noncompliance with a mitigation measure has occurred, the Director of Development Services shall cause appropriate actions to remedy any violation. The complainant shall receive written confirmation indicating the results of the investigation or the final action corresponding to the particular noncompliance issue. Merced Municipal Code (MMC) Sections 19.28.080 and 19.28.090 outline the criminal penalties and civil and administrative remedies which may be incurred in the event of noncompliance. MMC 19.28.100 spells out the appeals procedures.

MONITORING MATRIX

The following pages provide a series of tables identifying the mitigation measures proposed specifically for the Hunt Family Annexation. The columns within the tables are defined as follows:

Mitigation Measure:	Summarizes the Mitigation Measure (referenced by number) identified in <i>Expanded Initial Study #02-27</i> .
Timing:	Identifies at what point in time or phase of the project that the mitigation measure will be completed.
Agency/Department Consultation:	This column references any public agency or City department with which coordination is required to satisfy the identified mitigation.
Verification:	These columns will be initialed and dated by the individual designated to verify adherence to the project specific mitigation.

Hunt Family Annexation Mitigation Monitoring Checklist

Project Name: _____ File Number: _____
 Approval Date: _____ Project Location: _____
 Brief Project Description: _____

The following environmental mitigation measures were incorporated into the Conditions of Approval for this project in order to mitigate identified environmental impacts to a level of insignificance. A completed and signed checklist for each mitigation measure indicates that this mitigation measure has been complied with and implemented, and fulfills the City of Merced's Mitigation Monitoring Requirements (MMC 19.28) with respect to Assembly Bill 3180 (Public Resources Code Section 21081.6).

<i>Mitigation Measure</i>	<i>Timing</i>	<i>Agency or Department Consultation</i>	<i>City Verification (date and initials)</i>
2. AGRICULTURAL RESOURCES			
2-1 A provision shall be recorded by the applicants/developer or successors, at time of sale of any residentially-zoned property within the project that lies within 1,000 feet of the external boundary of any non-project property which currently has an active agricultural operation (including 4-H projects), or has had an agricultural operation on it during the calendar year preceding the year within which the sale takes place. This provision shall notify the buyer(s) and any subsequent owner(s) of the possible inconvenience or discomfort of farming operations, arising from the use of agricultural chemicals, including pesticides, and fertilizers, as well as from the pursuit of agricultural operations including plowing, spraying, and harvesting which occasionally generate dust, smoke, noise and odor, and the priority to which Merced County places on agricultural operations.	<i>Building Permits</i>	<i>City Planning & Inspection Services</i>	

<i>Mitigation Measure</i>	<i>Timing</i>	<i>Agency or Department Consultation</i>	<i>City Verification (date and initials)</i>
<p>3. AIR QUALITY</p> <p>3-1. All active portions of construction sites, earthen access roads, and material excavated or graded shall be sufficiently watered to prevent excessive amounts of dust. Watering shall occur at least twice a day with complete coverage, preferably in the late morning and after work is done for the day. Where feasible, reclaimed water shall be used.</p>	<p><i>Building Permits</i></p>	<p><i>City Inspection Services</i></p>	
<p>3-2. All clearing, grading, earth moving, or excavation activities shall cease during periods of winds greater than 20 miles per hour averaged over one hour.</p>	<p><i>Building Permits</i></p>	<p><i>City Inspection Services</i></p>	
<p>3-3. All material transported off site shall be either sufficiently watered or securely covered to prevent excessive amounts of dust.</p>	<p><i>Building Permits</i></p>	<p><i>City Inspection Services</i></p>	
<p>3-4. The area disturbed by clearing, earth moving, or excavation activities shall be minimized at all times. This can be accomplished by mowing instead of disking for weed control and seeding and watering inactive portions of the construction site until grass is evident, if construction time frames warrant.</p>	<p><i>Building Permits</i></p>	<p><i>City Inspection Services</i></p>	
<p>3-5. Construction site vehicle speeds shall be limited to 15 miles per hour.</p>	<p><i>Building Permits</i></p>	<p><i>City Inspection Services</i></p>	
<p>3-6. If used, petroleum-based dust palliatives shall meet the road oil requirements of the District's rule regarding Cutback Asphalt Paving Materials.</p>	<p><i>Building Permits</i></p>	<p><i>SJVUAPCD</i></p>	
<p>3-7. Streets adjacent to the Project site shall be swept as needed to remove silt and/or mud that may have accumulated from construction activities. The streets are required to be wet prior to or in conjunction with rotary sweeping.</p>	<p><i>Building Permits</i></p>	<p><i>City Inspection Services</i></p>	
<p>3-8. All internal combustion engine-driven equipment shall be properly maintained and well tuned according to the manufacturer's specifications.</p>	<p><i>Building Permits</i></p>	<p><i>City Inspection Services</i></p>	

Mitigation Measure	Timing	Agency or Department Consultation	City Verification (date and initials)
3-9. When reasonably available and economically feasible, diesel powered or electric equipment shall be utilized in lieu of gasoline powered engines.	Building Permits	City Inspection Services	
3-10. Construction activities shall minimize obstruction of through traffic lanes adjacent to the site and a flag person shall be retained to maintain safety adjacent to existing roadways.	Building Permits	City Inspection Services	
3-11. Prior to issuance of building permits, the project will be required to comply with District Regulation VIII. Specifically, the rules that apply to this project are: Rule 8010 (Administrative Requirements) and Rule 8020 (Construction, Demolition, Excavation, and Extraction Activities). Additional rules that may apply to this project depending on constructor practices employed are: Rule 8030 (Handling and Storage of Bulk Materials), Rule 8060 (Paved and Unpaved Roads), and Rule 8070 (Parking, Shipping, Receiving, Transfer, Fueling, and Service Areas).	Building Permits	SJVUAPCD	
3-12. If public transit is available in the area, a public transit stop shall be located within safe walking distance from the Project site or included as part of the Project. (Details to be worked out with Merced County Transit staff at the tentative map stage.)	Tentative Subdivision Map	City Planning and Merced County Transit Service	
3-13. Provide low nitrogen oxide (NOx) emitting and/or high efficiency water heaters.	Building Permits	City Inspection Services	
3-14. Planting of deciduous trees on the south and westerly facing sides of buildings.	Building Permits	City Inspection Services	
3-15. If fireplaces are proposed, only natural gas fireplaces, EPA-certified wood burning fireplaces/stoves, or pellet fueled heater should be installed. Conventional open-hearth fireplaces should not be permitted.	Building Permits	City Inspection Services	

Mitigation Measure	Timing	Agency or Department Consultation	City Verification (date and initials)
3-16. Sidewalks and bikepaths should be installed throughout as much of the project as possible and should be connected to any nearby open space areas, parks, schools, commercial areas, etc.	Tentative Subdivision Map	City Planning	
3-17. Natural gas lines and electrical outlets should be installed in patio areas to encourage the use of gas barbecues and electric yard tools.	Building Permits	City Inspection Services	
3-18. Energy efficient design including automated control system for heating/air conditioning and energy efficiency beyond Title 24 requirements, lighting controls and energy-efficient lighting in buildings, increased insulation beyond Title 24 requirements, and light colored roof materials to reflect heat.	Building Permits	City Inspection Services	
3-19. Install sandbags or other erosion control measures to prevent silt runoff to public roadways from sites with a slope greater than one percent.	Building Permits	City Inspection Services	
3-20. All operations shall limit or expeditiously remove the accumulation of mud or dirt from adjacent public streets at least once every 24 hours when operation are occurring. (the use of dry rotary brushes is expressly prohibited except where preceded or accompanied by sufficient wetting t limit the visible dust emissions.)	Building Permits	City Inspection Services	
3-21. Limit the hours of operation of heavy duty equipment to between 7 a.m. and 7 p.m. and/or the amount of equipment in use. (See also mitigation measure 11-2).	Building Permits	City Inspection Services	
4) BIOLOGICAL RESOURCES			
4-1. The developers shall dedicate to the City a minimum 50-foot-wide corridor from the centerline (or 25 feet from the crown, whichever is greater) of Black Rascal Creek in order to maintain these open space areas as natural riparian preserves and recreation areas per Merced Vision 2015 General Plan policy.	Tentative Subdivision Map	City Planning	

Mitigation Measure	Timing	Agency or Department Consultation	City Verification (date and initials)
<p>4-2. If any trees along Black Rascal Creek or on the Project site that have been determined to be potential nesting sites for raptors are proposed for removal, a pre-construction survey for nesting raptors shall be conducted prior to tree removal and alternatives to removal shall be explored. If removal is approved by the City, between February 1 and September 15, appropriate measures to avoid disturbing any nesting raptors shall be implemented at that time or the trees shall be felled between September 15 and January 31.</p>	<p>Tentative Subdivision Map</p>	<p>City Planning</p>	
<p>5) CULTURAL RESOURCES</p>			
<p>5-1. If evidence of archaeological artifacts is discovered during construction, all operations within an area at and adjacent to the discovered site shall halt until a qualified archaeologist determines the extent of significance of the site.</p>	<p>Building Permits</p>	<p>City Planning</p>	
<p>5-2. On-site preservation of a resource is the preferred alternative. Preserving a cultural deposit maintains the artifacts in context and may prevent inadvertent discovery of, or damage to, human burials. Preservation may be accomplished through a number of means such as capping or covering the site with a layer of soil, fencing the site area, and/or incorporation of the resource in a park area.</p>	<p>Building Permits</p>	<p>City Planning</p>	
<p>6. GEOLOGY AND SOILS</p>			
<p>6-1. Prior to approval of a tentative subdivision map, the City shall review plans for drainage and stormwater run-off control systems and their component facilities to ensure that these systems are non-erosive in design.</p>	<p>Building Permits</p>	<p>City Inspection Services</p>	

Mitigation Measure	Timing	Agency or Department Consultation	City Verification (date and initials)
<p>6-2. Upon completion of phased construction, subsequent phases shall re-vegetate all exposed soil surfaces within 30 days, or as otherwise approved by the City, to minimize potential topsoil erosion. Reasonable alternatives to re-vegetation may be employed, especially during peak high temperature periods or to avoid negative impacts to nearby agricultural activities, subject to the approval of the City.</p>	<p><i>Building Permits</i></p>	<p><i>City Inspection Services</i></p>	
<p>6-3. Projects under review shall be required to submit temporary erosion control plans for construction activities.</p>	<p><i>Building Permits</i></p>	<p><i>City Inspection Services</i></p>	
<p>6-4. Prior to the issuance of building permits, the applicant shall retain a qualified geologist or qualified soil specialist to conduct soil samples throughout the Project area to identify expansive soils, and those areas shall be identified on a map for the City.</p>	<p><i>Building Permits</i></p>	<p><i>City Inspection Services</i></p>	
<p>6-5. Building plans shall be reviewed by a registered engineer or other professional specializing in geo-technical assessments to ensure that the soils can support the load..</p>	<p><i>Building Permits</i></p>	<p><i>City Inspection Services</i></p>	
<p>8) HYDROLOGY AND WATER QUALITY</p>			
<p>8-1. Prior to approval of a tentative subdivision map, the applicant shall demonstrate to the City that storm drainage facilities are adequate to meet Project demands and that improvements are consistent with the Merced County Critical Area Flooding and Drainage Plan and/or the City's Storm Drainage Master Plan.</p>	<p><i>Tentative Subdivision Map</i></p>	<p><i>City Planning</i></p>	
<p>8-2. Prior to approval of building permits, the applicants shall demonstrate to the City that temporary erosion control measures will be followed during construction.</p>	<p><i>Building Permits</i></p>	<p><i>City Planning</i></p>	

Mitigation Measure	Timing	Agency or Department Consultation	City Verification (date and initials)
<p>11) NOISE</p> <p>11-1. Residential development on the Project site shall meet acceptable noise level standards as follows:</p> <ul style="list-style-type: none"> • A maximum of 45 dB for interior noise level for residential projects. • A maximum of 60 dB for exterior noise level, especially when outdoor activities are important components of a project. • A maximum of 65 dB when all the best available noise-reduction techniques have been exhausted without achieving 60 dB, and the strict application of such a maximum becomes a hindrance to development needed or typical for an area. 	<p><i>Building Permits</i></p>	<p><i>City Inspection Services</i></p>	
<p>11-2. Grading and construction activity shall be limited to daylight hours (between 7 a.m. and 7 p.m.) in areas where noise sensitive receptors (i.e. adjacent single-family development) are located.</p>	<p><i>Building Permits</i></p>	<p><i>City Inspection Services</i></p>	
<p>11-3. In noise sensitive areas, construction equipment, compressors, and generators shall be fitted with heavy duty mufflers specifically designed to reduce noise impacts.</p>	<p><i>Building Permits</i></p>	<p><i>City Inspection Services</i></p>	
<p>13) PUBLIC SERVICES</p> <p>13-1 Prior to the issuance of building permits, the applicant shall be responsible for the payment of school facility impact fees as adopted by the Merced City School District and Merced Union High School District.</p>	<p><i>Building Permits</i></p>	<p><i>City Inspection Services</i></p>	
<p>14) RECREATION</p>			
<p>14-1. The Project developers shall work with the City to locate a neighborhood park site within the Project boundaries. (Details to be addressed at the tentative subdivision map stage.)</p>	<p><i>Tentative Subdivision Map</i></p>	<p><i>City Planning</i></p>	

Mitigation Measure	Timing	Agency or Department Consultation	City Verification (date and initials)
<p>14-2. The Project developers shall work with the City (and County as applicable) on the design and construction of bike paths along Black Rascal Creek and possibly along the PG&E utility corridor, and to connect the City bike path to the County bike path along Lake Road. (Details and possible reimbursement to be addressed at the tentative subdivision map stage.)</p>	<p>Tentative Subdivision Map</p>	<p>City Planning and County Planning</p>	
<p>15) TRANSPORTATION AND TRAFFIC</p>			
<p>15-1 The Project shall pay all fees as required under the City's Public Facilities Impact Fees (Chapter 17.62 of the Merced Municipal Code) prior to building permit issuance.</p>	<p>Building Permits</p>	<p>City Inspection Services</p>	
<p>15-2 <i>Traffic Signal at Yosemite and McKee or Hatch:</i> Owner shall provide financial security acceptable to the City equivalent to a "fair share" (but not to exceed 25 percent) of the cost of a traffic signal at the intersection of either McKee Road and Yosemite Avenue or Hatch Road and Yosemite Avenue, whichever intersection the City ultimately decides to signalize. Scope of improvements includes a traffic signal and related intersection improvements to City standards and to the satisfaction of the City Engineer. The "fair share," final cost, and form of security shall be determined by the City Engineer at the time of the first tentative subdivision map or other discretionary action. The determination of the City Engineer will be subject to appeal to the City Council.</p>	<p>Tentative Subdivision Map</p>	<p>City Planning</p>	

Mitigation Measure	Timing	Agency or Department Consultation	City Verification (date and initials)
<p>15-3 <i>Yosemite Avenue:</i> The developer shall construct and dedicate any remaining improvements on half of the 94-foot right-of-way for Yosemite Avenue along the Project boundaries. The developer shall construct full frontage improvements (curb, gutter, sidewalks, street trees, street lights, etc.) on Yosemite and at least one travel lane in each direction. The timing of construction of the improvements is to be determined at the subdivision map stage. Construction is subject to reimbursement per Merced Municipal Code (MMC) section 17.58 and/or the Administrative Policy of the Public Facilities Impact Fees (City Council Resolution #98-73), whichever is applicable.</p>	<p><i>Tentative Subdivision Map</i></p>	<p><i>City Planning</i></p>	
<p>15-4 <i>McKee Road:</i> The developer shall construct and dedicate any remaining improvements on half of the 74-foot right-of-way for McKee Road along the Project boundaries. The developer shall construct full frontage improvements (curb, gutter, sidewalks, street trees, street lights, etc.) on McKee and at least one travel lane in each direction. The timing of construction of the improvements is to be determined at the subdivision map stage. Only off-site construction is subject to reimbursement per Merced Municipal Code (MMC) section 17.58, but no reimbursement is available from the Public Facilities Impact Fees for collectors, such as McKee.</p>	<p><i>Tentative Subdivision Map</i></p>	<p><i>City Planning</i></p>	
<p>15-5 <i>Local and Collector Streets:</i> The developer shall be responsible for construction and dedication of all interior collector and local streets within the Project boundaries. Construction shall meet all the requirements of the most recent edition of the City of Merced's <i>Standard Designs for Common Engineering Structures</i>. No reimbursement is available for these roadways.</p>	<p><i>Tentative Subdivision Map</i></p>	<p><i>City Planning</i></p>	

<i>Mitigation Measure</i>	<i>Timing</i>	<i>Agency or Department Consultation</i>	<i>City Verification (date and initials)</i>
<p>15-6 <i>Lake Road:</i> The property owners shall work with the City and the County to address whether a future extension of Lake Road is necessary from Yosemite Avenue south to Olive Avenue as shown in the County's Circulation Element. This issue shall be addressed prior to approval of the first final subdivision map with frontage on the possible Lake Road right-of-way. If the issue is not resolved prior to map approval, right-of-way for the future extension of Lake Road shall be preserved on the map, with the understanding that it might be given back to the property owners in the future if it is not needed.</p>	<p><i>Tentative Subdivision Map</i></p>	<p><i>City Planning and County Planning</i></p>	
<p>16) UTILITIES</p>			
<p>16-1 Prior to approval of a tentative subdivision map, the City shall review the Project application to ensure that wastewater facilities are adequate to meet Project service demands and are consistent with wastewater master plans.</p>	<p><i>Tentative Subdivision Map</i></p>	<p><i>City Planning</i></p>	

Copies of This Form Distributed To:

City Council _____ City Manager _____ Dev Serv Dir. _____ Public Works Dir. _____ City Engineer _____ Fire Chief _____
 Police Chief _____ Leisure Serv. Dir. _____ County of Merced (Dept. _____) Other (List _____)
 Responsible Agency: (List _____)

I hereby certify that I have inspected the project site and that the above information is true to the best of my knowledge.

Name: (Print) _____ Representing: (Agency/Firm) _____
 Signature: _____ Date: _____

APPLICABLE MITIGATION MEASURES OF THE GENERAL PLAN EIR—HUNT FAMILY ANNEXATION

<i>Mitigation Measure</i>	<i>Timing</i>	<i>Agency or Department Consultation</i>	<i>City Verification (date and initials)</i>
<p><i>Plant/Animal Life</i></p> <p>3-a) When site-specific development proposals are submitted to the City for review and action, surveys should be conducted for special-status species prior to the disturbance of potentially suitable habitat. All surveys will be conducted in accordance with applicable state and federal guidelines.</p>	<p><i>Tentative Subdivision Map</i></p>	<p><i>City Planning</i></p>	<p>Completed 10/2/02 with Biological Resources Inventory by Moore Biological Consultants (Appendix D)</p>
<p><i>Traffic/Circulation</i></p> <p>7-a) Appropriate traffic studies shall be prepared for all development projects which can be expected to reduce a road segment or intersection levels of service below "D."</p>	<p><i>Tentative Subdivision Map</i></p>	<p><i>City Planning</i></p>	
<p>7-b) The City shall require all development proposals to contribute, based on their proportionate share of impact, to circulation system improvements necessary to maintain at least a level of service "D" on all road segments and intersections impacted by the development project.</p>	<p><i>Certificate of Occupancy</i></p>	<p><i>City Planning</i></p>	
<p><i>Public Facilities/Services</i></p>			
<p>8-d) Development projects will be required to pay public facilities impact fees as established by the City in accordance with the requirements of State law.</p>	<p><i>Certificate of Occupancy</i></p>	<p><i>City Planning</i></p>	

**Merced Vision 2015 General Plan
 Environmental Mitigation Checklist Form A**

Project Name: _____ **File Number:** _____
Approval Date: _____ **EIR** _____ **Conditional Neg. Dec.** _____

The following environmental mitigation measures were incorporated into the Conditions of Approval for this project in order to mitigate identified environmental impacts to a level of insignificance. A completed and signed checklist for each mitigation measure indicates that this mitigation measure has been complied with and implemented, and fulfills the City of Merced's Mitigation Monitoring requirements with respect to Assembly Bill 3180 (Public Resources Code Section 21081.6)

Mitigation Measure	Type	Monitoring Dept.	Shown on Plans	Verified Implementation	Remarks
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					

(Add additional Measures as Necessary)

Explanation of Headings:

- Type: Project, ongoing, cumulative.
- Monitoring Dept. Department or Agency responsible for monitoring a particular mitigation measure.
- Shown on Plans: When mitigation measure is shown on plans, this column will be initialed and dated.
- Verified Implementation: When a mitigation measure has been implemented, this column will be initialed and dated.
- 8-3. Remarks: Area for describing status of ongoing mitigation measure, or for other information.

**Merced Vision 2015 General Plan
Mitigation Measure Monitoring Checklist--Form B**

Monitoring Phase: Pre-Construction Construction

Project File Number: _____

Project Name: _____

Brief Project Description: _____

Project Location: _____

Requirement Met:			
Date	Yes	No	Description of Mitigation Measures
_____	_____	_____	1. _____
_____	_____	_____	2. _____
_____	_____	_____	3. _____
_____	_____	_____	4. _____
_____	_____	_____	5. _____

Requirement On-Going:			
Date	Yes	No	Description of Mitigation Measures
_____	_____	_____	1. _____
_____	_____	_____	2. _____
_____	_____	_____	3. _____
_____	_____	_____	4. _____
_____	_____	_____	5. _____

Trustee Agency	Date	Yes	No
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____

Copies of This Form Distributed To:

_____ City Council _____ City Manager _____ Dev Serv Dir. _____ Public Works Dir.

_____ City Engineer _____ Fire Chief _____ Police Chief _____ Leisure Services Dir.

_____ County of Merced (Dept. _____) _____ Other (List _____)

_____ Responsible Agency: (List _____)

I hereby certify that I have inspected the project site and that the above information is true to the best of my knowledge.

Name: (Print) _____

Representing: (Agency/Firm) _____

Signature: _____

Date: _____



Air Quality and Greenhouse Gas Study for the University Village at Lake Project

Prepared by

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4825 J Street, Suite 200
Sacramento, CA 95819

March 2017

Air Quality and Greenhouse Gas Study

University Village at Lake Project, City of Merced, California

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Appendix

Appendix A: Site Plans

Appendix B: CalEEMod Air Quality and Greenhouse Gas Model Results

Appendix C: N₂O Calculations



AIR QUALITY & GREENHOUSE GAS STUDY

University Village at Lake Project City of Merced, California

This report is an analysis of the potential air quality and greenhouse gas (GHG) impacts of the proposed mixed-use (University Village) student housing project (“project”) located on a 17.25-acre parcel (APN 008-010-071) in the City of Merced. The report has been prepared by Rincon Consultants, Inc. under contract to Quad Knopf Inc., for use by the City of Merced in support of the environmental documentation being prepared pursuant to the California Environmental Quality Act (CEQA). The purpose of this study is to analyze the project’s air pollution and GHG emissions and associated impacts. This study analyzes both temporary air quality and GHG impacts related to short-term construction activity and possible long-term air quality and GHG impacts associated with the operation of the project.

Project Description

The project site is located on an undeveloped, triangular parcel south of East Yosemite Avenue in Merced, California. The project would involve a mixed use student housing development project with both residential and commercial land uses. No demolition activities would occur, as the land is currently vacant and free of existing development. Construction of the project would include 390,225 square feet (sf) of residential buildings, including 225 apartment units within 15 buildings (26,015 sf each) ranging between two and three stories tall. The project would also build a 13,700 sf two-story club house as part of the residential component, as well as a single-story 6,600 sf commercial retail space with a drive through, adjacent to East Yosemite Avenue. Approximately 687 total parking spaces (including 35 specifically designated for the commercial component) would be provided onsite via a surface parking lot and secure bicycle storage to encourage the use of bicycles in lieu of automobiles. The project would also include amenities such as an outdoor community plaza, small dog park, and outdoor leisure common areas. In addition, the project includes design elements and features that would reduce vehicle miles traveled (VMT), energy consumption, and GHG emissions. These features include a subsidized shuttle service for students traveling the two mile distance between the project site and the University of California Merced campus, three electric vehicle charging stations, secured bike lockers at each student housing building, bicycle path connections to existing bike paths on the east of the project site, fees for onsite parking, onsite solar photo voltaics, energy efficient appliances and lighting, low-flow plumbing fixtures, and drought tolerant landscaping.

The project site is bound by East Yosemite Avenue to the north near the Lake Road intersection. The site plans illustrate the location of the project site, and are included in Appendix A. The immediate vicinity is generally low density urban development and rural, agricultural land uses. The nearest residential homes are located approximately 100 feet north of the project, situated across East Yosemite Avenue. There are also residential single-family homes located approximately 775 feet southwest of the project site’s diagonal boundary, as well as 960 feet west of the site. Northeast, east, and south east of the project site are primarily rural agricultural land uses. Regionally, the project site is situated approximately three miles northeast of



Highway 99, two miles north of State Route 140, four miles east of State Route 59, two miles south of the UC Merced campus, and approximately 50 miles west of Yosemite National Park.

AIR QUALITY BACKGROUND

Air Pollution Regulation

Federal and state governments have authority under the federal and state Clean Air Acts to regulate emissions of airborne pollutants and have established ambient air quality standards for the protection of public health. The U.S. Environmental Protection Agency (EPA) is the federal agency designated to administer air quality regulation, while the California Air Resources Board (ARB) is the state equivalent in California.

Federal and state standards have been established for six criteria pollutants, including ozone (O₃), carbon monoxide (CO), nitrogen dioxide (NO₂), sulfur dioxide (SO₂), particulates less than 10 and 2.5 microns in diameter (PM₁₀ and PM_{2.5}), and lead (Pb). Table 1 on the following page lists the current federal and state standards for each of these pollutants. California has also set standards for sulfates, hydrogen sulfide, vinyl chloride, and visibility-reducing particles. Standards have been set at levels intended to be protective of public health. California standards are more restrictive than federal standards for each of these pollutants except lead and the eight-hour average for CO.

The ARB provides local air quality management through county-level or regional (multi-county) Air Pollution Control Districts (APCDs). The ARB establishes air quality standards and is responsible for control of mobile emission sources, while the local APCDs are responsible for enforcing standards and regulating stationary sources. The ARB has established 14 air basins statewide. Merced is one of the eight counties located within the San Joaquin Valley (SJV) Air Basin (Basin), which is under the jurisdiction of the San Joaquin Valley Air Pollution Control District (SJVAPCD). The SJVAPCD is required to monitor air pollutant levels to ensure that air quality standards are met and, if they are not met, to develop strategies to meet the standards. Depending on whether the standards are met or exceeded, the local air basin is classified as being in “attainment” or “non-attainment.”

Ozone and PM_{2.5} are the SJVAPCD’s greatest air quality challenges (SJVAPCD 2012). In May 2016, the EPA determined that the Basin achieved attainment for the 1-hour ozone National Ambient Air Quality Standards but not the 8-hour ozone standard (EPA 2016). In 2013 the ARB approved the SJVAPCD’s plan to bring the Valley into attainment of EPA’s 2006 PM_{2.5} standard by the 2019 deadline (SJVAPCD 2012). The Basin is now in attainment of the state and federal standards for O₃, PM₁₀, NO₂, and CO (SJVAPCD 2012). However, the Basin is in nonattainment of eight-hour O₃ and PM_{2.5} standards and will need to continue efforts to improve air quality to meet the more protective standards for both criteria pollutants and strive toward attainment (EPA 2016). The SJVAPCD is currently developing a 2017 Integrated PM_{2.5} Plan to integrate the PM_{2.5} standards under the federal Clean Air Act and incorporate additional stronger control measures. Additionally, the 2016 Plan for the 2008 eight-hour Ozone Standard was adopted on June 16, 2016. This strategic plan will enable the District to reduce nitrogen oxide (NO_x) emissions by over 60 percent and keep the District on track for attainment of the EPA’s 2008 eight-hour ozone standard, by the year 2031 (SJVAPCD 2016). For this analysis, if the proposed



project were to exceed the regional significance thresholds, then the project would conflict with the attainment plans. The regional air quality significance thresholds are discussed in detail in the *Impact Analysis* section of this study.

Federal and State standards for O₃, CO, NO₂, Lead, and suspended particulate matter (PM₁₀ and PM_{2.5}) are summarized in Table 1.

Table 1- Current Federal and State Ambient Air Quality Standards

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

ppm = parts per million

µg/m³ = micrograms per cubic meter

Source: ARB. May 4, 2016. <https://www.arb.ca.gov/research/aaqs/aaqs2.pdf>. (accessed February 2017).

Ozone

Ozone is produced by a photochemical reaction (triggered by sunlight) between NO_x and reactive organic gases (ROG). Nitrogen oxides are formed during the combustion of fuels, while reactive organic compounds are formed during combustion and evaporation of organic solvents. Because ozone requires sunlight to form, it mostly occurs in concentrations considered serious between the months of April and October. Ozone is a pungent, colorless, toxic gas with direct health effects on humans including respiratory and eye irritation and possible changes in lung functions. Groups most sensitive to ozone include children, the elderly, people with respiratory disorders, and people who exercise strenuously outdoors.

Carbon Monoxide

Carbon monoxide is a local pollutant that is found in high concentrations only near the source. The major source of CO, a colorless, odorless, poisonous gas, is automobile traffic. Elevated concentrations, therefore, are usually only found near areas of high traffic volumes. CO's health effects are related to its affinity for hemoglobin in the blood. At high concentrations, CO



reduces the amount of oxygen in the blood, causing heart difficulties in people with chronic diseases, reduced lung capacity and impaired mental abilities.

Nitrogen Dioxide

Nitrogen dioxide is a by-product of fuel combustion, with the primary source being motor vehicles and industrial boilers and furnaces. The principal form of nitrogen oxide produced by combustion is nitric oxide (NO), but NO reacts rapidly to form NO₂, creating the mixture of NO and NO₂ commonly called NO_x. NO₂ is an acute irritant. A relationship between NO₂ and chronic pulmonary fibrosis may exist, and an increase in bronchitis in young children at concentrations below 0.3 parts per million (ppm) may occur. NO₂ absorbs blue light and causes a reddish brown cast to the atmosphere and reduced visibility. It can also contribute to the formation of PM₁₀ and acid rain.

Suspended Particulates

PM₁₀ is particulate matter measuring no more than 10 microns in diameter, while PM_{2.5} is fine particulate matter measuring no more than 2.5 microns in diameter. Suspended particulates are mostly dust particles, nitrates and sulfates. Both PM₁₀ and PM_{2.5} are by-products of fuel combustion and wind erosion of soil and unpaved roads, and are directly emitted into the atmosphere through these processes. Suspended particulates are also created in the atmosphere through chemical reactions. The characteristics, sources, and potential health effects associated with the small particulates (those between 2.5 and 10 microns in diameter) and fine particulates (PM_{2.5}) can be very different. The small particulates generally come from windblown dust and dust kicked up from mobile sources, such as automobiles. The fine particulates are generally associated with combustion processes as well as being formed in the atmosphere as a secondary pollutant through chemical reactions. Fine particulate matter such as PM_{2.5} is more likely to penetrate deeply into the lungs and poses a health threat to all groups, but particularly to the elderly, children, and those with respiratory problems. More than half of the small and fine particulate matter that is inhaled into the lungs remains there. These materials can damage health by interfering with the body's mechanisms for clearing the respiratory tract or by acting as carriers of an absorbed toxic substance.

Local Air Quality

California's weather is heavily influenced by a semi-permanent high-pressure system west of the Pacific Ocean. The Mediterranean climate of the San Joaquin Valley region and the tule fog influence, results in hot dry summers and cool wet winters.

Air quality in the Basin is affected by the air pollution emission sources located in the region, as well as by several natural factors including topography, climate, and wind patterns, temperature, sunlight and ozone production, temperature inversions, as well as precipitation, humidity and fog (SJVAPCD 2015). The Basin is essentially a bowl shape surrounded by mountains on three sides and open to the Sacramento Valley and the San Francisco Bay Area to the North which inhibits the movement and dispersion of pollutants, trapping them in the valley. The main factors affecting the region are summarized below.



1. *Topographic* factors affect the Basin's air quality including natural adverse meteorological conditions that limit the dispersion and diffusion of pollutants, the generally limited capacity of the local air shed to eliminate pollutants from the air, and the number, type, and density of emission sources emitted within the Basin.
2. *Climate* factors such as temperature inversions resulting from subtropical high-pressure subsiding air inhibiting vertical mixing of air, trapping pollutants below the inversion during the spring, summer, and fall. During the winter, fog can create inversions which inhibit vertical mixing as well.
3. *Wind patterns* play a role in the dispersion and transport of pollutants; however the Basin's topographic factors restrict air movement and can result in stagnation events, trapping pollutants in the Basin, especially during the winter.
4. *Temperature, Sunlight and Ozone Production* influence the Basin's air quality due reaction of volatile organic compounds (VOC) and NO_x interacting with solar radiation. Reaction rates increase with temperature and are generally low during the winter and highest during the summer when temperatures can exceed 100 degrees F in the valley.
5. *Precipitation, Humidity and Fog* can help remove particulate matter from the air and deposit them on the ground, while fog with less moisture content acts to form secondary ammonium nitrate, contributing to the SJV's PM₁₀ and PM_{2.5} challenges.

The SJVAPCD operates a network of air monitoring stations throughout the Basin. The purpose of the monitoring stations is to measure ambient concentrations of the pollutants and determine whether the ambient air quality meets the California and federal standards. The air quality monitoring stations located nearest to the project site include the Merced South Coffee Street station, and the Merced-2334 M Street Monitoring Station. The Merced South Coffee Street station is located at 385 South Coffee Street, Merced CA 95340, which is approximately three miles south of the project site, near Pioneer Elementary School. The Merced-2334 M Street Monitoring Station is located approximately three miles southwest of the project site. Table 2 indicates the number of days that each of the state and federal standards has been exceeded in the region.

The hourly ozone concentration exceeded state standards for five days in 2013, three days in 2014, and two days in 2015 (based on most current data available). The hourly ozone concentration did not exceed federal standards in those three years. However, the 8-hour ozone concentrations exceeded federal standards 29 times in 2013, 40 times in 2014, and 29 times in 2015. The PM₁₀ concentrations exceeded state standards on 13 days in 2013, 9 days in 2014, and five days in 2015. PM₁₀ concentrations did not exceed federal standards in 2013, 2014, or 2015. The PM_{2.5} concentration exceeded federal standards 16 days in 2013, 16 days in 2014, and 15 days in 2015. No exceedances of either the state or federal standards for NO₂ have occurred in the last three years and CO values were not available.



Table 2- Ambient Air Quality Data

Pollutant	2013	2014	2015
Hourly Ozone, ppm – Worst Hour	0.100	0.100	0.102
Number of days of State exceedances (>0.09 ppm)	5	3	2
Number of days of Federal exceedances (>0.12 ppm)	0	0	0
8-Hour Ozone, ppm – Highest 8-Hour Averages	0.091	0.088	0.089
Number of days of State exceedances	*	*	*
Number of days of Federal exceedances (>0.07 ppm)	29	40	29
Carbon Monoxide, ppm - Worst 8 Hours	*	*	*
Number of days of State/Federal exceedances (>9.0 ppm)	*	*	*
Nitrogen Dioxide, ppm - Worst Hour	0.052	0.054	0.035
Number of days of State exceedances (>0.25 ppm)	0	0	0
Particulate Matter <10 microns, $\mu\text{g}/\text{m}^3$ Worst 24 Hours ¹	77.4	88.3	97.2
Number of days of State exceedances (>50 $\mu\text{g}/\text{m}^3$)	13	9	5
Number of days of Federal exceedances (>150 $\mu\text{g}/\text{m}^3$)	0	0	0
Particulate Matter <2.5 microns, $\mu\text{g}/\text{m}^3$ Worst 24 Hours	75.1	64.5	61.2
Number of samples of Federal exceedances (>35 $\mu\text{g}/\text{m}^3$)	16	16	15

Note values with “” indicates that data was not available. Values for each pollutant were based on South Coffee Street Monitoring Station except for PM_{10} which was sourced from the Merced-2334 M Street Monitoring Station. Carbon Monoxide measurements are unavailable at both Monitoring Stations.*

Source: California Air Resources Board. N.D. <https://www.arb.ca.gov/adam/topfour/topfour1.php>. (accessed March 2017).

Sensitive Receptors

Ambient air quality standards have been established to represent the levels of air quality considered sufficient, with an adequate margin of safety, to protect public health and welfare. They are designed to protect that segment of the public most susceptible to respiratory distress, such as children under age 14; persons over age 65; persons engaged in strenuous work or exercise; and people with cardiovascular and chronic respiratory diseases. Therefore, the majority of sensitive receptor locations are schools, hospitals, and residential units. The land uses surrounding the site include low density residential land uses northwest, west, and southwest of the project site and rural agricultural land uses to the northeast, east, and southeast. The nearest sensitive receptors to the project site are single-family residential homes located approximately 100 feet north of the project, located across East Yosemite Avenue.



AIR QUALITY THRESHOLDS AND METHODOLOGY

Air Quality Significance Thresholds

Regional Thresholds

To determine whether a project would have a significant impact to air quality, Appendix G of the *CEQA Guidelines* questions whether a project would:

- a) *Conflict with or obstruct implementation of the applicable air quality plan;*
- b) *Violate any air quality standard or contribute substantially to an existing or projected air quality violation;*
- c) *Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors);*
- d) *Expose sensitive receptors to substantial pollutant concentrations; or*
- e) *Create objectionable odors affecting a substantial number of people.*

In 2015, the SJVAPCD developed a guide for assessing and mitigating air quality impacts based on emissions expressed in tons per calendar year (SJVAPCD 2015). The SJVAPCD has established the following significance thresholds for construction activities and project operations within the San Joaquin Air Basin, which are summarized in Table 3.

Table 3 Air Quality Thresholds of Significance for Criteria Pollutants

Pollutant/ Precursor	Construction Emissions	Operational Emissions	
		Permitted Equipment and Activities	Non-Permitted Equipment and Activities
	Emissions (tons per year)	Emissions (tons per year)	Emissions (tons per year)
CO	100	100	100
NO _x	10	10	10
ROG	10	10	10
SO _x	27	27	27
PM ₁₀	15	15	15
PM _{2.5}	15	15	15

Source: SJVAPCD. Final Draft Guidance for Assessing and Mitigating Air Quality Impacts. March 19, 2015. http://www.valleyair.org/transportation/GAMAQI_3-19-15.pdf. (accessed February 2017).

Air Quality Methodology

This air quality analysis conforms to the methodologies and thresholds recommended by the SJVAPCD's *Air Quality Thresholds of Significance-Criteria Pollutants*, pursuant to CEQA guidelines (SJVAPCD 2006-2012). The SJVAPCD references CEQA compliant air quality thresholds for emissions associated with both construction and operation of proposed projects.



The construction activities associated with development would generate diesel emissions and dust. Construction equipment that would generate criteria air pollutants includes excavators, graders, dump trucks, and loaders. Some of this equipment would be used during grading activities as well as when structures are constructed. It is assumed that all construction equipment used would be diesel-powered. The California Emissions Estimator Model (CalEEMod) version 2016.3.1 was used to estimate construction emissions. CalEEMod was developed by SCAQMD and is used by jurisdictions throughout the state to quantify criteria pollutant emissions. Construction emissions are analyzed based on the regional thresholds established by the SJVAPCD (see Appendix B).

Operational emissions associated with on-site development were also estimated using CalEEMod. Operational emissions include mobile source emissions, energy emissions, and area source emissions. Mobile source emissions are generated by the increase in motor vehicle trips to and from the project site associated with operation of on-site development. Emissions attributed to energy use include electricity and natural gas consumption for space and water heating. Area source emissions are generated by landscape maintenance equipment, consumer products and architectural coating. To determine whether a regional air quality impact would occur, the increase in emissions would be compared with the SJVAPCD's recommended regional thresholds for operational emissions.

Air Quality Impact Analysis

Construction Emissions

Project construction would generate temporary air pollutant emissions. These impacts are associated with fugitive dust (PM₁₀ and PM_{2.5}) and exhaust emissions from heavy-duty construction vehicles, in addition to ROG emissions that would be released during the drying phase upon application of architectural coatings. Construction would generally consist of site preparation, grading, erection of the buildings and outdoor amenities, paving the parking lots, bicycle paths, pedestrian walkways, and application of architectural coating. For the purposes of this analysis, 2018 would be the project's operational year.

The site preparation phase and grading activities would involve the greatest amount of heavy equipment and the most substantial generation of fugitive dust. This analysis assumes that the project would be cut-fill balanced; therefore no additional soil would be imported or exported from the site. It was also assumed that the project would employ measures to reduce fugitive dust such as watering two times per day during construction activities to limit visible dust emissions (VDE) to 20 percent opacity as required by Rule 8021 (SJVAPCD 2001).

Construction emissions modeling for grading and site preparation is based on the development and phasing. The emissions modeling did not consider the inclusion of low-VOC paint (150 grams per liter for nonflat coatings). The maximum daily emissions of ROG would occur during the architectural coating phase, which was modeled to occur simultaneously during the second half of the building construction phase. The maximum daily emissions of NO_x would occur during the grading phase and the maximum daily emissions of PM₁₀ and PM_{2.5} would occur during the grading phase. Table 4 summarizes the estimated maximum daily emissions of air pollutants during construction.



Table 4- Estimated Maximum Daily Air Quality Construction Emissions

Construction Phase	Maximum Emissions (Tons/Year)					
	ROG	NO _x	CO	SO _x	PM ₁₀	PM _{2.5}
Maximum Daily Construction Emissions	4.3	3.2	3.1	<0.1	0.4	0.2
SJVAPCD Regional Thresholds	10	10	100	27	15	15
Threshold Exceeded? (Yes/No)	No	No	No	No	No	No

Notes: All calculations were made using the CalEEMod software. See the Appendix B for calculations. All values have been rounded. Values derived from the CalEEMod Annual output.

Grading phase incorporates anticipated emissions reductions (water 2x/day) include the conditions listed above.

Architectural Coating phase assumed to occur simultaneously during the last half of building construction phase.

As shown in Table 4, maximum daily emissions of all criteria air pollutants (ROG, NO_x, CO, SO_x, PM₁₀ and PM_{2.5}) would not exceed SJVAPCD thresholds. Because construction-related emissions are short-term in nature and below thresholds, the overall impacts would be less than significant.

Operational Emissions

The majority of project-related operational emissions would be due to vehicle trips to and from the project site, particularly due to the commercial uses generating approximately 1,755 total (adjusted) trips per day (DKS 2017). Analysis of the project’s anticipated operational emissions uses traffic volumes from the project Traffic Impact Study (DKS 2017). Overall, the project is estimated to generate approximately 2,504 total daily trips. This total reflects the sum of the total adjusted student housing trips (749 trips per day) and the total adjusted commercial trips (1,755 per day), which includes reductions and other assumptions such as internal capture (see traffic study in Appendix C for all assumptions). CalEEMod default values for trips from home to work (H-W) were reduced from 10.8 miles to two miles based on the assumption that the students would be commuting two miles from home to the campus, and the distance from home to shop (H-S) was reduced from 7.3 miles to 5.0 miles based on the distance to the shopping center in downtown Merced (see Appendix B). Table 5 summarizes the project’s operational emissions, broken down into each respective emission source.

Project-generated emissions would not exceed SJVAPCD thresholds for ROG, NO_x, CO, SO_x, PM₁₀, and PM_{2.5}. Therefore, the project’s long-term regional air quality impacts (including impacts related to criteria pollutants, sensitive receptors and violations of air quality standards) would be less than significant.



Table 5- Estimated Air Quality Operational Emissions

Operational Emissions	Estimated Emissions (tons/year)					
	ROG	NO _x	CO	SO _x	PM ₁₀	PM _{2.5}
Area	1.9	<0.1	1.7	<0.1	<0.1	<0.1
Energy	<0.1	0.2	0.1	<0.1	<0.1	<0.1
Mobile	0.9	9.7	5.9	<0.1	0.7	0.2
<i>Maximum tons/year</i>	2.9	9.9	7.7	<0.1	0.8	0.2
SJVAPCD Thresholds	10	10	100	27	15	15
<i>Threshold Exceeded?</i>	No	No	No	No	No	No

See Appendix B for CalEEMod computer model output and Appendix C for N₂O calculations. All values have been rounded to the nearest tenth.

Objectionable Odors

Odors are typically associated with industrial projects involving the use of chemicals, solvents, petroleum products, and other strong-smelling elements used in manufacturing processes, as well as sewage treatment facilities and landfills. The project which would include student housing and a commercial retail use that includes a drive through restaurant would not create or emit objectionable odors. Residential and commercial uses are not considered to be a land use that would generate objectionable operational odors that would affect a substantial number of people (SJVAPCD 2015). Construction activities could generate objectionable odors, particularly from operating diesel machinery, which produces oil and fuel smells. However, odors would be limited to the time that construction equipment is operating and would be temporary. In addition, engine idling time for heavy-duty diesel vehicles is restricted to five minutes by the ARB. As a result, odor impacts would be less than significant.

AQMP Consistency

A project may be inconsistent with the SJVAPCD's adopted Air Quality Management Plan (AQMP) if it would generate population, housing, or employment growth exceeding the forecasts used in the development of the AQMP. The SJVAPCD *Air Quality Guidelines for General Plans* document was most recently revised in June 2005. This Plan indicates that the projected population growth for the Valley from 1990 to 2020 would be 87.5 percent, while the projected increase in VMT would be 124.7 percent during the same timeframe. The Merced Vision 2030 General Plan *Chapter 9-Housing* indicates that new population growth projections will exceed this growth rate by approximately three percent (City of Merced 2016). In 1990, the City of Merced had a population of 56,216 people, while the population on January 1, 2016 totaled 83,962 people (Department of Finance 2016) and projections by Merced County of Association of Governments (MCAG) estimate that the population will reach 107,600 by the year 2020. MCAG also estimates that the UC Merced University community would amount to a total of 9,400 people in 2020 (City of Merced 2012). The project involves the development of a student housing mixed use project to accommodate the growing numbers of students attending UC Merced. Based on the Department Finance population and housing data, the project would



generate a population of approximately 709 people (Department of Finance 2016). The project would represent approximately 0.7 percent of the total projected growth anticipated by MCAG to occur in the City of Merced by the year 2020. Based on the estimated population of 709 students that would be accommodated by the 225 housing units, the project would not conflict with the AQMP.

GREENHOUSE GAS BACKGROUND

Climate Change and Greenhouse Gas

Climate change is the observed increase in the average temperature of the Earth's atmosphere and oceans along with other substantial changes in climate (such as wind patterns, precipitation, and storms) over an extended period of time. The term "climate change" is often used interchangeably with the term "global warming," but "climate change" is preferred to "global warming" because it helps convey that there are other changes anticipated to occur, in addition to rising temperatures. Some of these changes may include increased or prolonged drought events, flooding, changes in weather patterns, and an increase in the range or magnitude of extreme weather events. The baseline against which these changes are measured originates in historical records identifying temperature changes that have occurred in the past, such as during previous ice ages. The global climate is continuously changing, as evidenced by repeated episodes of substantial warming and cooling documented in the geologic record. The rate of change has typically been incremental, with warming or cooling trends occurring over the course of thousands of years. The past 10,000 years have been marked by a period of incremental warming, as glaciers have steadily retreated across the globe. However, scientists have observed acceleration in the rate of warming during the past 150 years. Per the United Nations Intergovernmental Panel on Climate Change (IPCC 2013), the understanding of anthropogenic warming and cooling influences on climate has led to a high confidence (95 percent or greater chance) that the global average net effect of human activities has been the dominant cause of warming since the mid-20th century (IPCC 2013).

Gases that absorb and re-emit infrared radiation in the atmosphere are called greenhouse gases (GHGs). The gases that are widely seen as the principal contributors to human-induced climate change include carbon dioxide (CO₂), methane (CH₄), nitrous oxides (N₂O), fluorinated gases such as hydrofluorocarbons (HFCs) and perfluorocarbons (PFCs), and sulfur hexafluoride (SF₆). Water vapor is excluded from the list of GHGs because it is short-lived in the atmosphere and its atmospheric concentrations are largely determined by natural processes, such as oceanic evaporation.

GHGs are emitted by both natural processes and human activities. Of these gases, CO₂ and CH₄ are emitted in the greatest quantities from human activities. Emissions of CO₂ are largely by-products of fossil fuel combustion, whereas CH₄ results from off-gassing associated with agricultural practices and landfills. Observations of CO₂ concentrations, globally-averaged temperature, and sea level rise are generally well within the range of the extent of the earlier IPCC projections. The recently observed increases in CH₄ and N₂O concentrations are smaller than those assumed in the scenarios in the previous assessments. Each IPCC assessment has used new projections of future climate change that have become more detailed as the models have become more advanced.



Man-made GHGs, many of which have greater heat-absorption potential than CO₂, include fluorinated gases and sulfur hexafluoride (SF₆) (California Environmental Protection Agency [CalEPA] 2006). Different types of GHGs have varying global warming potentials (GWPs). The GWP of a GHG is the potential of a gas or aerosol to trap heat in the atmosphere over a specified timescale (generally, 100 years). Because GHGs absorb different amounts of heat, a common reference gas (CO₂) is used to relate the amount of heat absorbed to the amount of the gas emissions, which is commonly referred to as “carbon dioxide equivalent” (CO₂e), and is the amount of a GHGs emitted multiplied by the respective GWP. Carbon dioxide has a 100-year GWP of one. By contrast, methane (CH₄) has a GWP of 25, meaning its global warming effect is 25 times greater than carbon dioxide on a molecule per molecule basis, and N₂O has a GWP of 298 (IPCC 2007). Although the GWP values vary between each IPCC assessment, for the purposes of this GHG study, the described GWPs have been utilized because they correspond with the GWP values utilized by the California Emissions Estimator Model Version 2016.3.1 (CalEEMod), which was used to analyze the impacts of the project (CAPCOA 2016). All CalEEMod assumptions and results will be discussed in greater detail in the sections to follow.

Regulatory Setting

California Regulations

California Air Resources Board is responsible for the coordination and oversight of State and local air pollution control programs in California. California has numerous regulations aimed at reducing the state’s GHG emissions. These initiatives are summarized below.

Assembly Bill (AB) 1493 (2002), California’s Advanced Clean Cars program (referred to as “Pavley”), requires the ARB to develop and adopt regulations to achieve “the maximum feasible and cost-effective reduction of GHG emissions from motor vehicles.” On June 30, 2009, U.S. EPA granted the waiver of Clean Air Act preemption to California for its greenhouse gas emission standards for motor vehicles beginning with the 2009 model year. Pavley I took effect for model years starting in 2009 to 2016 and Pavley II, which is now referred to as “LEV (Low Emission Vehicle) III GHG” will cover 2017 to 2025. Fleet average emission standards would reach 22 percent reduction from 2009 levels by 2012 and 30 percent by 2016. The Advanced Clean Cars program coordinates the goals of the Low Emissions Vehicles (LEV), Zero Emissions Vehicles (ZEV), and Clean Fuels Outlet programs and would provide major reductions in GHG emissions. By 2025, when the rules will be fully implemented, new automobiles will emit 34 percent fewer GHGs and 75 percent fewer smog-forming emissions from their model year 2016 levels (ARB 2011).

In 2005, the governor issued Executive Order (EO) S-3-05, establishing statewide GHG emissions reduction targets. EO S-3-05 provides that by the year 2010, emissions shall be reduced to 2000 levels; by 2020, emissions shall be reduced to 1990 levels; and by 2050, emissions shall be reduced to 80 percent below 1990 levels (CalEPA 2006). In response to EO S-3-05, CalEPA created the Climate Action Team (CAT), which in March 2006 published the Climate Action Team Report (the “2006 CAT Report”) (CalEPA 2006). The 2006 CAT Report identified a recommended list of strategies that the state could pursue to reduce GHG emissions. These are strategies that could be implemented by various state agencies to ensure that the emission reduction targets in EO S-3-05 are met and can be met with existing authority of the state agencies. The strategies include



the reduction of passenger and light duty truck emissions, the reduction of idling times for diesel trucks, an overhaul of shipping technology/infrastructure, increased use of alternative fuels, increased recycling, and landfill methane capture, etc. In April 2015 Governor Brown issued EO B-30-15, calling for a new target of 40 percent below 1990 levels by 2030.

California's major initiative for reducing GHG emissions is outlined in Assembly Bill 32 (AB 32), the "California Global Warming Solutions Act of 2006," signed into law in 2006. AB 32 codifies the statewide goal of reducing GHG emissions to 1990 levels by 2020 (essentially a 15 percent reduction below 2005 emission levels; the same requirement as under S-3-05), and requires ARB to prepare a Scoping Plan that outlines the main State strategies for reducing GHGs to meet the 2020 deadline. In addition, AB 32 requires the ARB to adopt regulations to require reporting and verification of statewide GHG emissions.

After completing a comprehensive review and update process, the ARB approved a 1990 statewide GHG level and 2020 limit of 427 MMT CO₂e. The AB 32 Scoping Plan was approved by ARB on December 11, 2008, and included measures to address GHG emission reduction strategies related to energy efficiency, water use, and recycling and solid waste, among other measures. Many of the GHG reduction measures included in the Scoping Plan (e.g., Low Carbon Fuel Standard (LCFS), Advanced Clean Car standards, and Cap-and-Trade) have been adopted over the last five years.

In May 2014, the ARB approved the first update to the AB 32 Scoping Plan. The 2013 Scoping Plan update defines the ARB's climate change priorities for the next five years and sets the groundwork to reach post-2020 goals set forth in EO S-3-05. The update highlights California's progress toward meeting the "near-term" 2020 GHG emission reduction goals defined in the original Scoping Plan. It also evaluates how to align the State's longer-term GHG reduction strategies with other State policy priorities, such as for water, waste, natural resources, clean energy and transportation, and land use (ARB 2014).

ARB Resolution 07-54 establishes 25,000 MT of GHG emissions as the threshold for identifying the largest stationary emission sources in California for purposes of requiring the annual reporting of emissions. This threshold is just over 0.005 percent of California's total inventory of GHG emissions for 2004.

In 2007 the ARB adopted EO S-01-07, the Low Carbon Fuel Standard (LCFS), which establishes the goal to reduce the carbon intensity of California's transportation fuels by at least 10 percent by 2020. In 2011 a federal judge issued an injunction blocking enforcement of the LCFS. The ARB appealed the ruling in 2012, and in 2013, the 9th U.S. Circuit Court of Appeals panel upheld the LCFS. The LCFS was readopted in 2015 and stands today. The LCFS established carbon credits for low carbon fuels and electric vehicles.

Senate Bill (SB) 375, signed in August 2008, enhances the state's ability to reach AB 32 goals by directing ARB to develop regional GHG emission reduction targets to be achieved from passenger vehicles for 2020 and 2035. In addition, SB 375 directs each of the state's 18 major Metropolitan Planning Organizations (MPO) to prepare a "sustainable communities strategy" (SCS) that contains a growth strategy to meet these emission targets for inclusion in the Regional Transportation Plan (RTP). On September 23, 2010, ARB adopted final regional targets for reducing GHG emissions from 2005 levels by 2020 and 2035.



In April 2011, Governor Brown signed SB 2X, requiring California to generate 33 percent of its electricity from renewable energy by 2020.

On April 29, 2015, Governor Brown issued an executive order B-30-15 establishing a statewide interim GHG reduction target of 40 percent below 1990 levels by 2030. According to the ARB, reducing GHG emissions by 40 percent below 1990 levels in 2030 ensures that California will continue its efforts to reduce carbon pollution and help to achieve federal health-based air quality standards. Setting clear targets beyond 2020 also provides market certainty to foster investment and growth in a wide array of industries throughout the State, including clean technology and clean energy.

In 2015, SB 350 the Clean Energy and Pollution Reduction Act was signed into law, establishing new clean energy, clean air and greenhouse gas reduction goals for 2030 and beyond. The law requires that the renewable portfolio standard be increased from 33 percent by 2020 to 50 percent by 2030 and requires the state to double statewide energy efficiency savings in electricity and natural gas by 2030.

In September 2016, SB 32 was signed into law, formally codifying the 40 percent GHG emission reduction target adopted by Governor Brown in April 2015 through an executive order (B-30-15) into California legislation. SB 32 became effective on January 1, 2017 and requires the ARB to develop technologically feasible and cost effective regulations to achieve the targeted 40 percent GHG emission reduction. The ARB is currently working to update the Scoping Plan to provide a framework for achieving the 2030 target. The updated Scoping Plan is expected to be completed and adopted by the ARB in summer 2017 (ARB 2016c).

For more information on the Senate and Assembly Bills, Executive Orders, and reports discussed above, and to view reports and research referenced above, please refer to the following websites: www.climatechange.ca.gov and www.arb.ca.gov/cc/cc.htm.

Local Regulations

On September 7, 2010, the Merced City Council adopted Resolution 1010-80, which committed the City to reduce GHG emissions through the adoption of a Climate Action Plan, and a Climate Action Plan Ad-Hoc Advisory Committee began recruiting members to provide objectives to develop the Climate Action Plan for the City of Merced. The City of Merced adopted its Climate Action Plan (CAP) on October 1, 2012. The CAP sets the goal of reducing the City's GHG emissions by 147,915 metric tons of CO₂e to 1990 levels by 2020, consistent with AB 32. The CAP contains 154 implementation actions which are intended to reduce GHG emissions, consistent with the Merced Vision 2030 General Plan policies. .

The CAP is driven by four main values: Healthy Communities, Quality Natural Resources, Clean Energy Resources, and Leaders and Partners. Each of these values has strategic goals to reduce GHG emissions. These goals include enhanced modes of transportation, sustainable community designs, water conservation, protection of air quality, waste reduction, increased use of renewable energy resources, building energy conservation, and public outreach and involvement (City of Merced CAP 2012). Further, the CAP identifies specific percentages of GHG emission reductions required within each of the targeted goal areas. The project's consistency with these targets is evaluated in Table 14 of this study.



GHG THRESHOLDS AND METHODOLOGY

Greenhouse Gas Emissions Thresholds

The *State CEQA Guidelines* are used in evaluating the cumulative significance of GHG emissions from a project. Based on Appendix G of the State CEQA Guidelines, impacts related to GHG emissions from the proposed project would be significant if the project would:

- (1) *Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment*
- (2) *Conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gases*

The vast majority of individual projects do not generate sufficient GHG emissions to create a project-specific impact through a direct influence to global climate change; therefore, the issue of climate change typically involves an analysis of whether a project's contribution towards an impact is cumulatively considerable. "Cumulatively considerable" means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, other current projects, and probable future projects (CEQA Guidelines, Section 15355).

The adopted *CEQA Guidelines* provide regulatory guidance on the analysis and mitigation of GHG emissions in CEQA documents, while giving lead agencies the discretion to set quantitative or qualitative thresholds for the assessment and mitigation of GHGs and climate change impacts.

The 2015 SJVAPCD Final Draft Guidance for Assessing and Mitigating Air Quality Impacts document states that in the absence of scientific evidence supporting establishment of a numerical threshold, the District policy applies performance based standards to assess project specific GHG emission impacts on global climate change (SJVAPCD 2015). The District has determined that if a project's GHG emissions are consistent with AB 32, a local GHG emissions reduction plan such as a CAP, or projects that implement Best Performance Standards (BPS), then the project would have a less than significant impact on global climate change. Therefore, the project would be less than significant if the project is consistent with the City of Merced CAP and/or implements BPS. The CAP identifies emissions reduction targets through the year 2020 in order to be consistent with AB 32. However, because the CAP does not establish a 2030 GHG emission reduction goal, the City's CAP does not provide a means to evaluate consistency with SB 32, on a project level basis.

Determination of a Project-Specific Significance Threshold

The Association of Environmental Planners (AEP) Climate Change Committee white paper evaluates and identifies defensible GHG thresholds for use in CEQA analyses. The white paper was published after California established the SB 32 target of 40 percent below 1990 levels GHG emissions by 2030 target and the November 2015 California Supreme Court ruling in the *Center for Biological Diversity vs. California Department of Fish and Wildlife*. The following four methods



for evaluating operational emissions described below are the most widely used and defensible evaluation criteria for determining a GHG emission threshold for an individual project.

- (1) **Consistency with a qualified GHG reduction plan.** For a project located within a jurisdiction that has adopted a qualified GHG reduction plan (as defined by CEQA Guidelines Section 15183.5), GHG emissions would be less than significant if the project is anticipated by the plan and fully consistent with the plan. However, projects with a horizon year beyond 2020 should not tier from a plan that is only qualified up to 2020.
- (2) **Efficiency thresholds.** Most land use sector efficiency thresholds are currently based on AB 32 targets and as they are currently calculated should not be used for projects with a horizon year beyond 2020. However, projects with a horizon year beyond 2020 should take into account the type and amount of land use projects and their expected emissions out to the year 2030. Efficiency metrics should be adjusted for 2030 and include applicable land uses.
- (3) **Bright line thresholds.** There are two types of bright line thresholds:
 - a. **Standalone thresholds:** Numeric thresholds determined by air districts or other jurisdictions, (e.g. SCAQMD residential and commercial project emission threshold of 3,000 metric tons CO₂e per year) are primarily based on market capture calculations for the pre-2020 period. Emissions exceeding standalone thresholds would be considered significant.
 - b. **Screening thresholds:** Emissions exceeding screening thresholds would require evaluation using a second tier threshold, such as an efficiency threshold or other threshold concept to determine whether project emissions would be considered significant. Projects that would result in emissions greater than the bright line screening threshold may or may not be determined to have significant impacts based on the assessment of additional criteria.

However, projects with a horizon year beyond 2020 should take into account the type and amount of land use projects and their expected emissions out to at least the year 2030 to take into account the post 2020 GHG reduction efforts and mitigation.
- (4) **Percent below “Business as Usual” (BAU).** This approach consists of comparing a project’s BAU emissions to a specified percent reduction level. Project GHG emissions would be less than significant if the project reduces BAU emissions by the same amount as the statewide 2020 reductions. This is the method identified as appropriate in the Merced CAP; however, this method presents challenges following the Newhall Ranch ruling and is no longer recommended.

The proposed project is located within the City of Merced. The City has a CAP, but the plan does not set a 2030 goal and is therefore not consistent with SB 32. At this time the Updated Scoping Plan is still in draft form and the final state-wide reduction measures and methodologies that will be developed to reach the state’s 2030 are not fully defined. Based on the findings of the Newhall Ranch ruling and the fact that the SB 32 scoping plan has not been finalized it is currently difficult to develop a clear unmitigated BAU percent reduction level that is consistent with both the AB 32 and SB 32 targets. Therefore, an applicable BAU threshold was not chosen. Furthermore, because the previously established brightline thresholds were not generally developed to meet the targets established by SB 32, previously proposed and adopted



bright-line thresholds are no longer relevant. Therefore, to be consistent with SB 32, an efficiency threshold methodology has been selected to evaluate the significance of the project’s overall GHG emissions.

The selected methodology will include amortizing construction GHG emissions over a 30 year period in combination with the summed annual operational emissions from each operational emission source category. The total annual emissions will then be divided by the increase in population associated with the project to estimate the project’s per capita emissions to compare to a per capita efficiency threshold (consistent with method (2) listed above) in order to demonstrate that this project’s GHG emissions are on a reduction trajectory in-line with the statewide SB 32 GHG reduction goal. In addition, the project will qualitatively be compared to the City of Merced CAP and the Merced County Association of Governments (MCAG) Regional Transportation Plan / Sustainable Communities Strategy (RTP/SCS) to ensure consistency with plans and policies intended to reduce GHG emissions.

The quantitative efficiency threshold was calculated specifically for this project to represent a per capita emissions target for the City of Merced to demonstrate consistency with a straight-line GHG emission reduction trajectory to bring the City’s overall GHG emissions to 40 percent below 1990 levels by the year 2030 (SB 32). Table 6 summarizes the data utilized to calculate the 2018 per capita emissions target, which is 4.41 metric tons of CO₂e per person per year.

Table 6- Per Capita Emissions Target Calculations

City of Merced Emissions Targets Years	GHG Emission Targets
2020 GHG Emissions Target (1990 GHG Emissions) (Demonstrating AB 32 Consistency)	349,981 metric tons of CO ₂ e
2030 GHG Emissions Target (40% below 1990 Emissions) (Demonstrating SB 32 Consistency)	209,989 metric tons of CO ₂ e
2018 GHG Emissions Target (Demonstrating Trajectory Towards SB 32 Target)	377,980 metric tons of CO ₂ e
2018 Citywide Population Projection	85,650 people
2018 Project Efficiency Threshold/ Per Capita Emissions Target	4.41 metric tons CO₂e per person per year

Note: 1990 GHG emissions sourced from City of Merced CAP. 2018 population projection based on a one percent annual growth rate based on 2016 population data (DOF 2016). Values have been rounded.

This threshold of 4.41 metric tons of CO₂e per person per year was calculated using City of Merced’s 2020 target GHG emission target level, sourced from the City of Merced CAP, and utilizing population and housing data from the California Department of Finance. The City’s CAP identifies the 2020 emissions target as equivalent to 1990 levels, which is 349,981 metric tons of CO₂e. To achieve the SB 32 statewide GHG reductions target of 40 percent below 1990 levels the City would need to reduce their emissions by a total of 139,992 metric tons of CO₂e, between the years of 2020 and 2030, which would bring the City’s 2030 overall emissions to approximately 209,989 metric tons of CO₂e. Because the project’s operational year is scheduled for 2018, the target emissions threshold was calculated by “backcasting” from the 2030 target to 2018 assuming a constant emission rate per year. Using this methodology the target citywide GHG emissions in 2018 are estimated to be 377,980 metric tons of CO₂e. This 2018 emission



target lies on a straight-line trajectory to attain a City GHG emission level that is consistent with the statewide SB 32 2030 reduction target.

To estimate the project specific per capita emissions threshold for 2018, the City's 2018 emissions target was divided by the 2018 Merced population projection. The City's 2018 population was calculated utilizing 2016 population data from the City of Merced Cap (83,962 people) and adding a one percent population growth rate identified by DOF, resulting in an estimated population of 85,650 people in 2018. Therefore, the project's efficiency threshold utilized for this analysis is 4.41 metric tons of CO₂e per capita.

Greenhouse Gas Emissions Calculation Methodology

This analysis is based on the extended timeline of the project and uses CalEEMod default settings for construction equipment based on each phase of construction. The analysis focuses on CO₂, N₂O, and CH₄ as these are the GHG emissions that onsite development would generate in the largest quantities. Fluorinated gases, such as HFCs, PFCs, and SF₆, were also considered for the analysis. However, the project involves a 225 unit student housing project totaling 390,225 square feet, a clubhouse space consisting of 13,700 square feet, and an additional 6,600 square feet of retail space. Therefore, the quantity of fluorinated gases would not be significant since fluorinated gases are primarily associated with industrial processes. Calculations were based on the methodologies discussed in the CAPCOA white paper (January 2008) and included the use of the California Climate Action Registry General Reporting Protocol (January 2009).

This analysis calculates GHG emissions by quantifying the project's amenities and design features and also takes into account current state and federal measures that are intended to reduce GHG emissions. State and federal measures that are built into the emissions model calculation include 2013 Title 24 Energy Standards, Pavley (Clean Car Standards) and Low Carbon Fuel Standards. Although California Emissions Estimator Model (CalEEMod) version 2016.3.1 has 2013 Title 24 standards built into the model, the project would need to comply with 2016 Title 24 standards, which are 28 percent more stringent than the 2013 standards; therefore, this assumption was included in the analysis.

Evaluation of Construction Emissions

Construction of the project would generate GHG emissions, primarily due to the operation of construction equipment and truck trips. Project construction was estimated to be completed within approximately one year. For this analysis, it was assumed that construction would commence in September 1, 2017 and would be completed August 24, 2018. Emissions associated with the construction period were estimated using CalEEMod, based on the projected maximum amount of equipment that would be used onsite at one time (see Appendix B for CalEEMod results).

Although construction activity is addressed in this analysis, CAPCOA does not discuss whether any of the suggested threshold approaches (as discussed below in *GHG Cumulative Significance*) adequately address impacts from temporary construction activity. As stated in the *CEQA and Climate Change* white paper, "more study is needed to make this assessment or to develop separate thresholds for construction activity" (CAPCOA 2008). Nevertheless, the SJVAPCD has



recommended amortizing construction-related emissions over a 30-year period in conjunction with the project's operational emissions.

Evaluation of Indirect Emissions

Emissions associated with area sources including consumer products, landscape maintenance, and architectural coating were calculated in CalEEMod and utilize standard emission rates from the ARB, USEPA, and district supplied emission factor values (CalEEMod User Guide, 2016).

Operational emissions from electricity and natural gas use at the project were estimated using CalEEMod (see Appendix B for calculations). The default values on which CalEEMod are based include the California Energy Commission (CEC) sponsored California Commercial End Use Survey (CEUS) and Residential Appliance Saturation Survey (RASS) studies. CalEEMod provides operational emissions of CO₂, N₂O, and CH₄. This methodology is considered reasonable and reliable for use, as it has been subjected to peer-review by numerous public and private stakeholders and in particular by the CEC. It is also recommended by CAPCOA (January 2008).

Emissions from waste generation were also calculated in CalEEMod and are based on the IPCC's methods for quantifying GHG emissions from solid waste using the degradable organic content of waste (CalEEMod User Guide 2016). Waste disposal rates by land use and overall composition of municipal solid waste in California was primarily based on data provided by the California Department of Resources Recycling and Recovery (CalRecycle).

Emissions from water and wastewater usage calculated in CalEEMod were based on the default electricity intensity is from the CEC's 2006 Refining Estimates of Water-Related Energy Use in California using the average values for Northern and Southern California.

Direct Emissions from Mobile Combustion

Emissions of CO₂ and CH₄ from transportation sources were quantified using CalEEMod. Because CalEEMod does not calculate N₂O emissions from mobile sources, N₂O emissions were quantified using the California Climate Action Registry General Reporting Protocol (January 2009) direct emissions factors for mobile combustion (see Appendix A for calculations). The calculation methodology used is consistent with, but more conservative than, The Climate Registry (March 2013). Vehicle trips defaults estimated in CalEEMod were replaced with daily trip rate values derived from the Traffic Study, completed by DKS. The trip rate values were calculated by dividing the adjusted total daily trip rates for the residential and commercial components, by the applicable respective units. Emission rates for N₂O emissions were calculated based on the vehicle mix output generated by CalEEMod and the emission factors found in the California Climate Action Registry General Reporting Protocol and have been included in Appendix C.

One of the limitations to a quantitative analysis is that emission models, such as CalEEMod, evaluate aggregate emissions and do not demonstrate, with respect to a global impact, what proportion of these emissions are "new" emissions, specifically attributable to the project in question. For most projects, the main contribution of GHG emissions is from motor vehicles and the total vehicle miles traveled (VMT), but the quantity of these emissions appropriately characterized as "new" is uncertain. Traffic associated with a project may be relocated trips



from other locales, and consequently, may result in either higher or lower net VMT. For the project analyzed in this report, it is likely that some of the GHG emissions associated with traffic and energy demand would be truly “new” emissions. However, it is also likely that some of the emissions represent diversion of emissions from other locations. Thus, although GHG emissions are associated with onsite development, it is not possible to discern how much diversion is occurring or what fraction of those emissions represents global increases. In the absence of information regarding the different types of trips, the VMT estimate generated by CalEEMod, which assumes that all trips are new, is used as a conservative, “worst-case” scenario estimate.

GREENHOUSE GAS IMPACTS

Construction Emissions

Construction activity is assumed to occur over a period of approximately one year. Based on CalEEMod results, construction activity for the project would generate an estimated 856 metric tons of CO₂e units between September 2017 and August 2018. The SJVAPCD recommends amortizing construction emissions over a 30 year period (the assumed life of the project). Therefore, construction of the project would generate about 29 metric tons of CO₂e per year. Table 7 summarizes the estimated GHG emissions anticipated to result from the construction of the project, per year as well as amortized over the assumed life of the project.

Table 7- Estimated Construction Emissions of Greenhouse Gases

Year	Annual Emissions
2017	259 metric tons CO ₂ e
2018	597 metric tons CO ₂ e
Total Construction Emissions	856 metric tons CO ₂ e
Amortized over 30 years	29 metric tons CO₂e per year

See Appendix B for CalEEMod Results. Annual results shown. Total may not sum as values have been rounded.

Operational Indirect and Stationary Direct Emissions

Area Source Emissions

The CalEEMod model was used to calculate direct sources of air emissions located at the project site. Direct sources include hearths/fireplaces, consumer product use, and landscape maintenance equipment. Although no wood burning hearths or fireplaces were included in the modeling assumptions for the student housing project, the project would include two outdoor gas powered fire pits, thus two gas fireplaces were included in the model. As shown in Table 8, area source emissions resulting from the project would be approximately four metric tons of CO₂e per year.



Table 8- Estimated Area Source Greenhouse Gas Emissions

Project Emission Source	Annual Emissions
Area Source Emissions	4 metric tons CO ₂ e

Source: See Appendix B for calculations and for GHG emission factor assumptions. Total may not sum as values have been rounded.

Energy Use

The default setting in the CalEEMod output assumes that the operation of the onsite development would consume both electricity and natural gas. The generation of electricity through combustion of fossil fuels typically yields CO₂, and to a smaller extent, N₂O and CH₄. As discussed above, annual electricity and natural gas emissions have been calculated using default values from the CEC sponsored CEUS and RASS studies, which are built into CalEEMod.

The project will include an onsite solar photovoltaic component which was included in the model, and assumed to generate 90 percent of the project’s electricity needs. Based on the onsite solar energy production and the default setting in CalEEMod, the project would generate approximately 42 metric tons of CO₂e per year as a result of electricity use and about 247 metric tons of CO₂e resulting from natural gas consumption. Table 9, summarizes the electricity and natural gas consumption associated with the project, which would collectively generate a total of approximately 289 metric tons of CO₂e per year.

Table 9- Estimated Annual Operational Energy Related Greenhouse Gas Emissions

Emissions by Source	Annual Emissions
Electricity Use	42 metric tons CO ₂ e
Natural Gas Use	247 metric tons CO ₂ e
Total GHG Emissions	289 metric tons CO₂e

See Appendix B for calculations and for GHG emission factor assumptions. Total may not sum as values have been rounded.

Solid Waste Emissions

The project would generate approximately 55 tons of solid waste per year, according to CalEEMod, based on the assumption that the project would comply with mandatory recycling requirements pursuant to AB 341, which would require the project to divert 50 percent of solid waste from the landfill through recycling or composting. However, waste diversion requirements will increase to 75 percent in the year 2020; additionally, Merced’s CAP identifies a goal of 65 percent waste diversion by 2020. Because the project would be operational in 2018, a diversion rate of 75 percent was utilized in the model to demonstrate compliance with the AB 341 mandatory waste reduction trajectory (CalRecycle 2017). As shown in Table 10, the project would result in approximately 23 metric tons of CO₂e emissions per year, associated with the generation of 45 tons of solid waste annually.



Table 10- Estimated Annual Operational Solid Waste Greenhouse Gas Emissions

Emission Source	Annual Emissions
Residential Waste	13 metric tons CO ₂ e
Commercial Waste	10 metric tons CO ₂ e
Total Emissions	23 metric tons CO₂e

Source: See Appendix B for calculations and GHG emission factor assumptions. Values have been rounded.

Water Use Emissions

The project would utilize approximately 22 million gallons of water per year (approximately 13 million gallons for indoor consumption and 9 million gallons for outdoor use). Based on the amount of electricity generated in order to supply this amount of water, the project would generate approximately 48 metric tons of CO₂e per year.

Transportation Emissions

Mobile source GHG emissions were estimated using the average daily trips derived from the Traffic Impact Study (See Appendix C) and by the total vehicle miles traveled (VMT) estimated in CalEEMod. Based on the CalEEMod estimate, onsite development would generate an estimated 1,850,376 annual VMT.

Table 11 shows the estimated mobile emissions of GHGs for the project based on the estimated annual VMT. As noted above, CalEEMod does not calculate N₂O emissions related to mobile sources. As such, N₂O emissions were calculated based on the project’s VMT using calculation methods provided by the 2009 California Climate Action Registry General Reporting Protocol. Based on these calculations, the project would result in 0.13 metric tons of N₂O which equates to about 39 metric tons of CO₂e. As shown in Table 11, the project would generate approximately 2,019 metric tons of CO₂e from mobile source emissions annually.

Table 11- Estimated Annual Mobile Emissions of Greenhouse Gases

Emission Source	Annual Emissions
Proposed Project Mobile Emissions (CO ₂ & CH ₄)	1,980 metric tons CO ₂ e
Proposed Project Mobile Emissions (N ₂ O)	39 metric tons CO ₂ e
Total Mobile GHG Emissions	2,019 metric tons CO₂e

See Appendix B for project CalEEMod computer model output and Appendix C for N₂O calculations. Annual results shown. Totals may not sum as values have been rounded.

Combined Construction, Stationary and Mobile Source Emissions

Construction emissions associated with construction activity (approximately 857 metric tons CO₂e) are amortized over 30 years resulting in 29 metric tons CO₂e (the anticipated life of the project). Operational emissions, including mobile sources sum to 2,383 metric tons of CO₂e. Table 12 combines the construction, operational and mobile GHG emissions associated with onsite development for the project.



Table 12- Combined Greenhouse Gas Emissions Summary

Emission Source	Project Annual Emissions
Construction (amortized)	29 metric tons CO ₂ e
<i>Operational:</i> Area	4 metric tons CO ₂ e
Energy (electricity and natural gas)	289 metric tons CO ₂ e
Solid Waste	23 metric tons CO ₂ e
Water	48 metric tons CO ₂ e
Mobile	2,019 metric tons CO ₂ e
Total	2,412 metric tons CO₂e

See Appendix B for Project CalEEMod computer model output. Totals may not sum as values have been rounded.

The project would result in a total of approximately 2,412 metric tons of CO₂e per year, including amortized construction emission.

Impact Discussion

The project is located in the City of Merced, and the objective of the project is to provide student housing to accommodate the University’s anticipated student population growth. City of Merced released the City’s CAP in November 2012 with the objective to reduce the City’s GHG emissions to 1990 levels by 2020, consistent with AB 32, by encouraging municipal facilities and operations to reduce emissions in the community. The CAP as well as the SJVAPCD Draft Guidance for Assessing and Mitigation Air Quality Impacts document state that a project would have less than significant impacts if the project were to achieve 29 percent GHG emission reductions compared to business as usual (BAU) conditions. However, as discussed in the *Greenhouse Gas Emissions Threshold* section of this document, as a result of the Newhall Ranch decision, projects can no longer defensibly conclude that impacts are less than significant solely based on BAU reductions (AEP 2016). Consequently, a project specific efficiency threshold was developed to demonstrate that the project’s GHG emissions per-capita would be below the threshold and therefore would be on a trajectory to achieve SB 32 reduction targets.

As shown in Table 13, the project would result in a total of approximately 2,412 metric tons of CO₂e which equates to a GHG emission efficiency of 3.4 metric tons of CO₂e per the total project population of 709 residents generated by the project. As a result, the project would not exceed the efficiency threshold of 4.41 metric tons of CO₂e annually. As a result, the project’s GHG impacts would be less than significant and would not require mitigation.



Table 13- Project GHG Emissions Summary and Efficiency Threshold

Project Emission Source	Project Annual Emissions
Total Project Emissions	2,412 metric tons CO ₂ e
Project Population	709 people
Project-Specific Emissions Target	4.41 metric tons CO₂e per person per year
Project Emissions (Per Capita)	3.4 metric tons CO₂e per person per year
Does Project Exceed Efficiency Threshold? (Y/N)	No

*Total residential units based on project site plans. Project population calculated by (225 units*3.15 persons per household=709 people). Project efficiency threshold was calculated by first identifying the 2030 target emissions for the City of Merced, in 2018 and dividing the City target emissions by the 2018 population projection. Note: 2018 City population data was calculated based on a 1 percent annual growth rate from 2016 population data. Data sourced from City of Merced CAP and Department of Finance. Values have been rounded.*

Project Consistency with Applicable Policies

Senate Bill 375, signed in August 2008, requires the inclusion of sustainable communities strategies (SCS) in regional transportation plans (RTPs) for the purpose of reducing GHG emissions. In 2014, the Merced County Association of Governments (MCAG) adopted the 2014-2040 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS). MCAG’s RTP/SCS includes a commitment to reduce emissions from transportation sources by promoting compact higher density developments and “sustainable communities” to comply with SB 375. The RTP/ SCS identifies specific goals and objectives to implement active transportation systems, and encourage community designs that encourage walking, transit, and bicycling (MCAG 2014). This project is consistent with that goal by proposing the development of transportation oriented higher density mixed-use residential “village” The project would be a mixed-use higher density development that would also be located within walking and cycling distance of residential, commercial, and recreational activities, as well as public transportation including a new (project proposed) university shuttle, as well as access to an existing bus stop (0.13 miles east on Yosemite Avenue). The project would also include pedestrian and bike path connections, secure bicycle parking that would reduce the number and length of project-generated vehicle trips, and three zero emission electric vehicle charging stations. Therefore, the project would be consistent with MCAG’s goals in the SCS and thus would be consistent with SB 375.

Merced’s CAP was developed based on the City’s General Plan measures and provides detailed action item discussed related to reducing GHG emissions. Overall, the project’s design elements and features would not conflict with the CAP. Table 14 summarizes how the project’s design elements and features would be consistent with the City of Merced’s CAP, broken down by each respective CAP category, measure, and goal, as applicable.



Table 14- Consistency with Applicable City of Merced Climate Action Plan (CAP) GHG Reduction Measures

Measure	Project Consistency
<i>Healthy Communities</i>	
<p><i>Goal 1.</i> 21 percent of the GHG emissions targeted for reduction will be accomplished through enhanced mobility programs and projects. Enhance Transit, Pedestrian and Bicycle Mobility <i>Strategy EM 1.1</i> Increasing the percentage of citizens that travel by walking, cycling and by using transit services. <i>Strategy EM 1.3.</i> Dramatically increase the amount of facilities that support bicycle transportation throughout the City.</p>	<p>Consistent The project is located on a site adjacent to an existing bus stop and bicycle path. The project includes design elements such as bicycle path connections, secure bicycle parking facilities, and a shuttle bus (to and from the UC campus), and three on-site electric vehicle charging stations. There would also be a monthly cost associated with on-site parking to deter driving.</p>
<p><i>Goal 2.</i> 10 percent of the GHG Emissions targeted to reduction will be accomplished through sustainable land use designs and urban growth management. <i>Compact Urban Form/Infill.</i> Create compact, mixed-use, transit oriented communities Merced’s Urban Villages: This goal builds upon the City’s General Plan concept of developing “urban villages” as a form of transit oriented developments and mixed use developments which are foundational elements of reducing GHG emissions through land use planning.</p>	<p>Consistent The project is a mixed-use “University Village” concept intended to comply with the City’s goal to develop “Urban Village” communities. The project would provide a livable, walkable, and bike able community for students with access to transit and multi modal opportunities (bus, bike, walk, carpool, drive) to connect the village to the UC campus. The mixed-use element is also consistent with the CAP to reduce VMT by providing pedestrian linkages between the commercial and residential developments.</p>
<i>Quality Natural Resources</i>	
<p><i>Goal 3.</i> 5 percent of the GHG Emissions targeted for reduction will be accomplished through water management practices</p>	<p>Consistent In accordance with the 2016 California Green Building Standards Code, the project would include a schedule of plumbing fixtures and fixture fittings that would reduce the overall use of potable water within the buildings. Additionally, the project would include weather controlled outdoor landscape irrigation technologies. Specifically, the project site plans indicate that the landscape palette will incorporate drought tolerant, indigenous plantings to minimize water use. The buildings would include energy efficient mechanical and plumbing systems and low-flow plumbing fixtures.</p>
<p><i>Goal 4.</i> 10percent of the GHG Emissions targeted for reduction will be accomplished through programs and actions that protect the quality of Merced’s air resources.</p>	<p>Consistent The project would be consistent with the City’s goal to improve local air quality by including building design elements that minimize energy use, utilize energy efficient fixtures, provide ventilation, utilize non-toxic or non VOC architectural coating materials, provide access to a network of walking and biking trails, onsite secure bicycle parking, onsite outdoor recreational spaces, a university shuttle service and access to a community bus stop.</p>
<p><i>Goal 5.</i> 1 percent of the GHG Emissions targeted for reduction will be accomplished through waste reduction programs.</p>	<p>Potentially Consistent The project would be consistent with the CAP’s goal to divert 65 percent of all waste generated through recycling and composting by the year 2020. The project would need to provide adequate waste collection infrastructure including landfill, recycling, and composting services to comply with this CAP goal and the AB 341 regulation.</p>



Measure	Project Consistency
<i>Clean Energy Resources</i>	
<p><i>Goal 6.</i> 23 percent of the GHG Emissions targeted for reduction will be accomplished through utilization of renewable resources.</p>	<p>Consistent According to the project site plans, the buildings would be constructed to provide opportunities for solar photovoltaic panels to be connected to individual buildings' electric systems. The developer is seeking a net-zero energy project (90 percent on-site energy generation was included in the CalEEMod analysis).</p>
<p><i>Goal 7.</i> 30 percent of the GHG Emissions targeted for reduction will be accomplished through energy conservation habits and equipment.</p>	<p>Consistent The project would comply with the most recent 2016 California Green Building Standards Code (Title 24) energy efficiency standards. The project would include a variety energy conservation elements including, natural ventilation and daylighting, energy efficient appliances, solar shading and solar water heating for the pool, and LED lighting fixtures.</p>

The project would not conflict with any measures intended to reduce GHG emissions and would be consistent with the City's CAP goals and design elements for new development projects.

Greenhouse Gas Emissions Conclusion

Although the project would generate additional GHG emissions beyond existing conditions (vacant land), the total amount of GHG emissions would be approximately 2,412 metric tons of CO₂e per year, or 3.4 metric tons per person per year, which is below the project-specific threshold of 4.41 metric tons of CO₂e per person per year. The analysis demonstrates that the project's per capita GHG emissions would be below the 4.41 metric tons of CO₂e threshold. Further, the project would not conflict with any applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs and would be consistent with the MCAG RTP/SCS and the City of Merced CAP.

Because the project would be consistent with the City of Merced CAP, the MCAG RTP/SCS and because the project would result in less per capita GHG emissions than the 4.41 metric tons of CO₂e, the project's overall impacts from GHG emissions would be less than significant.



References

- Air Resources Board (ARB). 2015. 2020 Business as usual Emissions Projection, 2014 Edition.
<https://www.arb.ca.gov/cc/inventory/data/bau.htm> (accessed February 2017).
- ARB. 2016a. Ambient Air Quality Standards.
<http://www.arb.ca.gov/research/aaqs/aaqs2.pdf>. (accessed February 2017).
- ARB. 2016b. California Greenhouse Gas Emission Inventory- 2016 Edition.
<https://www.arb.ca.gov/cc/inventory/data/data.htm>.
- ARB. 2016c. Timeline of AB 32 Scoping Plan Activities.
<https://www.arb.ca.gov/cc/scopingplan/timeline.htm>. (accessed February 2017).
- ARB. May 4, 2016. Ambient Air Quality Standards.
<https://www.arb.ca.gov/research/aaqs/aaqs2.pdf>. (accessed February 2017).
- ARB. January 20, 2017. AB 32 Scoping Plan.
<https://www.arb.ca.gov/cc/scopingplan/scopingplan.htm>. (accessed March 2017).
- ARB. 2017. AB 32 Scoping Plan. <https://www.arb.ca.gov/cc/scopingplan/scopingplan.htm>.
(accessed February 2017).
- ARB. N.D. iADAM: Air Quality Data Statistics, Top 4 Measurements and Days Above the Standard. <https://www.arb.ca.gov/adam/topfour/topfour1.php>. (accessed March 2017).
- AEP. 2007. Alternative Approaches to Analyzing Greenhouse Gas Emissions and Global Climate Change in CEQA Documents.
- AEP. 2012. California Environmental Quality Act (CEQA) Statute and Guidelines.
- AEP. October 18, 2016. Final White Paper Beyond 2020 and Newhall: A Field Guide to New CEQA Greenhouse Gas Thresholds and Climate Action Plan Targets for California.
https://www.califaep.org/images/climate-change/AEP-2016_Final_White_Paper.pdf.
(accessed March 2017).
- California Air Pollution Control Officers Association (CAPCOA). 2008. CEQA and Climate Change. <http://docplayer.net/34706402-Ceqa-climate-change-evaluating-and-addressing-greenhouse-gas-emissions-from-projects-subject-to-the-california-environmental-quality-act.html>. (accessed March 2017).
- CAPCOA. 2010. Quantifying Greenhouse Gas Mitigation Measures.
- CAPCOA. 2016. Appendix A Calculation Details for CalEEMod.
http://www.aqmd.gov/docs/default-source/caleemod/upgrades/2016.3/02_appendix-a2016-3-1.pdf?sfvrsn=2. (accessed March 2017).



California Climate Action Registry General Reporting Protocol, Reporting Entity-Wide Greenhouse Gas Emissions, Version 3.1, January 2009.
<http://www.climateregistry.org/tools/protocols/general-reporting-protocol.html>.
(accessed February 2017).

California Climate Change Center (CCC). 2006. Climate Scenarios for California.
<http://www.energy.ca.gov/2005publications/CEC-500-2005-203/CEC-500-2005-203-SF.PDF>. (accessed March 2017).

CCC. 2009. California Climate Adaptation Strategy.
http://resources.ca.gov/docs/climate/Statewide_Adaptation_Strategy.pdf. (accessed March 2017).

California Department of Finance (DOF). 2017 Estimates
<http://www.dof.ca.gov/Forecasting/Demographics/Estimates/>. (accessed February 2017).

California Department of Water Resources. 2008. Progress on Incorporating Climate Change into Management of California's Water Resources.

California Energy Commission (CEC). 2006. Inventory of California Greenhouse Gas Emissions and Sinks: 1990-2004. Staff Final Report. CEC-600-2006-013-SF.
<http://www.energy.ca.gov/2006publications/CEC-600-2006-013/CEC-600-2006-013-SF.PDF>. (accessed March 2017).

California Energy Commission (CEC). 2006. Cayan, D., A.L. Luers, M. Hanemann, G. Granco, and B. Croes. Scenarios of Climate Change in California: An Overview. California Climate Change Center, State of California. White Paper, CEC-500-2005-203-SF.
<http://www.energy.ca.gov/2005publications/CEC-500-2005-203/CEC-500-2005-203-SF.PDF>. (accessed March 2017).

California Environmental Protection Agency (Cal EPA). 2006. Climate Action Team Report to Governor Schwarzenegger and the Legislature.
http://climatechange.ca.gov/climate_action_team/reports/2006report/2006-04-03_FINAL_CAT_REPORT.PDF. (accessed march 2017).

CalRecycle. 2015. Local Government Construction and Demolition (C&D) Guild.
<http://www.calrecycle.ca.gov/LGCentral/Library/CandDModel/Instruction/FAQ.htm>.
(accessed February 2017).

CalRecycle. 2016. C&D Waste Diversion Ordinance.
<http://www.calrecycle.ca.gov/LGCentral/Library/CandDModel/Instruction/FAQ.htm>.
(accessed February 2017).

Cayan, D., E. Maurer, M. Dettinger, M. Tyree, K. Hayhoe, C. Bonfils, P. Duffy, and B. Santer. Climate Scenarios for California: Climate Action Team Reports to the Governor and Legislature. 2006.



Demand Response Research Center. 2006. Water Supply Related Electricity Demand in California. <http://www.waterandenergyconsulting.com/WEDemandReport.pdf>. (accessed March 2017).

Environmental Protection Agency. May 3, 2016. Fact Sheet. <https://www3.epa.gov/region9/air/actions/pdf/ca/sjv/epa-r09-oar-2016-0164-sjv1hour-ozone-determ-nprm-factsheet-2016-05-03%20.pdf>. (accessed February 2017).

Intergovernmental Panel on Climate Change [IPCC], 2007: Summary for Policymakers. In: Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor and H.L. Miller (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

Intergovernmental Panel on Climate Change [IPCC], 2013: Summary for Policymakers. In: Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Stocker, T.F., D. Qin, G.-K. Plattner, M. Tignor, S. K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P.M. Midgley (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

Intergovernmental Panel on Climate Change [IPCC], 2014: Summary for Policymakers. In: Climate Change 2014, Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Edenhofer, O., R. Pichs-Madruga, Y. Sokona, E. Farahani, S. Kadner, K. Seyboth, A. Adler, I. Baum, S. Brunner, P. Eickemeier, B. Kriemann, J. Savolainen, S. Schlömer, C. von Stechow, T. Zwickel and J.C. Minx (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

Merced, City of. Climate Action Plan (CAP). November 2, 2012. https://www.cityofmerced.org/depts/cd/planning/climate_action_plan/. (accessed February 2017).

Merced, City of. CAP Capacity Overview. <https://www.cityofmerced.org/civicax/filebank/blobdload.aspx?BlobID=11895>. (accessed February 2017).

Merced County Association of Governments. 2014. Regional Transportation Plan Sustainable Communities Strategy 2014-2040. <http://www.mcgov.org/DocumentCenter/View/789>. (accessed March 2017).

Merced Vision 2030 General Plan *Chapter 9-Housing*. Tables 9.3.1-9.3.2. <https://www.cityofmerced.org/civicax/filebank/blobdload.aspx?BlobID=11482>. (accessed February 2017).

Office of Environmental Health Hazard Assessment. 2013. Indicators of Climate Change in California.



Parmesan, C. August 2006. Ecological and Evolutionary Responses to Recent Climate Change.

San Joaquin Valley Air Basin. 2015. Topography.

http://www.valleyair.org/transportation/GAMAQI_3-19-15.pdf. (accessed February 2017).

San Joaquin Valley Air Pollution Control District (SJVAPCD). December 2009. Guidance for Valley Land-use Agencies in Addressing GHG Emission Impacts for New Projects under CEQA. http://www.valleyair.org/programs/CCAP/CCAP_idx.htm. (accessed February 2017).

SJVAPCD. 2001. Rule 8020 Fugitive Dust Requirements for Control of Fine Particulate Matter (PM₁₀) From Construction, Demolition, Excavation, and Extraction Activities. <http://www.valleyair.org/rules/currnrules/r8020.pdf>. (accessed March 2017).

SJVAPCD. 2006-2012. CEQA. http://www.valleyair.org/transportation/ceqa_idx.htm. (accessed March 2017).

SJVAPCD. 2012. About the District: Criteria Pollutants.

http://www.valleyair.org/General_info/aboutdist.htm#TheJurisdictionPuzzle. (accessed February 2017).

SJVAPCD. 2016. Plan For The 2008 8-Hour Ozone Standard.

http://www.valleyair.org/Air_Quality_Plans/Ozone-Plan-2016/03.pdf. (accessed February 2017).

Southern California Association of Governments (SCAG). 2001. Employment Density Study Summary Report.

[file:///C:/Users/sdavis/Downloads/SCAG%20Employment%20Density%20Report_1%20\(3\).pdf](file:///C:/Users/sdavis/Downloads/SCAG%20Employment%20Density%20Report_1%20(3).pdf). (accessed March 2017).

United Nations. November 2011. Gateway to the United Nations Systems Work on Climate Change: Durban conference delivers breakthrough in international community's response to climate change. <http://www.un.org/climatechange/blog/2011/12/durban-climate-conference-delivers-breakthrough/>. (accessed March 2017).

United Nations Framework Convention on Climate Change (UNFCCC). 2007. United Nations Framework Convention on Climate Change. (www.unfccc.int).

UNFCCC. 2011. Outcome of the work of the Ad Hoc Working Group on Further Commitments for Annex I Parties under the Kyoto Protocol at its sixteenth session.

UNFCCC. 2015. Adoption of the Paris Agreement.

<https://unfccc.int/resource/docs/2015/cop21/eng/l09r01.pdf>. (accessed March 2017).

United States Environmental Protection Agency (USEPA). 2007. Climate Change Technology Program (CCTP).



https://www.arb.ca.gov/cc/etaac/meetings/053107pubmeet/main/7_amy_zimpfer.pdf.
(accessed March 2017).

USEPA. 2008. Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2006.
<https://www3.epa.gov/climatechange/Downloads/ghgemissions/US-GHG-Inventory-2015-Main-Text.pdf>. (accessed March 2017).

USEPA. 2010. Solid Waste Management and Greenhouse Gases.
<https://www3.epa.gov/warm/SWMSGHGreport.html>. (accessed March 2017).

Worland, J. December 12, 2015. What to Know About the Historic 'Paris Agreement' on Climate Change. Time. <http://time.com/4146764/paris-agreement-climate-cop-21/>. (accessed March 2017).

World Meteorological Organization (WMO). March 2013. A summary of current and climate change findings and figures.
<file:///C:/Users/sdavis/Downloads/ClimateChangeInfoSheet2013-03final.pdf>. (accessed March 2017).



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Appendix A
Site Plans

DATE	ISSUANCE FOR REVIEW
10/20/16	PLANNING COMMISSION
10/20/16	UNIVERSITY PLAN
10/20/16	PLANNING BOARD
10/20/16	BOARD
10/20/16	BOARD
10/20/16	BOARD
10/20/16	PLANNING COMMISSION

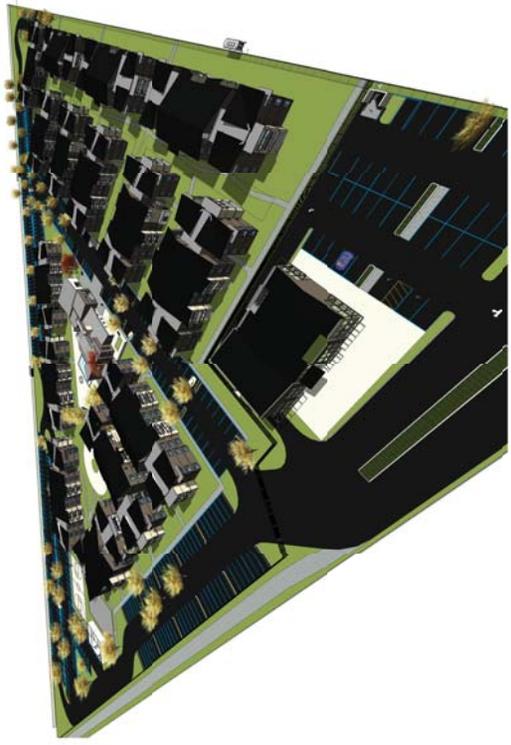
THIS PLAN AND THE INFORMATION CONTAINED HEREIN IS THE PROPERTY OF HOCHHAUSER BLATTER ARCHITECTURE AND PLANNING. IT IS TO BE USED ONLY FOR THE PROJECT AND SITE SPECIFICALLY IDENTIFIED HEREIN. ANY REUSE OR MODIFICATION OF THIS PLAN WITHOUT THE WRITTEN CONSENT OF HOCHHAUSER BLATTER ARCHITECTURE AND PLANNING IS STRICTLY PROHIBITED.

SHEET CONTENTS
AERIAL 3D VIEWS OF
MASTER SITE PLAN

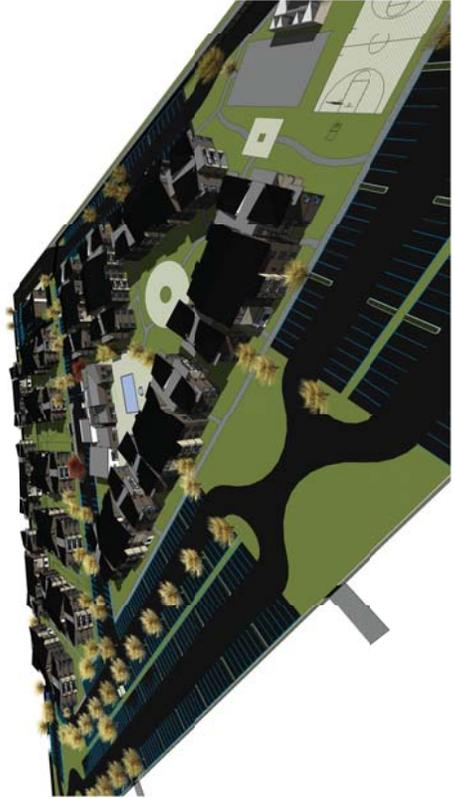
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SHEET
A3.7



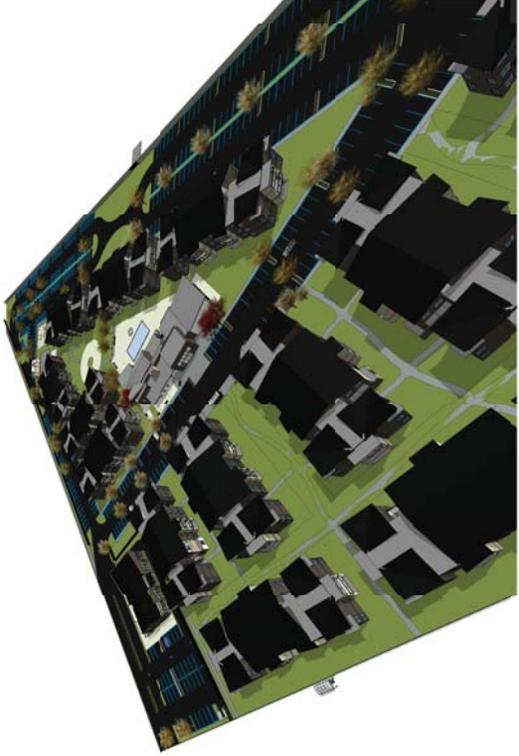
1 AERIAL VIEW FROM EAST



2 AERIAL VIEW FROM NORTH-EAST



3 AERIAL VIEW FROM SOUTH-WEST



4 AERIAL VIEW FROM NORTH-WEST



Appendix B

CalEEMod

Air Quality and Greenhouse Gas Model Results

University Village at Lake Project - Merced County, Annual

University Village at Lake Project
Merced County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Parking Lot	687.00	Space	6.18	274,800.00	0
Apartments Low Rise	225.00	Dwelling Unit	10.92	403,925.00	644
Fast Food Restaurant with Drive Thru	6.60	1000sqft	0.15	6,600.00	0

1.2 Other Project Characteristics

Urbanization	Urban	Wind Speed (m/s)	2.2	Precipitation Freq (Days)	49
Climate Zone	3			Operational Year	2019
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MW hr)	641.35	CH4 Intensity (lb/MW hr)	0.029	N2O Intensity (lb/MW hr)	0.006

1.3 User Entered Comments & Non-Default Data

University Village at Lake Project - Merced County, Annual

Project Characteristics -

Land Use - 17.25 acre site.

Construction Phase - Construction to be completed prior to 2018 school year. Arch Coating and Paving overlap with end of Building Construction.

Grading - Onsite balanced cut/fill. No export/import. 17.25 total acre site.

Vehicle Trips - Rates match traffic study. 3.328 trips per unit = 1,755 daily trips for residential. Commercial = 265.9 = 1755 total trips /6.6 per thousand square feet. 2 miles to UC campus (H-O and H-W).

Woodstoves - Only 2 gas fireplaces in common areas

Construction Off-road Equipment Mitigation -

Mobile Land Use Mitigation -

Mobile Commute Mitigation -

Area Mitigation -

Energy Mitigation -

Water Mitigation -

Waste Mitigation -

University Village at Lake Project - Merced County, Annual

Table Name	Column Name	Default Value	New Value
tblAreaMitigation	UseLowVOCPaintParkingCheck	False	True
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	40	0
tblConstructionPhase	NumDays	20.00	154.00
tblConstructionPhase	NumDays	300.00	200.00
tblConstructionPhase	NumDays	20.00	40.00
tblFireplaces	NumberGas	123.75	2.00
tblFireplaces	NumberNoFireplace	101.25	213.00
tblGrading	AcresOfGrading	75.00	17.25
tblLandUse	BuildingSpaceSquareFeet	225,000.00	403,925.00
tblLandUse	LandUseSquareFeet	225,000.00	403,925.00
tblLandUse	LotAcreage	14.06	10.92
tblProjectCharacteristics	OperationalYear	2018	2019
tblVehicleTrips	HS_TL	7.30	5.00
tblVehicleTrips	HW_TL	10.80	2.00
tblVehicleTrips	ST_TR	7.16	3.33
tblVehicleTrips	ST_TR	722.03	265.90
tblVehicleTrips	SU_TR	6.07	3.33
tblVehicleTrips	SU_TR	542.72	265.90
tblVehicleTrips	WD_TR	6.59	3.33
tblVehicleTrips	WD_TR	496.12	265.90
tblWoodstoves	NumberCatalytic	10.92	0.00
tblWoodstoves	NumberNoncatalytic	10.92	0.00

2.0 Emissions Summary

University Village at Lake Project - Merced County, Annual

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	9-1-2017	11-30-2017	1.9462	1.9462
2	12-1-2017	2-28-2018	2.4415	2.4415
3	3-1-2018	5-31-2018	3.0413	3.0413
4	6-1-2018	8-31-2018	2.4679	2.4679
		Highest	3.0413	3.0413

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	2.0627	0.0209	1.6859	1.0000e-004		9.3300e-003	9.3300e-003		9.3300e-003	9.3300e-003	0.0000	4.3167	4.3167	2.7400e-003	3.0000e-005	4.3938
Energy	0.0302	0.2625	0.1400	1.6500e-003		0.0209	0.0209		0.0209	0.0209	0.0000	756.5813	756.5813	0.0264	9.7700e-003	760.1516
Mobile	0.9615	10.6006	7.0786	0.0266	1.0447	0.0318	1.0765	0.2817	0.0302	0.3119	0.0000	2,483.7949	2,483.7949	0.3983	0.0000	2,493.7514
Waste						0.0000	0.0000		0.0000	0.0000	36.4409	0.0000	36.4409	2.1536	0.0000	90.2809
Water						0.0000	0.0000		0.0000	0.0000	5.2864	35.7698	41.0562	0.5446	0.0132	58.5910
Total	3.0544	10.8840	8.9045	0.0284	1.0447	0.0621	1.1067	0.2817	0.0604	0.3421	41.7273	3,280.4626	3,322.1900	3.1256	0.0230	3,407.1687

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2.2 Overall Operational

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	1.9428	0.0209	1.6859	1.0000e-004		9.3300e-003	9.3300e-003		9.3300e-003	9.3300e-003	0.0000	4.3167	4.3167	2.7400e-003	3.0000e-005	4.3938
Energy	0.0248	0.2157	0.1187	1.3500e-003		0.0171	0.0171		0.0171	0.0171	0.0000	287.0278	287.0278	6.5900e-003	4.8900e-003	288.6489
Mobile	0.8932	9.7078	5.8649	0.0212	0.7091	0.0242	0.7333	0.1912	0.0230	0.2141	0.0000	1,980.063 2	1,980.063 2	0.3842	0.0000	1,989.668 4
Waste						0.0000	0.0000		0.0000	0.0000	9.1102	0.0000	9.1102	0.5384	0.0000	22.5702
Water						0.0000	0.0000		0.0000	0.0000	4.2291	29.9420	34.1711	0.4357	0.0105	48.2041
Total	2.8607	9.9443	7.6695	0.0226	0.7091	0.0507	0.7597	0.1912	0.0494	0.2406	13.3394	2,301.349 7	2,314.689 0	1.3677	0.0155	2,353.485 5

	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
Percent Reduction	6.34	8.63	13.87	20.20	32.13	18.37	31.36	32.13	18.24	29.67	68.03	29.85	30.33	56.24	32.67	30.93

3.0 Construction Detail

Construction Phase

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Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	9/1/2017	9/14/2017	5	10	
2	Grading	Grading	9/15/2017	10/26/2017	5	30	
3	Building Construction	Building Construction	10/27/2017	8/2/2018	5	200	
4	Architectural Coating	Architectural Coating	1/1/2018	8/2/2018	5	154	
5	Paving	Paving	7/1/2018	8/24/2018	5	40	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 17.25

Acres of Paving: 6.18

Residential Indoor: 817,948; Residential Outdoor: 272,649; Non-Residential Indoor: 9,900; Non-Residential Outdoor: 3,300; Striped Parking Area: 16,488 (Architectural Coating – sqft)

OffRoad Equipment

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Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	6.00	78	0.48
Grading	Excavators	2	8.00	158	0.38
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Paving	Pavers	2	8.00	130	0.42
Paving	Rollers	2	8.00	80	0.38
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Grading	Graders	1	8.00	187	0.41
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Paving	Paving Equipment	2	8.00	132	0.36
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Grading	Scrapers	2	8.00	367	0.48
Building Construction	Welders	1	8.00	46	0.45

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
Architectural Coating	1	56.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	280.00	70.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

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Water Exposed Area

Clean Paved Roads

3.2 Site Preparation - 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					
Fugitive Dust					0.0903	0.0000	0.0903	0.0497	0.0000	0.0497	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0248	0.2614	0.1173	1.9000e-004		0.0144	0.0144		0.0132	0.0132	0.0000	17.6672	17.6672	5.4100e-003	0.0000	17.8025
Total	0.0248	0.2614	0.1173	1.9000e-004	0.0903	0.0144	0.1047	0.0497	0.0132	0.0629	0.0000	17.6672	17.6672	5.4100e-003	0.0000	17.8025

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3.2 Site Preparation - 2017

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	5.7000e-004	4.4000e-004	4.4000e-003	1.0000e-005	7.2000e-004	1.0000e-005	7.2000e-004	1.9000e-004	1.0000e-005	2.0000e-004	0.0000	0.7075	0.7075	3.0000e-005	0.0000	0.7083
Total	5.7000e-004	4.4000e-004	4.4000e-003	1.0000e-005	7.2000e-004	1.0000e-005	7.2000e-004	1.9000e-004	1.0000e-005	2.0000e-004	0.0000	0.7075	0.7075	3.0000e-005	0.0000	0.7083

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					0.0407	0.0000	0.0407	0.0223	0.0000	0.0223	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0248	0.2614	0.1173	1.9000e-004		0.0144	0.0144		0.0132	0.0132	0.0000	17.6672	17.6672	5.4100e-003	0.0000	17.8025
Total	0.0248	0.2614	0.1173	1.9000e-004	0.0407	0.0144	0.0550	0.0223	0.0132	0.0356	0.0000	17.6672	17.6672	5.4100e-003	0.0000	17.8025

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3.2 Site Preparation - 2017

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	5.7000e-004	4.4000e-004	4.4000e-003	1.0000e-005	7.2000e-004	1.0000e-005	7.2000e-004	1.9000e-004	1.0000e-005	2.0000e-004	0.0000	0.7075	0.7075	3.0000e-005	0.0000	0.7083
Total	5.7000e-004	4.4000e-004	4.4000e-003	1.0000e-005	7.2000e-004	1.0000e-005	7.2000e-004	1.9000e-004	1.0000e-005	2.0000e-004	0.0000	0.7075	0.7075	3.0000e-005	0.0000	0.7083

3.3 Grading - 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					
Fugitive Dust					0.0995	0.0000	0.0995	0.0506	0.0000	0.0506	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0862	1.0191	0.5817	9.3000e-004		0.0461	0.0461		0.0424	0.0424	0.0000	86.3398	86.3398	0.0265	0.0000	87.0011
Total	0.0862	1.0191	0.5817	9.3000e-004	0.0995	0.0461	0.1456	0.0506	0.0424	0.0930	0.0000	86.3398	86.3398	0.0265	0.0000	87.0011

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3.3 Grading - 2017

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.9000e-003	1.4500e-003	0.0147	3.0000e-005	2.3900e-003	2.0000e-005	2.4100e-003	6.4000e-004	2.0000e-005	6.6000e-004	0.0000	2.3584	2.3584	1.1000e-004	0.0000	2.3611
Total	1.9000e-003	1.4500e-003	0.0147	3.0000e-005	2.3900e-003	2.0000e-005	2.4100e-003	6.4000e-004	2.0000e-005	6.6000e-004	0.0000	2.3584	2.3584	1.1000e-004	0.0000	2.3611

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					0.0448	0.0000	0.0448	0.0228	0.0000	0.0228	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0862	1.0191	0.5817	9.3000e-004		0.0461	0.0461		0.0424	0.0424	0.0000	86.3397	86.3397	0.0265	0.0000	87.0010
Total	0.0862	1.0191	0.5817	9.3000e-004	0.0448	0.0461	0.0909	0.0228	0.0424	0.0652	0.0000	86.3397	86.3397	0.0265	0.0000	87.0010

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3.3 Grading - 2017

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.9000e-003	1.4500e-003	0.0147	3.0000e-005	2.3900e-003	2.0000e-005	2.4100e-003	6.4000e-004	2.0000e-005	6.6000e-004	0.0000	2.3584	2.3584	1.1000e-004	0.0000	2.3611
Total	1.9000e-003	1.4500e-003	0.0147	3.0000e-005	2.3900e-003	2.0000e-005	2.4100e-003	6.4000e-004	2.0000e-005	6.6000e-004	0.0000	2.3584	2.3584	1.1000e-004	0.0000	2.3611

3.4 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	0.0716	0.6108	0.4182	6.2000e-004		0.0411	0.0411		0.0386	0.0386	0.0000	55.3134	55.3134	0.0136	0.0000	55.6540
Total	0.0716	0.6108	0.4182	6.2000e-004		0.0411	0.0411		0.0386	0.0386	0.0000	55.3134	55.3134	0.0136	0.0000	55.6540

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3.4 Building Construction - 2017

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	0.0111	0.2403	0.0684	4.7000e-004	0.0107	2.3100e-003	0.0130	3.0800e-003	2.2100e-003	5.2900e-003	0.0000	44.7660	44.7660	4.6300e-003	0.0000	44.8818
Worker	0.0408	0.0312	0.3146	5.6000e-004	0.0514	4.6000e-004	0.0518	0.0137	4.2000e-004	0.0141	0.0000	50.6266	50.6266	2.2900e-003	0.0000	50.6838
Total	0.0519	0.2715	0.3830	1.0300e-003	0.0620	2.7700e-003	0.0648	0.0167	2.6300e-003	0.0194	0.0000	95.3925	95.3925	6.9200e-003	0.0000	95.5656

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	0.0716	0.6108	0.4182	6.2000e-004		0.0411	0.0411		0.0386	0.0386	0.0000	55.3133	55.3133	0.0136	0.0000	55.6540
Total	0.0716	0.6108	0.4182	6.2000e-004		0.0411	0.0411		0.0386	0.0386	0.0000	55.3133	55.3133	0.0136	0.0000	55.6540

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3.4 Building Construction - 2017

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	0.0111	0.2403	0.0684	4.7000e-004	0.0107	2.3100e-003	0.0130	3.0800e-003	2.2100e-003	5.2900e-003	0.0000	44.7660	44.7660	4.6300e-003	0.0000	44.8818
Worker	0.0408	0.0312	0.3146	5.6000e-004	0.0514	4.6000e-004	0.0518	0.0137	4.2000e-004	0.0141	0.0000	50.6266	50.6266	2.2900e-003	0.0000	50.6838
Total	0.0519	0.2715	0.3830	1.0300e-003	0.0620	2.7700e-003	0.0648	0.0167	2.6300e-003	0.0194	0.0000	95.3925	95.3925	6.9200e-003	0.0000	95.5656

3.4 Building Construction - 2018

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	0.2063	1.8010	1.3537	2.0700e-003		0.1155	0.1155		0.1086	0.1086	0.0000	183.0808	183.0808	0.0449	0.0000	184.2021
Total	0.2063	1.8010	1.3537	2.0700e-003		0.1155	0.1155		0.1086	0.1086	0.0000	183.0808	183.0808	0.0449	0.0000	184.2021

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3.4 Building Construction - 2018

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	0.0318	0.7563	0.1942	1.5700e-003	0.0357	6.2400e-003	0.0419	0.0103	5.9700e-003	0.0163	0.0000	149.2603	149.2603	0.0150	0.0000	149.6352
Worker	0.1207	0.0905	0.9191	1.8400e-003	0.1719	1.4600e-003	0.1734	0.0457	1.3500e-003	0.0471	0.0000	166.1896	166.1896	6.7700e-003	0.0000	166.3589
Total	0.1525	0.8469	1.1133	3.4100e-003	0.2076	7.7000e-003	0.2153	0.0560	7.3200e-003	0.0633	0.0000	315.4499	315.4499	0.0218	0.0000	315.9940

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	0.2063	1.8010	1.3537	2.0700e-003		0.1155	0.1155		0.1086	0.1086	0.0000	183.0806	183.0806	0.0449	0.0000	184.2019
Total	0.2063	1.8010	1.3537	2.0700e-003		0.1155	0.1155		0.1086	0.1086	0.0000	183.0806	183.0806	0.0449	0.0000	184.2019

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3.4 Building Construction - 2018

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	0.0318	0.7563	0.1942	1.5700e-003	0.0357	6.2400e-003	0.0419	0.0103	5.9700e-003	0.0163	0.0000	149.2603	149.2603	0.0150	0.0000	149.6352
Worker	0.1207	0.0905	0.9191	1.8400e-003	0.1719	1.4600e-003	0.1734	0.0457	1.3500e-003	0.0471	0.0000	166.1896	166.1896	6.7700e-003	0.0000	166.3589
Total	0.1525	0.8469	1.1133	3.4100e-003	0.2076	7.7000e-003	0.2153	0.0560	7.3200e-003	0.0633	0.0000	315.4499	315.4499	0.0218	0.0000	315.9940

3.5 Architectural Coating - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	3.8944					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0230	0.1544	0.1428	2.3000e-004		0.0116	0.0116		0.0116	0.0116	0.0000	19.6601	19.6601	1.8700e-003	0.0000	19.7068
Total	3.9174	0.1544	0.1428	2.3000e-004		0.0116	0.0116		0.0116	0.0116	0.0000	19.6601	19.6601	1.8700e-003	0.0000	19.7068

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3.5 Architectural Coating - 2018

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	0.0241	0.0181	0.1838	3.7000e-004	0.0344	2.9000e-004	0.0347	9.1400e-003	2.7000e-004	9.4100e-003	0.0000	33.2379	33.2379	1.3500e-003	0.0000	33.2718
Total	0.0241	0.0181	0.1838	3.7000e-004	0.0344	2.9000e-004	0.0347	9.1400e-003	2.7000e-004	9.4100e-003	0.0000	33.2379	33.2379	1.3500e-003	0.0000	33.2718

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	3.8944					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0230	0.1544	0.1428	2.3000e-004		0.0116	0.0116		0.0116	0.0116	0.0000	19.6601	19.6601	1.8700e-003	0.0000	19.7068
Total	3.9174	0.1544	0.1428	2.3000e-004		0.0116	0.0116		0.0116	0.0116	0.0000	19.6601	19.6601	1.8700e-003	0.0000	19.7068

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3.5 Architectural Coating - 2018

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	0.0241	0.0181	0.1838	3.7000e-004	0.0344	2.9000e-004	0.0347	9.1400e-003	2.7000e-004	9.4100e-003	0.0000	33.2379	33.2379	1.3500e-003	0.0000	33.2718
Total	0.0241	0.0181	0.1838	3.7000e-004	0.0344	2.9000e-004	0.0347	9.1400e-003	2.7000e-004	9.4100e-003	0.0000	33.2379	33.2379	1.3500e-003	0.0000	33.2718

3.6 Paving - 2018

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	0.0329	0.3504	0.2959	4.6000e-004		0.0191	0.0191		0.0176	0.0176	0.0000	41.6233	41.6233	0.0130	0.0000	41.9472
Paving	8.1000e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	0.0410	0.3504	0.2959	4.6000e-004		0.0191	0.0191		0.0176	0.0176	0.0000	41.6233	41.6233	0.0130	0.0000	41.9472

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3.6 Paving - 2018

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.6800e-003	1.2600e-003	0.0128	3.0000e-005	2.3900e-003	2.0000e-005	2.4100e-003	6.4000e-004	2.0000e-005	6.5000e-004	0.0000	2.3125	2.3125	9.0000e-005	0.0000	2.3148
Total	1.6800e-003	1.2600e-003	0.0128	3.0000e-005	2.3900e-003	2.0000e-005	2.4100e-003	6.4000e-004	2.0000e-005	6.5000e-004	0.0000	2.3125	2.3125	9.0000e-005	0.0000	2.3148

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	0.0329	0.3504	0.2959	4.6000e-004		0.0191	0.0191		0.0176	0.0176	0.0000	41.6232	41.6232	0.0130	0.0000	41.9471
Paving	8.1000e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	0.0410	0.3504	0.2959	4.6000e-004		0.0191	0.0191		0.0176	0.0176	0.0000	41.6232	41.6232	0.0130	0.0000	41.9471

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3.6 Paving - 2018

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.6800e-003	1.2600e-003	0.0128	3.0000e-005	2.3900e-003	2.0000e-005	2.4100e-003	6.4000e-004	2.0000e-005	6.5000e-004	0.0000	2.3125	2.3125	9.0000e-005	0.0000	2.3148
Total	1.6800e-003	1.2600e-003	0.0128	3.0000e-005	2.3900e-003	2.0000e-005	2.4100e-003	6.4000e-004	2.0000e-005	6.5000e-004	0.0000	2.3125	2.3125	9.0000e-005	0.0000	2.3148

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

- Increase Density
- Increase Diversity
- Improve Destination Accessibility
- Increase Transit Accessibility
- Implement NEV Network
- Unbundle Parking Cost

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	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.8932	9.7078	5.8649	0.0212	0.7091	0.0242	0.7333	0.1912	0.0230	0.2141	0.0000	1,980.0632	1,980.0632	0.3842	0.0000	1,989.6684
Unmitigated	0.9615	10.6006	7.0786	0.0266	1.0447	0.0318	1.0765	0.2817	0.0302	0.3119	0.0000	2,483.7949	2,483.7949	0.3983	0.0000	2,493.7514

4.2 Trip Summary Information

Land Use	Average Daily Trip Rate			Unmitigated	Mitigated
	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments Low Rise	749.25	749.25	749.25	1,086,512	737,458
Fast Food Restaurant with Drive Thru	1,754.94	1,754.94	1,754.94	1,639,684	1,112,918
Parking Lot	0.00	0.00	0.00		
Total	2,504.19	2,504.19	2,504.19	2,726,196	1,850,376

4.3 Trip Type Information

Land Use	Miles			Trip %			Trip Purpose %		
	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 Low Rise	2.00	5.00	7.50	46.90	17.40	35.70	86	11	3
Fast Food Restaurant with Drive	9.50	7.30	7.30	2.20	78.80	19.00	29	21	50
Parking Lot	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

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Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Parking Lot	0.477385	0.032954	0.155020	0.127450	0.023126	0.005418	0.015590	0.149182	0.002365	0.002469	0.006628	0.001652	0.000762
Apartment Low Rise	0.477385	0.032954	0.155020	0.127450	0.023126	0.005418	0.015590	0.149182	0.002365	0.002469	0.006628	0.001652	0.000762
Fast Food Restaurant with Drive Thru	0.477385	0.032954	0.155020	0.127450	0.023126	0.005418	0.015590	0.149182	0.002365	0.002469	0.006628	0.001652	0.000762

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

Exceed Title 24

Install High Efficiency Lighting

Percent of Electricity Use Generated with Renewable Energy

Install Energy Efficient Appliances

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					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	41.7888	41.7888	1.8900e-003	3.9000e-004	41.9525
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	457.2836	457.2836	0.0207	4.2800e-003	459.0754
NaturalGas Mitigated	0.0248	0.2157	0.1187	1.3500e-003		0.0171	0.0171		0.0171	0.0171	0.0000	245.2390	245.2390	4.7000e-003	4.5000e-003	246.6964
NaturalGas Unmitigated	0.0302	0.2625	0.1400	1.6500e-003		0.0209	0.0209		0.0209	0.0209	0.0000	299.2977	299.2977	5.7400e-003	5.4900e-003	301.0763

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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					
Apartments Low Rise	4.21867e+006	0.0228	0.1944	0.0827	1.2400e-003		0.0157	0.0157		0.0157	0.0157	0.0000	225.1241	225.1241	4.3100e-003	4.1300e-003	226.4619
Fast Food Restaurant with Drive Thru	1.38996e+006	7.4900e-003	0.0681	0.0572	4.1000e-004		5.1800e-003	5.1800e-003		5.1800e-003	5.1800e-003	0.0000	74.1736	74.1736	1.4200e-003	1.3600e-003	74.6143
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		0.0302	0.2625	0.1400	1.6500e-003		0.0209	0.0209		0.0209	0.0209	0.0000	299.2977	299.2977	5.7300e-003	5.4900e-003	301.0763

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					
Apartments Low Rise	3.27199e+006	0.0176	0.1508	0.0642	9.6000e-004		0.0122	0.0122		0.0122	0.0122	0.0000	174.6058	174.6058	3.3500e-003	3.2000e-003	175.6434
Fast Food Restaurant with Drive Thru	1.32362e+006	7.1400e-003	0.0649	0.0545	3.9000e-004		4.9300e-003	4.9300e-003		4.9300e-003	4.9300e-003	0.0000	70.6332	70.6332	1.3500e-003	1.2900e-003	71.0530
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		0.0248	0.2157	0.1187	1.3500e-003		0.0171	0.0171		0.0171	0.0171	0.0000	245.2390	245.2390	4.7000e-003	4.4900e-003	246.6964

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5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Apartments Low Rise	1.13571e+006	330.3898	0.0149	3.0900e-003	331.6843
Fast Food Restaurant with Drive Thru	194370	56.5445	2.5600e-003	5.3000e-004	56.7660
Parking Lot	241824	70.3494	3.1800e-003	6.6000e-004	70.6250
Total		457.2836	0.0207	4.2800e-003	459.0754

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Apartments Low Rise	104133	30.2934	1.3700e-003	2.8000e-004	30.4121
Fast Food Restaurant with Drive Thru	17750.8	5.1639	2.3000e-004	5.0000e-005	5.1842
Parking Lot	21764.2	6.3314	2.9000e-004	6.0000e-005	6.3563
Total		41.7888	1.8900e-003	3.9000e-004	41.9525

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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	1.9428	0.0209	1.6859	1.0000e-004		9.3300e-003	9.3300e-003		9.3300e-003	9.3300e-003	0.0000	4.3167	4.3167	2.7400e-003	3.0000e-005	4.3938
Unmitigated	2.0627	0.0209	1.6859	1.0000e-004		9.3300e-003	9.3300e-003		9.3300e-003	9.3300e-003	0.0000	4.3167	4.3167	2.7400e-003	3.0000e-005	4.3938

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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	0.3894					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	1.6211					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	1.6000e-004	1.3600e-003	5.8000e-004	1.0000e-005		1.1000e-004	1.1000e-004		1.1000e-004	1.1000e-004	0.0000	1.5753	1.5753	3.0000e-005	3.0000e-005	1.5847
Landscaping	0.0520	0.0195	1.6854	9.0000e-005		9.2200e-003	9.2200e-003		9.2200e-003	9.2200e-003	0.0000	2.7414	2.7414	2.7100e-003	0.0000	2.8092
Total	2.0627	0.0209	1.6859	1.0000e-004		9.3300e-003	9.3300e-003		9.3300e-003	9.3300e-003	0.0000	4.3167	4.3167	2.7400e-003	3.0000e-005	4.3938

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6.2 Area by SubCategory

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	0.3894					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	1.5012					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	1.6000e-004	1.3600e-003	5.8000e-004	1.0000e-005		1.1000e-004	1.1000e-004		1.1000e-004	1.1000e-004	0.0000	1.5753	1.5753	3.0000e-005	3.0000e-005	1.5847
Landscaping	0.0520	0.0195	1.6854	9.0000e-005		9.2200e-003	9.2200e-003		9.2200e-003	9.2200e-003	0.0000	2.7414	2.7414	2.7100e-003	0.0000	2.8092
Total	1.9428	0.0209	1.6859	1.0000e-004		9.3300e-003	9.3300e-003		9.3300e-003	9.3300e-003	0.0000	4.3167	4.3167	2.7400e-003	3.0000e-005	4.3938

7.0 Water Detail

7.1 Mitigation Measures Water

- Install Low Flow Bathroom Faucet
- Install Low Flow Kitchen Faucet
- Install Low Flow Toilet
- Install Low Flow Shower
- Use Water Efficient Irrigation System

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	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	34.1711	0.4357	0.0105	48.2041
Unmitigated	41.0562	0.5446	0.0132	58.5910

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Apartments Low Rise	14.6597 / 9.24196	37.1370	0.4792	0.0116	52.5676
Fast Food Restaurant with Drive Thru	2.00332 / 0.127872	3.9192	0.0654	1.5700e-003	6.0234
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		41.0562	0.5446	0.0132	58.5910

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7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Apartments Low Rise	11.7277 / 8.6782	31.0176	0.3834	9.2800e-003	43.3672
Fast Food Restaurant with Drive Thru	1.60266 / 0.120071	3.1535	0.0523	1.2600e-003	4.8369
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		34.1711	0.4357	0.0105	48.2041

8.0 Waste Detail

8.1 Mitigation Measures Waste

Institute Recycling and Composting Services

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Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	9.1102	0.5384	0.0000	22.5702
Unmitigated	36.4409	2.1536	0.0000	90.2809

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Apartments Low Rise	103.5	21.0096	1.2416	0.0000	52.0503
Fast Food Restaurant with Drive Thru	76.02	15.4314	0.9120	0.0000	38.2306
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Total		36.4409	2.1536	0.0000	90.2809

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8.2 Waste by Land Use

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Apartments Low Rise	25.875	5.2524	0.3104	0.0000	13.0126
Fast Food Restaurant with Drive Thru	19.005	3.8578	0.2280	0.0000	9.5576
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Total		9.1102	0.5384	0.0000	22.5702

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type
----------------	--------	-----------	-----------	-------------	-------------	-----------

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type
----------------	--------	-----------	------------	-------------	-------------	-----------

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type
----------------	--------	----------------	-----------------	---------------	-----------

User Defined Equipment

Equipment Type	Number
----------------	--------

University Village at Lake Project - Merced County, Annual

11.0 Vegetation



Appendix C
N₂O Calculations

Greenhouse Gas Emission Worksheet

N2O Mobile Emissions

Annual VMT 1,850,376 < from CalEEMod output:4.2 Mitigated Annual VMT

Vehicle Ty	Percent Type	CH4 Emission Factor (g/mile)*	CH4 Emission (g/mile)**	N2O Emission Factor (g/mile)*	N2O Emission (g/mile)**
Light Auto	48%	0.04	0.019108	0.04	0.019108
Light Truck	3%	0.05	0.001645	0.06	0.001974
Light Truck	16%	0.05	0.00775	0.06	0.0093
Med Truck	13%	0.12	0.015288	0.2	0.02548
Lite-Heavy	2%	0.12	0.002772	0.2	0.00462
Lite-Heavy	1%	0.09	0.000486	0.125	0.000675
Med-Heavy	2%	0.06	0.000936	0.05	0.00078
Heavy-Hea	15%	0.06	0.00894	0.05	0.00745
Other Bus	0%	0.06	0.000142	0.05	0.000118
Urban Bus	0%	0.06	0.000148	0.05	0.000123
Motorcycle	1%	0.09	0.000596	0.01	6.62E-05
School Bus	0%	0.06	0.000099	0.05	8.25E-05
Motor Hom	0%	0.09	6.84E-05	0.125	0.000095
Total	100.0%		0.057977		0.069872

change from output: land use 4.4

Total Emissions (metric tons) =

Emission Factor by Vehicle Mix (g/mi) x Annual VMT(mi) x 0.000001 metric tons/g

Conversion to Carbon Dioxide Equivalency (CO2e) Units based on Global Warming Potential (GWP)

CH4 25 GWP
 N2O 298 GWP
 1 ton (short) 0.90718474 metric ton

Annual Mobile Emissions:

Total Emissions	Total CO2e units
Emissions: 0.1293 metric tons N2O	38.53 metric tons CO2e
Project Total: 38.53 metric tons CO2e	

References

* from Table C.4: Methane and Nitrous Oxide Emission Factors for Mobile Sources by Vehicle and Fuel Type (g/m in California Climate Action Registry General Reporting Protocol, Reporting Entity-Wide Greenhouse Gas Emission Report. Assume Model year 2000-present, gasoline fueled.
 ** Source: California Climate Action Registry General Reporting Protocol, Reporting Entity-Wide Greenhouse Gas Emission Report.
 *** From URBEMIS 2007 results for mobile sources



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March 22, 2017
File No.: 20173783.001A

Quad Knopf
2816 Park Avenue
Merced, CA 95348

Attention: Mr. Desmond Johnston

**SUBJECT: Geotechnical Investigation Report
Proposed University Village at Lake Mixed Use
Merced, California**

Dear Mr. Johnston:

The attached report presents the results of a geotechnical investigation for the proposed University Village at Lake Mixed Use project located at Yosemite Avenue and Lake Road in Merced, California. The report describes the study, findings, conclusions, and recommendations for use in project design.

Kleinfelder appreciates the opportunity to provide geotechnical engineering services to the Quad Knopf and the City of Merced during the design phase of this project. If there are any questions concerning the information presented in this report, please contact this office at your convenience.

Respectfully submitted,
KLEINFELDER, INC.


Michael R. Beltran, P.E.
Project Manager


Nathan L. Dahlen, P.E.
Senior Engineer

MRB:NLD:sj



**GEOTECHNICAL INVESTIGATION REPORT
PROPOSED UNIVERSITY VILLAGE AT LAKE
MIXED USE
MERCED, CALIFORNIA**

March 22, 2017

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**ONLY THE CLIENT OR ITS DESIGNATED REPRESENTATIVES MAY USE THIS
DOCUMENT AND ONLY FOR THE SPECIFIC PROJECT FOR WHICH THIS REPORT WAS
PREPARED.**

A Report Prepared for:

Quad Knopf
2816 Park Avenue
Merced, CA 95348

**GEOTECHNICAL INVESTIGATION REPORT
PROPOSED UNIVERSITY VILLAGE AT LAKE MIXED USE
MERCED, CALIFORNIA**

Kleinfelder Job No.: 20173783

Prepared by:



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March 22, 2017

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1 INTRODUCTION

1.1 GENERAL

This report presents the results of a geotechnical investigation for the proposed University Village at Lake Mixed Use located at Yosemite Avenue and Lake Road in Merced, California. The purpose of the investigation was to explore and evaluate the subsurface conditions at the site and develop geotechnical engineering recommendations to aid in project design. The Site Vicinity Map, presented on Plate 1, shows the location of the project and the Boring Location Map, presented on Plate 2, shows the approximate boring locations for the project.

This report includes recommendations related to the geotechnical aspects of project design. Conclusions and recommendations presented in this report are based on subsurface conditions encountered at the locations of the exploration, as well as the provisions and requirements outlined in the “Additional Services” and “Limitations” Sections of this report. Recommendations presented herein should not be extrapolated to other areas or used for other projects without prior review.

1.2 PROPOSED CONSTRUCTION

The proposed project will involve the design and construction of approximately 391,000 square feet of mixed use facilities on approximately 14.9 acres of land located south west of the intersection of Yosemite Avenue and Lake Road in Merced, California.

No grading plan is available at this time. Cuts and fill of up to one foot are anticipated to create pad grade and positive site drainage.

1.3 PURPOSE AND SCOPE OF SERVICES

The purpose of this investigation was to evaluate the site subsurface conditions and develop geotechnical recommendations and opinions to assist in project design. The scope of our services was outlined in our proposal dated January 12, 2017 included the following:

- A field exploration program consisting of drilling, sampling and logging of ten (10) exploratory borings on the site;
- Laboratory testing to evaluate certain geotechnical engineering parameters of the subsurface soils;
- Engineering analysis of the data gathered; and

- Preparation of this report, which includes:
 - A description of the proposed project, including a vicinity map showing the location of the site and a site plan showing the locations of the exploration points for this study;
 - A description of the site surface and subsurface conditions encountered during the field investigation;
 - A summary of the field exploration and laboratory testing programs;
 - Recommendations for site preparation and earthwork grading (soil expansion, compaction, and moisture conditioning requirements), including a discussion concerning the use of on-site soils for engineered fill;
 - Recommendations for foundation (shallow) design including bearing capacity of foundation soil for sustained loading and total combined loading including embedment depths and anticipated settlements;
 - Recommendations for subgrade preparations for concrete slabs-on-grade, including a modulus of subgrade reaction for on-site soil and vapor barrier recommendations;
 - Recommendations for adhesion and passive pressure for resistance of lateral loads;
 - Recommended 2016 CBC seismic design criteria;
 - Comments on liquefaction potential and seismically induced settlement;
 - Recommended flexible pavement sections based on a range of traffic indexes;
 - Comments on the corrosion potential of on-site soils to buried metal and concrete;
 - Comments on groundwater conditions encountered and regional groundwater; and,
 - Comments to aid in the design of site drainage.

2 FIELD EXPLORATION AND LABORATORY TESTING

2.1 FIELD EXPLORATION

The field exploration, conducted on February 14, 2017, consisted of drilling ten (10) exploratory test borings and site reconnaissance by a staff engineer. The test borings were drilled with a CME-75 truck mounted drill rig utilizing hollow stem auger techniques. The borings were advanced to a depths ranging from 11½ to 51½ feet below the existing ground surface. The approximate locations of the test borings are indicated on the Boring Location Map, Plate 2.

The soils encountered in the borings were visually classified in the field and a continuous log for each boring was recorded. Relatively undisturbed samples were collected from the test borings at selected depths by driving a 2.5-inch I.D. split barrel sampler containing brass liners into the undisturbed soil with a 140-pound automatic hammer free falling a distance of 30 inches. In addition, a 1.4-inch I.D. standard penetrometer (SPT) was driven at selected depths in accordance with ASTM D1586 test procedures. The standard penetration sampler was used without liners. Resistance to sampler penetration is noted on the boring logs as the number of blows per 6 inches over 18 inches of sampler penetration. The blow counts listed in the boring logs have not been corrected for the effects of overburden pressure, sampler size, or hammer efficiency. Bulk samples were also obtained from auger cuttings at some of the boring locations. The borings were backfilled with lean cement grout.

2.2 FIELD AND LABORATORY TESTS

Penetration rates, determined in general accordance with ASTM D1586, were used to aid in evaluating the consistency, compression, and strength characteristics of the foundation soils.

Laboratory tests were performed on selected near surface samples to evaluate certain physical characteristics. The following laboratory tests were used to develop the design geotechnical parameters:

- Unit Weight (ASTM D2937)
- Moisture Content (ASTM D2216)
- pH and Minimum Resistivity (California Test Method 543)
- Soluble Sulfate Content (California Test Method 417)
- Soluble Chloride Content (California Test Method 422)

- Grain Size Distribution (ASTM D422 without hydrometer)
- R-value (California Test Method 301)
- Direct Shear Test (ASTM D3080)
- Consolidation Test (ASTM D2435)
- Atterberg Limits (ASTM D2487)
- Expansion Index (ASTM D4829)
- Moisture Density Relationship (ASTM D1557)

The dry density, moisture content, expansion index, direct shear, R-value, and corrosion test results are shown on the boring logs in Appendix A. The soluble sulfate, soluble chloride, pH and minimum resistivity are also discussed in the “Corrosion Potential” section (Section 6.4). Appendix B provides the laboratory test data.

3 SITE AND SUBSURFACE CONDITIONS

3.1 SITE DESCRIPTION

The project site is located south west of the intersection of Yosemite Avenue and Lake Road in Merced, California.

At the time of the field reconnaissance, the site was an unplowed field with a heavy growth of seasonal weeds/grasses and was relatively flat.

3.2 EARTH MATERIALS

The following description provides a general summary of the subsurface conditions encountered during the field exploration and further validated by the laboratory testing program. For a more thorough description of the actual conditions encountered at specific boring locations, refer to the boring logs presented in Appendix A (Plates A-3 through A-12). All soils have been classified in general conformance to the Unified Soil Classification System (ASTM D2487).

The soil in the general site vicinity is mapped as Pleistocene age deposits of the Modesto and Riverbank formations. The natural soil encountered is comprised generally of sandy lean clay underlain by laterally discontinuous layers of sandy lean clay, sandy silt, and silty sand. These soils are generally over-consolidated sediments with a relative density of medium dense to very dense for the granular material and relative consistency of firm to very hard for the fine-grained material.

3.3 GROUNDWATER

Groundwater was not encountered in the borings performed for this study. The State of California Department of Water Resources Water Data Library groundwater data indicates regional ground water is about 70 feet below the existing ground surface as of 2015. While it is possible that ground water conditions at the site could change at some time in the future due to variations in rainfall, ground water withdrawal or recharge, construction activities, or other factors not apparent at the time of the test borings, it is not anticipated that the changes would be substantial. Ground water is not anticipated to effect design or anticipated construction.

4 GEOLOGIC CONDITIONS

4.1 FAULTS LOCAL TO THE PROPOSED FACILITY

The project site and its vicinity are located in an area traditionally characterized by low seismic activity. There are no known faults, which cut through the local soils in or near the site, and the site is not located in an Alquist-Priolo Earthquake Fault Zone as defined by Special Publication 42 published by the California Geologic Survey (CGS). Based on the current understanding of the geologic framework and tectonic setting of the proposed project, the primary sources of seismic shaking are anticipated to be the Coast Range/Sierran Block fault and Foothill Fault System. The Foothill Fault System would likely be the most significant.

4.2 SEISMIC DESIGN CRITERIA

For a code-based (2016 CBC) design, the estimated Maximum Considered Earthquake (MCE) mapped spectral accelerations for 0.2 second and 1 second periods (S_S and S_1), associated soil amplification factors (F_a and F_v), and peak ground acceleration (PGA) are presented in Table 4.2-1. Corresponding site modified (S_{MS} and S_{M1}) and design (S_{DS} and S_{D1}) spectral accelerations, PGA modification coefficient (F_{PGA}), PGA_M , risk coefficients (C_{RS} and C_{R1}) and long-period transition period (T_L) are also presented in Table 4.2-1. Presented values were estimated using Section 1613 of the 2016 CBC, ASCE 7-10, and the United States Geological Survey (USGS) U.S. seismic design maps¹. The Site Class and Seismic Design Category are estimated to be D.

¹ <http://geohazards.usgs.gov/designmaps/us/>

**TABLE 4.2-1
GROUND MOTION PARAMETERS BASED ON 2013 CBC**

Parameter	Value	Reference
S _s	0.607g	2016 CBC Section 1613.3.1
S ₁	0.262g	2016 CBC Section 1613.3.1
Site Class	D	2016 CBC Section 1613.3.2
Seismic Design Category	D	2016 CBC Tables 1613.3.5 (1) and (2)
F _a	1.314	2016 CBC Table 1613.3.3(1)
F _v	1.875	2016 CBC Table 1613.3.3(2)
PGA	0.209g	ASCE 7-10 Figure 22-7
S _{MS}	0.798g	2016 CBC Section 1613.3.3
S _{M1}	0.492g	2016 CBC Section 1613.3.3
S _{DS}	0.532g	2016 CBC Section 1613.4.4
S _{D1}	0.328g	2016 CBC Section 1613.4.4
T _L	12s	ASCE 7-10 Section 11.4.5
F _{PGA}	1.381	ASCE 7-10 Table 11.8-1
PGA _M	0.289g	ASCE 7-10 Section 11.8.3
C _{RS}	1.095	ASCE 7-10 Figure 22-17
C _{R1}	1.137	ASCE 7-10 Figure 22-18

4.3 LIQUEFACTION

In order for liquefaction, and possible associated effects, of soils due to ground shaking to occur, it is generally accepted that four conditions will exist:

- The subsurface soils are in a relatively loose state,
- The soils are saturated,
- The soils are non-plastic, and
- Ground shaking is of sufficient intensity to act as a triggering mechanism.

Geologic age also influences the potential for liquefaction. Sediments deposited within the past few thousand years are generally much more susceptible to liquefaction than older Holocene sediments; Pleistocene sediments are even more resistant; and pre-Pleistocene sediments are generally immune to liquefaction (Youd, 2001).

Based on the ground shaking which may be expected at this site, the soil relative density, soil type, and depth to groundwater, analysis utilizing Youd (2001) indicates liquefaction, and associated seismically induced settlement, is considered unlikely.

5 EARTHWORK

5.1 GENERAL

Based on the results of the various field and laboratory testing, and the geotechnical analysis conducted by Kleinfelder, it is geotechnically feasible to develop the site using conventional grading and foundation construction techniques.

The investigation has indicated moderate expansion potential [Expansion Index (EI) of 49] for the near surface clayey soils. Expansive soils are susceptible to volume changes associated with changes in soil moisture content. The potential for future differential movement resulting from these soils can be reduced to normally tolerable levels by following the recommendations presented in this report. The intent of the recommendations is to result in a degree of saturation of about 80% to 85% at the time of construction. Moisture conditioning and compaction mitigation implemented during grading should be consistent with the soil expansiveness. Careful attention must be paid to future maintenance, including site drainage and irrigation practices.

Recommendations regarding site grading are presented in subsequent sections of this report. All reference to relative compaction, maximum density, and optimum moisture is based on ASTM D1557.

5.2 SITE PREPARATION

5.2.1 Stripping

Any existing annual grasses and weeds or other vegetation which may exist at the time of grading, should be stripped and removed.

5.2.2 Disturbed Soil, Undocumented Fill, and Subsurface Obstructions

Initial site grading should include a reasonable search to locate soil disturbed by previous activity, undocumented fill soils and any abandoned underground structures, irrigation systems, or utilities that may exist within the area of construction. Any obstructions or deleterious material should be removed from the project area. Any disturbed or loose soils, or undocumented fill, which are encountered, should be excavated to expose firm native material. The encountered fill or disturbed soil can be reused in fills, provided they are free of deleterious material.

5.2.3 Over-excavation

Over-excavation is typically reserved for soils that, in their natural state, will not provide adequate support for structures. The native soils at the project site should provide adequate support for the proposed structures. Therefore, provided the recommendations in this section are followed, no general site over-excavation is required.

5.2.4 Scarification and Compaction

Following site stripping and any necessary removal, all areas to receive engineered fill should be properly prepared. The exposed surface should be scarified to a depth of 8 inches and moisture conditioned to a minimum of 4% over optimum, and compacted to at least 88%, but not more than 92%, relative compaction, as determined by ASTM D1557.

5.3 ENGINEERED FILL

5.3.1 Materials

All engineered fill soils should be nearly free of organic or other deleterious debris and less than 3 inches in maximum dimension. The native soil materials, exclusive of debris, may be used as engineered fill provided they contain less than 3 percent organics by weight (ASTM D2974).

Recommended requirements for any imported soil to be used as engineered fill, as well as applicable test procedures to verify material suitability, are provided on Table 5.3-1.

**TABLE 5.3-1
CRITERIA FOR IMPORTED FILL**

<u>Gradation</u>		<u>Test Procedures</u>	
<u>Sieve Size</u>	<u>Percent Passing</u>	<u>ASTM¹</u>	<u>Caltrans²</u>
76 mm (3 inch)	100	C136	202
19 mm (¾ inch)	80 – 100	C136	202
No. 4	60 - 100	C136	202
No. 200	20 – 70	C136	202
<u>Plasticity</u>			
<u>Expansion Index</u>			
< 80		D4318	204
<u>Soluble Sulfates</u>			
< 2000 ppm		-	417
<u>Soluble Chloride</u>			
< 300 ppm		-	422
<u>Resistivity</u>			
> 2000 ohm-cm		-	532
Notes:			
¹ American Society for Testing and Materials Standards (latest edition) ² State of California, Department of Transportation, Standard Test Methods (latest edition)			

Any imported materials to be used for engineered fill should be sampled and tested by a representative of the project Geotechnical Engineer prior to being transported to the site.

5.3.2 Compaction Criteria

On-site soil used for engineered fill or imported soil, which has an EI greater than 20, should be uniformly moisture-conditioned to at least 4% above optimum, placed in horizontal lifts less than 8 inches in loose thickness, and compacted to at least 88 percent, but not more than 92 percent, as determined by ASTM D1557. The general intent is to bring the expansive material to about 80% to 85% saturation at the time of construction. Moisture and compaction may be adjusted,

as necessary, to achieve this intent. Disking and/or blending may be required to uniformly moisture-condition soils used for engineered fill.

Imported fill with an EI less than 20 should be moisture conditioned to at least the optimum moisture and compacted to at least 90% of the maximum density.

5.3.3 Construction Considerations

Should site grading be performed during or subsequent to wet weather, near-surface site soils may be significantly above optimum moisture content. These conditions could hamper equipment maneuverability and efforts to compact site soils to the recommended compaction criteria. Disking to aerate, chemical treatment, replacement with drier material, stabilization with a geotextile fabric or grid, or other methods may be required to reduce excessive soil moisture and facilitate earthwork operations. Any consideration of chemical treatment (e.g. lime) to facilitate construction would require additional soil chemistry evaluation and could affect landscape areas or some building materials.

If construction is performed during dry, hot or windy weather, it may be necessary to periodically apply surface watering to counter evaporative loss or re-establish moisture prior to constructing slabs (see Section 6.2.1).

5.4 TEMPORARY EXCAVATIONS

5.4.1 General

All excavations must comply with applicable local, State, and Federal safety regulations including the current OSHA Excavation and Trench Safety Standards. Construction site safety is generally the responsibility of the contractor, who shall also be responsible for the means, methods, and sequencing of construction operations. Information is provided as a service to the client. Under no circumstances should the information provided be interpreted to mean that Kleinfelder is assuming responsibility for construction site safety or the contractor's activities; such responsibility is not being implied and should not be inferred.

5.4.2 Excavations and Slopes

The contractor should be aware that slope height, slope inclination, or excavation depths (including utility trench excavations) should in no case exceed those specified in local, State, and/or Federal safety regulations (e.g., OSHA Health and Safety Standards for Excavations, 29

CFR Part 1926, or successor regulations). Such regulations are strictly enforced and, if they are not followed, the owner, contractor, and/or earthwork and utility subcontractors could be liable for substantial penalties.

All excavations should be constructed and maintained in conformance with current OSHA requirements (29 CFR Part 1926). Site soil is most closely associated with OSHA Type B soil.

5.4.3 Construction Considerations

Heavy construction equipment, building materials, excavated soil, and vehicular traffic should be kept sufficiently away from the top of any excavation to prevent any unanticipated surcharging. If it is necessary to encroach upon the top of an excavation, Kleinfelder can provide comments on slope gradients or loads on shoring to address surcharging, if provided with the geometry. Shoring, bracing, or underpinning required for the project (if any), should be designed by a professional engineer registered in the State of California.

During wet weather, earthen berms or other methods should be used to prevent runoff water from entering all excavations. All runoff should be collected and disposed of outside the construction limits.

5.5 TRENCH BACKFILL

5.5.1 Materials

Pipe embedment zone backfill (haunching, embedment and initial backfill per ASTM D2321) should consist of soil compatible with design requirements for the specific types of pipes. Consideration should be given to use of Class III or better material. It is recommended the project designer or pipe supplier develop the material specifications based on planned pipe types, bedding conditions, tolerable deflection and other factors beyond the scope of this study. Randomly excavated on-site soil will likely be Class IV material per ASTM D2321.

Trench zone backfill (i.e., material placed between the pipe zone backfill and finished subgrade) may consist of on-site soil, which meets the requirements for engineered fill. It should be noted that the clay soil compaction will be relatively labor intensive in narrow trenches. If a granular trench zone backfill is used in trenches within the upper 5 feet below finish grade, a lean concrete or on-site clay soil “dike” should be placed where trenches cross the perimeter of structures to minimize lateral moisture migration beneath the structure.

5.5.2 Compaction Criteria

All trench backfill should be placed and compacted in accordance with recommendations provided above for engineered fill. Reduced compaction (85% minimum) could be specified for trench zone backfill in non-structural areas. Mechanical compaction is recommended; ponding or jetting should not be used.

Table 5.5-1 provides estimated geotechnical parameters for designers to consider in evaluating pipe zone backfill criteria that is compatible with pipe types and deformation tolerances.

**TABLE 5.5-1
PIPE ZONE BACKFILL PARAMETERS**

Soil Stiffness Modulus (psi)			Backfill Density (pcf)	
E' _n (Trench Sidewall)	E' _b (Backfill)		85% Compaction	90% Compaction
	85% Compaction	90% Compaction		
Class IVA				
3000	700	1000	120	127
Class III				
3000	950	1350	117	124

E'_n represents the modulus for the undisturbed natural soil and is based on relative density and data by Howard (1996). E'_b is the modulus for backfill soil and is based on data by Hartley and Duncan (1982) and Watkins and Anderson (2000). The design E' will be dependent upon the pipe diameter and trench width, which dictates the relative influence of E'_n and E'_b. Methods by Howard (1996) are suggested for evaluating the design E'. Kleinfelder can furnish a recommended design E', if provided with pipe diameter and specifications for trench construction.

In evaluating the maximum load (W_c) on pipes, a K x u' of 0.15 can be used for the on-site clay soil in determining the load coefficient factor C_d.

6 DESIGN RECOMMENDATIONS

6.1 SPREAD FOUNDATIONS

6.1.1 General

The proposed structures may be supported by conventional shallow footings supported on approved undisturbed native soil or properly engineered fill. The following recommendations are based on the assumption that the recommendations in Section 5, "Earthwork", have been implemented. Recommendations regarding the geotechnical aspects of building design are presented below.

The foundation soil is anticipated to have a moderate expansion potential. Therefore, foundation embedment for interior and exterior footings should be at least 18 inches below lowest final adjacent grade. It is recommended a continuous perimeter footing, or grade beam between exterior column footings, be used to reduce the potential for cyclic moisture variations in the clay soils below the floor slab.

Based on geotechnical considerations (e.g. expansive soils), conventional continuous footings should be reinforced with a minimum of two (2) #4 reinforcement bar near the top and two (2) #4 reinforcement bars near the bottom of the footing (four bars total). These recommendations are based on engineering judgment and experience associated with expansive soil and is not based on any structural analysis. All footings should also satisfy any reinforcement required by structural consideration.

6.1.2 Allowable Vertical Bearing Pressures and Settlements

Generally two geotechnical issues determine the design bearing pressure for conventional spread footing or mat foundations: (1) available soil bearing capacity based on the strength of the soil and/or (2) tolerable settlement.

Table 6.1-1 presents the foundation type, allowable bearing capacity (based on engineering judgment and the total shear strength of the soil) for static loading (D.L + sustained L.L) and total combined loading (D.L. + L.L. + transient loading, such as wind or seismic), and settlement (analyses assumes the sustained loading is 80% of the dead plus live load). If total settlements are deemed excessive, Table 6.1-1 also presents

settlement based on placing two (2) feet of lean concrete slurry beneath the footing. This lean concrete would be coincident with the plan dimensions of the footing. All settlements are based on a minimum foundation depth of 1½ feet.

**TABLE 6.1-1
AVAILABLE ALLOWABLE BEARING**

Foundation Type	Footing	Maximum Load		Anticipated Settlement (inch)	Anticipated Settlement w/ 2 Feet Lean Concrete Slurry (inch)
		Load	Bearing (psf)		
Shallow	Square	To 25 kips	To 2400	0.5	< 0.25
		50 kips	2800	0.9	0.3
		75 kips	3000	1.0	0.5
	Continuous	3 kips/ft	3000	0.6	< 0.25

A modulus of subgrade reaction, K_p ($B_p = 1$ foot), of 290 pci can be used for undisturbed on-site soil and engineered fill. It should be noted that the subgrade modulus reflects the response of the subgrade under primarily elastic conditions and small deflections. It is not a characteristic intended to define soil compressibility (settlement) or load bearing capacity.

6.1.3 Lateral Resistance

Lateral loads applied to foundations can be resisted by a combination of passive lateral bearing and base friction. The allowable and ultimate passive pressures and frictional coefficients for the footings are presented in Table 6.1-2.

**TABLE 6.1-2
FRICTIONAL COEFFICIENTS AND PASSIVE PRESSURES**

Item Description	Allowable		Ultimate
	Static	Total Combined	
Frictional Coefficient	0.39	0.46	0.58
Passive Pressure (psf/ft of depth)	315	420	630
Lateral Translation Needed to Develop Lateral Bearing (inch)	0.005	0.007	0.013

Due to the possible expansion potential of foundation soils, passive pressure should not be considered in the upper 18 inches, unless the foundation is abutted by hardscape. If the deflection resulting from the strain necessary to develop the passive pressure is within structural tolerance, the passive pressure and frictional resistance can be used in combination. Otherwise, additional passive pressure values could be provided based on tolerable deflection. The allowable values already incorporate a factor of safety and, as such, would be compared directly to the driving loads. If analytical approaches require the input of a ratio of available resisting forces and driving loads greater than unity, the ultimate values would be used.

6.2 CONCRETE SLABS-ON-GRADE

6.2.1 Subgrade Preparation

Concrete slabs-on-grade (i.e. building, sidewalks, etc.) should be supported on properly moisture conditioned native soil and/or approved engineered fill placed as described in Section 5.2 and 5.3 of this report. Clay subgrade soil should have a moisture content of at least four (4) percent above optimum, to a depth of at least 24 inches below subgrade elevation, immediately prior to pouring the slab or placing any vapor retarding membrane.

A moisture cut-off/containment system should be provided at the free edges (not adjacent to buildings or pavement curbing) of exterior concrete slabs. This cut-off could consist of a 10-mil PVC membrane draped vertically for a depth of 24 inches.

It will be necessary to maintain the moisture in conditioned subgrade, if the moisture conditioning is performed prior to the time of concrete placement. This could be achieved by periodic watering

to provide sufficient moisture to counter evaporative loss. The frequency of moisture application will vary based on ambient temperature, humidity and wind conditions.

6.2.2 Capillary and Moisture/Vapor Break

Considering the depth to ground water and the soil types, a capillary break (i.e. clean sand or gravel layer) is not necessary. Ground or sand bedding is not recommended beneath exterior slabs.

If the building contains components (flooring or equipment) which might be adversely affected by moisture or moisture vapor transmission through the floor slab, it is recommended that the slab subgrade be covered by a vapor retarding membrane, such as 10-mil polyolefin. If design should incorporate a gravel subgrade layer, the membrane should have a minimum thickness of 15 mil. As an added precaution, consideration could be given to extending the vapor retarding membrane down along the interior side of the footings to provide a more complete vapor barrier. The subgrade surface should be smooth and care should be exercised to avoid tearing, ripping, or otherwise puncturing the vapor retarding membrane. If the vapor retarding membrane becomes torn or disturbed, it should be removed and replaced or properly patched. It is recommended consideration be given to placing concrete directly on the vapor retarding membrane. If required by designers, the vapor retarding membrane could be covered with approximately 1 to 2 inches of saturated surface dry (SSD), relatively clean sand to protect it during construction. Concrete should not be placed if sand overlying the vapor barrier has been allowed to attain a moisture content greater than about 5% (due to precipitation or excessive moistening). Excessive water beneath interior floor slabs could result in future significant vapor transmission through the slab, adversely affecting moisture-sensitive floor coverings and the indoor environment.

It should be noted that, although the slab support discussed above is currently the industry standard, this system might not be completely effective in preventing floor slab moisture vapor transmission problems. This system will not necessarily assure that floor slab moisture transmission rates will meet floor-covering manufacturer standards and that indoor humidity levels will not inhibit mold growth. A qualified specialist(s) with knowledge of slab moisture protection systems, flooring design and other potential components that may be influenced by moisture, should address these post-construction conditions separately. The purpose of a geotechnical study is to address subgrade conditions only, and consequently, it does not evaluate future potential conditions.

6.2.3 Conventional Slab Design

Due to the expansive potential of soils, the minimum reinforcement of concrete floor systems should consist of at least #3 reinforcement bars, placed at 18 inches on center in both principle directions or the structural equivalent. The reinforcement is based on engineering judgment and experience with expansive soils and is not based on any structural analysis. The reinforcement assumes a nominal slab thickness of 4 to 5 inches. Slab thickness and reinforcement must also satisfy structural considerations. Any additional reinforcement for structural considerations should be provided by a structural engineer or building designer.

A modulus of subgrade reaction, K_1 ($B_p = 1$ foot), of 290 pci may be used for elastic analysis of slabs on properly compacted native or similar soil

Slab concrete should have good density, a low water/cement ratio, and proper curing to promote a low porosity. It is recommended the water/cement ratio not exceed 0.45 to mitigate vapor transfer.

Consideration should be given to some form of reinforcement of exterior slabs to aid in crack control. Additionally, dowelling of exterior slabs to building foundations and at slab central joints or “cold” interfaces should be considered at any location where hazard or other problematic performance (such as door thresholds).

6.3 PAVEMENT DESIGN

6.3.1 General

The subgrade R-value for the on-site soil was evaluated in the laboratory. The laboratory test was performed in conformance to Caltrans Test Method 301.

Detailed vehicular load and frequency information is not available for this project. Traffic on the roadways are anticipated to consist of automobile traffic with regular trash collection, delivery and emergency trucks.

6.3.2 Flexible Pavement

The potential subgrade Resistance-value (R-value) for the on-site soil was evaluated in the laboratory on a near surface soil sample taken from test boring B-3. The laboratory test was performed in conformance to Caltrans Test Method 301. The measured R-value was 8 by

exudation. Expansion pressures were observed during the testing. The site is in an area where the material often has an R-value of less than 5.

The flexible pavement design recommendations presented are based upon the California Department of Transportation (Caltrans) design procedures, including the gravel equivalent safety factor on the wearing surface. The flexible asphalt concrete pavement section associated with the assumed Traffic Index (T.I.) is summarized in Table 6.3-1.

**TABLE 6.3-1
RECOMMENDED MINIMUM PAVEMENT SECTIONS**

Traffic Index	R-value	Hot Mix Asphalt (HMA-A)	Aggregate Base (Class 2)
5.0	5	0.20'	0.9'
6.0		0.25'	1.15'

The design criteria assumes a 20-year design period and that normal maintenance (crack sealing, etc.) is performed. The traffic index is a measure of the number of trucks that will be applied to a pavement section in the design life. The average daily truck traffic (ADTT) for the assigned T.I.'s are given in Table 6.3-2. If anticipated higher traffic volume might occur, revised pavement sections can be developed if furnished with anticipated loading conditions.

**TABLE 6.3-2
AVERAGE DAILY TRUCK TRAFFIC**

Traffic Index	2-Axle Vehicle	or	3-Axle Vehicle
5.0	5.2		2.0
6.0	24.1		9.0

The flexible pavement should conform to, and be placed in accordance with Caltrans Standard Specification. The aggregate base (Class 2) should comply with Section 26 of the Caltrans Standard Specifications. The aggregate base should be compacted to a minimum of 95 percent relative compaction as determined by the ASTM D1557 test procedures. The upper 12 inches of

pavement subgrade should be moisture conditioned to at least 3% above optimum and compacted to at least 90%, but not more than 95%, of maximum density.

6.3.3 Moisture Considerations

The pavement design should consider both the vehicular loading, as well as the environmental factors. The vehicular loading will depend on the amount and type of traffic anticipated for the pavement design life. Environmental factors include the potential for moisture variations beneath the pavement structural section. It is recommended that all pavement areas conform to the following criteria:

- All trench backfill should be properly placed and adequately compacted to provide a stable subgrade.
- Adequate drainage should be provided to prevent ponding of surface water which could saturate the subgrade soil.
- A periodic maintenance program should be incorporated to include sealing cracks and other measures.
- Any concrete curbs and gutters should extend to the subgrade.

6.3.4 Construction Considerations

In the event unstable (pumping) subgrades are encountered within planned pavement areas, it is recommended a heavy, rubber-tired vehicle (typically a loaded water truck) be used to test the load/deflection characteristics of the finished subgrade materials. It is recommended this vehicle have a minimum rear axle load (at the time of testing) of 16,000 pounds with tires inflated to at least 65-psi pressure. If the tested surface shows a visible deflection extending more than about 6 inches from the wheel track at the time of loading, or a visible crack remains after loading, corrective measures should be implemented. Such measures could include disking to aerate, chemical treatment, replacement with drier material, or other methods. It is recommended Kleinfelder be retained to assist in developing which method (or methods) would be applicable for this project.

6.4 CORROSION POTENTIAL

A soil sample obtained from the upper 5 feet of Boring B-1 was tested to evaluate pH, minimum electrical resistivity, soluble sulfate content and soluble chloride content.

The pH of the soil tested was 7.8. The minimum electrical resistivity is 6,700 ohm-cm. These values could be representative of an environment that is potentially corrosive to buried

unprotected metals. Corrosion is dependent upon a complex variety of conditions, which are beyond the geotechnical practice. Consequently, a qualified corrosion engineer should be consulted if the owner or designers need specific recommendations on material types or protective measures.

The same sample was also evaluated for soluble sulfates and chlorides. Results suggest that a relatively moderate level of soluble sulfates (29.9 ppm) and chlorides (20.1 ppm) are present in on-site soils. Normal cement (Type II) should be adequate in foundation concrete. Reinforcement cover need not be increased for concrete that comes in contact with the foundation soils.

6.5 SITE DRAINAGE

Providing and maintaining adequate site drainage to prevent entrapment and ponding of surface water and excessive moisture migration into moisture sensitive (expansive) soil is very important. This area of mitigation is one of the most difficult to accomplish because it requires a partnering between design, construction, and maintenance of the mixed use development. The design and construction needs to provide the basis for good drainage. This includes:

- Sufficient pad height to allow for proper drainage.
- Defined drainage gradients away from the structure to points of conveyance, such as drainage swales and/or area drains and discharge pipe.
- Roof drainage connected to proper areas of discharge.

Future operation of the property must maintain the established site drainage by not blocking or obstructing gradients away from the building and swales which convey surface run-off to points of discharge without providing some alternative drainage means (e.g. area drains and subsurface pipes). Only maintenance and landscape personnel can avoid over-watering or under-watering. Ideally, the area adjacent to building would be covered with hardscape to aid in maintaining year-round uniformity of soil moisture. Where planter areas near the building are established, it is important to prevent surface run-off from entering the planter and watering practices must strive to use only sufficient water to sustain and promote plant growth. Well-maintained low-volume emitter irrigation (drip system) is best suited for planters adjacent to buildings. All landscape irrigation should strive to promote a soil moisture condition that is relatively uniform year round.

7 ADDITIONAL SERVICES

7.1 PLANS AND SPECIFICATIONS REVIEW

It is recommended Kleinfelder conduct a general review of plans and specifications to evaluate that the earthwork and foundation recommendations have been properly interpreted and implemented during design. In the event Kleinfelder is not retained to perform this recommended review, no responsibility will be assumed for misinterpretation of the recommendations.

7.2 CONSTRUCTION OBSERVATION AND TESTING

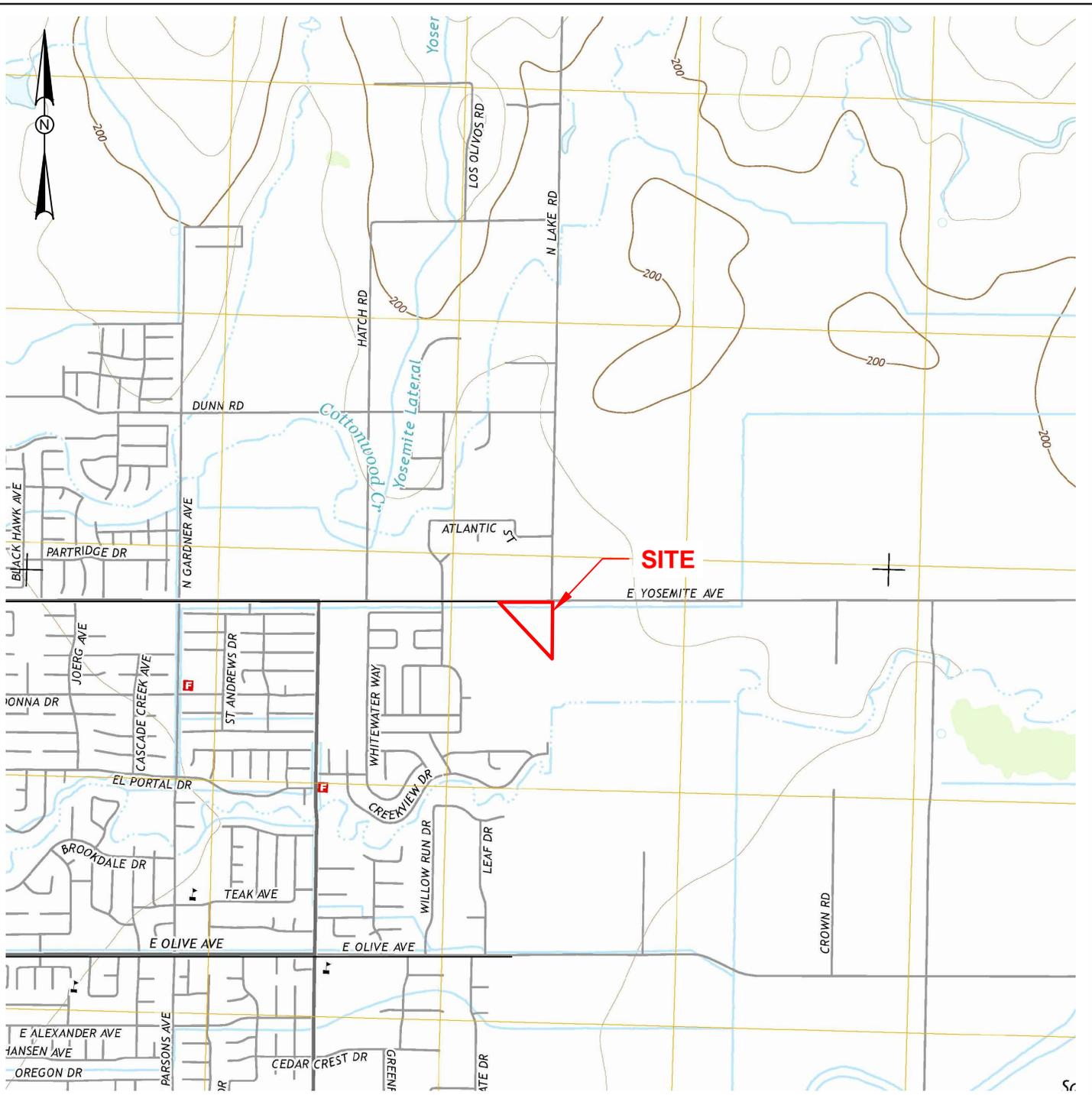
It is recommended that all earthwork during construction be monitored by a representative from Kleinfelder, including site preparation, placement of all engineered fill and trench backfill, construction of slab and pavement subgrades, and all foundation excavations. The purpose of these services would be to provide Kleinfelder the opportunity to observe the soil conditions encountered during construction, evaluate the applicability of the recommendations presented in this report to the soil conditions encountered, and recommend appropriate changes in design or construction procedures if conditions differ from those described herein.

8 LIMITATIONS

Recommendations contained in this report are based on the field observations and subsurface explorations, laboratory tests, and present knowledge of the proposed construction. It is possible that soil conditions could vary between or beyond the points explored. If soil conditions are encountered during construction that differ from those described herein, Kleinfelder should be notified immediately in order that a review may be made and any supplemental recommendations provided. If the scope of the proposed construction changes from that described in this report, the recommendations provided should also be reviewed.

This report has been prepared in substantial accordance with the generally accepted geotechnical engineering practice, as it exists in the general area at the time of the study. No warranty, express or implied, is provided or intended. The recommendations provided in this report are based on the assumption that Kleinfelder will conduct an adequate program of tests and observations during the construction phase in order to evaluate compliance with the recommendations.

This report may be used only by Quad Knopf and their designated representatives and designers and governing regulatory agencies, and only for the purposes stated, within a reasonable time from its issuance, but in no event later than two years (without review) from the date of the report. Land use, site conditions or other factors may change over time, and additional work may be required with the passage of time. Any other party who wishes to use this report shall notify Kleinfelder of such intended use. Based on the intended use of the report, Kleinfelder may require that additional work be performed and that an updated report be issued. Non-compliance with any of these requirements by the client or anyone else will release Kleinfelder from any liability resulting from the use of this report by any unauthorized party.

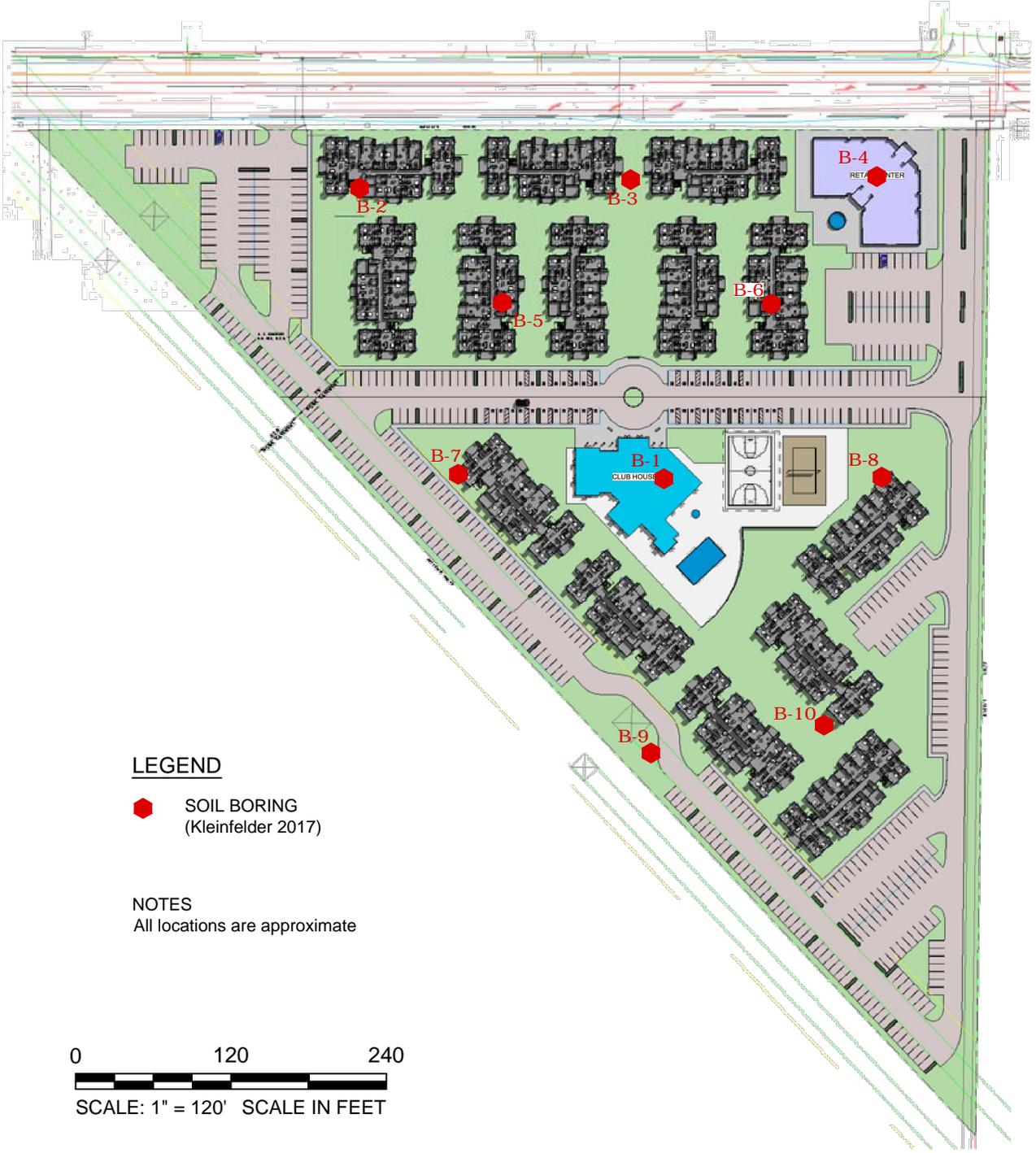


NOTES:

VICINITY MAP CREATED FROM DATA COMPILED BY USGS US TOPO MERCED QUADRANGLE 7.5-MINUTE SERIES, DATED 2015.

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	PROJECT NO. 20173783 DRAWN BY: JDS CHECKED BY: NS DATE: 02/09/2017 REVISED:	SITE VICINITY MAP UNIVERSITY VILLAGE AT LAKE E. YOSEMITE AVENUE & LAKE ROAD MERCED, CALIFORNIA	FIGURE 1
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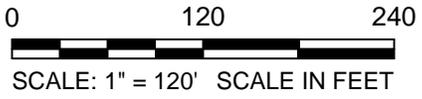


LEGEND

 SOIL BORING
(Kleinfelder 2017)

NOTES

All locations are approximate



NOTES:

BASE MAPPING CREATED FROM THE FOLLOWING:
PLAN TITLED "SITE PLAN & PROJECT STATISTICS", DATED: 11/30/2016, AND
PREPARED BY HOCHHAUSER BLATTER ARCHITECTURE AND PLANNING

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CHECKED BY: NS
DATE: 02/23/2017
REVISED:

BORING LOCATION MAP

UNIVERSITY VILLAGE AT LAKE
E. YOSEMITE AVENUE & LAKE ROAD
MERCED, CALIFORNIA

FIGURE

2

SAMPLER AND DRILLING METHOD GRAPHICS

	BULK / GRAB / BAG SAMPLE
	MODIFIED CALIFORNIA SAMPLER (2 or 2-1/2 in. (50.8 or 63.5 mm.) outer diameter)
	CALIFORNIA SAMPLER (3 in. (76.2 mm.) outer diameter)
	STANDARD PENETRATION SPLIT SPOON SAMPLER (2 in. (50.8 mm.) outer diameter and 1-3/8 in. (34.9 mm.) inner diameter)
	SHELBY TUBE SAMPLER
	HOLLOW STEM AUGER
	SOLID STEM AUGER
	WASH BORING

GROUND WATER GRAPHICS

	WATER LEVEL (level where first observed)
	WATER LEVEL (level after exploration completion)
	WATER LEVEL (additional levels after exploration)
	OBSERVED SEEPAGE

NOTES

- The report and graphics key are an integral part of these logs. All data and interpretations in this log are subject to the explanations and limitations stated in the report.
- Lines separating strata on the logs represent approximate boundaries only. Actual transitions may be gradual or differ from those shown.
- No warranty is provided as to the continuity of soil or rock conditions between individual sample locations.
- Logs represent general soil or rock conditions observed at the point of exploration on the date indicated.
- In general, Unified Soil Classification System designations presented on the logs were based on visual classification in the field and were modified where appropriate based on gradation and index property testing.
- Fine grained soils that plot within the hatched area on the Plasticity Chart, and coarse grained soils with between 5% and 12% passing the No. 200 sieve require dual USCS symbols, ie., GW-GM, GP-GM, GW-GC, GP-GC, GC-GM, SW-SM, SP-SM, SW-SC, SP-SC, SC-SM.
- If sampler is not able to be driven at least 6 inches then 50/X indicates number of blows required to drive the identified sampler X inches with a 140 pound hammer falling 30 inches.

ABBREVIATIONS

WOH - Weight of Hammer
WOR - Weight of Rod

UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D 2487)

GRAVELS (More than half of coarse fraction is larger than the #4 sieve)	CLEAN GRAVEL WITH <5% FINES	Cu ≥ 4 and 1 ≤ Cc ≤ 3		GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES
		Cu < 4 and/or 1 > Cc > 3		GP	POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES
	GRAVELS WITH 5% TO 12% FINES	Cu ≥ 4 and 1 ≤ Cc ≤ 3		GW-GM	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE FINES
				GW-GC	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE CLAY FINES
		Cu < 4 and/or 1 > Cc > 3		GP-GM	POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE FINES
				GP-GC	POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE CLAY FINES
	GRAVELS WITH > 12% FINES			GM	SILTY GRAVELS, GRAVEL-SILT-SAND MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
				GC-GM	CLAYEY GRAVELS, GRAVEL-SAND-CLAY-SILT MIXTURES
	COARSE GRAINED SOILS (More than half of coarse fraction is smaller than the #4 sieve)	CLEAN SANDS WITH <5% FINES	Cu ≥ 6 and 1 ≤ Cc ≤ 3		SW
Cu < 6 and/or 1 > Cc > 3				SP	POORLY GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE OR NO FINES
SANDS WITH 5% TO 12% FINES		Cu ≥ 6 and 1 ≤ Cc ≤ 3		SW-SM	WELL-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE FINES
				SW-SC	WELL-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE CLAY FINES
		Cu < 6 and/or 1 > Cc > 3		SP-SM	POORLY GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE FINES
				SP-SC	POORLY GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE CLAY FINES
SANDS WITH > 12% FINES				SM	SILTY SANDS, SAND-GRAVEL-SILT MIXTURES
				SC	CLAYEY SANDS, SAND-GRAVEL-CLAY MIXTURES
				SC-SM	CLAYEY SANDS, SAND-SILT-CLAY MIXTURES
FINE GRAINED SOILS (More than half of material is smaller than the #200 sieve)	SILTS AND CLAYS (Liquid Limit less than 50)		ML	INORGANIC SILTS AND VERY FINE SANDS, SILTY OR CLAYEY FINE SANDS, SILTS WITH SLIGHT PLASTICITY	
			CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS	
			CL-ML	INORGANIC CLAYS-SILTS OF LOW PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS	
	SILTS AND CLAYS (Liquid Limit greater than 50)		OL	ORGANIC SILTS & ORGANIC SILTY CLAYS OF LOW PLASTICITY	
			MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILT	
			CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS	
		OH	ORGANIC CLAYS & ORGANIC SILTS OF MEDIUM-TO-HIGH PLASTICITY		



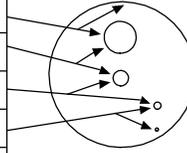
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DATE:
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GRAPHICS KEY
MERCED, CA: UNIVERSITY VILLAGE AT LAKE
YOSEMITE AND LAKE ROAD
MERCED, CALIFORNIA

FIGURE
A-1

GRAIN SIZE

DESCRIPTION	SIEVE SIZE	GRAIN SIZE	APPROXIMATE SIZE
Boulders	>12 in. (304.8 mm.)	>12 in. (304.8 mm.)	Larger than basketball-sized
Cobbles	3 - 12 in. (76.2 - 304.8 mm.)	3 - 12 in. (76.2 - 304.8 mm.)	Fist-sized to basketball-sized
Gravel	coarse 3/4 - 3 in. (19 - 76.2 mm.)	3/4 - 3 in. (19 - 76.2 mm.)	Thumb-sized to fist-sized
	fine #4 - 3/4 in. (#4 - 19 mm.)	0.19 - 0.75 in. (4.8 - 19 mm.)	Pea-sized to thumb-sized
Sand	coarse #10 - #4	0.079 - 0.19 in. (2 - 4.9 mm.)	Rock salt-sized to pea-sized
	medium #40 - #10	0.017 - 0.079 in. (0.43 - 2 mm.)	Sugar-sized to rock salt-sized
	fine #200 - #40	0.0029 - 0.017 in. (0.07 - 0.43 mm.)	Flour-sized to sugar-sized
Fines	Passing #200	<0.0029 in. (<0.07 mm.)	Flour-sized and smaller



SECONDARY CONSTITUENT

Term of Use	AMOUNT	
	Secondary Constituent is Fine Grained	Secondary Constituent is Coarse Grained
Trace	<5%	<15%
With	≥5 to <15%	≥15 to <30%
Modifier	≥15%	≥30%

MOISTURE CONTENT

DESCRIPTION	FIELD TEST
Dry	Absence of moisture, dusty, dry to the touch
Moist	Damp but no visible water
Wet	Visible free water, usually soil is below water table

CEMENTATION

DESCRIPTION	FIELD TEST
Weakly	Crumbles or breaks with handling or slight finger pressure
Moderately	Crumbles or breaks with considerable finger pressure
Strongly	Will not crumble or break with finger pressure

CONSISTENCY - FINE-GRAINED SOIL

CONSISTENCY	SPT - N ₆₀ (# blows / ft)	Pocket Pen (tsf)	UNCONFINED COMPRESSIVE STRENGTH (Q _u)(psf)	VISUAL / MANUAL CRITERIA
Very Soft	<2	PP < 0.25	<500	Thumb will penetrate more than 1 inch (25 mm). Extrudes between fingers when squeezed.
Soft	2 - 4	0.25 ≤ PP <0.5	500 - 1000	Thumb will penetrate soil about 1 inch (25 mm). Remolded by light finger pressure.
Medium Stiff	4 - 8	0.5 ≤ PP <1	1000 - 2000	Thumb will penetrate soil about 1/4 inch (6 mm). Remolded by strong finger pressure.
Stiff	8 - 15	1 ≤ PP <2	2000 - 4000	Can be imprinted with considerable pressure from thumb.
Very Stiff	15 - 30	2 ≤ PP <4	4000 - 8000	Thumb will not indent soil but readily indented with thumbnail.
Hard	>30	4 ≤ PP	>8000	Thumbnail will not indent soil.

REACTION WITH HYDROCHLORIC ACID

DESCRIPTION	FIELD TEST
None	No visible reaction
Weak	Some reaction, with bubbles forming slowly
Strong	Violent reaction, with bubbles forming immediately

FROM TERZAGHI AND PECK, 1948; LAMBE AND WHITMAN, 1969; FHWA, 2002; AND ASTM D2488

APPARENT / RELATIVE DENSITY - COARSE-GRAINED SOIL

APPARENT DENSITY	SPT-N ₆₀ (# blows/ft)	MODIFIED CA SAMPLER (# blows/ft)	CALIFORNIA SAMPLER (# blows/ft)	RELATIVE DENSITY (%)
Very Loose	<4	<4	<5	0 - 15
Loose	4 - 10	5 - 12	5 - 15	15 - 35
Medium Dense	10 - 30	12 - 35	15 - 40	35 - 65
Dense	30 - 50	35 - 60	40 - 70	65 - 85
Very Dense	>50	>60	>70	85 - 100

FROM TERZAGHI AND PECK, 1948

PLASTICITY

DESCRIPTION	LL	FIELD TEST
Non-plastic	NP	A 1/8-in. (3 mm.) thread cannot be rolled at any water content.
Low (L)	< 30	The thread can barely be rolled and the lump or thread cannot be formed when drier than the plastic limit.
Medium (M)	30 - 50	The thread is easy to roll and not much time is required to reach the plastic limit. The thread cannot be rerolled after reaching the plastic limit. The lump or thread crumbles when drier than the plastic limit.
High (H)	> 50	It takes considerable time rolling and kneading to reach the plastic limit. The thread can be rerolled several times after reaching the plastic limit. The lump or thread can be formed without crumbling when drier than the plastic limit.

STRUCTURE

DESCRIPTION	CRITERIA
Stratified	Alternating layers of varying material or color with layers at least 1/4-in. thick, note thickness.
Laminated	Alternating layers of varying material or color with the layer less than 1/4-in. thick, note thickness.
Fissured	Breaks along definite planes of fracture with little resistance to fracturing.
Slickensided	Fracture planes appear polished or glossy, sometimes striated.
Blocky	Cohesive soil that can be broken down into small angular lumps which resist further breakdown.
Lensed	Inclusion of small pockets of different soils, such as small lenses of sand scattered through a mass of clay; note thickness.

ANGULARITY

DESCRIPTION	CRITERIA
Angular	Particles have sharp edges and relatively plane sides with unpolished surfaces.
Subangular	Particles are similar to angular description but have rounded edges.
Subrounded	Particles have nearly plane sides but have well-rounded corners and edges.
Rounded	Particles have smoothly curved sides and no edges.



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SOIL DESCRIPTION KEY
MERCED, CA: UNIVERSITY VILLAGE AT LAKE
YOSEMITE AND LAKE ROAD
MERCED, CALIFORNIA

FIGURE
A-2

PLOTTED: 03/21/2017 04:45 PM BY: NStrid

Date Begin - End: <u>2/14/2017</u>	Drilling Co.-Lic.#: <u>AWA - #848359</u>	BORING LOG B-1	
Logged By: <u>N. Strid</u>	Drill Crew: <u>Rob</u>		
Hor.-Vert. Datum: <u>Not Available</u>	Drilling Equipment: <u>CME-75 (truck-mounted)</u>	Hammer Type - Drop: <u>140 lb. Auto - 30 in.</u>	
Plunge: <u>-90 degrees</u>	Drilling Method: <u>Hollow Stem Auger</u>	Hammer Efficiency: <u>76%</u>	
Weather: <u>Foggy</u>	Bore Diameter: <u>8 in. O.D.</u>	Hammer Cal. Date: <u>Unknown</u>	

Depth (feet)	Graphical Log	FIELD EXPLORATION				LABORATORY RESULTS							Additional Tests/ Remarks
		Surface Condition: Grass	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in.	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	
Lithologic Description													
		Lean CLAY with Sand (CL): fine-grained, medium to high plasticity, dark brown, moist							100	56		ASTM D1557 Method A= Max. Dry Unit Wt.: 123.8 pcf Opt. Water Content: 10.4% Expansion Index= 49 Direct Shear= Peak Cohesion: 580 psf Peak Friction Angle: 30.1°	
		Sandy Lean CLAY (CL): fine-grained, low plasticity, reddish brown, moist											
5		Silty SAND with Clay (SM): fine-grained, non-plastic to low plasticity, reddish brown, moist, dense	BC=6 10 20										
		Clayey SAND (SC): fine-grained, low to medium plasticity, reddish brown, moist, dense, gray and black markings	BC=5 16 2										
10		Lean CLAY with Sand (CL): fine-grained, low to medium plasticity, grayish brown, moist, hard, some white staining present	BC=4 6 23			20.4	112.6						
		Clayey SAND (SC): fine to medium-grained, non-plastic to low plasticity, brown, moist, dense, fine to coarse gravel present	BC=5 9 12					100	75				
20		Sandy Lean CLAY (CL): fine-grained, medium plasticity, reddish brown, moist, soft											
		low to medium plasticity, black staining present	BC=3 10 19			25.9	101.2						
25													
		grayish brown, red staining present, decrease in fines content	BC=15 31 34										
30													

PROJECT NUMBER: 20173783
 GINT LIBRARY: E:KLF_STANDARD_GINT_LIBRARY_2017.GLB [KLF_BORING/TEST PIT/ SOIL LOG]



PROJECT NO.: 20173783
 DRAWN BY: VT
 CHECKED BY: MB
 DATE:
 REVISED: -

BORING LOG B-1

MERCED, CA: UNIVERSITY VILLAGE AT LAKE
 YOSEMITE AND LAKE ROAD
 MERCED, CALIFORNIA

FIGURE
A-3

PAGE: 1 of 2

PLOTTED: 03/21/2017 04:45 PM BY: NStrid

Date Begin - End: <u>2/14/2017</u>	Drilling Co.-Lic.#: <u>AWA - #848359</u>	BORING LOG B-1
Logged By: <u>N. Strid</u>	Drill Crew: <u>Rob</u>	
Hor.-Vert. Datum: <u>Not Available</u>	Drilling Equipment: <u>CME-75 (truck-mounted)</u>	Hammer Type - Drop: <u>140 lb. Auto - 30 in.</u>
Plunge: <u>-90 degrees</u>	Drilling Method: <u>Hollow Stem Auger</u>	Hammer Efficiency: <u>76%</u>
Weather: <u>Foggy</u>	Bore Diameter: <u>8 in. O.D.</u>	Hammer Cal. Date: <u>Unknown</u>

Depth (feet)	Graphical Log	FIELD EXPLORATION				LABORATORY RESULTS						
		Surface Condition: Grass	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in.	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)
Lithologic Description												
40	[Diagonal Hatching]	Sandy Lean CLAY (CL): fine-grained, medium plasticity, reddish brown, moist, soft reddish brown, black staining present, increase in fines	BC=15 16 48			20.3	112.8					
45	[Diagonal Hatching]	fine to medium-grained, dark brown, lenses of reddish brown soil	BC=20 28 30									
50	[Diagonal Hatching]	fine-grained, light grayish brown, hard, red and black staining present	BC=13 28 50/5.5"			20.6	103.7					
55	[Diagonal Hatching]	Lean CLAY with Sand (CL): fine-grained, medium to high plasticity, brownish gray, moist, hard	BC=10 20 35									
		<p>The boring was terminated at approximately 51.5 ft. below ground surface. The boring was backfilled with lean cement grout on February 15, 2017.</p>				<p>GROUNDWATER LEVEL INFORMATION: Groundwater was not observed during drilling or after completion.</p> <p>GENERAL NOTES:</p>						

PROJECT NUMBER: 20173783
GINT TEMPLATE: E:KLF_STANDARD_GINT_LIBRARY_2017.GLB [KLF_BORING/TEST PIT/ SOIL LOG]



PROJECT NO.: 20173783
 DRAWN BY: VT
 CHECKED BY: MB
 DATE:
 REVISED: -

BORING LOG B-1

MERCED, CA: UNIVERSITY VILLAGE AT LAKE
 YOSEMITE AND LAKE ROAD
 MERCED, CALIFORNIA

FIGURE

A-3

PAGE: 2 of 2

PLOTTED: 03/21/2017 04:45 PM BY: NStrid

Date Begin - End: 2/14/2017	Drilling Co.-Lic.#: AWA - #848359	BORING LOG B-2	
Logged By: N. Strid	Drill Crew: Rob		
Hor.-Vert. Datum: Not Available	Drilling Equipment: CME-75 (truck-mounted)	Hammer Type - Drop: 140 lb. Auto - 30 in.	
Plunge: -90 degrees	Drilling Method: Hollow Stem Auger	Hammer Efficiency: 76%	
Weather: Foggy	Bore Diameter: 8 in. O.D.	Hammer Cal. Date: Unknown	

Depth (feet)	Graphical Log	FIELD EXPLORATION				LABORATORY RESULTS							Additional Tests/ Remarks
		Surface Condition: Grass	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in.	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	
Lithologic Description													
		Lean CLAY (CL): fine-grained, medium to high plasticity, dark brown, moist											
5		Sandy Lean CLAY (CL): fine-grained, low to medium plasticity, dark brown, moist, hard, some root holes present		BC=15 20 27									
10		Lean CLAY (CL): fine-grained, medium to high plasticity, dark brown, moist, soft		BC=2 10 12									
15		The boring was terminated at approximately 11.5 ft. below ground surface. The boring was backfilled with lean cement grout on February 15, 2017.				GROUNDWATER LEVEL INFORMATION: Groundwater was not observed during drilling or after completion. GENERAL NOTES:							

PROJECT NUMBER: 20173783
 GINT TEMPLATE: E\KLF_STANDARD_GINT_LIBRARY_2017.GLB [KLF_BORING\TEST PIT SOIL LOG]
 GINT FILE: Klf_gint_master_2017

	PROJECT NO.: 20173783	BORING LOG B-2 MERCED, CA: UNIVERSITY VILLAGE AT LAKE YOSEMITE AND LAKE ROAD MERCED, CALIFORNIA	FIGURE
	DRAWN BY: VT CHECKED BY: MB DATE: REVISED: -		A-4

PLOTTED: 03/21/2017 04:45 PM BY: NStrid

Date Begin - End: <u>2/14/2017</u>	Drilling Co.-Lic.#: <u>AWA - #848359</u>	BORING LOG B-3	
Logged By: <u>N. Strid</u>	Drill Crew: <u>Rob</u>		
Hor.-Vert. Datum: <u>Not Available</u>	Drilling Equipment: <u>CME-75 (truck-mounted)</u>	Hammer Type - Drop: <u>140 lb. Auto - 30 in.</u>	
Plunge: <u>-90 degrees</u>	Drilling Method: <u>Hollow Stem Auger</u>	Hammer Efficiency: <u>76%</u>	
Weather: <u>Foggy</u>	Bore Diameter: <u>8 in. O.D.</u>	Hammer Cal. Date: <u>Unknown</u>	

Depth (feet)	Graphical Log	FIELD EXPLORATION				LABORATORY RESULTS							Additional Tests/ Remarks
		Surface Condition: Grass	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in.	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	
Lithologic Description													
0 - 5		Lean CLAY (CL): fine-grained, medium to high plasticity, dark brown, moist, soft											
5 - 10		Sandy Lean CLAY (CL): fine-grained, low to medium plasticity, reddish brown, moist, hard	BC=2 2 3								40	24	
10 - 11.5			BC=4 11 27			18.3	114.8						
<p>The boring was terminated at approximately 11.5 ft. below ground surface. The boring was backfilled with lean cement grout on February 15, 2017.</p>						<p><u>GROUNDWATER LEVEL INFORMATION:</u> Groundwater was not observed during drilling or after completion.</p> <p><u>GENERAL NOTES:</u></p>							

PROJECT NUMBER: 20173783
 GINT LIBRARY: E:\KLF_STANDARD_GINT_LIBRARY_2017.GLB [KLF_BORING/TEST PIT/ SOIL LOG]

GINT FILE: Klf_gint_master_2017
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PROJECT NO.: 20173783
 DRAWN BY: VT
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 DATE:
 REVISED: -

BORING LOG B-3

MERCED, CA: UNIVERSITY VILLAGE AT LAKE
 YOSEMITE AND LAKE ROAD
 MERCED, CALIFORNIA

FIGURE

A-5

PAGE: 1 of 1

PLOTTED: 03/21/2017 04:45 PM BY: NStrid

Date Begin - End: <u>2/14/2017</u>	Drilling Co.-Lic.#: <u>AWA - #848359</u>	BORING LOG B-4	
Logged By: <u>N. Strid</u>	Drill Crew: <u>Rob</u>		
Hor.-Vert. Datum: <u>Not Available</u>	Drilling Equipment: <u>CME-75 (truck-mounted)</u>	Hammer Type - Drop: <u>140 lb. Auto - 30 in.</u>	
Plunge: <u>-90 degrees</u>	Drilling Method: <u>Hollow Stem Auger</u>	Hammer Efficiency: <u>76%</u>	
Weather: <u>Foggy</u>	Bore Diameter: <u>8 in. O.D.</u>	Hammer Cal. Date: <u>Unknown</u>	

Depth (feet)	Graphical Log	FIELD EXPLORATION				LABORATORY RESULTS							Additional Tests/ Remarks
		Surface Condition: Grass	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in.	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	
Lithologic Description													
		Lean CLAY (CL): fine-grained, medium to high plasticity, dark brown, moist, soft											
5		Clayey SAND (SC): fine to medium-grained, non-plastic to low plasticity, dark reddish brown, moist, very dense	BC=21 31 50/4"			21.2	101.8						
10		Lean CLAY (CL): fine-grained, medium to high plasticity, dark brown, moist, soft	BC=3 7 7						50				
15		The boring was terminated at approximately 11.5 ft. below ground surface. The boring was backfilled with lean cement grout on February 15, 2017.				GROUNDWATER LEVEL INFORMATION: Groundwater was not observed during drilling or after completion. GENERAL NOTES:							
20													
25													
30													

PROJECT NUMBER: 20173783
 GINT LIBRARY: E:\KLF_STANDARD_GINT_LIBRARY_2017.GLB [KLF_BORING/TEST PIT/ SOIL LOG]



PROJECT NO.: 20173783
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 DATE:
 REVISED: -

BORING LOG B-4

MERCED, CA: UNIVERSITY VILLAGE AT LAKE
 YOSEMITE AND LAKE ROAD
 MERCED, CALIFORNIA

FIGURE
A-6

PAGE: 1 of 1

PLOTTED: 03/21/2017 04:45 PM BY: NStrid

Date Begin - End: <u>2/14/2017</u>	Drilling Co.-Lic.#: <u>AWA - #848359</u>	BORING LOG B-5	
Logged By: <u>N. Strid</u>	Drill Crew: <u>Rob</u>		
Hor.-Vert. Datum: <u>Not Available</u>	Drilling Equipment: <u>CME-75 (truck-mounted)</u>	Hammer Type - Drop: <u>140 lb. Auto - 30 in.</u>	
Plunge: <u>-90 degrees</u>	Drilling Method: <u>Hollow Stem Auger</u>	Hammer Efficiency: <u>76%</u>	
Weather: <u>Sunny</u>	Bore Diameter: <u>8 in. O.D.</u>	Hammer Cal. Date: <u>Unknown</u>	

Depth (feet)	Graphical Log	FIELD EXPLORATION				LABORATORY RESULTS							Additional Tests/ Remarks	
		Surface Condition: Grass	Lithologic Description	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in.	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit		Plasticity Index (NP=NonPlastic)
		Lean CLAY (CL) : fine-grained, medium to high plasticity, dark brown, moist, soft												
5		Sandy Lean CLAY (CL) : fine-grained, low to medium plasticity, dark reddish brown, moist, soft medium plasticity		BC=2 5 5										
10		Clayey SAND (SC) : fine-grained, non-plastic to low plasticity, brown, moist, loose		BC=2 1 3										Hard drilling from 7' to 7.5' probable hardpan.
15		The boring was terminated at approximately 11.5 ft. below ground surface. The boring was backfilled with lean cement grout on February 15, 2017.												
20														
25														
30														

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.
GENERAL NOTES:

PROJECT NUMBER: 20173783
GINT LIBRARY: E:\KLF_STANDARD_GINT_LIBRARY_2017.GLB [KLF_BORING/TEST PIT/ SOIL LOG]

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PROJECT NO.: 20173783
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DATE:
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BORING LOG B-5

MERCED, CA: UNIVERSITY VILLAGE AT LAKE
YOSEMITE AND LAKE ROAD
MERCED, CALIFORNIA

FIGURE

A-7

PAGE: 1 of 1

PLOTTED: 03/21/2017 04:45 PM BY: NStrid

Date Begin - End: <u>2/14/2017</u>	Drilling Co.-Lic.#: <u>AWA - #848359</u>	BORING LOG B-6	
Logged By: <u>N. Strid</u>	Drill Crew: <u>Rob</u>		
Hor.-Vert. Datum: <u>Not Available</u>	Drilling Equipment: <u>CME-75 (truck-mounted)</u>	Hammer Type - Drop: <u>140 lb. Auto - 30 in.</u>	
Plunge: <u>-90 degrees</u>	Drilling Method: <u>Hollow Stem Auger</u>	Hammer Efficiency: <u>76%</u>	
Weather: <u>Sunny</u>	Bore Diameter: <u>8 in. O.D.</u>	Hammer Cal. Date: <u>Unknown</u>	

Depth (feet)	Graphical Log	FIELD EXPLORATION				LABORATORY RESULTS							Additional Tests/ Remarks	
		Surface Condition: Grass	Lithologic Description	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in.	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit		Plasticity Index (NP=NonPlastic)
0 - 5		Lean CLAY (CL): fine-grained, medium to high plasticity, dark brown, moist, soft												
5 - 11		low to medium plasticity, more fine sands present		BC=6 7 11										
11 - 15.5		Sandy Lean CLAY (CL): fine to medium-grained, non-plastic to low plasticity, dark reddish brown, moist, hard, trace fine to coarse gravel		BC=5 11 27										
15.5 - 11.5	The boring was terminated at approximately 11.5 ft. below ground surface. The boring was backfilled with lean cement grout on February 15, 2017.													
<p>GROUNDWATER LEVEL INFORMATION: Groundwater was not observed during drilling or after completion.</p> <p>GENERAL NOTES:</p>														

PROJECT NUMBER: 20173783
 GINT LIBRARY: E:\KLF_STANDARD_GINT_LIBRARY_2017.GLB [KLF_BORING/TEST PIT/ SOIL LOG]
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PROJECT NO.: 20173783
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 DATE:
 REVISED: -

BORING LOG B-6

MERCED, CA: UNIVERSITY VILLAGE AT LAKE
 YOSEMITE AND LAKE ROAD
 MERCED, CALIFORNIA

FIGURE

A-8

PAGE: 1 of 1

PLOTTED: 03/21/2017 04:45 PM BY: NStrid

Date Begin - End: <u>2/14/2017</u>	Drilling Co.-Lic.#: <u>AWA - #848359</u>	BORING LOG B-7	
Logged By: <u>N. Strid</u>	Drill Crew: <u>Rob</u>		
Hor.-Vert. Datum: <u>Not Available</u>	Drilling Equipment: <u>CME-75 (truck-mounted)</u>	Hammer Type - Drop: <u>140 lb. Auto - 30 in.</u>	
Plunge: <u>-90 degrees</u>	Drilling Method: <u>Hollow Stem Auger</u>	Hammer Efficiency: <u>76%</u>	
Weather: <u>Sunny</u>	Bore Diameter: <u>8 in. O.D.</u>	Hammer Cal. Date: <u>Unknown</u>	

Depth (feet)	Graphical Log	FIELD EXPLORATION				LABORATORY RESULTS							Additional Tests/ Remarks
		Surface Condition: Grass	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in.	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	
Lithologic Description													
0 - 5		Lean CLAY (CL): fine-grained, medium to high plasticity, dark brown, moist, soft, trace sand											
5 - 10		Sandy Lean CLAY (CL): fine-grained, non-plastic to low plasticity, light brownish gray, moist, hard	BC=1 2 8										
10 - 11.5			BC=12 23 29										
<p>The boring was terminated at approximately 11.5 ft. below ground surface. The boring was backfilled with lean cement grout on February 15, 2017.</p>						<p><u>GROUNDWATER LEVEL INFORMATION:</u> Groundwater was not observed during drilling or after completion.</p> <p><u>GENERAL NOTES:</u></p>							

PROJECT NUMBER: 20173783
 GINT LIBRARY: E:\KLF_STANDARD_GINT_LIBRARY_2017.GLB [KLF_BORING/TEST PIT/ SOIL LOG]

GINT FILE: KLF_gint_master_2017
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PROJECT NO.: 20173783
 DRAWN BY: VT
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 DATE:
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BORING LOG B-7

MERCED, CA: UNIVERSITY VILLAGE AT LAKE
 YOSEMITE AND LAKE ROAD
 MERCED, CALIFORNIA

FIGURE

A-9

PAGE: 1 of 1

PLOTTED: 03/21/2017 04:45 PM BY: NStrid

Date Begin - End: <u>2/14/2017</u>	Drilling Co.-Lic.#: <u>AWA - #848359</u>	BORING LOG B-8	
Logged By: <u>N. Strid</u>	Drill Crew: <u>Rob</u>		
Hor.-Vert. Datum: <u>Not Available</u>	Drilling Equipment: <u>CME-75 (truck-mounted)</u>	Hammer Type - Drop: <u>140 lb. Auto - 30 in.</u>	
Plunge: <u>-90 degrees</u>	Drilling Method: <u>Hollow Stem Auger</u>	Hammer Efficiency: <u>76%</u>	
Weather: <u>Sunny</u>	Bore Diameter: <u>8 in. O.D.</u>	Hammer Cal. Date: <u>Unknown</u>	

Depth (feet)	Graphical Log	FIELD EXPLORATION				LABORATORY RESULTS								
		Surface Condition: Grass	Lithologic Description	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in.	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
0 - 5		Lean CLAY (CL): fine-grained, high plasticity, dark brown, moist, stiff												
5 - 10		very stiff	BC=7 11 15											
10 - 11.5		Clayey SAND (SC): fine to coarse-grained, non-plastic to low plasticity, reddish brown, moist, very dense, fine to coarse gravel present	BC=7 17 27											
11.5 - 30		The boring was terminated at approximately 11.5 ft. below ground surface. The boring was backfilled with lean cement grout on February 15, 2017.												

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.
GENERAL NOTES:

PROJECT NUMBER: 20173783
GINT LIBRARY: E:\KLF_STANDARD_GINT_LIBRARY_2017.GLB [KLF_BORING/TEST PIT/ SOIL LOG]

GINT FILE: Klf_gint_master_2017
GINT TEMPLATE: E:\KLF_STANDARD_GINT_LIBRARY_2017.GLB [KLF_BORING/TEST PIT/ SOIL LOG]



PROJECT NO.: 20173783
DRAWN BY: VT
CHECKED BY: MB
DATE:
REVISED: -

BORING LOG B-8

MERCED, CA: UNIVERSITY VILLAGE AT LAKE
YOSEMITE AND LAKE ROAD
MERCED, CALIFORNIA

FIGURE
A-10
PAGE: 1 of 1

PLOTTED: 03/21/2017 04:45 PM BY: NStrid

Date Begin - End: <u>2/14/2017</u>	Drilling Co.-Lic.#: <u>AWA - #848359</u>	BORING LOG B-9	
Logged By: <u>N. Strid</u>	Drill Crew: <u>Rob</u>		
Hor.-Vert. Datum: <u>Not Available</u>	Drilling Equipment: <u>CME-75 (truck-mounted)</u>	Hammer Type - Drop: <u>140 lb. Auto - 30 in.</u>	
Plunge: <u>-90 degrees</u>	Drilling Method: <u>Hollow Stem Auger</u>	Hammer Efficiency: <u>76%</u>	
Weather: <u>Sunny</u>	Bore Diameter: <u>8 in. O.D.</u>	Hammer Cal. Date: <u>Unknown</u>	

Depth (feet)	Graphical Log	FIELD EXPLORATION				LABORATORY RESULTS									
		Surface Condition: Grass	Lithologic Description	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in.	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks	
0 - 5		Lean CLAY (CL): fine-grained, medium to high plasticity, moist, stiff													
5 - 10		Sandy Lean CLAY (CL): fine-grained, medium plasticity, dark grayish brown, moist, stiff	BC=4 6 10												
10 - 11.5		low plasticity, reddish brown	BC=3 8 38												
		The boring was terminated at approximately 11.5 ft. below ground surface. The boring was backfilled with lean cement grout on February 15, 2017.						GROUNDWATER LEVEL INFORMATION: Groundwater was not observed during drilling or after completion. GENERAL NOTES:							

PROJECT NUMBER: 20173783
 GINT LIBRARY: E:\KLF_STANDARD_GINT_LIBRARY_2017.GLB [KLF_BORING/TEST PIT/ SOIL LOG]
 GINT FILE: Klf_gint_master_2017
 GINT TEMPLATE: E:\KLF_STANDARD_GINT_LIBRARY_2017.GLB [KLF_BORING/TEST PIT/ SOIL LOG]

	PROJECT NO.: 20173783	BORING LOG B-9 MERCED, CA: UNIVERSITY VILLAGE AT LAKE YOSEMITE AND LAKE ROAD MERCED, CALIFORNIA	FIGURE
	DRAWN BY: VT CHECKED BY: MB DATE: REVISED: -		A-11

PLOTTED: 03/21/2017 04:45 PM BY: NStrid

Date Begin - End: <u>2/14/2017</u>	Drilling Co.-Lic.#: <u>AWA - #848359</u>	BORING LOG B-10	
Logged By: <u>N. Strid</u>	Drill Crew: <u>Rob</u>		
Hor.-Vert. Datum: <u>Not Available</u>	Drilling Equipment: <u>CME-75 (truck-mounted)</u>	Hammer Type - Drop: <u>140 lb. Auto - 30 in.</u>	
Plunge: <u>-90 degrees</u>	Drilling Method: <u>Hollow Stem Auger</u>	Hammer Efficiency: <u>76%</u>	
Weather: <u>Sunny</u>	Bore Diameter: <u>8 in. O.D.</u>	Hammer Cal. Date: <u>Unknown</u>	

Depth (feet)	Graphical Log	FIELD EXPLORATION				LABORATORY RESULTS							
		Surface Condition: Grass	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in.	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
Lithologic Description													
		Lean CLAY (CL): fine-grained, medium to high plasticity, dark brown, moist, soft											
5		low to medium plasticity, sands present	BC=2 2 4										
10		Silty SAND (SM): non-plastic to low plasticity, reddish brown, moist, dense, trace clay and fine gravel	BC=2 13 12										
15		The boring was terminated at approximately 11.5 ft. below ground surface. The boring was backfilled with lean cement grout on February 15, 2017.											
20													
25													
30													

GROUNDWATER LEVEL INFORMATION:
Groundwater was not observed during drilling or after completion.
GENERAL NOTES:

PROJECT NUMBER: 20173783
KLF_BORING/TEST PIT/ SOIL LOG



PROJECT NO.: 20173783
DRAWN BY: VT
CHECKED BY: MB
DATE:
REVISED: -

BORING LOG B-10

MERCED, CA: UNIVERSITY VILLAGE AT LAKE
YOSEMITE AND LAKE ROAD
MERCED, CALIFORNIA

FIGURE
A-12
PAGE: 1 of 1

Exploration ID	Depth (ft.)	Sample Description	Water Content (%)	Dry Unit Wt. (pcf)	Sieve Analysis (%)			Atterberg Limits			Additional Tests
					Passing 3/4"	Passing #4	Passing #200	Liquid Limit	Plastic Limit	Plasticity Index	
B-1	0.0 - 5.0	SANDY LEAN CLAY				100	56				Expansion Index= 49 ASTM D1557 Method A= Maximum Dry Unit Weight: 123.8 pcf Optimum Water Content: 10.4%
B-1	5.0	SILTY SAND WITH CLAY									Direct Shear= Peak Cohesion: 580 psf Peak Friction Angle: 30.1°
B-1	15.0	LEAN CLAY WITH SAND	20.4	112.6							
B-1	20.0	LEAN CLAY WITH SAND				100	75				
B-1	25.0	LEAN CLAY WITH SAND	25.9	101.2							
B-1	35.0	LEAN CLAY WITH SAND	20.3	112.8							
B-1	45.0	LEAN CLAY WITH SAND	20.6	103.7							
B-3	5.0	LEAN CLAY						40	16	24	
B-3	10.0	SANDY LEAN CLAY	18.3	114.8							
B-4	5.0	CLAYEY SAND	21.2	101.8							
B-4	10.0	LEAN CLAY					50				

Refer to the Geotechnical Evaluation Report or the supplemental plates for the method used for the testing performed above.
NP = NonPlastic



PROJECT NO.: 20173783

DRAWN BY:

CHECKED BY:

DATE:

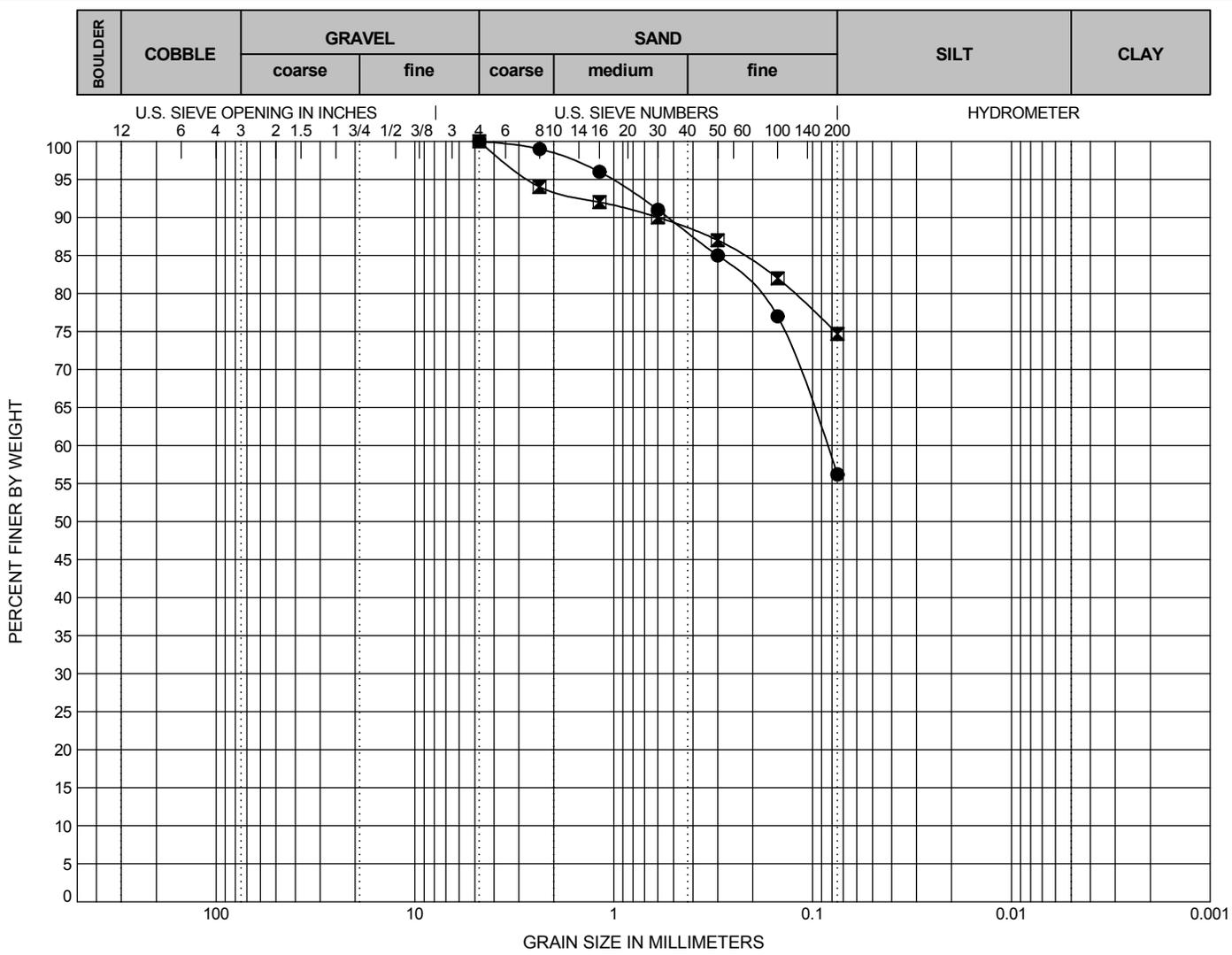
REVISED:

LABORATORY TEST
RESULT SUMMARY

MERCED, CA: UNIVERSITY VILLAGE AT LAKE
YOSEMITE AND LAKE ROAD
MERCED, CALIFORNIA

FIGURE

B-1



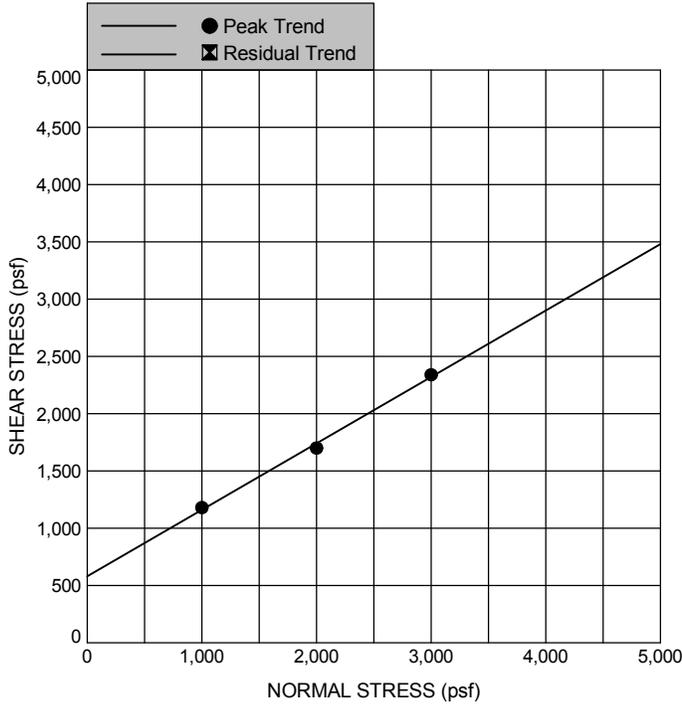
Exploration ID	Depth (ft.)	Sample Description	LL	PL	PI
● B-1	0 - 5	SANDY LEAN CLAY	NM	NM	NM
■ B-1	20 - 20.5	LEAN CLAY WITH SAND	NM	NM	NM

Exploration ID	Depth (ft.)	D ₁₀₀	D ₆₀	D ₃₀	D ₁₀	C _c	C _u	Passing #4	Passing #200	%Silt	%Clay
● B-1	0 - 5	4.75	0.085	NM	NM	NM	NM	100	56	NM	NM
■ B-1	20 - 20.5	4.75	NM	NM	NM	NM	NM	100	75	NM	NM

Sieve Analysis and Hydrometer Analysis testing performed in general accordance with ASTM D422.
 NP = Nonplastic
 NM = Not Measured

Coefficients of Uniformity - $C_u = D_{60} / D_{10}$
 Coefficients of Curvature - $C_c = (D_{30})^2 / D_{60} D_{10}$
 D₆₀ = Grain diameter at 60% passing
 D₃₀ = Grain diameter at 30% passing
 D₁₀ = Grain diameter at 10% passing

	PROJECT NO.: 20173783	SIEVE ANALYSIS MERCED, CA: UNIVERSITY VILLAGE AT LAKE YOSEMITE AND LAKE ROAD MERCED, CALIFORNIA	TABLE
	DRAWN BY: VT CHECKED BY: MB DATE: REVISED: -		B-3



Exploration ID	Depth (ft.)	Sample Description
B-1	5	SILTY SAND WITH CLAY

Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plastic Limit	Plasticity Index	Specific Gravity
NM	NM	NM	NM	NM	

Initial	Specimen No.	Water Content (%)	Dry Unit Weight (pcf)	Saturation (%)	Void Ratio	Area (in ²)	Height (in)
	1	19.1	108.7	97.1	0.522	4.60	0.96
	2	20.3	106.2	96.5	0.557	4.60	0.96
	3	21.4	106.0	101.3	0.560	4.60	0.96

At Test	Specimen No.	Water Content (%)	Dry Unit Weight (pcf)	Saturation (%)	Void Ratio	Area (in ²)	Height (in)
	1	21.7	110.0		0.502	4.60	0.95
	2	22.2	109.3		0.515	4.60	0.93
	3	22.8	109.2		0.514	4.60	0.93

Specimen No.	Peak Shear Stress (psf)	Residual Shear Stress (psf)	Horizontal Displacement (in)	Normal Stress (psf)	Strain Rate (in/min)
1	1180		0.0300	1000	0.001
2	1700		0.0700	2000	0.001
3	2340		0.0700	3000	0.001

Results	Cohesion (psf)	Friction ϕ (deg)	Tan ϕ (deg)
Peak	580	30.11	
Residual			

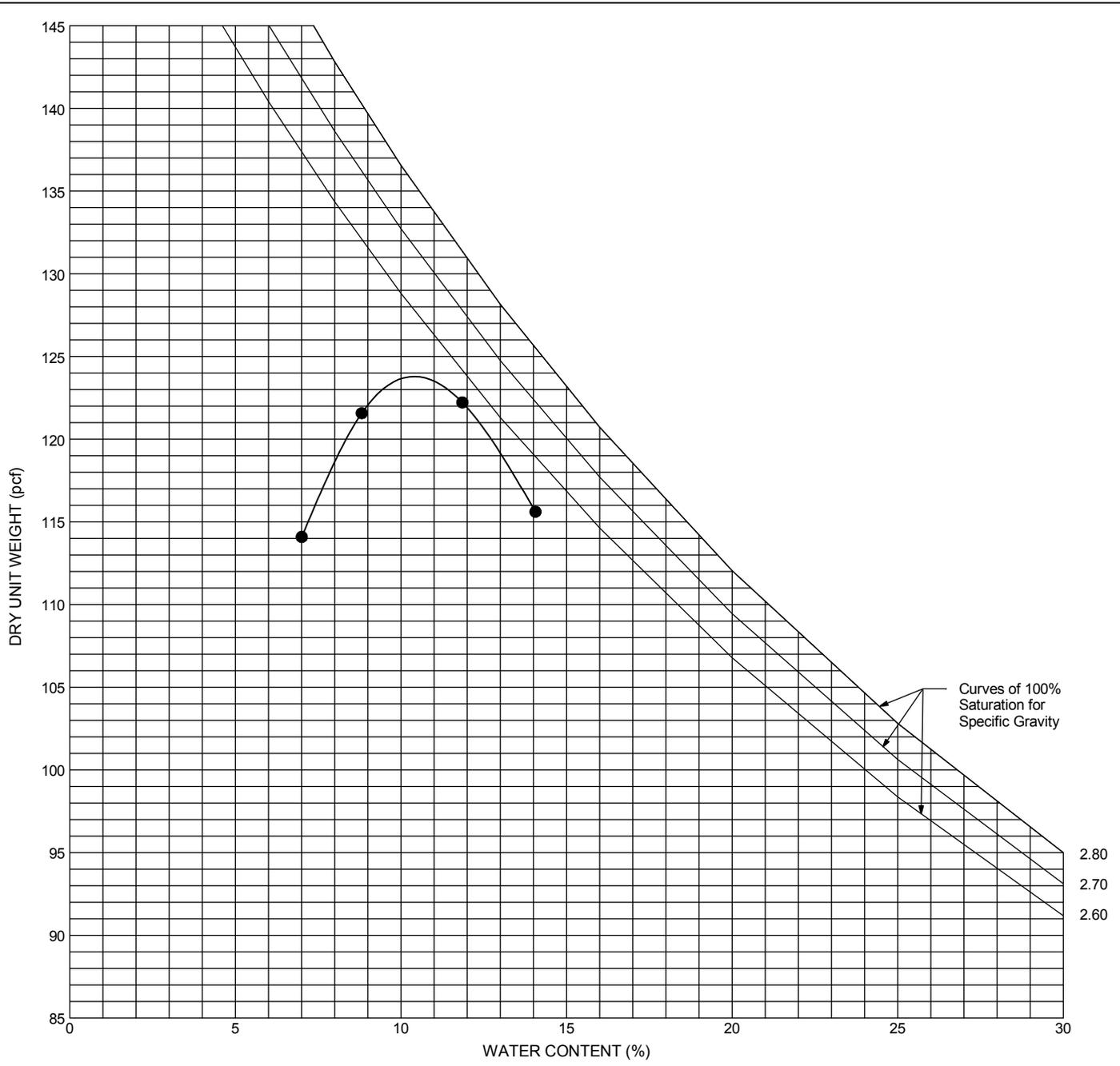
Testing performed in general accordance with ASTM D3080.
 NP = Nonplastic
 NM = Not Measured



PROJECT NO.: 20173783
 DRAWN BY: VT
 CHECKED BY: MB
 DATE:
 REVISED: -

DIRECT SHEAR
 MERCED, CA: UNIVERSITY VILLAGE AT LAKE
 YOSEMITE AND LAKE ROAD
 MERCED, CALIFORNIA

TABLE
 B-4



Exploration ID		Depth (ft.)		Sample Description					
● B-1		0 - 5		SANDY LEAN CLAY					
Passing 3/4"	Passing #4	Passing #200	LL	PL	PI	Maximum Dry Unit Weight (pcf)	Optimum Water Content (%)		
NM	100	56	NM	NM	NM	123.8	10.4		

Testing performed in general accordance with ASTM D1557 Method A.
 NP = Nonplastic
 NM = Not Measured



PROJECT NO.: 20173783
 DRAWN BY: VT
 CHECKED BY: MB
 DATE:
 REVISED: -

COMPACTON CURVE
 MERCED, CA: UNIVERSITY VILLAGE AT LAKE
 YOSEMITE AND LAKE ROAD
 MERCED, CALIFORNIA

TABLE
 B-5

NOTICE OF PUBLIC HEARING
FOR GENERAL PLAN AMENDMENT #16-06, ZONE CHANGE #424, ESTABLISHMENT OF
PLANNED DEVELOPMENT #76, AND NOTICE OF INTENT TO ADOPT
A MITIGATED NEGATIVE DECLARATION

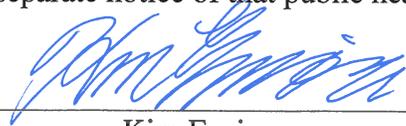
A public hearing will be held by the Merced City Planning Commission on Wednesday, April 19, 2017, at 7:00 p.m., or as soon thereafter as may be heard in the City Council Chambers located at 678 W. 18th Street, Merced, CA, concerning General Plan Amendment #16-06, Zone Change #424, and the establishment of Planned Development (P-D) #76. This application was initiated by University Village LLC, on behalf of Fagundes Dairy, A Partnership and CBCP Assets, LLC, property owners. The application is a request to change the General Plan and Zoning designations and to establish a Planned Development (P-D) for approximately 17.25 acres of land located on the south side of Yosemite Avenue at Lake Road. The requested General Plan Amendment would change the General Plan designation from Low Density Residential (LD) to High-Medium Density Residential (HMD) for approximately 16.25 acres and to Neighborhood Commercial (CN) for approximately 1 acre of the site. The Zone Change would change the Zoning designation for 14.86 acres from R-1-6 to Planned Development (P-D) #76 and 2.39 acres from Planned Development (P-D) #52 to Planned Development (P-D) #76 for the future development of 225 student housing units and a 6,600-square-foot commercial building. The property is more particularly described as: a 2.39-acre portion of Adjusted Parcel 1 and all of Adjusted Parcel 2 as described in Document #2006-079691 recorded 11/27/2006 in Merced County Records; also known as Assessor's Parcel Number (APN): 008-010-070 and -071.

An environmental review checklist has been filed for this project, and a draft mitigated negative declaration has been prepared under the California Environmental Quality Act. A copy of this evaluation (Initial Study #16-37) is available for public inspection at the City of Merced Planning Department during regular business hours, at 678 West 18th Street, Merced, California. A copy of this document can also be purchased at the Planning Department for the price of reproduction.

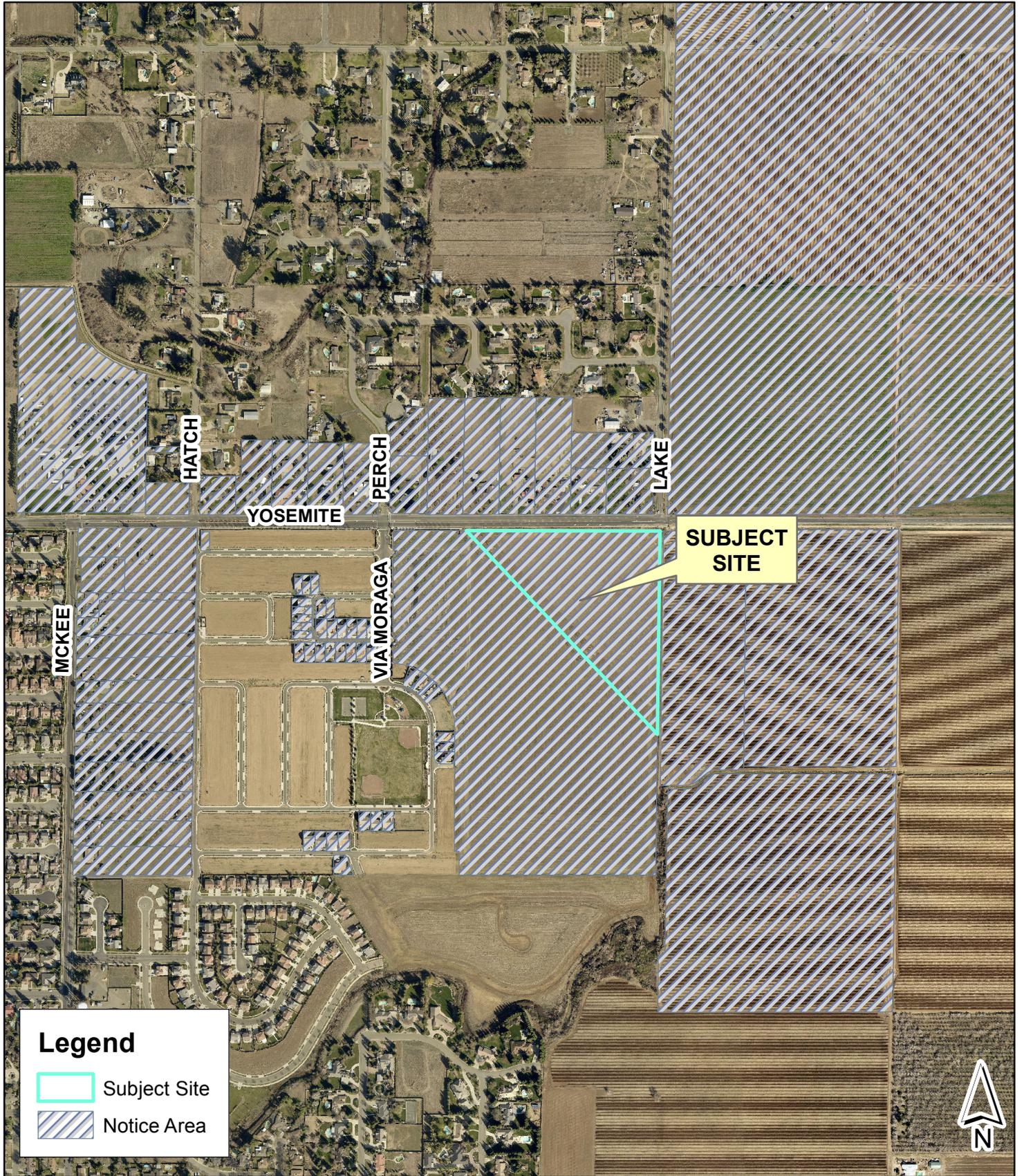
All persons in favor of, opposed to, or in any manner interested in this request for a General Plan Amendment, Zone Change, and Establishment of Planned Development (P-D) #76, are invited to attend this public hearing or forward written comments to the Director of Development Services, City of Merced, 678 West 18th Street, Merced, CA 95340. The public review period for the environmental determination begins on March 30, 2017, and ends on April 19, 2017. Please feel free to call the Planning Department at (209) 385-6858 for additional information. If you challenge the decision of the Planning Commission in court, you may be limited to raising only those issues you or someone else raised at the public hearing described in this notice, or in written correspondence delivered to the City of Merced at, or prior to, the public hearing.

After the Planning Commission makes its decision on this matter, the General Plan Amendment, Zone Change, and Establishment of Planned Development (P-D) #76 will also be considered at a public hearing before the City Council. A separate notice of that public hearing will also be given.

March 27, 2017



Kim Espinosa,
Planning Manager



Legend

-  Subject Site
-  Notice Area

Disclaimer: This document was prepared for general inquiries only. The City of Merced makes no warranty, representation, or guarantee regarding the accuracy of this map. The City of Merced is not responsible for errors or omissions that might occur. Official information regarding specific parcels should be obtained from official recorded or adopted City documents.

General Plan Amendment #16-06
Zone Change #424
Establishment of Planned Development #76



ATTACHMENT H

ENVIRONMENTAL REVIEW #16-37
Mitigation Monitoring Program

MITIGATION MONITORING CONTENTS

This mitigation monitoring program includes a brief discussion of the legal basis and purpose of the mitigation monitoring program, a key to understanding the monitoring matrix, a discussion of noncompliance complaints, and the mitigation monitoring matrix itself.

LEGAL BASIS AND PURPOSE OF THE MITIGATION MONITORING PROGRAM

Public Resource Code (PRC) 21081.6 requires public agencies to adopt mitigation monitoring or reporting programs whenever certifying an environmental impact report or mitigated negative declaration. This requirement facilitates implementation of all mitigation measures adopted through the California Environmental Quality Act (CEQA) process.

The City of Merced has adopted its own “Mitigation Monitoring and Reporting Program” (MMC 19.28). The City’s program was developed in accordance with the advisory publication, *Tracking CEQA Mitigation Measures*, from the Governor’s Office of Planning and Research.

As required by MMC 19.28.050, the following findings are made:

- 1) The requirements of the adopted mitigation monitoring program for the General Plan Amendment #16-06, Zone Change #424, and Establishment of Planned Development (P-D) #76 shall run with the real property. Successive owners, heirs, and assigns of this real property are bound to comply with all of the requirements of the adopted program.
- 2) Prior to any lease, sale, transfer, or conveyance of any portion of the subject real property, the applicant shall provide a copy of the adopted program to the prospective lessee, buyer, transferee, or one to whom the conveyance is made.

MITIGATION MONITORING PROCEDURES

In most cases, mitigation measures can be monitored through the City’s construction plan approval/plan check process. When the approved project plans and specifications, with mitigation measures, are submitted to the City Development Services Department, a copy of the monitoring checklist will be attached to the submittal. The Mitigation Monitoring Checklist will be filled out upon project approval with mitigation measures required. As project plans and specifications are checked, compliance with each mitigation measure can be reviewed.

In instances where mitigation requires on-going monitoring, the Mitigation Monitoring Checklist will be used until monitoring is no longer necessary. The Development Services Department will be required to file periodic reports on how the implementation of various mitigation measures is progressing or is being maintained. Department staff may be required to conduct periodic inspections to assure compliance. In some instances, outside agencies and/or consultants may be required to conduct necessary periodic inspections as part of the mitigation monitoring program. Fees may be imposed per MMC 19.28.070 for the cost of implementing the monitoring program.

GENERAL PLAN MITIGATION MEASURES

As a second tier environmental document, Initial Study #16-37 incorporates some mitigation measures adopted as part of the *Merced Vision 2030 General Plan Program Environmental Impact Report* (SCH# 2008071069), as mitigation for potential impacts of the Project.

NONCOMPLIANCE COMPLAINTS

Any person or agency may file a complaint asserting noncompliance with the mitigation measures associated with the project. The complaint shall be directed to the Director of Development Services in written form providing specific information on the asserted violation. The Director of Development Services shall cause an investigation and determine the validity of the complaint. If noncompliance with a mitigation measure has occurred, the Director of Development Services shall cause appropriate actions to remedy any violation. The complainant shall receive written confirmation indicating the results of the investigation or the final action corresponding to the particular noncompliance issue. Merced Municipal Code (MMC) Sections 19.28.080 and 19.28.090 outline the criminal penalties and civil and administrative remedies which may be incurred in the event of noncompliance. MMC 19.28.100 spells out the appeals procedures.

MONITORING MATRIX

The following pages provide a series of tables identifying the mitigation measures proposed specifically for General Plan Amendment #16-06, Zone Change #424, and Establishment of Planned Development (P-D) #76. The columns within the tables are defined as follows:

Mitigation Measure:	Describes the Mitigation Measure (referenced by number).
Timing:	Identifies at what point in time or phase of the project that the mitigation measure will be completed.
Agency/Department Consultation:	This column references any public agency or City department with which coordination is required to satisfy the identified mitigation measure.
Verification:	These columns will be initialed and dated by the individual designated to verify adherence to the project specific mitigation.

**General Plan Amendment #16-06/Zone Change #424/Establishment of Planned Development (P-D) #76
Mitigation Monitoring Checklist**

Project Name: _____ **File Number:** _____
Approval Date: _____ **Project Location** _____
Brief Project Description _____

The following environmental mitigation measures were incorporated into the Conditions of Approval for this project in order to mitigate identified environmental impacts to a level of insignificance. A completed and signed checklist for each mitigation measure indicates that this mitigation measure has been complied with and implemented, and fulfills the City of Merced's Mitigation Monitoring Requirements (MMC 19.28) with respect to Assembly Bill 3180 (Public Resources Code Section 21081.6).

B) Agriculture Resources				
<i>Impact No.</i>	<i>Mitigation Measures</i>	<i>Timing</i>	<i>Agency or Department</i>	<i>City Verification (date and initials)</i>
B-4	B-1) A provision shall be recorded by the applicants/developer or successors, at time of sale of any residentially-zoned property within the project that lies within 1,000 feet of the external boundary of any non-project property which currently has an active agricultural operation (including 4-H projects), or has had an agricultural operation on it during the calendar year preceding the year within which the sale takes place. This provision shall notify the buyer(s) and any subsequent owner(s) of the possible inconvenience or discomfort of farming operations arising from the use of agricultural chemicals, including pesticides and fertilizers; as well as from the pursuit of agricultural operations including plowing, spraying, and harvesting which occasionally generate dust, smoke, noise, and odor, and the priority to which Merced County places on agricultural operations.	Building Permits	Planning Department	
E) Cultural Resources				
<i>Impact No.</i>	<i>Mitigation Measures</i>	<i>Timing</i>	<i>Agency or Department</i>	<i>City Verification (date and initials)</i>
E-1	E-1) If evidence of archaeological artifacts is discovered during construction, all operations within the area and adjacent to the discovered site shall halt until a qualified archaeologist determines the extent of significance of the site and mitigation/preservation of any artifacts.	Building Permit	Planning Department	

E-3	E-2) If evidence of a paleontological resource, site, or unique geological feature is discovered during construction, all operations within the area and adjacent to the discovered site shall halt until a qualified paleontologist or geologist determines the extent of significance of the site and the mitigation/preservation of any resources.	Building Permit	Planning Department	
F) Geology and Soils				
F-2	F-1) Prior to the approval of a tentative subdivision map or building permit, the City shall review plans for drainage and storm water run-off control systems and their component facilities to ensure that these systems are non-erosive in design.	Building Permit	Engineering Department	
	F-2) Upon completion of phased construction, subsequent phases shall re-vegetate all exposed soil surfaces within 30 days, or as otherwise approved by the City, to minimize potential topsoil erosion. Reasonable alternatives to re-vegetation may be employed, especially during peak high temperature periods or to avoid negative impacts to nearby agricultural activities, subject to the approval of the City.	Building Permit	Planning Department	
	F-3) Projects under review shall be required to submit temporary erosion control plans for construction activities.	Building Permit	Engineering Department	
F-4	F-4) All recommendations for addressing expansive soils and site grading recommended in the Geotechnical Study prepared by Kleinfelder and found at Attachment E of Initial Study #16-37 shall be implemented.	Building Permit	Inspection Services Department	
	F-5) Building plans shall be reviewed by a registered engineer or other professional specializing in geo-technical assessments to ensure that the soils can support the load.	Building Permit	Inspection Services Department	

H) Hydrology and Water Quality				
H-5	H-5) Prior to the issuance of a building permit for this project, the applicant shall demonstrate to the City that storm drainage facilities are adequate to meet the Project demands and that improvements are consistent with the City's Storm Drainage Master Plan and the Post Construction Standards for the City's Phase II MS4 permit.	Building Permit	Engineering Department	
K) Noise				
K-1	K-1) Construction activities shall be limited to the hours of 7:00 a.m. to 7:00 p.m.	Building Permit	Inspection Services Department	
	K-2) Construction equipment, compressors, and generators shall be fitted with heavy duty mufflers specifically designed to reduce noise impacts.	Building Permit	Inspection Services Department	
	K-3) Prior to the issuance of a building permit, the project applicant or any successor in interest, shall provide documentation showing the interior noise levels of the residential units would meet the City's interior standard of 45 dB ldn.	Building Permit	Inspection Services Department	
O) Transportation/Traffic				
O-1	O-1) The project shall pay all fees as required under the City's Public Facilities Impact Fee Program prior to issuance of a certificate of occupancy for any building.	Building Permit	Planning Department	
R) Greenhouse Gas Emissions				
R-1	R-1) The project shall comply with all mitigation measures outlined in Appendix B of the Greenhouse Gas Study prepared for this project (Attachment D of Initial Study #16-37).	Building Permit	Planning Department/Inspection Services Department	

Certificate of Completion:

By signing below, the environmental coordinator confirms that the required mitigation measures have been implemented as evidenced by the Schedule of Tasks and Sign-Off Checklist, and that all direct and indirect costs have been paid. This act constitutes the issuance of a *Certificate of Completion*.

Environmental Coordinator

Date