# Science and Agriculture Teaching and Research Complex Project

## Final Initial Study – Mitigated Negative Declaration

*prepared by*

**California Polytechnic State University, San Luis Obispo**
Facilities Planning and Capital Projects
1 Grand Avenue
San Luis Obispo, California 93407
Contact: Anthony R. Palazzo

*prepared with the assistance of*

**Rincon Consultants, Inc.**
1530 Monterey Street, Suite D
San Luis Obispo, California 93401

**December 2018**

Rincon Consultants, Inc.
Environmental Scientists Planners Engineers
www.rinconconsultants.com

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# Initial Study

## 1. Project Title

Science and Agriculture Teaching and Research Complex Project (SATRC)

## 2. Lead Agency Name and Address

California State University (CSU) Board of Trustees
401 Golden Shore
Long Beach, California 90802

## 3. Contact Person and Phone Number

Anthony R. Palazzo
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California Polytechnic State University, San Luis Obispo
Phone: (805) 756-6538
e-mail: arpalazz@calpoly.edu

## 4. Project Applicant's Name and Address

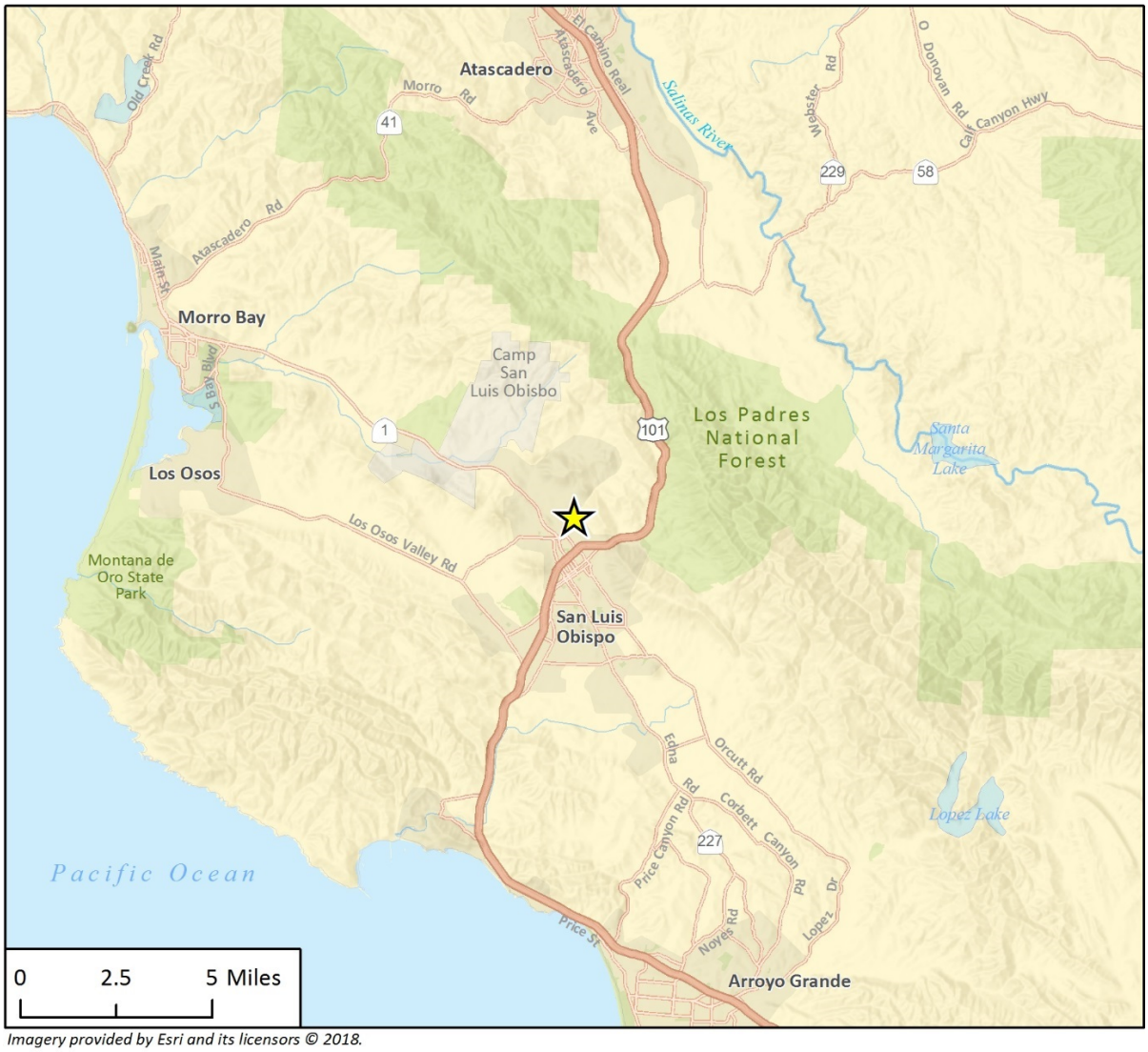
California Polytechnic State University, San Luis Obispo
1 Grand Avenue
San Luis Obispo, California 93407
Contact: Anthony R. Palazzo

## 5. Project Location and Setting

California Polytechnic State University, San Luis Obispo (Cal Poly) is located northeast of the city of San Luis Obispo, approximately midway between San Francisco and Los Angeles on California's central coast. The university campus occupies over 6,000 acres. University lands include range and agricultural areas as well as natural preserves, in addition to more developed areas. The more developed portion of the campus is identified as the "campus instructional core" and includes agricultural support facilities and academic, housing, and administrative buildings. The campus instructional core is generally bound by Highland Drive on the north, California Boulevard on the west, Slack Street on the south, and primarily undeveloped foothills on the east.

Figure 1 and Figure 2 show the location of the project site on regional and local scales, respectively. The SATRC project site is located in the campus instructional core to the south of Buildings #10 (Erhart Agriculture) and #22 (English) and to the north of Building #180 (Baker Science) and Poly View Drive. The site is approximately 3.5 acres and currently contains Building #53A (Science North Annex), trees, and landscaping.

## Figure 1 Regional Location




*Imagery provided by Esri and its licensors © 2018.*

Project Location

N

**Figure 2 Project Location**


*Imagery provided by Microsoft and its licensors © 2018.*

Fig 2 Project Location

The plant conservatory and vivarium, currently housed in Building #53A (Science North Annex), would be relocated to nearby sites. The plant conservatory site is approximately 0.2 acre, located to the north of Building #71 (Transportation Services) and Village Drive. The vivarium site is approximately 0.1 acre, located to the north of Building #70G (Facilities Services Storage) and to the south of Village Drive. Both sites are previously disturbed and undeveloped, and include several trees.

# 6. Local Planning Context

The 2001 Cal Poly Master Plan is the primary document governing land use and capital improvements on campus through the year 2020. The Master Plan includes several elements which guide development on campus, including, but not limited to Campus Instructional Core, Residential Communities, Circulation, and Parking. The Master Plan establishes land uses for the entire campus and outlines principles to guide future development. The Master Plan does not set specific standards for development; however, mitigation measures outlined in the Master Plan EIR, as applicable, condition Master Plan development.

## Master Plan Designation

The SATRC site is designated "Campus Instructional Core" as delineated in the 2001 Campus Master Plan and Environmental Impact Report (Cal Poly San Luis Obispo 2001), while the vivarium and plant conservatory relocation sites are designated "Outdoor Teaching and Learning." The Campus Instructional Core land use focuses on creating a compact, student-friendly, learner-centered area, and encompasses most of the area bounded by California Boulevard, Perimeter Road, and Grand Avenue sound to Slack Avenue and Campus Way, including educational buildings and dorms. The Outdoor Teaching and Learning land use allows for the operation of "living laboratories" in which students acquire applied skills in an outdoor, in-field setting. Outdoor Teaching and Learning sites include agricultural field operations, animal units, and research centers.

According to the Campus Land Use and Design Guidelines, the SATRC project site is located in zone A-5, which emphasizes academic facilities. The plant conservatory site is located in zone OS-1, an area reserved for open space, passive recreation uses, and outdoor teaching and learning facilities or displays. The vivarium site is in zone MU-1, a mixed-use area that includes academic spaces.

# 7. Project Description

The project would include construction of a four story, 72,144 assignable square-foot (ASF)[1]/102,000 gross square-foot (GSF)[2] Science and Agriculture Teaching and Research Complex (SATRC) to foster interdisciplinary teaching and research between science and agricultural colleges. The project includes two components: Phase A and Phase B. Phase A would include 58,704 ASF/87,000 GSF of space. Phase B would include 13,440 ASF/15,000 GSF.

The new SATRC would house laboratories, interdisciplinary spaces, and faculty offices. An atrium would extend through all four stories in the center of the complex. The first floor would include a lecture hall, classrooms, a computer lab, project space, a culinary laboratory, and an area for

[1] Assignable square footage refers to the areas available to be assigned to an occupant or specific use.

[2] The sum of all areas on all floors of a building included within the outside faces of its exterior walls.

electrical and mechanical equipment. Floors two through four would include research laboratories and faculty offices, as well as relocation of the fabrication shop, which is currently located in Building #53A. Figure 3 shows a conceptual site plan. The maximum building height would be approximately 90 feet. The conceptual building height section is shown in Figure 4. Figure 5 shows the north elevation aerial view with building massing.

The SATRC project would meet or exceed Leadership in Energy and Environmental Design (LEED™) "Silver" certification from the United States Green Building Council (USGBC) or equivalent.

The project would include demolition of Building #53A (Science North Annex), which is approximately 8,300 square feet, and removal of approximately 40 trees. The new building would accommodate all of the existing Building #53A uses except for two (plant conservatory and vivarium), which would be relocated to other nearby sites (Figure 2). The plant conservatory would consist of 3,000 square-feet of covered space and 3,000 square-feet of uncovered/outdoor space. The vivarium use would consist of a 1,500 square-foot pre-fabricated building. Construction of a pad and connection of utilities would be required.

Due to the funding uncertainty for Phase B, the exact project timeline for future phasing is not yet known. Therefore, for purposes of this CEQA analysis, the "reasonable worst case" scenario with respect to environmental effects will be analyzed—assuming that all funding is received and both phases are built simultaneously.

Construction is anticipated to start in July 2019 and be completed in two years. Earthwork would consist of 29,251 cubic yards of cut, 1,728 cubic yards of fill, and 27,523 cubic yards of export.

The project will require a Campus Master Plan Amendment, but would not affect overall enrollment. The project square footage does not exceed the development potential identified in the 2001 Master Plan.

## Utilities

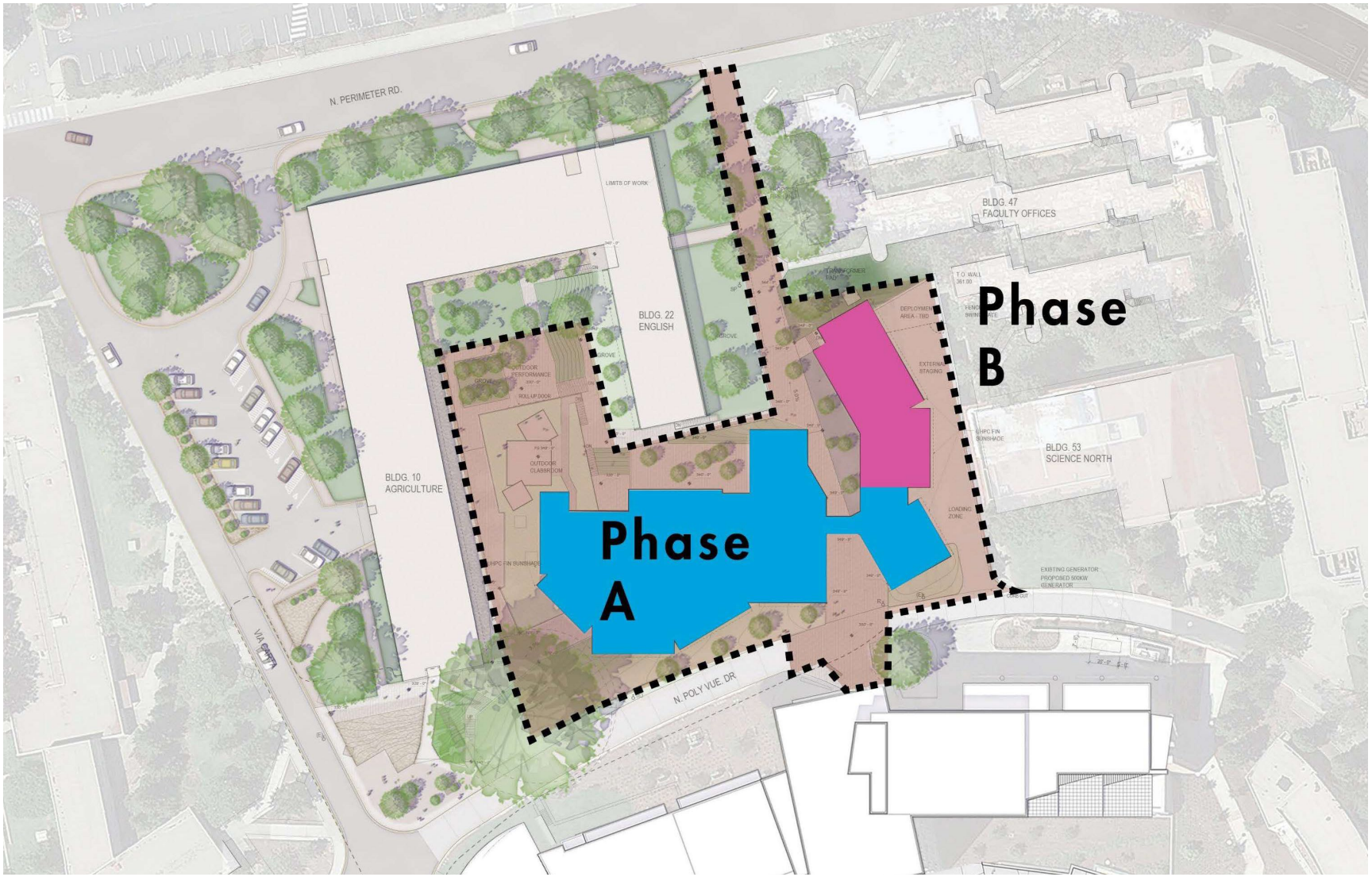
The project would include a new water lateral for potable drinking water and a separate fire line that would connect to existing water mains in North Poly View Drive and North Perimeter Road. It would also include a new sanitary sewer line that would connect to the existing sewer main located in Via Carta. No off-site improvements would be necessary.

In addition, the project would require rerouting of two main utilities: the high voltage electrical feed to Building #180 (Baker Science) and the sewer from Building #53/53A (Science North Annex).

The existing high voltage Baker Science feed is from a switch on Perimeter Drive. The Baker Science power feed would need to be pulled off of a different switch and routed up Poly View to the existing Baker Science transformer. The existing Baker power feed that runs from Perimeter Drive through the proposed SATRC feed would become the new SATRC power feed.

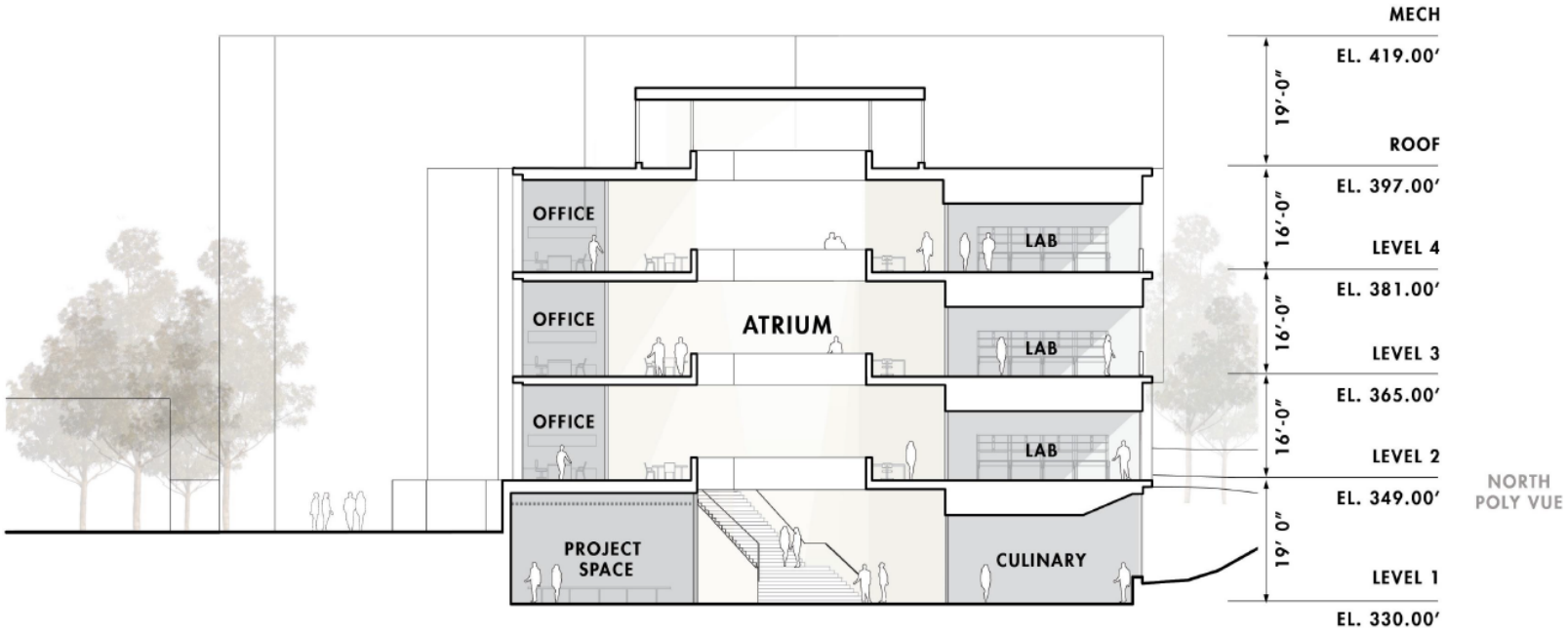
The sewer from Building #53 also needs to be rerouted as it runs through the proposed building site. Also due to route conflicts, the most feasible reroute appears to be from Building #53 down North Poly View Drive to the existing Baker Science lateral.

**Figure 3 Conceptual Site Plan and Phasing**




Source: ZGF 2018

**Figure 4 Conceptual Building Height**




Source: ZGF 2018

**Figure 5 North Elevation Aerial View with Building Massing**

Source: ZGF 2018

### Stormwater Management

The site drainage design will comply with the post-construction stormwater management requirements of the State Water Resources Control Board Phase II Small MS4 Permit. The project would result in a net increase in impervious surface area primarily due to the building footprint. The guidelines require that the project treat, infiltrate, and detain stormwater to the extent feasible. In this case, shallow bedrock and the clayey soils preclude infiltration of stormwater on-site. The project would use Low-Impact Development (LID) bioretention planters for pass-through treatment and detention of stormwater for compliance. Cartridge filter inlets may also be required to treat stormwater in the space available. The project design team has currently scoped a rainwater harvesting system to collect, treat, and reuse stormwater collected from between approximately 50 to 75 percent of the building footprint. This would both reduce the net developed site runoff and treat roof runoff to help comply with post-construction stormwater requirements.

## 8. Other Public Agencies Whose Approval is Required

- Regional Water Quality Control Board: National Pollutant Discharge Elimination System Permit

## 9. Permits and Approvals Required

Implementation of the project would require discretionary approvals by the Board of Trustees of the California State University (CSU Trustees). Specifically, the CSU Trustees will:

- Adopt the IS-MND
- Approve a Campus Master Plan Amendment
- Approve schematic plans

## 10. California Environmental Quality Act Compliance

This document serves as the Initial Study (IS) and Mitigated Negative Declaration (MND) for the proposed Cal Poly San Luis Obispo SATRC Project, located in San Luis Obispo County, California. This IS/MND has been prepared in accordance with CEQA (California Public Resources Code, Section 21000 et seq.), and Title 14 of the California Code of Regulations (hereafter "CEQA Guidelines") (14 CCR 15000 et seq.).

A lead agency prepares an IS to determine whether a project may have a significant impact on the environment (14 CCR 15063(a)) and thereby confirm the appropriate environmental document to be prepared by the lead agency. This IS concludes the project would not result in any significant environmental impacts upon implementation of available and feasible mitigation measures that will be incorporated into the project design. An MND is therefore the appropriate environmental review document under CEQA. The lead agency, the Trustees, will be responsible for the review and approval of the proposed project.

The IS and Draft MND for the proposed project were circulated for a 30-day public review period from October 23, 2018 through November 21, 2018. No comments were received during the public review period; therefore, no responses to comments were required for the Final MND.

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# Environmental Factors Potentially Affected

This project would potentially affect the environmental factors checked below, involving at least one impact that is "Potentially Significant" or "Potentially Significant Unless Mitigation Incorporated" as indicated by the checklist on the following pages.

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

# Determination

Based on this initial evaluation:

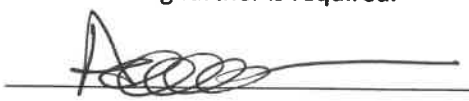
☐ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

■ I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions to the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

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

☐ I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect (1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and (2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

X I find that although the proposed project could have a significant effect on the environment, because all potential significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.



Signature

10/19/18

Date

ANTHONY R. PALAZZO

Printed Name

PROJECT PLANNER ARCHITECT

Title

# Environmental Checklist

## 1 Aesthetics

| | Potentially Significant Impact | Less than Significant with Mitigation Incorporated | Less than Significant Impact | No Impact |
|---|---|---|---|---|
| Would the project: | | | | |
| a. Have a substantial adverse effect on a scenic vista? | ☐ | ☐ | ☐ | ■ |
| b. Substantially damage scenic resources, including but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway? | ☐ | ☐ | ☐ | ■ |
| c. Substantially degrade the existing visual character or quality of the site and its surroundings? | ☐ | ☐ | ■ | ☐ |
| d. Create a new source of substantial light or glare that would adversely affect daytime or nighttime views in the area? | ☐ | ■ | ☐ | ☐ |

### Setting

The SATRC project site is located in the campus instructional core, adjacent to Building #10 (Erhart Agriculture), Building #22 (English), Building #47 (Faculty Offices), Building #180 (Baker Science), and North Poly View Drive. Mostly, views of the site are experienced by pedestrians along North Poly View Drive and pathways in the area. The site currently contains Building #53A (Science North Annex), trees, and landscaping.

The existing visual environment surrounding the project site is developed and characterized by campus buildings associated with educational, instructional, and administrative functions of the university. Surrounding buildings range from two to six stories tall. The site is not located within a Campus Master Plan designated scenic vista or along a designated scenic highway. Existing lighting sources on campus include structure lighting, campus security lighting, and street lighting.

The plant conservatory and vivarium sites are previously disturbed and undeveloped, and include several trees. Both sites are adjacent to Village Drive and pedestrian walkways.

*a. Would the project have a substantial adverse effect on a scenic vista?*

No scenic vistas are located within the proposed project area as identified in the 2001 Campus Master Plan and Environmental Impact Report (Cal Poly San Luis Obispo 2001) or in the Campus

Land Use and Design Guidelines (Cal Poly San Luis Obispo 2010). As such, the project would not have a substantial adverse effect on a scenic vista. No impact to scenic vistas would occur because of the project.

**NO IMPACT**

*b. Would the project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?*

State Route (SR) 1, between San Luis Obispo and the northern San Luis Obispo County boundary line, is an Officially Designated State Scenic Highway. SR 1 is located approximately a half-mile mile west of the project site, but existing development, vegetation, and topography would block views of the project. As such, the project is not in the view corridor of any officially designated state scenic highway. Therefore, no impact to scenic highways would occur because of this project.

**NO IMPACT**

*c. Would the project substantially degrade the existing visual character or quality of the site and its surroundings?*

The project would involve the removal of an existing campus building and landscaping, including ornamental trees (such as several species of pittosporum, corymbia, eucalyptus, Ficus aurea, Washingtonia robusta, Cotoneaster lacteus, Gleditsia triacanthos f. inermis, Aesculus californica, x Chitalpa tashkentensis, Heteromeles arbutifolia, Liquidambar styraciflua, and others) approximately 15 to 45 feet tall in the campus instructional core and construction of a four story, 72,144 ASF/102,000 GSF SATRC with new landscaping. The 2001 Campus Master Plan proposes a campus interior that remains roughly the same in terms of height and mass, to that of surrounding structures, and promotes visual continuity. At four stories tall and 72,144 ASF/102,000 GSF, the SATRC would be visually compatible with other surrounding buildings in the campus instructional core and would not result in a significant impact to the visual character of the campus.

During construction, potential aesthetic impacts would occur because of stockpiling, construction equipment, and re-routing of underground utilities within the project site. However, potential impacts would be temporary and cease upon completion of construction.

The project would also locate a 1,500 square-foot pre-fabricated building on the vivarium site, and 3,000 square-foot covered area and 3,000 square-feet of uncovered space on the plant conservatory site. Both sites are designated in the 2001 Campus Master Plan as Outdoor Teaching and Learning, which include agricultural field operations, animal units, and research centers. Neither the scale nor massing of the vivarium or plant conservatory would be dissimilar to existing campus development. Consequently, the vivarium and plant conservatory would be visually compatible with existing structural development in the immediate area.

Overall, the project would not degrade the existing visual character or quality of the site. Impacts on visual character and quality would be less than significant.

**LESS THAN SIGNIFICANT IMPACT**

*d. Would the project create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?*

Potential increased sources of light and glare include operational lighting, including exterior lighting associated with the SATRC, and reflective building components, such as windows that could produce

glare. Although the project is located within a developed area of campus with existing structure that produce light and glare, the project would result in new sources of potential lighting and glare impacts associated with the proposed structures. These light and glare sources could adversely affect day or nighttime views and would be potentially significant.

## Mitigation Measure

The following mitigation measure in accordance with the 2001 Campus Master Plan EIR would be required to reduce light and glare impacts to a less than significant level.

### *AES-1 Lighting and Glare Minimization*

All exterior lighting shall be hooded. No unobstructed beam of light shall be directed toward sensitive uses. The use of reflective materials in all structures shall be minimized (e.g., metal roofing, expanses of reflective glass on west-facing walls).

**LESS THAN SIGNIFICANT WITH MITIGATION INCORPORATED**

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# 2 Agriculture and Forestry Resources

| | Potentially Significant Impact | Less than Significant with Mitigation Incorporated | Less than Significant Impact | No Impact |
|---|---|---|---|---|
| Would the project: | | | | |
| a. Convert Prime Farmland, Unique Farmland, Farmland of Statewide Importance (Farmland), as shown on maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use? | ☐ | ☐ | ☐ | ■ |
| b. Conflict with existing zoning for agricultural use or a Williamson Act contract? | ☐ | ☐ | ☐ | ■ |
| c. Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code Section 12220(g)); timberland (as defined by Public Resources Code Section 4526); or timberland zoned Timberland Production (as defined by Government Code Section 51104(g))? | ☐ | ☐ | ☐ | ■ |
| d. Result in the loss of forest land or conversion of forest land to non-forest use? | ☐ | ☐ | ☐ | ■ |
| e. Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural use or conversion of forest land to non-forest use? | ☐ | ☐ | ☐ | ■ |

## Setting

A substantial portion of the University's land holdings are devoted to agriculture. The University has extensive livestock operations, ranches, and cultivated croplands including vineyards, row crops, and orchards, in addition to more intensive agricultural facilities such as feedlots. Agricultural operations, however, are generally located in the northern portions of campus, away from the project site. The project site and surrounding areas are designated as Urban and Built-up Land in the California Department of Conservation's Farmland Mapping and Monitoring Program. Neither the project site nor surrounding areas contain forest land, timberland, or Timberland Production areas (as defined in the Public Resources Codes 12220 (g), 4526, or 51104 (g)).

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

*b. Would the project conflict with existing zoning for agricultural use, or a Williamson Act contract?*

*c. Would the project conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code Section 12220(g)), timberland (as defined by Public Resources Code Section 4526), or timberland zoned Timberland Production (as defined by Government Code Section 51104(g))?*

*d. Would the project result in the loss of forest land or conversion of forest land to non-forest use?*

*e. Would the project involve other changes in the existing environment, which, due to their location or nature, could result in conversion of Farmland to non-agricultural use?*

The project site lies within the designated urban areas of the Cal Poly campus. The project site does not contain any agricultural resources, land identified for potential agricultural production, lands designated as or zoned for agricultural use, or lands under a Williamson Act contract. Furthermore, no timberland land exists on the project site. Therefore, no impact to agricultural resources or forest land would occur as a result of the project.

**NO IMPACT**

# 3 Air Quality

| | Potentially Significant Impact | Less than Significant with Mitigation Incorporated | Less than Significant Impact | No Impact |
|---|---|---|---|---|
| Would the project: | | | | |
| 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 non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)? | ☐ | ■ | ☐ | ☐ |
| d. Expose sensitive receptors to substantial pollutant concentrations? | ☐ | ■ | ☐ | ☐ |
| e. Create objectionable odors affecting a substantial number of people? | ☐ | ☐ | ☐ | ■ |

## Setting

The project site is located in the South Central Coast Air Basin (SCCAB) under the jurisdiction of the San Luis Obispo County Air Pollution Control District (SLOCAPCD). The SLOCAPCD is the local agency responsible for the administration and enforcement of air quality regulations for the area. SLOAPCD monitors air pollutant levels to assure that air quality standards are met, and if they are not met, develops strategies to meet the standards. Depending on whether the standards are met or exceeded, the air basin is classified as being in "attainment" or as "non-attainment." SLOAPCD is in non-attainment for the 24-hour state standard for particulate matter ($PM_{10}$) and the eight-hour state standard for ozone ($O_3$) (SLOAPCD 2015).

The major sources of $PM_{10}$ in the SCCAB are agricultural operations, vehicle dust, grading, and dust produced by high winds. Additional sources of particulate pollution include diesel exhaust; mineral extraction and production; combustion products from industry and motor vehicles; smoke from open burning; paved and unpaved roads; condensation of gaseous pollutants into liquid or solid particles; and wind-blown dust from soils disturbed by demolition and construction, agricultural operations, off-road vehicle recreation, and other activities. Ozone is a secondary pollutant not produced directly by a source; rather is forms from a reaction between nitrogen oxides (NOx) and reactive organic gases (ROG) in the presence of sunlight. Reductions in ozone concentrations are

dependent on reducing the amount of these precursors. In the SCCAB, the major sources of ROGs are motor vehicles, organic solvents, the petroleum industry, and pesticides. The major sources of NOx are motor vehicles, public utility power generation, and fuel combustion by various industrial sources (SLOAPCD 2015).

To comply with the California Clean Air Act, the SLOAPCD 2001 Clean Air Plan which outlines the District's strategies to reduce ozone precursor emissions from a wide variety of stationary and mobile sources.

## Construction Emissions Thresholds

The SLOAPCD has developed specific daily and quarterly numeric thresholds that apply to projects within the SCCAB. Daily thresholds are for projects that would be completed in less than one quarter (90 days). The SLOAPCD's quarterly construction thresholds are applicable to the project because construction would last for more than one quarter. Thresholds are based on guidance in the SLOAPCD's CEQA Air Quality Handbook (2012). These include:

### *ROG and $NO_X$ Emissions*

- **Quarterly – Tier 1:** For construction projects lasting more than one quarter, exceedance of the 2.5 tons per quarter threshold requires Standard Mitigation Measures and Best Available Control Technology (BACT) for construction equipment. If implementation of the Standard Mitigation and BACT measures cannot bring the project below the threshold, off-site mitigation may be necessary; and
- **Quarterly – Tier 2:** For construction projects lasting more than one quarter, exceedance of the 6.3 tons per quarter threshold requires Standard Mitigation Measures, BACT, implementation of a Construction Activity Management Plan (CAMP), and off-site mitigation.

### *Diesel Particulate Matter (DPM) Emissions*

- **Quarterly – Tier 1:** For construction projects lasting more than one quarter, exceedance of the 0.13 tons per quarter threshold requires Standard Mitigation Measures, BACT for construction equipment; and
- **Quarterly – Tier 2:** For construction projects lasting more than one quarter, exceedance of the 0.32 ton per quarter threshold requires Standard Mitigation Measures, BACT, implementation of a CAMP, and off-site mitigation.

### *Fugitive Particulate Matter ($PM_{10}$), Dust Emissions*

- **Quarterly:** Exceedance of the 2.5 tons per quarter threshold requires Fugitive $PM_{10}$ Mitigation Measures and may require the implementation of a CAMP.

## Operational Emissions Thresholds

Table 1 summarizes SLOAPCD's long-term operational emission thresholds.

**Table 1 SLOAPCD Operational Emissions Significance Thresholds**

| Pollutant | Daily Threshold (lbs/day) | Annual Threshold (tons/year) |
|---|---|---|
| ROG + $NO_X$ (combined)[1] | 25 | 25 |
| Diesel Particulate Matter (DPM)[1] | 1.25 | – |
| Fugitive Particulate Matter ($PM_{10}$), Dust | 25 | 25 |
| CO | 550 | – |

[1] SLOAPCD specifies that CalEEMod winter emission outputs be compared to operational thresholds for these pollutants.
Source: SLOAPCD 2012

Project emissions for both construction and operation of the project were estimated using the CalEEMod air quality modeling program (version 2016.3.2). Where project-specific information was not available, model default assumptions were used.

## Sensitive Receptors

Certain population groups are considered more sensitive to air pollution than others. Sensitive population groups include children, the elderly, the acutely ill, and the chronically ill, especially those with cardio-respiratory diseases. Residential uses are also considered sensitive to air pollution because residents tend to be at home for extended periods, resulting in sustained exposure to any pollutants present. The nearest air quality sensitive receptors to the project site are Shasta Hall and Lassen Hall, located approximately 500 feet east of the project site.

*a. Would the project conflict with or obstruct implementation of the applicable air quality plan?*

The applicable air quality plan is the SLOAPCD Clean Air Plan (2001). The plan projects air quality emissions and standard attainment goals based on growth rates in population and vehicle travel in San Luis Obispo County. The project involves demolition of the existing sciences building and construction of the new SATRC building in the campus core. The project would not affect overall enrollment and is consistent with the development potential identified in the 2001 Campus Master Plan and analyzed in the 2001 Campus Master Plan EIR. The project would not conflict with or obstruct the Clean Air Plan because it does not include additional development growth, urban sprawl, or result in a long-term increase in vehicle miles traveled. Impacts would be less than significant.

**LESS THAN SIGNIFICANT IMPACT**

*b. Would the project violate any air quality standard or contribute substantially to an existing or projected air quality violation?*

*c. Would the project result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions that exceed quantitative thresholds for ozone precursors)?*

*d. Would the project expose sensitive receptors to substantial pollutant concentrations?*

## Construction Impacts

Construction activities (including demolition of Building #53A) would generate fugitive dust particles, ozone precursors, and diesel exhaust that could result in an increase in criteria pollutants and could contribute to the existing San Luis Obispo County nonattainment status for ozone and $PM_{10}$. Sensitive receptors near the project site include Shasta Hall and Lassen Hall, located approximately 500 feet east of the project site. Table 2 summarizes the estimated project emissions generated from demolition and construction activities. Maximum quarterly emissions are shown in Table 2 (see Appendix A for complete CalEEMod results), and compared to the applicable SLOAPCD construction emissions thresholds.

**Table 2 Project Quarterly Construction Emissions**

| | ROG and $NO_X$ (combined)[1] (tons/quarter) | Fugitive $PM_{10}$ (dust) (tons/quarter) | DPM[2] (tons/quarter) |
|---|---|---|---|
| Project Construction Emissions | 0.7 | 0.1 | 0.1 |
| SLOAPCD Significance Threshold | 2.5 (Tier 1) | 2.5 (Tier 1) | 0.13 (Tier 1) |
| **Threshold Exceeded?** | **No** | **No** | **No** |

[1] The combined ROG and $NO_X$ emissions were derived from the rolling maximum quarterly emissions for "ROG + $NO_X$" from CalEEMod.

[2] The DPM estimations were derived from the "$PM_{10}$ Exhaust" and "$PM_{2.5}$ exhaust" output from CalEEMod as recommended by SLOAPCD. This estimation represents a worst case scenario because it includes other $PM_{10}$ exhaust other than DPM. See Appendix A for CalEEMod software program output.

Note: Quarterly emissions for Fugitive $PM_{10}$ and DPM were calculated by dividing maximum annual construction emissions from CalEEMod by 4, since construction activities would extend for a duration exceeding 90 days, as recommended by SLOAPCD.

As shown in Table 2, the project would not exceed SLOAPCD quarterly construction emissions for ROG and $NO_X$, $PM_{10}$, or DPM. In accordance with the standards of the SLOPACD CEQA Handbook, standard mitigation measures are required because sensitive receptors (Shasta Hall and Lassen Hall) are located within 1,000 feet of the project site and because the SCCAB is in non-attainment for $PM_{10}$. Construction impacts would be potentially significant unless mitigation is incorporated.

## Operational Impacts

Operation of the project would result in ongoing emissions associated with natural gas use and area sources, such as landscaping, consumption of consumer products, and off gassing from architectural coatings. The proposed project would meet or exceed LEED "Silver" certification or equivalent; however, in order to ensure a conservative analysis, the energy efficiency measures incorporated into the project were not accounted for in the emissions modeling. Table 3 shows the daily and annual operational emissions associated with the project (see Appendix A for complete CalEEMod results and assumptions), compared to the applicable SLOAPCD operational emissions thresholds.

**Table 3 Project Operational Emissions**

| Source | ROG and NOX | $PM_{10}$ | DPM[1] | CO |
|---|---|---|---|---|
| Total Daily Emissions (lbs/day) | 5.4 | 0.1 | 0.1 | 0.7 |
| SLOAPCD Daily Threshold (lbs/day) | 25 | 25 | 1.25 | 550 |
| **Threshold Exceeded?** | **No** | **No** | **No** | **No** |
| Total Annual Emissions (tons/year) | 0.6 | <0.1 | <0.1 | 0.1 |
| SLOAPCD Annual Threshold (tons/year) | 25 | 25 | n/a | n/a |
| **Threshold Exceeded?** | **No** | **No** | **n/a** | **n/a** |

[1] The DPM estimations were derived from the "$PM_{10}$ Exhaust" and "$PM_{2.5}$ exhaust" output from CalEEMod as recommended by SLOAPCD. This estimation represents a worst case scenario because it includes other $PM_{10}$ exhaust other than DPM. CalEEMod – use winter operational emission data to compare to operational thresholds. See Appendix A for CalEEMod results.

Operational emissions from the project would not exceed applicable SLOAPCD thresholds, as shown in Table 3. Operational emissions associated with the project would be less than significant.

## Mitigation Measures

The following mitigation measures would be required to reduce construction emissions and impacts to sensitive receptors to a less than significant level.

### *AQ-1 Fugitive Dust Control Measures*

Construction projects shall implement the following dust control measures so as to reduce $PM_{10}$ emissions in accordance with SLOAPCD requirements.

- Reduce the amount of the disturbed area where possible
- Water trucks or sprinkler systems shall be used during construction in sufficient quantities to prevent airborne dust from leaving the site. Increased watering frequency shall be required whenever wind speeds exceed 15 mph. Reclaimed (non-potable) water shall be used whenever possible
- All dirt stock pile areas shall be sprayed daily as needed
- Permanent dust control measures identified in the approved project revegetation and landscape plans shall be implemented as soon as possible following completion of any soil disturbing activities
- Exposed ground areas planned to be reworked at dates greater than one month after initial grading shall be sown with a fast germinating, non-invasive grass seed and watered until vegetation is established
- All disturbed soil areas not subject to revegetation shall be stabilized using approved chemical soil binders, jute netting, or other methods approved in advance by the SLOAPCD
- All roadways, driveways, sidewalks, etc. to be paved shall be completed as soon as possible after grading unless seeding or soil binders are used
- Vehicle speed for all construction vehicles shall not exceed 15 mph on any unpaved surface at the construction site
- All trucks hauling dirt, sand, soil, or other loose materials are to be covered or shall maintain at least two feet of freeboard (minimum vertical distance between top of load and top of trailer) in accordance with California Vehicle Code Section 23114

- Install wheel washers where vehicles enter and exit unpaved roads onto streets, or wash off trucks and equipment leaving the site
- Sweep streets at the end of each day if visible soil material is carried onto adjacent paved roads, with water sweepers using reclaimed water where feasible
- All of these fugitive dust mitigation measures shall be shown on grading and building plans
- The contractor or builder shall designate a person or persons to monitor the fugitive dust emissions and enhance the implementation of the measures as necessary to minimize dust complaints, reduce visible emissions below 20 percent opacity, and to prevent transport of dust off-site; duties shall include holidays and weekend periods when work may not be in progress, and the name and telephone number of such persons shall be provided to the SLOAPCD Compliance Division prior to the start of any grading, earthwork or demolition

### *AQ-2(a) Standard Control Measures for Construction Equipment*

The following standard air quality mitigation measures shall be implemented during construction activities at the project site:

- Maintain all construction equipment in proper tune according to manufacturer's specifications
- Fuel all off-road and portable diesel powered equipment with ARB certified motor vehicle diesel fuel (non-taxed version suitable for sue off-road)
- Use diesel construction equipment meeting ARB's Tier 2 certified engines or cleaner off-road heavy-duty diesel engines, and comply with the State Off-Road Regulation
- Use on-road heavy-duty trucks that meet the ARB's 2007 or cleaner certification standard for on-road heavy-duty diesel engines, and comply with the State On-Road Regulation
- Construction or trucking companies with fleets that do not have engines in their fleet that meet the engine standards identified in the above two measures (e.g., captive or $NO_X$ exempt area fleets) may be eligible by proving alternative compliance
- All on and off-road diesel equipment shall not idle for more than five minutes. Signs shall be posted in the designated queuing areas and or job sites to remind drivers and operators of the five-minute idling limit
- Diesel idling within 1,000 feet of sensitive receptors is not permitted
- Staging and queuing areas shall not be located within 1,000 feet of sensitive receptors
- Electrify equipment when feasible
- Substitute gasoline-powered in place of diesel-powered equipment, where feasible
- Use alternatively fueled construction equipment on-site where feasible, such as compressed natural gas, liquefied natural gas, propane or biodiesel

### *AQ-2(b) Best Available Control Technology (BACT) for Construction Equipment*

The following BACT for diesel-fueled construction equipment shall be implemented during construction activities at the project site, where feasible:

- Further reducing emissions by expanding use of Tier 3 and Tier 4 off-road and 2010 on-road compliant engines where feasible
- Repowering equipment with the cleanest engines available
- Installing California Verified Diesel Emission Control Strategies, such as level 2 diesel particulate filters; strategies provided at www.arb.ca.gov/diesel/verdev/vt/cvt.htm

### *AQ-2(c) Architectural Coating*

To reduce ROG and $NO_X$ levels during the architectural coating phase, low or no VOC-emission paint shall be used with levels of 50 g/L or less.

**LESS THAN SIGNIFICANT WITH MITIGATION INCORPORATED**

*e. Would the project create objectionable odors affecting a substantial number of people?*

The SLOAPCD CEQA Handbook (2012) identifies typical land uses with the potential to result in increases in odorous emissions. None of the uses proposed under the project, including SATRC, vivarium, and plant conservatory, are listed as uses project that typically create objectionable odors. Therefore, they would not create objectionable odors affecting a substantial number of people. No impact related to objectionable odors would result.

**NO IMPACT**

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# 4 Biological Resources

| | Potentially Significant Impact | Less than Significant with Mitigation Incorporated | Less than Significant Impact | No Impact |
|---|---|---|---|---|
| Would the project: | | | | |
| a. Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service? | ☐ | ☐ | ☐ | ■ |
| b. Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service? | ☐ | ☐ | ☐ | ■ |
| c. Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means? | ☐ | ☐ | ☐ | ■ |
| d. Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites? | ☐ | ■ | ☐ | ☐ |
| e. Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance? | ☐ | ☐ | ☐ | ■ |
| f. Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan? | ☐ | ☐ | ☐ | ■ |

## Setting

This region of San Luis Obispo County is in the Outer South Coast Ranges geographic subdivision of California. The Outer South Coast Ranges subdivision contains an array of vegetation community types that range from southern oak forest, blue-oak/foothill-pine wood land and chaparral to grasslands and agricultural/urbanized areas. The Outer South Coast Ranges subdivision is part of the larger South Coast Ranges geographic sub-region, which is a component of the even larger Central Western California physiographic area.

The federal Migratory Bird Treaty Act (16 United States Code Section 703-711) protects all migratory birds, their nests and eggs against take, possession, or destruction. The MBTA was enacted in 1918 and is enforced by the U.S. Fish and Wildlife Service. Abiding by the MBTA requires that active nests be avoided.

*a. Would the project have a substantial adverse effect, either directly or through habitat modifications, on any species identified as candidate, sensitive, or special status in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or the U.S. Fish and Wildlife Service?*

The project site is currently disturbed and does not support suitable habitat for special status species. There would be no impact to special status species.

**NO IMPACT**

*b. Would the project have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?*

The project site is disturbed and surrounded by urban land uses. It does not contain any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service. There would be no impact to any riparian habitat or other sensitive natural community from the project.

**NO IMPACT**

*c. Would the project have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?*

The project site is disturbed and surrounded by urban land uses. It does not contain federally protected wetlands as defined by Section 404 of the Clean Water Act and therefore would not have a substantial adverse effect on such resources. There would be no impact to federally protected wetlands.

**NO IMPACT**

*d. Would the project interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?*

The project site is disturbed and surrounded by urban land uses. The site does not provide suitable habitat for wildlife and the surrounding urban uses would act as barriers to wildlife movement.

However, trees on the site may support nesting birds protected under the Migratory Bird Treaty Act. The removal of trees and general construction activity may affect protected nesting birds. Impacts to migratory bird species would be potentially significant unless mitigation is incorporated.

## Mitigation Measure

Adherence to the following mitigation measure would reduce impacts on nesting birds during construction to a less than significant level.

### *BIO-1 Native/Breeding Native Bird Protection*

To avoid impacts to nesting birds, including birds protected under the Migratory Bird Treaty Act, all initial ground-disturbing activities including tree removal should be limited to the time period between August 16 and January 31 (i.e., outside the nesting season) if feasible. If initial site disturbance, grading, and vegetation removal cannot be conducted during this time period, a pre-construction survey for active nests within the project site shall be conducted by a qualified biologist at the site no more than two weeks prior to any construction activities. If an active bird nest is located, the nest site shall be fenced at a distance commensurate with the particular species and in consultation with the California Department of Fish and Wildlife (CDFW) until juveniles have fledged and when there is no evidence of a second attempt at nesting. Limits of construction to avoid a nest should be established in the field with flagging and stakes or construction fencing. Construction personnel shall be instructed on the sensitivity of the area. The project proponent shall record the results of the recommended protective measures described above to document compliance with applicable state and federal laws pertaining to protection of native birds.

**LESS THAN SIGNIFICANT WITH MITIGATION INCORPORATED**

*e. Would the project conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?*

The project would not conflict with University policies regarding biological resources. The University does not have an adopted tree preservation policy. Campus Master Plan policies that address biological resources call generally that new development is sited proximate to or within existing developed areas, and that it avoids sensitive areas such as creeks. The project, including SATRC, vivarium, and plant conservatory, would be located in or adjacent to existing developed areas and away from sensitive areas. Therefore, it is therefore consistent with guidance provided in the Campus Master Plan. No impact would result.

**NO IMPACT**

*f. Would the project conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?*

The project site is not within an area subject to a Habitat Conservation Plan (HCP) or Natural Community Conservation Planning (NCCP), or other local or regional conservation plans. No impact would occur.

**NO IMPACT**

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# 5 Cultural Resources

| | Potentially Significant Impact | Less than Significant with Mitigation Incorporated | Less than Significant Impact | No Impact |
|---|---|---|---|---|
| Would the project: | | | | |
| a. Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5? | ☐ | ☐ | ☐ | ■ |
| b. Cause a substantial adverse change in the significance of an archaeological resource as defined in §15064.5? | ☐ | ■ | ☐ | ☐ |
| c. Directly or indirectly destroy a unique paleontological resource or site or unique geological feature? | ☐ | ■ | ☐ | ☐ |
| d. Disturb any human remains, including those interred outside of formal cemeteries? | ☐ | ☐ | ■ | ☐ |

## Setting

The analysis in this section is based on a previous records searches conducted for Cal Poly. On December 15, 2016 and March 16, 2015, SWCA Environmental Consultants requested searches of the California Historical Resources Information System (CHRIS) at the Central Coast Information Center at UC Santa Barbara. The search was conducted to identify any previously recorded cultural resources and previously conducted cultural resources studies within the campus and a 0.5-mile radius around it. The CHRIS search included a review of the National Register of Historic Places, the California Register of Historical Resources, the California Points of Historical Interest list, the California Historical Landmarks list, the Archaeological Determinations of Eligibility list, and the California State Historic Resources Inventory list. The records search also included a review of all available historic USGS 7.5- and 15-minute quadrangle maps. The records search identified one previously recorded prehistoric archaeological site (CA-SLO-669) within a 0.25-mile radius of the project area. No tribal cultural resources have been identified in the project boundary.

*a. Would the project cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?*

No historic-period structures or historic resources including prehistoric or historic archaeological sites exist on site. Additionally, the 2001 Campus Master Plan and Final EIR does not identify any historic resources on the project site as shown on Exhibit 6.5 (Cal Poly 2001). Building #53A, which would be demolished as part of the project, was built between 1961 and 1970 (Cal Poly 2001). No impact to historical resources would result from the project.

**NO IMPACT**

*b. Would the project cause a substantial adverse change in the significance of an archaeological resource as defined in §15064.5?*

The project area was occupied historically by the northernmost subdivision of the Obispeño Chumash, with the Salinan bordering to the north. However, the precise location of the boundary between the Chumashan-speaking Obispeño Chumash and their northern neighbors, the Hokan-speaking Playanos Salinan, is currently the subject of debate. The SATRC site has been altered and is developed with an existing structure and landscaping. The vivarium and plant conservatory sites are previously disturbed and undeveloped. There are no known or suspected archaeological resources within the project area based on documentation and records searches. Onsite development (and fill in the case of the vivarium and plant conservatory site) further reduces the potential for discovery of buried resources. Though unlikely, in the event of an inadvertent discovery, mitigation is required to ensure potential impacts to unknown archaeological resources are reduced to less than significant.

## Mitigation Measure

The following mitigation measure is required to reduce potential impacts to unknown archaeological resources.

### *CUL-1 Treatment of Unknown Archaeological Resources*

In the event unknown archaeological resources are exposed or unearthed during project construction, all earth disturbing work within the vicinity of the find must be temporarily suspended or redirected until an archaeologist has evaluated the nature and significance of the find. If the archaeologist determines that the resource is an "historic resource" or "unique archaeological resource" as defined by California Environmental Quality Act Guidelines Section 15064.5 and avoidance is not feasible, further evaluation by the archaeologist shall occur. The archaeologist's recommendations for further evaluation may include a Phase II testing and evaluation program to assess the significance of the site. Resources found not to be significant will not require mitigation. Impacts to sites found to be significant shall be mitigated through implementation of a Phase III data recovery program. After the find has been mitigated appropriately, work in the area may resume. A local Native American representative shall monitor any mitigation work associated with prehistoric cultural material.

**LESS THAN SIGNIFICANT WITH MITIGATION INCORPORATED**

*c. Would the project directly or indirectly destroy a unique paleontological resource or site or unique geological feature?*

The geologic formation underlying the project site consists of Franciscan Melange (Fm) (Earth Systems Pacific 2018). It is rare to find fossils within Fm, as this formation is heavily deformed and metamorphosed in many locations, a process that destroys fossils; however, important finds have been documented in this formation including trace fossils, mollusks, and marine reptiles. Implementation of the project would require deep grading. The presence of bedrock was identified at depths ranging between 8 to 11 feet at the project site. Based on the presence of shallow bedrock proximate to the project site, bedrock potentially containing paleontological resources may be affected during construction of the facility. Therefore, based on the underlying geologic formations and potential for significant discovery in the Fm formation, mitigation is required.

## Mitigation Measure

The following mitigation measure would address the potentially significant impacts relating to the discovery of previously unknown paleontological resources during construction.

### *CUL-2 Treatment of Paleontological Resources*

If soil excavation associated with grading activities requires disturbance of bedrock formations and should any vertebrate fossils or potentially significant finds (e.g., numerous well-preserved invertebrate or plant fossils) be encountered during work on the site, all activities in the immediate vicinity of the find shall cease until a qualified paleontologist evaluates the find for its scientific value. If deemed significant, the paleontological resource(s) shall be salvaged and deposited in an accredited and permanent scientific institution where they will be curated and preserved properly. If monitoring is required, the qualified paleontologist shall submit a monitoring report to the University following completion of all required monitoring activities.

**LESS THAN SIGNIFICANT WITH MITIGATION INCORPORATED**

*d. Would the project disturb any human remains, including those interred outside of formal cemeteries?*

No known burials are located on the project site. In the unlikely event that human remains are unearthed, the University and contractor will comply with State Health and Safety Code Section 7050.5, which requires that no further disturbance shall occur until the County of San Luis Obispo Coroner has made a determination of origin and disposition pursuant to Public Resources Code Section 5097.98. The County Coroner must be notified of the find immediately. If the human remains are determined to be Native American, the County Coroner will notify the Native American Heritage Commission within 24 hours, which will determine and notify a Most Likely Descendant, a representative of which shall complete the inspection of the site within 48 hours of notification and may recommend scientific removal and nondestructive analysis of human remains and items associated with Native American burials. Impacts would be less than significant through compliance with existing state law.

**LESS THAN SIGNIFICANT IMPACT**

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# 6 Geology and Soils

| | Potentially Significant Impact | Less than Significant with Mitigation Incorporated | Less than Significant Impact | No Impact |
|---|---|---|---|---|
| Would the project: | | | | |
| a. Expose people or structures to potentially substantial adverse effects, including the risk of loss, injury, or death involving: | | | | |
| 1. 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? | ☐ | ☐ | ■ | ☐ |
| 2. Strong seismic ground shaking? | ☐ | ☐ | ■ | ☐ |
| 3. Seismic-related ground failure, including liquefaction? | ☐ | ☐ | ■ | ☐ |
| 4. Landslides? | ☐ | ☐ | ☐ | ■ |
| b. Result in substantial soil erosion or the loss of topsoil? | ☐ | ☐ | ■ | ☐ |
| c. Be located on a geologic unit or soil that is made unstable as a result of the project, and potentially result in on or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse? | ☐ | ■ | ☐ | ☐ |
| d. Be located on expansive soil, as defined in Table 1-B of the Uniform Building Code (1994), creating substantial risks to life or property? | ☐ | ■ | ☐ | ☐ |
| e. Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater? | ☐ | ☐ | ☐ | ■ |

## Setting

The project site is located within the Santa Lucia Range of the Coast Ranges Geomorphic Province of California. The San Luis Obispo region is primarily underlain by Jurassic-era rocks of the Franciscan complex. The project site is located in a seismically active region that includes several active earthquake faults of local and regional significance. There are no known fault lines on the site or in the immediate vicinity. The closest active fault to the site is the Los Osos Fault, which lies approximately four miles from the project site. The project site is situated in close proximity to several other faults in the area including the Cambria, West Huasna/Oceanic Fault, Nacimiento, Rinconada, and Edna faults (Cal Poly San Luis Obispo 2001). Based on the 2001 Campus Master Plan, the project site is not located in a geologically hazardous area.

A Geotechnical Engineering Report was prepared for the SATRC project by Earth Systems Pacific in May 2018 (Appendix B). As the plant conservatory and vivarium sites are in close proximity to the SATRC site and all three sites are underlain by the same soil type (Los Osos-Diablo complex with 9 to 15 percent slopes), the geotechnical setting of the sites not differ substantially (NRCS 2017). Based on the report, the site is generally suitable for development provided certain recommendations are implemented in the design and construction. The soils consist of varying sediments overlying bedrock, with a potential for expansion and differential settlement. Furthermore, the soils above the bedrock are considered erodible. The site is underlain by varying amounts of artificial topsoil, residual soils, alluvium, and Franciscan Melange sandstone bedrock. The soil and bedrock are classified as being slightly moist to moist. Subsurface water was not encountered at time of drilling; however, the report notes that it is common to encounter subsurface water at the soil/bedrock contact throughout campus. Due to the relatively shallow depth to bedrock and the clayey overlying soil, the potential for liquefaction on-site is none.

*a.1. Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving 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?*

According to the Official Maps of Earthquake Fault Zones delineated by the California Geological Survey, San Luis Obispo Quadrangle map, the project site is not located within an earthquake fault zone (Alquist-Priolo Special Studies Zones) for surface fault rupture. No active faults are located on the project site or the Cal Poly campus; therefore, impacts related to surface rupture would be less than significant.

**LESS THAN SIGNIFICANT IMPACT**

*a.2. Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving strong seismic ground shaking?*

Due to the proposed project site's proximity to known faults, seismic ground shaking (i.e., ground acceleration) could adversely affect the project. However, the project would not be subject to seismic ground shaking to any greater degree than existing surrounding development. Additionally, all new building design projects are mandated to be consistent with the California Building Code and the CSU Seismic Policy. With mandatory incorporation of these design standards, impacts would be less than significant.

**LESS THAN SIGNIFICANT IMPACT**

*a.3. Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving seismic-related ground failure, including liquefaction?*

The Geotechnical Engineering Report prepared for the project found no potential for liquefaction on-site due to the relatively shallow depth to bedrock and the clayey overlying soil (Earth Systems Pacific 2018). Therefore, impacts would be less than significant.

**LESS THAN SIGNIFICANT IMPACT**

*a.4. Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving landslides?*

While the Cal Poly campus does contain areas of high landslide potential, they are located on the eastern portion of campus adjacent to the steep hillslopes that form the eastern boundary. The project site is not located in an area of landslide potential as mapped in the 2001 Campus Master Plan. There would be no impact with respect to landslides.

**NO IMPACT**

*b. Would the project result in substantial soil erosion or the loss of topsoil?*

Construction of the project would involve grading, trenching, and other ground-disturbing activities that could result in soil erosion or loss of topsoil. Upon completion of the project, structures, roadways, and landscaping or revegetated areas would eventually cover any soils exposed during construction; thus, no long-term new erodible soils would be created because of the project.

During construction, the project would be required to implement erosion control measures stipulated in a Stormwater Pollution Prevention Plan (SWPPP) pursuant to the National Pollutant Discharge Elimination System (NPDES) requirements, which the project would be subject to as it would disturb more than 1.0 acre of land. Through compliance with these requirements, impacts would be less than significant.

**LESS THAN SIGNIFICANT IMPACT**

*c. Would the project be located on a geologic unit or soil that is made unstable as a result of the project, and potentially result in on or offsite landslide, lateral spreading, subsidence, liquefaction, or collapse?*

The project site would not be impacted by, or cause an increase in, landslide potential, as described in (a) above. The topography of the project site is sloping; however, the Geotechnical Report concluded there is no potential to encounter liquefiable soil (Earth Systems Pacific 2018). Therefore, the potential for lateral spreading at the project site is low.

However, portions of the project site contain loose or uncontrolled (non-engineered) fill and may be susceptible to subsidence, which could expose people or structures to potential adverse effects (Earth Systems Pacific 2018). Therefore, impacts to soil stability would be potentially significant, but mitigable.

## Mitigation Measure

The following mitigation measure would reduce impacts to a less than significant level.

*GEO-1 Geotechnical Hazard Reduction Measures*

Grading, foundation design, and construction of the proposed project shall comply with recommendations in the 2018 site specific Geotechnical Engineering Report by Earth Systems Pacific (Appendix B), including the following:

- Within the building area, all soils used as fill in the final 18 inches below bottom of slab elevation shall be non-expansive soils. All imported fill shall be approved by the geotechnical engineer before being transported to the site. The upper 6 inches below the vapor retarder, shall consist of free-draining granular gravel with a maximum size of 1 inch. If a sand cushion is needed below the vapor retarder, a filter fabric shall be placed between the sand and gravel.
- Following site preparation, exterior pedestrian flatwork areas shall be over-excavated to allow for placement of non-expansive material beneath the flatwork. The soil surface exposed by over-excavation shall be scarified, moisture conditioned, and recompacted prior to placement of the non-expansive material. If fill is required to reach the elevation of the bottom of the non-expansive layer, the prepared soil surface shall be scarified, moisture conditioned, and recompacted prior to placement of fill.
- If the soils are overly moist so that they become unstable, or if the recommended compaction cannot be achieved readily, drying the soil to optimum moisture content, or just above, may be necessary. Placement of gravel layers or geotextiles may also be necessary to help stabilize unstable soils. Soils disturbed in any manner shall be removed, moisture conditioned, and recompacted.
- A select, noncorrosive, easily compacted sand shall be used as bedding and shading immediately around utilities. Trench backfill, above the select material, within the building area shall also be non-expansive sand up to the drainage layer; beyond the building area the site soils may be used.
- Place 8 to 21 inches non-expansive material below flatwork. Prior to placement of the non-expansive material, the underlying soil shall be moisture conditioned and no desiccation cracks shall be present. For an added level of protection, the flatwork can be provided with perimeter trenched edges up to 21 inches deep. The trenched edges, if utilized, shall be reinforced with No. 4 rebar top and bottom. The decision regarding the thickness of non-expansive material to use below flatwork, as well as the use of trenched edges, is left to the architect/engineer or owner.

**LESS THAN SIGNIFICANT WITH MITIGATION INCORPORATED**

*d. Would the project be located on expansive soil, as defined in Table 1-B of the Uniform Building Code (1994), creating substantial risks to life or property?*

According to the Geotechnical Engineering Report, expansion index testing on three samples of the site soils indicate that the soils tested are expansive. In addition, the Geotechnical Report also determined that soils on-site have the potential for total and differential settlement.

The project would be required to adhere to the recommendations specified in the Geotechnical Report (Appendix B); therefore impacts related to expansive soils would be potentially significant but mitigable. Implementation of Mitigation Measure GEO-1, described above, would be required to reduce impacts to a less than significant level.

**LESS THAN SIGNIFICANT WITH MITIGATION INCORPORATED**

*e. Would the project 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?*

The project would not require a septic system or any alternative wastewater disposal system. Therefore, no impact would occur.

**NO IMPACT**

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# 7 Greenhouse Gas Emissions

| | Potentially Significant Impact | Less than Significant with Mitigation Incorporated | Less than Significant Impact | No Impact |
|---|---|---|---|---|
| Would the project: | | | | |
| a. Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment? | ☐ | ☐ | ■ | ☐ |
| b. Conflict with any applicable plan, policy, or regulation adopted for the purposes of reducing the emissions of greenhouse gases? | ☐ | ☐ | ☐ | ■ |

## Setting

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. Climate change is the result of numerous, cumulative sources of greenhouse gases (GHG) that contribute to the "greenhouse effect," a natural occurrence that helps regulate the temperature of the planet. The majority of radiation from the sun hits the earth's surface and warms it. The surface in turn radiates heat back towards the atmosphere, known as infrared radiation. Gases and clouds in the atmosphere trap and prevent some of this heat from escaping into space and re-radiate it in all directions. This process is essential to support life on Earth because it warms the planet by approximately 60° Fahrenheit. Emissions from human activities since the beginning of the industrial revolution (approximately 250 years ago) are adding to the natural greenhouse effect by increasing the gases in the atmosphere that trap heat and contribute to an average increase in Earth's temperature.

GHGs occur naturally and from human activities. Human activities that produce GHGs include fossil fuel burning (coal, oil, and natural gas for heating and electricity, gasoline and diesel for transportation); methane generated by landfill wastes and raising livestock; deforestation activities; and some agricultural practices. GHGs produced by human activities include carbon dioxide ($CO_2$), methane ($CH_4$), nitrous oxide ($N_2O$), hydrofluorocarbons (HFC), perfluorocarbons (PFC), and sulfur hexafluoride ($SF_6$). Since 1750, estimated concentrations of $CO_2$, $CH_4$, and $N_2O$ in the atmosphere have increased over by 36 percent, 148 percent, and 18 percent respectively, primarily due to human activity. Emissions of GHGs affect the atmosphere directly by changing its chemical composition. Changes to the land surface indirectly affect the atmosphere by changing the way in the Earth absorbs gases from the atmosphere. Potential impacts in California of global warming may include loss of snow pack, sea level rise, more extreme heat days per year, more high ozone days, more large forest fires, and more drought years (California Energy Commission 2009).

CEQA Guidelines provide regulatory direction for the analysis and mitigation of GHG emissions appearing 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.

As discussed in Section 3.3, Air Quality, the project site is in the SCCAB under the jurisdiction of the SLOAPCD. The SLOAPCD has adopted a GHG emissions threshold of 1,150 metric tons of carbon dioxide equivalent (MT $CO_2e$) per year, which is applied in this analysis (SLOAPCD 2012).

*a. Would the project generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment?*

Construction and operation of the project would generate GHG emissions. Construction and demolition activities would result in GHG emissions from heavy construction equipment, truck traffic, and worker trips to and from the project site. Operation of the proposed project would generate GHG emissions associated with new buildings (natural gas, purchased electricity), and water consumption. A substantial increase in vehicle emissions would not occur as the project would not result in a direct increase in vehicle trips or student enrollment.

Table 4 shows operational emissions, including those associated with area, energy, solid waste, and water. Table 4 also includes amortized construction emissions, consistent with SLOAPCD guidance that indicates that the short-term GHG emissions from the construction phase should be amortized over the life of the project (25 years for commercial projects). Additionally, while the project would meet or exceed LEED "Silver" certification or equivalent, in order to ensure a conservative analysis, the energy efficiency measures incorporated into the project were not accounted for in the emissions modeling.

As shown in Table 4, the project is estimated to generate approximately 607 MT $CO_2e$ of per year. The project's operational GHG emissions combined with the annualized construction emissions would not exceed SLOAPCD's GHG emissions threshold of 1,150 MT $CO_2e$ per year. Therefore, the project's impact on GHG emissions would be less than significant.

**Table 4 Project GHG Emissions**

| Emission Source | Annual Emissions (MT $CO_2e$/year) |
|---|---|
| Area | 0.003 |
| Energy | 411 |
| Solid Waste | 4.1 |
| Water | 155 |
| **Total Operational Emissions** | **571.6** |
| Annualized Construction Emissions | 35 |
| **Total** | **606.6** |

See Appendix A for CalEEMod worksheets.

**LESS THAN SIGNIFICANT IMPACT**

*b. Would the project conflict with any applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases?*

The project would not be subject to the City of San Luis Obispo Climate Action Plan or any other municipal policy related to the reduction of GHG emissions. Therefore, the project would not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions. No impact would occur.

**NO IMPACT**

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# 8 Hazards and Hazardous Materials

| | Potentially Significant Impact | Less than Significant with Mitigation Incorporated | Less than Significant Impact | No Impact |
|---|---|---|---|---|
| Would the project: | | | | |
| a. Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials? | ☐ | ☐ | ■ | ☐ |
| b. Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment? | ☐ | ☐ | ■ | ☐ |
| c. Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within 0.25 mile of an existing or proposed school? | ☐ | ☐ | ■ | ☐ |
| d. Be located on a site that is included on a list of hazardous material 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? | ☐ | ☐ | ■ | ☐ |
| e. For a project located in 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? | ☐ | ☐ | ☐ | ■ |
| f. For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area? | ☐ | ☐ | ☐ | ■ |

| | Potentially Significant Impact | Less than Significant with Mitigation Incorporated | Less than Significant Impact | No Impact |
|---|---|---|---|---|
| g. Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan? | ☐ | ☐ | ■ | ☐ |
| h. Expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands? | ☐ | ☐ | ■ | ☐ |

## Setting

The Cal Poly San Luis Obispo Environmental Health and Safety department oversees health and safety procedures and programs on campus, including facility construction and operations. The Environmental Health and Safety department develops and implements programs to ensure the safe use, handling, and storage of hazardous materials, and appropriate and compliant disposal of hazardous wastes. The department oversees and implements employee training programs, procedures and policies, and compliance surveys to this end.

Review of environmental records included a database search from GeoTracker and EnviroStor databases maintained by the State Water Resources Control Board and Department of Toxic Substances Control.

### *Off-site Contamination*

Two properties on the State Water Resources Control Board's GeoTracker website are located within 0.5-mile of the project site. The Cal Poly University Farm Shop is located north of the project site and involved a case of gasoline contamination of an aquifer that has been closed since 2014 (SWRCB 2015a). The Cal Poly Winery, located west of the project site, is listed as an active Waste Discharge Requirement (WDR) site since 2008 (SWRCB 2015b). WDR sites are those operating under WDRs issues by SWRCB or another Regional Water Quality Control Board and do not necessarily indicate a release of hazardous materials. Neither listing is expected to impact the project site.

### *On-site Contamination*

The project site is not listed in the hazardous materials records search as having or storing potential hazardous contaminants. However, there have been past closed cases of hazardous materials releases on the campus grounds. However, the potential contamination is not anticipated from a closed site.

*a. Would the project create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?*

*c. Would the project emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within 0.25 mile of an existing or proposed school?*

The project involves the demolition of Building #53A, construction and operation of an approximately 102,000 GSF SATRC, as well as relocation of the plant conservatory and vivarium.

Building #53A was built between 1961 and 1970 (Cal Poly 2001), which means that demolition of the structure has the potential to expose construction workers to lead-based paint and/or asbestos-containing material. Lead exposure is regulated at the state level under CCR §1532.1 by Cal OSHA, and asbestos exposure is regulated at the federal and state level under CFR Title 40, Part 61, Subpart M and CCR §1529, respectively. The project would be required to comply with all applicable regulations, which reduce potential hazards from the accidental release of lead and asbestos during demolition activities to a less than significant level.

The project may involve the transport, use, or disposal of small quantities of hazardous materials such as solvents and reagents, associated with science classes. However, proper handling, transportation, and disposal in accordance with federal, state, and local laws and regulations would avoid significant exposure and hazards to people and the environment from potential hazardous materials contamination. No acutely hazardous materials would be used on site during project construction or operation. Impacts would be less than significant.

**LESS THAN SIGNIFICANT IMPACT**

*b. Would the project create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?*

Upset and accident conditions that may release hazardous materials into the environment are most likely during the construction phase of the project. Construction equipment, if damaged, can release fuel, oil, lubricants and other materials into the environment and expose workers and the campus population. The campus requires contractors to prepare, maintain, and implement management plans for upset and accident condition on-site, including protocols for stop work, spill containment, notification and remediation. These measures are sufficient to reduce risks associated with accidents.

Small quantities of hazardous materials such as solvents and reagents, associated with science classes would be used during project operations and could generate small amounts of hazardous waste. All chemicals would be stored within containment areas as required per the California Fire Code. Proper handling, transportation, and disposal in accordance with federal, state, and local laws and regulations would limit exposure and hazards to people and the environment from potential hazardous materials contamination. With compliance with these existing regulations, impacts would be less than significant.

**LESS THAN SIGNIFICANT IMPACT**

*d. Would the project be located on a site included on a list of hazardous material 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?*

The proposed project is not located on a site which has been included on a list of hazardous material sites. As described above, the project area site is located within 0.5 mile of sites listed on a database. However, because of the distance between these listings and the project site, as well as the specific conditions from each of the sites as described above, the listings would not be anticipated to result in contamination of soil or groundwater at the project site. Therefore, impacts would be less than significant.

**LESS THAN SIGNIFICANT IMPACT**

*e. For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?*

*f. For a project near a private airstrip, would it result in a safety hazard for people residing or working in the project area?*

The project site is located approximately five miles from the San Luis Obispo County Regional Airport, and is outside the safety zones and flight path of the airport. Therefore, significant airport safety hazards are not anticipated. No impact would occur.

**NO IMPACT**

*g. Would the project impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?*

Construction and operation of the project would be subject to State Fire Marshall inspection and approval prior to operation, which would ensure appropriate emergency access is provided to and within the new facilities. Based on the locations of the project components, neither construction nor operation would affect emergency access to existing campus facilities. The project, in the context of the overall campus, would be governed by the Cal Poly San Luis Obispo Campus Emergency Management Plan, which includes action response protocol in the event of a number of major disasters. Impacts would be less than significant.

**LESS THAN SIGNIFICANT IMPACT**

*h. Would the project 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?*

The combination of available fuels, weather, and topography found in a large majority of the areas both surrounding and on the outlying areas of the campus puts the University at considerable hazardous wildfire risk, as outlined in the Hazard Profile Overview prepared by the University Police Department and Cal Poly Department of Emergency Management (Cal Poly 2017). However, the project site is not adjacent to urban/wildland interface areas and is surrounded on all sides by campus and urban development. Therefore, the risk of wildland fire is low. As stated under criterion (g), the project would comply with the state fire code, and State Fire Marshal inspection and approval would ensure adequate emergency access is provided under proposed project design. Moreover, the project, in the context of the overall campus, would be governed by the Cal Poly San Luis Obispo Campus Emergency Management Plan, which includes action response protocol in the

event of a major fire. Therefore, while the potential for wildland fires exists, impacts related to wildland fire hazards would be less than significant.

**LESS THAN SIGNIFICANT IMPACT**

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# 9 Hydrology and Water Quality

| | Potentially Significant Impact | Less than Significant with Mitigation Incorporated | Less than Significant Impact | No Impact |
|---|---|---|---|---|
| Would the project: | | | | |
| a. Violate any water quality standards or waste discharge requirements? | ☐ | ☐ | ■ | ☐ |
| b. Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering or the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level that would not support existing land uses or planned uses for which permits have been granted)? | ☐ | ☐ | ■ | ☐ |
| c. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner that would result in substantial erosion or siltation on- or off-site? | ☐ | ☐ | ■ | ☐ |
| d. Substantially alter the existing drainage pattern of the site or area, including the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding on- or off-site? | ☐ | ☐ | ■ | ☐ |
| e. Create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff? | ☐ | ☐ | ■ | ☐ |
| f. Otherwise substantially degrade water quality? | ☐ | ☐ | ■ | ☐ |

| | Potentially Significant Impact | Less than Significant with Mitigation Incorporated | Less than Significant Impact | No Impact |
|---|---|---|---|---|
| g. Place housing in a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary, Flood Insurance Rate Map, or other flood hazard delineation map? | ☐ | ☐ | ☐ | ■ |
| h. Place structures in a 100-year flood hazard area that would impede or redirect flood flows? | ☐ | ☐ | ☐ | ■ |
| i. Expose people or structures to a significant risk of loss, injury, or death involving flooding, including that occurring as a result of the failure of a levee or dam? | ☐ | ☐ | ☐ | ■ |
| j. Result in inundation by seiche, tsunami, or mudflow? | ☐ | ☐ | ☐ | ■ |

## Setting

The Central Coast Regional Water Quality Control Board (RWQCB) is responsible for issuing construction stormwater permits on behalf of the State Water Resources Control Board (SWRCB).

The project site is not located in a flood hazard zone or a tsunami inundation area (Cal Poly 2001).

*a. Would the project violate any water quality standards or waste discharge requirements?*

*f. Would the project otherwise substantially degrade water quality?*

The project would involve the construction of the SATRC on an infill site in the campus core and relocation of the vivarium and plant conservatory. Existing developed campus and urban infrastructure borders the site, including paved sidewalks and streets, and developed storm drainage infrastructure. During construction, particularly during initial site clearance and excavation, the project would pose short-term risks associated with erosion, sediment transport, and off-site flooding. Construction equipment on-site would pose risk of release of fuels, lubricants, and other contaminants. In addition, construction of the project would require approximately 3.8 acres of ground disturbance, and soils loosened during excavation and grading could degrade water quality, if mobilized and transported off-site via water flow.

Because construction of the project would disturb more than one acre, incorporation of an SWPPP and implementation of appropriate best management practices (BMP) would be required during project construction as part of the project's General Construction Activity Stormwater Permit issued by the Regional Water Quality Control Board. The SWPPP will identify which structural and nonstructural BMPs will be implemented, such as sandbag barriers, temporary desilting basins, gravel access roads, dust controls, and construction worker training. In addition, Cal Poly has developed a Water Quality Management Plan and a Storm Water Pollution Prevention Program for

development on campus (Cal Poly 2005). The Water Quality Management Plan outlines BMPs for construction and operation, which would be applicable to the project. Design and implementation of such a plan, as required, would ensure that the project would not substantially degrade water quality or violate any water quality standards or waste discharge requirements.

Once operational, the primary source of stormwater pollutants would be pesticides, herbicides, sediment, or trash. The site drainage design will comply with the post-construction stormwater management requirements of the State Water Resources Control Board Phase II Small MS4 Permit. These guidelines require that the project treat, infiltrate, and detain stormwater to the extent feasible. The project would include LID bioretention planters that would treat stormwater, and cartridge filter inlets or a rainwater harvesting system may be used to treat stormwater. As these design features would ensure the project would not substantially degrade water quality or violate any water quality standards or waste discharge requirements once operational. Impacts would be less than significant.

**LESS THAN SIGNIFICANT IMPACT**

*b. Would the project substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering or the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level that would not support existing land uses or planned uses for which permits have been granted)?*

The project involves the removal of the existing building and landscaping and construction of a new 102,000 GSF SATRC. Overall, the amount of impervious surface would increase by approximately 21,756 square feet on the project site and by 6,000 square feet on the plant conservatory site, and 1,500 feet on the vivarium site. However, the proposed project footprint would not be substantial such that the project would substantially interfere with groundwater recharge. In addition, the project would include LID bioretention planters to facilitate groundwater recharge. Dewatering or reduction of the groundwater table is not anticipated because of proposed project implementation. Impacts would be less than significant.

**LESS THAN SIGNIFICANT IMPACT**

*c. Would the project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner that would result in substantial erosion or siltation on- or off-site?*

*d. Would the project substantially alter the existing drainage pattern of the site or area, including the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding on- or off-site?*

*e. Would the project create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?*

The project involves the removal of the existing building and landscaping, relocation of the vivarium and plant conservatory, and construction of a new 102,000 GSF SATRC. Overall, the amount of impervious surface would increase by approximately 21,756 square feet on the project site and by 6,000 square feet on the plant conservatory site, and 1,500 feet on the vivarium site. The proposed project is designed to avoid direct disturbance of existing drainages and swales proximate to the development area. In addition to compliance with an approved SWPPP, development and

implementation of a site-specific drainage plan would be required to manage stormwater runoff from the impervious project areas. LID methods including bioretention planters for pass-through treatment and detention of stormwater incorporated into project design. The project site drainage design would comply with the post-construction stormwater management requirements of the State Water Resources Control Board Phase II Small MS4 Permit, which require that the project treat, infiltrate, and detain stormwater to the extent feasible. Therefore, the development of the proposed project would not alter the existing drainage pattern or create a significant change in runoff conditions. Impacts would be less than significant.

**LESS THAN SIGNIFICANT IMPACT**

*g. Would the project place housing in a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary, Flood Insurance Rate Map, or other flood hazard delineation map?*

*h. Would the project place structures in a 100-year flood hazard area that would impede or redirect flood flows?*

The proposed project is not located within the 100-year floodplain. The project site is located within Zone X, an area of minimal flood hazard (Federal Emergency Management Agency 2012). The project would, therefore, not expose people to risks from flooding nor would the building or utilities impede or redirect flood flows. No impacts would occur.

**NO IMPACT**

*i. Would the project expose people or structures to a significant risk of loss, injury, or death involving flooding, including that occurring as a result of the failure of a levee or dam?*

*j. Would the project result in inundation by seiche, tsunami, or mudflow?*

The Cal Poly campus is not located within a dam inundation area and is not subject to flooding risks from dam failure. The campus is located inland from the coast and is not subject to tsunami hazards, and it is not located near any impounded bodies of water that could present hazards from seiches. No impacts would occur.

**NO IMPACT**

# 10 Land Use and Planning

| | Potentially Significant Impact | Less than Significant with Mitigation Incorporated | Less than Significant Impact | No Impact |
|---|---|---|---|---|
| Would the project: | | | | |
| a. Physically divide an established community? | ☐ | ☐ | ☐ | ■ |
| b. Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect? | ☐ | ☐ | ☐ | ■ |
| c. Conflict with an applicable habitat conservation plan or natural community conservation plan? | ☐ | ☐ | ☐ | ■ |

*a. Would the project physically divide an established community?*

*b. Would the project 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?*

*c. Would the project conflict with an applicable habitat conservation plan or natural community conservation plan?*

The project site is located in the campus instructional core and would not generate additional on-campus growth with the potential to affect adjacent land uses. The project would not physically divide an established community, nor would it conflict with any land use plans or policies adopted for the purpose of avoiding or mitigating an environmental effect or any habitat conservation plans. The project would require an amendment to the 2001 Campus Master Plan, but would not affect overall enrollment or exceed the capacity identified in the existing 2001 Campus Master Plan. In addition, it would not conflict with any of the plan's policies related to avoiding or mitigating an environmental impact. No impact would occur.

**NO IMPACT**

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# 11 Mineral Resources

| | Potentially Significant Impact | Less than Significant with Mitigation Incorporated | Less than Significant Impact | No Impact |
|---|---|---|---|---|
| Would the project: | | | | |
| a. Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state? | ☐ | ☐ | ☐ | ■ |
| b. 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? | ☐ | ☐ | ☐ | ■ |

*a. Would the project result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?*

*b. Would the project result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?*

The project area is not used or otherwise identified for mineral resource extraction. No impact to mineral resources is anticipated.

**NO IMPACT**

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# 12 Noise

| | Potentially Significant Impact | Less than Significant with Mitigation Incorporated | Less than Significant Impact | No Impact |
|---|---|---|---|---|
| Would the project result in: | | | | |
| a. Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies? | ☐ | ☐ | ■ | ☐ |
| b. Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels? | ☐ | ■ | ☐ | ☐ |
| c. A substantial permanent increase in ambient noise levels above those existing prior to implementation of the project? | ☐ | ☐ | ■ | ☐ |
| d. A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project? | ☐ | ■ | ☐ | ☐ |
| e. For a project located in 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? | ☐ | ☐ | ☐ | ■ |
| f. For a project near a private airstrip, would it expose people residing or working in the project area to excessive noise? | ☐ | ☐ | ☐ | ■ |

## Setting

The nearest noise-sensitive receptor to the project site are the classroom and lab facilities located approximately 25 feet from the project site, including Building #10 (Erhart Agriculture), Building #22 (English), and Building #53 (Science North), and Building #47 (Faculty Offices) of the project site. In addition, Building #180 (Baker Center for Science and Mathematics) is located approximately 50 feet from the project site.

Cal Poly has not adopted specific numerical thresholds for groundborne vibration impacts. Therefore, this analysis uses the Federal Transit Administration's (FTA) vibration impact thresholds

to determine whether groundborne vibration would be "excessive." A vibration velocity level of 75 VdB is the approximate dividing line between barely perceptible and distinctly perceptible levels, where many people find transit vibration at this level annoying. Consequently, the FTA recommends a 78 VdB threshold for occasional[3] vibration events affecting institutional buildings[4] such as schools.

Cal Poly has not adopted established thresholds for construction noise exposure; therefore, while Cal Poly is not subject to County noise standards, the County of San Luis Obispo standards, which exempt construction noise occurring between 7 a.m. and 9 p.m. Monday through Friday, and between 8 a.m. and 5 p.m. on Saturday or Sunday, were applied for the purpose of this analysis (Section 23.06.042(d) of the County Code).

Cal Poly also has not adopted established thresholds for long-term noise exposure or generation on campus; however, the 2001 Campus Master Plan and EIR threshold of long-term increases in noise levels greater than 3 dBA has been applied to this analysis.

*a. Would the project result in 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?*

*c. Would the project result in a substantial permanent increase in ambient noise levels above levels existing without the project?*

The project includes removal of the existing Building #53A (Science North Annex) and construction of the new SATRC in the campus instructional core. The project also includes the relocation of the plant conservatory and vivarium adjacent to the campus instructional core. The uses would be similar to existing academic uses in Building #53A and surrounding the project site, and would not be considered a substantially noisier use than other academic structures or program-related uses on campus. Impacts would be less than significant.

**LESS THAN SIGNIFICANT IMPACT**

*b. Would the project result in exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?*

Operation of the project would not result in the installation of any stationary equipment or long-term operational activities that would generate ground vibration. Heavy equipment would be required for site-preparation and construction of the proposed project. As such, ground-vibration impacts associated with the project would be limited to short-term construction activities that have the potential to affect nearby sensitive receptors. As described above, the nearest noise-sensitive receptors include Building #53, Building #22, Building #10, and Building #47, which are located approximately 25 feet from the project. In addition, Building #180 (Baker Center for Science and Mathematics) is located approximately 50 feet from the project site.

Table 5 identifies vibration velocity levels for the types of construction equipment that would operate at the project site during construction at a distance of 25 feet and 50 feet. Table 5 identifies vibration velocity levels at a distance of 25 feet and 50 feet from the source. Although campus buildings are adjacent to the site boundary, construction equipment would not typically operate at

[3] The "occasional" vibration event threshold was chosen because the frequency of vibration events associated with construction is not yet known as part of the project schedule. However, vibration events would be short-term, temporary, and intermittent.

[4] It is assumed that no vibration -sensitive research occurs in adjacent buildings.

the property line; therefore, the distance of 25 feet represents a conservative estimate and 50 feet is more likely to be the case. Pile driving is not anticipated.

**Table 5 Construction Vibration Levels**

| | Approximate VdB | |
|---|---|---|
| **Equipment** | **25 feet** | **50 feet** |
| Loaded Trucks | 86 | 77 |
| Jackhammer | 79 | 70 |
| Bulldozer (small) | 58 | 48 |

As illustrated in Table 5, vibration levels could reach approximately 86 VdB at the nearest sensitive receptor. These vibration levels would exceed the groundborne vibration threshold level of 78 VdB for occasional vibration at institutional (university) buildings. Therefore, mitigation is required.

## Mitigation Measure

The following mitigation measure would be required to reduce construction vibration impacts to a less than significant level.

### *NOI-1 Construction Vibration Mitigation*

The following vibration measures shall be applied during project construction activity.

- Operations: keep vibration-intensive equipment as far as possible from vibration-sensitive site boundaries. Machines and equipment should not be left idling.
- Schedule vibration-intensive operations to minimize their duration at any given location. Notify the Trustees and the Architect in advance of performing work creating unusual noise and schedule such work at times mutually agreeable.
- Whenever practical, the most vibration-intensive construction operations shall be scheduled to occur together in the construction program to avoid continuous periods of vibration. Scheduling of vibration-intensive construction activities shall also take advantage of summer sessions and other times when classes are not in session.

**LESS THAN SIGNIFICANT WITH MITIGATION INCORPORATED**

*d. Would the project result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?*

Construction of the project would involve the use of heavy construction equipment, such as a backhoe, graders, tractors, a crane, forklifts, welders, cement mixers, loaders, rollers, an air compressor, and a paving machine that would generate short-term, periodic noise. Noise levels related to project construction activities could affect classroom and laboratory facilities in adjacent buildings, including Building #53, Building #22, Building #10, Building #47, and Building #180.

Table 6 shows noise levels at a distance of 25 feet during each construction phase, as modeled by the Roadway Construction Noise Model. As shown, noise levels range from 80 to 94 dBA at the nearest sensitive receptors.

**Table 6 Construction Noise Levels by Phase**

| Construction Phase | Equipment | Estimated Noise at 25 feet (dBA Leq) |
|---|---|---|
| Demolition | Dozer, Welder, Lift., Saw, Crane, Generator, Tractor/Backhoe | 94 |
| Site Preparation | Grader, Dozer, Scraper, Tractor/Backhoe | 94 |
| Grading | Backhoe, Dozer, Tractor/Backhoe | 91 |
| Building Construction | Crane, Lift, Backhoe, Generator, Welder | 88 |
| Architectural Coating | Compressor | 80 |
| Paving | Paver, Roller, Compressor, Mixer, Backhoe, Scarifier | 91 |

Source: Appendix C

Based on the thresholds applied for the purposes of this analysis, construction noise would be exempt between 7 a.m. and 9 p.m. Monday through Friday, and between 8 a.m. and 5 p.m. on Saturday or Sunday. While construction noise during these hours would be exempt, due to the close proximity of sensitive receptors, construction may still conflict with neighboring classrooms. To reduce conflicts with neighboring land uses (classrooms), the following mitigation measure is required to reduce impacts to a less than significant level.

## Mitigation Measure

### *NOI-2 Construction Noise*

The following Cal Poly Standard Requirements shall be implemented during project construction.

- Maximum noise levels within 1,000 feet of any classroom, laboratory, residence, business, adjacent buildings, or other populated area; noise levels for trenchers, pavers, graders and trucks shall not exceed 90 dBA at 50 feet as measured under the noisiest operating conditions. For all other equipment, noise levels shall not exceed 85 dBA at 50 feet.
- Equipment: equip jackhammers with exhaust mufflers and steel muffling sleeves. Air compressors should be of a quiet type such as a “whisperized” compressor. Compressor hoods shall be closed while equipment is in operation. Use electrically powered rather than gasoline or diesel powered forklifts. Provide portable noise barriers around jack hammering, and barriers constructed of 3/4-inch plywood lined with 1-inch thick fiberglass on the work side.
- Operations: keep noisy equipment as far as possible from noise-sensitive site boundaries. Machines should not be left idling. Use electric power in lieu of internal combustion engine power wherever possible. Maintain equipment properly to reduce noise from excessive vibration, faulty mufflers, or other sources. All engines shall have properly functioning mufflers.
- Scheduling: schedule noisy operations to minimize their duration at any given location, and to minimize disruption to the adjoining users. Notify the Trustees and the Architect in advance of performing work creating unusual noise and schedule such work at times mutually agreeable.
- Do not play radios, tape recorders, televisions, and other similar items at construction site.
- When work occurs in or near occupied buildings, the Contractor is cautioned to keep noise associated with any activities to a minimum. If excessively noisy operations that disrupt

academic activities are anticipated, they must be scheduled after normal work hours, as needed.

- A haul route plan shall be prepared for review and approval by the University that designates haul routes as far as possible from sensitive receptors.
- Stockpiling and vehicle staging areas shall be located as far as practical from occupied structures.
- Whenever practical, the noisiest construction operations shall be scheduled to occur together in the construction program to avoid continuous periods of noise generation.

**LESS THAN SIGNIFICANT WITH MITIGATION INCORPORATED**

*e. For a project located in 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?*

*f. For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise?*

The project area site is located approximately five miles north of the San Luis Obispo County Regional Airport, and the proposed project does not involve the development of new noise-sensitive uses. Thus, no impacts relating to aircraft noise are anticipated.

**NO IMPACT**

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# 13 Population and Housing

| | Potentially Significant Impact | Less than Significant with Mitigation Incorporated | Less than Significant Impact | No Impact |
|---|---|---|---|---|
| Would the project: | | | | |
| a. Induce substantial population growth in an area, either directly (e.g., by proposing new homes and businesses) or indirectly (e.g., through extension of roads or other infrastructure)? | ☐ | ☐ | ☐ | ■ |
| b. Displace substantial amounts of existing housing, necessitating the construction of replacement housing elsewhere? | ☐ | ☐ | ☐ | ■ |
| c. Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere? | ☐ | ☐ | ☐ | ■ |

*a. Would the project induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?*

The project includes the demolition of an existing science building and construction of a 102,000 GSF SATRC. It also includes relocation of the vivarium and plant conservatory. The project would not affect overall enrollment and would not result in extension of roads or other infrastructure to a new location. Therefore, the project would not induce substantial population growth in an area, either directly or indirectly. No impact would result.

**NO IMPACT**

*b. Would the project displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?*

*c. Would the project displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?*

The project includes the demolition of an existing science building and construction of a 102,000 GSF SATRC. It also includes relocation of the vivarium and plant conservatory. The project would not displace existing housing or people necessitating the construction of replacement housing elsewhere. No impact would result.

**NO IMPACT**

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# 14 Public Services

| | | Potentially Significant Impact | Less than Significant with Mitigation Incorporated | Less than Significant Impact | No Impact |
|---|---|---|---|---|---|
| a. | Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, or the need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services: | | | | |
| | 1 Fire protection? | ☐ | ☐ | ☐ | ■ |
| | 2 Police protection? | ☐ | ☐ | ☐ | ■ |
| | 3 Schools? | ☐ | ☐ | ☐ | ■ |
| | 4 Parks? | ☐ | ☐ | ☐ | ■ |
| | 5 Other public facilities? | ☐ | ☐ | ☐ | ■ |

*a.1. Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered fire protection facilities, or the need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives?*

Cal Poly is situated in an unincorporated area of the County of San Luis Obispo, immediately adjacent to the City of San Luis Obispo. Cal Poly is within the jurisdiction and service area of the County of San Luis Obispo Fire Department (County Fire) and Cal Fire for fire services. Under the laws of the State of California, only the State and incorporated cities are obligated to provide fire protection services. The State provides wildland and watershed fire protection within State Responsibility Areas; it does not provide structure protection, rescue and emergency service and hazardous materials response. Counties provide fire services at their discretion, and service levels vary from county to county. The County of San Luis Obispo chose to protect residents and property within its jurisdiction by creating the San Luis Obispo County Fire Department in partnership with Cal Fire. The partnering and consolidation between County Fire and Cal Fire is documented through contractual agreements that direct Cal Fire/County Fire to provide fire protection and emergency response services and shared funding for the provision of such services. Because Cal Poly is located in an unincorporated County area and a State Responsibility Area, Cal Fire and County Fire have jurisdictional fire protection obligations over the campus. The closest Cal Fire/County Fire station is

Station 12, which is located on Cal Poly property at 635 N. Santa Rosa Street and across Highway 1 from the campus.

The City has a robust fire department which is designed to address fire, rescue, and emergency services needed for the predominantly urban/sub-urban land use patterns within the City limits, and to Cal Poly (pursuant to previous written agreements with the City). The City has four fire stations staffed with 40+ firefighters. The fire station closest to Cal Poly's campus is Fire Station 2, located at 132 North Chorro Street. This station currently serves Cal Poly and the north section of the City. The City and Cal Fire/County Fire have adopted an "automatic mutual aid" doctrine which provides for the closest fire engine to respond to a new emergency regardless of jurisdictional lines. This allows for enhanced service without increasing the number of fire stations or firefighters by utilizing existing resources regionally, rather than just within jurisdictional boundaries. The City and Cal Fire/County Fire have documented their automatic mutual aid agreement through an Operational Plan and Agreement for Automatic Aid dated January 30, 2012 ("Automatic Aid Agreement"). Through the Automatic Aid Agreement, the City serves as the primary first responder to the Cal Poly campus core, with support from Cal Fire/County Fire as needed. The Automatic Aid Agreement exists independent of any agreement between Cal Poly and the City, and obligates the City Fire Department to provide fire and emergency response services to Cal Poly. In exchange, the City receives support from Cal Fire/County Fire for its more rural locations and/or where Cal Fire/County Fire is the closest responder.

Through an Agreement for Enhanced Emergency Services between Cal Poly, the City, the County, and Cal Fire, the University is provided enhanced fire protection and emergency services for the campus core which includes multi-story academic buildings. Pursuant to the terms of the Agreement for Enhanced Emergency Services, the SATRC project will be designed to meet or exceed the standards of the California State Fire Marshal who has jurisdiction over State property and is responsible for the compliance of facilities and operations with applicable fire and safety codes as well as fire safety design of facilities and supporting infrastructure. Under the Agreement for Enhanced Emergency Services, Cal Poly compensates the City for enhanced emergency services based on the primary factor that influences fire, medical, and rescue service delivery: campus residential population. The SATRC project would not alter enrollment; therefore, the total population served by the City would be unchanged. No new or physically altered fire department facilities are anticipated because of this project; therefore, no environmental impacts associated with the construction of new facilities would occur.

**NO IMPACT**

*a.2. Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered police protection facilities, or the need for new or physically altered police protection facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives?*

The University police serve the campus and may call upon City and County of San Luis Obispo law enforcement for backup as needed. The project would not alter enrollment; therefore, the total population served by University police would be unchanged. No new or physically altered police facilities are required because of this project; therefore, no environmental impacts associated with construction of new facilities are expected.

**NO IMPACT**

*a.3. Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered schools, or the need for new or physically altered schools, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives?*

*a.4. Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered parks, or the need for new or physically altered parks, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios or other performance objectives?*

*a.5. Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, or the 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 other public facilities?*

The project includes the demolition of an existing science building and construction of a 102,00 GSF SATRC. The project would not affect overall enrollment or increase population or populations of school-age children. Therefore, the project would not increase the demand for schools, parks, or other public facilities. No impacts would occur.

**NO IMPACT**

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# 15 Recreation

| | Potentially Significant Impact | Less than Significant with Mitigation Incorporated | Less than Significant Impact | No Impact |
|---|---|---|---|---|
| a. Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated? | ☐ | ☐ | ☐ | ■ |
| b. Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment? | ☐ | ☐ | ☐ | ■ |

*a. Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?*

*b. Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?*

The project includes the demolition of an existing science building and construction of a 102,000 GSF SATRC. It also includes relocation of the vivarium and plant conservatory. The project would not increase population and therefore would not increase the use of existing parks or recreational facilities. The project does not include recreational facilities. No impacts would occur.

**NO IMPACT**

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# 16 Transportation/Traffic

| | Potentially Significant Impact | Less than Significant with Mitigation Incorporated | Less than Significant Impact | No Impact |
|---|---|---|---|---|
| Would the project: | | | | |
| a. Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation, including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways, and freeways, pedestrian and bicycle paths, and mass transit? | ☐ | ☐ | ■ | ☐ |
| b. Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways? | ☐ | ☐ | ■ | ☐ |
| c. Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks? | ☐ | ☐ | ☐ | ■ |
| d. Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible use (e.g., farm equipment)? | ☐ | ☐ | ☐ | ■ |
| e. Result in inadequate emergency access? | ☐ | ☐ | ☐ | ■ |
| f. Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise substantially decrease the performance or safety of such facilities? | ☐ | ☐ | ☐ | ■ |

## Setting

The CSU Transportation Impact Study Manual provides guidance to help determine when a transportation impact study is required. This determination is based on responses to the transportation/traffic checklist questions included in Appendix G of the CEQA Guidelines. No specific trip generation threshold is provided that would require a transportation impact study. Instead the need for a transportation impact study is determined based on conflicts with applicable plans, ordinances, programs or policies related to transportation.

*a. Would the project conflict with an applicable plan, ordinance or policy establishing a measure of effectiveness for the performance of the circulation system, taking into account all modes of transportation, including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways, and freeways, pedestrian and bicycle paths, and mass transit?*

*b. Would the project conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?*

The project includes demolition of the existing Building #53A, relocation of the vivarium and plant conservatory, and construction of the SATRC. Project construction would temporarily add trips to campus and city roadways in the project vicinity through the duration of construction activities, including haul trips, worker trips, material delivery trips, and heavy equipment trips. This minimal level of trip generation would not have an adverse effect on traffic operations or increase congestion on area roadways in the long-term. Therefore, potential impacts related to construction would be less than significant.

The project would not result in additional student enrollment. Once operational, the project would result in no permanent changes to daily, a.m. peak-hour, and p.m. peak-hour traffic volumes, nor would it affect the level of service at intersections. Therefore, the project would not conflict with plan, policies, programs, or ordinances, and impacts would be less than significant.

**LESS THAN SIGNIFICANT IMPACT**

*c. Would the project 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?*

*d. Would the project substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible use (e.g., farm equipment)?*

*e. Would the project result in inadequate emergency access?*

*f. Would the project conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise substantially decrease the performance or safety of such facilities?*

The proposed project would not alter or increase air traffic, create any traffic hazards, conflict with emergency access patterns, or conflict with any adopted transportation plans or policies. The project would not permanently change vehicular, transit, pedestrian, or bicycle access to Cal Poly or other parcels. The project would not introduce incompatible uses or hazards related to a roadway design feature. No impacts would occur.

**NO IMPACT**

# 17 Tribal Cultural Resources

| | Potentially Significant Impact | Less than Significant with Mitigation Incorporated | Less than Significant Impact | No Impact |
|---|---|---|---|---|
| Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in a Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is: | | | | |
| a. Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k), or | ☐ | ☐ | ■ | ☐ |
| b. A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Cod Section 2024.1. In applying the criteria set forth in subdivision (c) of Public Resources Code Section 5024.1, the lead agency shall consider the significant of the resource to a California Native American tribe. | ☐ | ☐ | ■ | ☐ |

*a. Would the project cause a substantial adverse change in the significance of a tribal cultural resource as defined in Public Resources Code 21074 that is listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k)?*

*b. Would the project cause a substantial adverse change in the significance of a tribal cultural resource as defined in Public Resources Code 21074 that is a resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 2024.1?*

To date, no Native American tribes have requested government to government consultation formally with Cal Poly as required under AB 52. As discussed in the Cultural Resources section, SWCA conducted records searches covering the project area. The search was conducted to identify any previously recorded cultural resources and previously conducted cultural resources studies within the campus and a 0.5-mile radius around it. The records search identified one previously recorded prehistoric archaeological site (CA-SLO-669) within a 0.25-mile radius of the project area. No tribal cultural resources have been identified in the project boundary and Cal Poly has satisfied

the requirements of AB 52 for the project. Therefore, the proposed project would not result in a substantial adverse change to a tribal cultural resource. Impacts would be less than significant.

**LESS THAN SIGNIFICANT IMPACT**

# 18 Utilities and Service Systems

| | Potentially Significant Impact | Less than Significant with Mitigation Incorporated | Less than Significant Impact | No Impact |
|---|---|---|---|---|
| Would the project: | | | | |
| a. Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board? | ☐ | ☐ | ■ | ☐ |
| b. Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects? | ☐ | ☐ | ■ | ☐ |
| c. Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects? | ☐ | ☐ | ■ | ☐ |
| d. Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed? | ☐ | ☐ | ■ | ☐ |
| e. Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments? | ☐ | ☐ | ■ | ☐ |
| f. Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs? | ☐ | ☐ | ■ | ☐ |
| g. Comply with federal, state, and local statutes and regulations related to solid waste? | ☐ | ☐ | ■ | ☐ |

## Setting

Whale Rock Reservoir is the primary source of water supply for the campus. Whale Rock Reservoir's safe annual yield is estimated at 959 acre-feet per year (AFY). Non-agricultural water use from Whale Rock Reservoir is estimated at 597 AFY and agricultural water use is limited to 320 AFY; thus,

Whale Rock Reservoir water use is 917 AFY, which results in 42 AFY of available water (Cal Poly 2018).

Water from Whale Rock reservoir is treated at the Stenner Canyon water treatment facility, owned and operated by the City of San Luis Obispo. Peak treatment capacity has been expanded recently to 16 million gallons per day (Cal Poly 2001). Based on an existing contract with the City of San Luis Obispo dated May 1, 2007, Cal Poly has a capacity interest in the city's water treatment facility calculated as average demand equivalent to 1,000 acre feet as calculated on an annual basis. Cal Poly's current potable water use is estimated at 531 AFY, resulting in 469 AFY of available water treatment capacity (Cal Poly 2018).

Cal Poly's existing storm drains operate close to capacity during high rains, and existing storm drains feed into Brizzolara and Stenner creeks (Cal Poly 2001).

The City of San Luis Obispo provides wastewater collection and treatment services to the University through a contractual agreement dated May 1, 2007. Based on this agreement, Cal Poly has a capacity interest in the City's wastewater recovery facility of 0.471 million gallons per day (MGD) dry weather flow. Cal Poly's baseline dry weather (October) monthly average daily flow has averaged 0.312 MGD between 2014 to 2017 with a maximum of 0.345 MGD in October 2017. The entire campus ties into a sewer main located near the intersection of California Street and Foothill Boulevard.

Cal Poly operates an integrated waste management program that includes source use reduction, recycling, composting of food waste, green waste, and manure, resale of scrap metal and surplus equipment, and zero waste event catering. Cal Poly contracts with San Luis Garbage for collection of solid waste and recycling. Facility Services provides recycling containers to faculty, staff, and students, and Custodial Services and the campus Recycling Coordinator collect the waste. Cal Poly has a 50 percent diversion goal for solid waste. The University has met or exceeded that goal since 2003, with over 86 percent diversion achieved in 2017. In 2017, Cal Poly's solid waste generation rate was 0.55 tons of solid waste per person. Paper, cardboard, aluminum, glass, and plastics are collected and sent to recycling facilities. Campus Dining sends food waste to a composting operation. The University also encourages recycling through its procurement policies: to the extent possible, all products must be recyclable or made from recycled materials.

Solid waste not diverted by the University is transported to the Cold Canyon Landfill. The landfill is located approximately 7 miles from San Luis Obispo. The landfill serves private entities and municipalities throughout San Luis Obispo County. The landfill has recently expanded and has a remaining capacity of 14,500,000 cubic yards out of a total capacity of 23,900,000 cubic yards (CalRecycle 2018).

*a. Would the project exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?*

*e. Would the project result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?*

The Central Coast Regional Water Quality Control Board regulates wastewater treatment for the City of San Luis Obispo and Cal Poly. Wastewater for the project is estimated at 2.3 AFY (or 2,052 gallons per day). This wastewater would be discharged via a new on-site sewer line, connecting to an existing campus sewer main located in Via Carta and delivered to the City of San Luis Obispo's wastewater treatment facility. No off-site improvements would be necessary. There is at least 0.126

MGD (or 126,000 gallons per day) of unused capacity in Cal Poly's share of the City's water treatment facility's capacity. Therefore, there is adequate capacity to treat the project's maximum wastewater generation rate of 2,052 gallons per day and the project would not exceed wastewater treatment requirements. Impacts would be less than significant.

**LESS THAN SIGNIFICANT IMPACT**

*b. Would the project 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?*

The project would include a new on-site water lateral for potable drinking water and a separate on-site fire water line that would connect to existing water mains in North Poly View Drive and North Perimeter Road. It would also include a new sanitary sewer line that would connect to the existing sewer main located in Via Carta. In addition, the project would require rerouting of the sewer from Building #53 as it currently runs through the proposed building site. No off-site improvements would be necessary and the potential environmental effects associated with on-site improvements are evaluated throughout this MND. As discussed under checklist questions a, e, and d, there is sufficient water and wastewater capacity to serve the project; therefore, the construction of new water or wastewater treatment facilities or expansion of existing facilities would not occur. Impacts would be less than significant.

**LESS THAN SIGNIFICANT IMPACT**

*d. Would the project have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?*

The SATRC water demand is estimated at 2.3 AFY (Cal Poly 2018). As stated above, Whale Rock Reservoir has 42 AFY of available capacity, and thus would be able to meet project demand. Additionally, Cal Poly's unused allotment of water treated at the City's water treatment plant is 469 AFY, which is more than sufficient to meet the project's 2.3 AFY water demand. Impacts would be less than significant.

**LESS THAN SIGNIFICANT IMPACT**

*c. Would the project 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?*

New stormwater infrastructure would be installed throughout the project site similar to existing on-site infrastructure and stormwater facilities associated with other buildings on campus. Proposed stormwater facilities would be designed to capture and convey anticipated stormwater runoff for the site. The construction of such facilities for SATRC, vivarium, and plant conservatory would not be considered substantial and would not cause significant environmental effects. Impacts would be less than significant.

**LESS THAN SIGNIFICANT IMPACT**

*f. Would the project be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?*

*g. Would the project comply with federal, state, and local statutes and regulations related to solid waste?*

The project includes demolition of Building #53A, relocation of the vivarium and plant conservatory, and construction of the SATRC. Cold Canyon Landfill accepts construction/demolition waste (Cold Canyon Landfill 2018), and the waste associated with these activities would be transported to the landfill. The amount of construction waste associated with the demolition of the existing 8,300 square foot building would be a one-time increase in solid waste. As discussed above, the Cold Canyon Landfill has available capacity, and would be able to accommodate the project's construction/demolition waste. The project would be outfitted with traditional trash and recycling facilities. As the project would not include a residential component resulting in on-campus population growth, a substantial increase in solid waste generation is not anticipated. Additionally, the proposed project would be consistent with all state and local regulations regarding solid waste diversion, and at least 50 percent of the campus' non-hazardous solid waste is diverted to a licensed recycling facility. Maintaining the existing diversion rate would ensure compliance with Assembly Bill 75, which requires all large state facilities to divert at least 50 percent of non-hazardous solid waste from landfills. The Cold Canyon landfill serves Cal Poly and was recently expanded; it has sufficient remaining capacity to continue to serve the campus (CalRecycle 2018). Therefore, a less-than-significant impact to landfills, solid waste policies, and programs would occur.

**LESS THAN SIGNIFICANT IMPACT**

# 19 Mandatory Findings of Significance

| | Potentially Significant Impact | Less than Significant with Mitigation Incorporated | Less than Significant Impact | No Impact |
|---|---|---|---|---|
| Does the project: | | | | |
| a. Have the potential to substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, 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? | ☐ | ■ | ☐ | ☐ |
| b. 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 probable future projects)? | ☐ | ■ | ☐ | ☐ |
| c. Have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly? | ☐ | ■ | ☐ | ☐ |

*a. Does the project have the potential to substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, 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?*

As described in this document, the project would not have the potential to substantially reduce the habitat of a fish or wildlife species or cause a fish or wildlife population to drop below self-sustaining levels, eliminate a plant or animal community, or reduce or restrict the range of a rare or endangered plant or animal. Based on implementation of mitigation for biological resources, to protect native birds, and cultural resources, and to protect previously unknown resources, the project would not substantially reduce habitat or fish or wildlife populations or adversely impact historic or prehistoric resources.

**LESS THAN SIGNIFICANT WITH MITIGATION INCORPORATED**

*b. Does the project 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 probable future projects)?*

Construction of the SATRC would not result in substantial construction impacts, and construction activities would be short-term, temporary, and localized to the project site. Impacts during construction activities would be mitigated to a less than significant level, and would not contribute to a cumulative impact when considered in combination with other projects that may occur on campus. The project would require a minor amendment to the 2001 Campus Master Plan. However, this project would not affect overall campus enrollment and is consistent with the development potential identified in the 2001 Master Plan. The project would not generate substantial additional growth or off-site vehicle trips that could impact the City's circulation system, existing level of service standards, regional operation air contaminant emissions, GHG emissions standards, or noise standards, on a cumulative basis. As a result, operational impacts would not be cumulatively considerable. All project construction and operational impacts would be mitigated to a less than significant level, and would not, in combination with other projects, be considered cumulatively considerable.

**LESS THAN SIGNIFICANT WITH MITIGATION INCORPORATED**

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

Project impacts related to GHG emissions, hazards and hazardous materials, and hydrology and water quality would be less than significant. Mitigation measures identified in this document would ensure impacts to air quality, geology and soils, and noise would be reduced below a level of significance. Therefore, with implementation of the required measures, no substantial adverse effects on human beings would occur because of the proposed project.

**LESS THAN SIGNIFICANT WITH MITIGATION INCORPORATED**

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# List of Preparers

Rincon Consultants, Inc. prepared this IS-MND under contract to Cal Poly. Persons involved in data gathering analysis, project management, and quality control are listed below.

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# Appendix A

CalEEMod Air Quality and Greenhouse Gas Emissions Estimates

# Science and Agriculture Teaching and Research Complex Project

**San Luis Obispo County, Annual**

## 1.0 Project Characteristics

### 1.1 Land Usage

| Land Uses | Size | Metric | Lot Acreage | Floor Surface Area | Population |
|---|---|---|---|---|---|
| Research & Development | 102.90 | 1000sqft | 2.36 | 102,900.00 | 0 |
| Research & Development | 3.00 | 1000sqft | 0.07 | 3,000.00 | 0 |
| Research & Development | 1.50 | 1000sqft | 0.03 | 1,500.00 | 0 |
| Other Non-Asphalt Surfaces | 3.00 | 1000sqft | 0.07 | 3,000.00 | 0 |

### 1.2 Other Project Characteristics

| | | | | | |
|---|---|---|---|---|---|
| **Urbanization** | Urban | **Wind Speed (m/s)** | 3.2 | **Precipitation Freq (Days)** | 44 |
| **Climate Zone** | 4 | | | **Operational Year** | 2022 |
| **Utility Company** | Pacific Gas & Electric Company | | | | |
| **CO2 Intensity (lb/MWhr)** | 641.35 | **CH4 Intensity (lb/MWhr)** | 0.029 | **N2O Intensity (lb/MWhr)** | 0.006 |

### 1.3 User Entered Comments & Non-Default Data

Science and Agriculture Teaching and Research Complex Project - San Luis Obispo County, Annual

Project Characteristics -

Land Use -

Construction Phase - Construction July 2019 through July 2021

Grading - project description: 27,251 cy

Demolition -

Vehicle Trips - no student increase anticipated

Architectural Coating - Rule 433 SLOAPCD flat and nonflat coatings

Area Coating - Rule 433 SLOAPCD

Water And Wastewater -

Land Use Change -

Construction Off-road Equipment Mitigation -

| Table Name | Column Name | Default Value | New Value |
|---|---|---|---|
| tblArchitecturalCoating | EF_Nonresidential_Exterior | 250.00 | 150.00 |
| tblArchitecturalCoating | EF_Nonresidential_Interior | 250.00 | 100.00 |
| tblArchitecturalCoating | EF_Residential_Exterior | 250.00 | 150.00 |
| tblArchitecturalCoating | EF_Residential_Interior | 250.00 | 100.00 |
| tblAreaCoating | Area_EF_Nonresidential_Exterior | 250 | 150 |
| tblAreaCoating | Area_EF_Nonresidential_Interior | 250 | 100 |
| tblAreaCoating | Area_EF_Residential_Exterior | 250 | 150 |
| tblAreaCoating | Area_EF_Residential_Interior | 250 | 100 |
| tblConstructionPhase | NumDays | 10.00 | 20.00 |
| tblConstructionPhase | NumDays | 220.00 | 440.00 |
| tblConstructionPhase | NumDays | 20.00 | 40.00 |
| tblConstructionPhase | NumDays | 6.00 | 12.00 |
| tblConstructionPhase | NumDays | 10.00 | 20.00 |
| tblConstructionPhase | NumDays | 3.00 | 6.00 |

| | | | |
|---|---|---|---|
| tblConstructionPhase | PhaseEndDate | 7/9/2020 | 7/21/2021 |
| tblConstructionPhase | PhaseEndDate | 6/11/2020 | 5/26/2021 |
| tblConstructionPhase | PhaseEndDate | 7/26/2019 | 8/23/2019 |
| tblConstructionPhase | PhaseEndDate | 8/8/2019 | 9/18/2019 |
| tblConstructionPhase | PhaseEndDate | 6/25/2020 | 6/23/2021 |
| tblConstructionPhase | PhaseEndDate | 7/31/2019 | 9/3/2019 |
| tblConstructionPhase | PhaseStartDate | 6/26/2020 | 6/24/2021 |
| tblConstructionPhase | PhaseStartDate | 8/9/2019 | 9/19/2019 |
| tblConstructionPhase | PhaseStartDate | 8/1/2019 | 9/3/2019 |
| tblConstructionPhase | PhaseStartDate | 6/12/2020 | 5/27/2021 |
| tblConstructionPhase | PhaseStartDate | 7/27/2019 | 8/26/2019 |
| tblGrading | AcresOfGrading | 9.00 | 3.00 |
| tblGrading | AcresOfGrading | 9.00 | 4.50 |
| tblGrading | AcresOfGrading | 6.00 | 3.00 |
| tblGrading | MaterialExported | 0.00 | 27,251.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 3.00 | 1.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 2.00 |
| tblOffRoadEquipment | UsageHours | 8.00 | 6.00 |
| tblTripsAndVMT | VendorTripNumber | 0.00 | 18.00 |
| tblTripsAndVMT | WorkerTripNumber | 33.00 | 13.00 |
| tblTripsAndVMT | WorkerTripNumber | 18.00 | 8.00 |
| tblTripsAndVMT | WorkerTripNumber | 18.00 | 10.00 |
| tblTripsAndVMT | WorkerTripNumber | 33.00 | 36.00 |
| tblTripsAndVMT | WorkerTripNumber | 18.00 | 15.00 |
| tblTripsAndVMT | WorkerTripNumber | 18.00 | 7.00 |
| tblVehicleTrips | ST_TR | 1.90 | 0.00 |
| tblVehicleTrips | SU_TR | 1.11 | 0.00 |

| | | | |
|---|---|---|---|
| tblVehicleTrips | WD_TR | 8.11 | 0.00 |

## 2.0 Emissions Summary

## 2.1 Overall Construction

### Unmitigated Construction

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | tons/yr | | | | | | | | | | MT/yr | | | | | |
| 2019 | 0.2515 | 2.5623 | 1.5700 | 4.0000e-003 | 0.1594 | 0.1058 | 0.2651 | 0.0630 | 0.1003 | 0.1632 | 0.0000 | 362.7933 | 362.7933 | 0.0535 | 0.0000 | 364.1303 |
| 2020 | 0.3291 | 2.5480 | 2.1881 | 4.1700e-003 | 0.0561 | 0.1259 | 0.1820 | 0.0152 | 0.1206 | 0.1358 | 0.0000 | 355.3624 | 355.3624 | 0.0592 | 0.0000 | 356.8421 |
| 2021 | 0.6937 | 1.0672 | 1.0049 | 1.9100e-003 | 0.0269 | 0.0506 | 0.0775 | 7.2100e-003 | 0.0483 | 0.0556 | 0.0000 | 163.3077 | 163.3077 | 0.0281 | 0.0000 | 164.0095 |
| **Maximum** | **0.6937** | **2.5623** | **2.1881** | **4.1700e-003** | **0.1594** | **0.1259** | **0.2651** | **0.0630** | **0.1206** | **0.1632** | **0.0000** | **362.7933** | **362.7933** | **0.0592** | **0.0000** | **364.1303** |

### Mitigated Construction

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | tons/yr | | | | | | | | | | MT/yr | | | | | |
| 2019 | 0.2515 | 2.5623 | 1.5700 | 4.0000e-003 | 0.1594 | 0.1058 | 0.2651 | 0.0630 | 0.1003 | 0.1632 | 0.0000 | 362.7931 | 362.7931 | 0.0535 | 0.0000 | 364.1301 |
| 2020 | 0.3291 | 2.5480 | 2.1881 | 4.1700e-003 | 0.0561 | 0.1259 | 0.1820 | 0.0152 | 0.1206 | 0.1358 | 0.0000 | 355.3621 | 355.3621 | 0.0592 | 0.0000 | 356.8417 |
| 2021 | 0.6937 | 1.0672 | 1.0049 | 1.9100e-003 | 0.0269 | 0.0506 | 0.0775 | 7.2100e-003 | 0.0483 | 0.0556 | 0.0000 | 163.3076 | 163.3076 | 0.0281 | 0.0000 | 164.0094 |
| **Maximum** | **0.6937** | **2.5623** | **2.1881** | **4.1700e-003** | **0.1594** | **0.1259** | **0.2651** | **0.0630** | **0.1206** | **0.1632** | **0.0000** | **362.7931** | **362.7931** | **0.0592** | **0.0000** | **364.1301** |

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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 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |

| Quarter | Start Date | End Date | Maximum Unmitigated ROG + NOX (tons/quarter) | Maximum Mitigated ROG + NOX (tons/quarter) |
|---|---|---|---|---|
| **1** | **7-1-2019** | **9-30-2019** | 1.9320 | 1.9320 |
| **2** | **10-1-2019** | **12-31-2019** | 0.7865 | 0.7865 |
| **3** | **1-1-2020** | **3-31-2020** | 0.7137 | 0.7137 |
| **4** | **4-1-2020** | **6-30-2020** | 0.7126 | 0.7126 |
| **5** | **7-1-2020** | **9-30-2020** | 0.7205 | 0.7205 |
| **6** | **10-1-2020** | **12-31-2020** | 0.7216 | 0.7216 |
| **7** | **1-1-2021** | **3-31-2021** | 0.6465 | 0.6465 |
| **8** | **4-1-2021** | **6-30-2021** | 0.6825 | 0.6825 |
| **9** | **7-1-2021** | **9-30-2021** | 0.4340 | 0.4340 |
| | | **Highest** | 1.9320 | 1.9320 |

## 2.2 Overall Operational

### Unmitigated Operational

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Area | 0.4759 | 2.0000e-005 | 1.8600e-003 | 0.0000 | | 1.0000e-005 | 1.0000e-005 | | 1.0000e-005 | 1.0000e-005 | 0.0000 | 3.6200e-003 | 3.6200e-003 | 1.0000e-005 | 0.0000 | 3.8600e-003 |
| Energy | 0.0153 | 0.1389 | 0.1167 | 8.3000e-004 | | 0.0106 | 0.0106 | | 0.0106 | 0.0106 | 0.0000 | 409.2655 | 409.2655 | 0.0146 | 5.1900e-003 | 411.1752 |
| Mobile | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Waste | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 1.6564 | 0.0000 | 1.6564 | 0.0979 | 0.0000 | 4.1037 |
| Water | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 16.7535 | 83.1261 | 99.8796 | 1.7245 | 0.0414 | 155.3319 |
| **Total** | **0.4912** | **0.1389** | **0.1185** | **8.3000e-004** | **0.0000** | **0.0106** | **0.0106** | **0.0000** | **0.0106** | **0.0106** | **18.4099** | **492.3953** | **510.8052** | **1.8370** | **0.0466** | **570.6147** |

## 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 | 0.4759 | 2.0000e-005 | 1.8600e-003 | 0.0000 | | 1.0000e-005 | 1.0000e-005 | | 1.0000e-005 | 1.0000e-005 | 0.0000 | 3.6200e-003 | 3.6200e-003 | 1.0000e-005 | 0.0000 | 3.8600e-003 |
| Energy | 0.0153 | 0.1389 | 0.1167 | 8.3000e-004 | | 0.0106 | 0.0106 | | 0.0106 | 0.0106 | 0.0000 | 409.2655 | 409.2655 | 0.0146 | 5.1900e-003 | 411.1752 |
| Mobile | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Waste | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 1.6564 | 0.0000 | 1.6564 | 0.0979 | 0.0000 | 4.1037 |
| Water | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 16.7535 | 83.1261 | 99.8796 | 1.7245 | 0.0414 | 155.3319 |
| **Total** | **0.4912** | **0.1389** | **0.1185** | **8.3000e-004** | **0.0000** | **0.0106** | **0.0106** | **0.0000** | **0.0106** | **0.0106** | **18.4099** | **492.3953** | **510.8052** | **1.8370** | **0.0466** | **570.6147** |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |

## 3.0 Construction Detail

**Construction Phase**

| Phase Number | Phase Name | Phase Type | Start Date | End Date | Num Days Week | Num Days | Phase Description |
|---|---|---|---|---|---|---|---|
| 1 | Demolition | Demolition | 7/1/2019 | 8/23/2019 | 5 | 40 | |
| 2 | Site Preparation | Site Preparation | 8/26/2019 | 9/3/2019 | 5 | 6 | |
| 3 | Grading | Grading | 9/3/2019 | 9/18/2019 | 5 | 12 | |
| 4 | Building Construction | Building Construction | 9/19/2019 | 5/26/2021 | 5 | 440 | |
| 5 | Paving | Paving | 5/27/2021 | 6/23/2021 | 5 | 20 | |
| 6 | Architectural Coating | Architectural Coating | 6/24/2021 | 7/21/2021 | 5 | 20 | |

**Acres of Grading (Site Preparation Phase): 3**

**Acres of Grading (Grading Phase): 3**

**Acres of Paving: 0.07**

**Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 161,100; Non-Residential Outdoor: 53,700; Striped Parking Area: 180 (Architectural Coating – sqft)**

**OffRoad Equipment**

| Phase Name | Offroad Equipment Type | Amount | Usage Hours | Horse Power | Load Factor |
|---|---|---|---|---|---|
| Paving | Air Compressors | 1 | 6.00 | 78 | 0.48 |
| Paving | Cement and Mortar Mixers | 1 | 8.00 | 9 | 0.56 |
| Demolition | Concrete/Industrial Saws | 1 | 8.00 | 81 | 0.73 |
| Demolition | Generator Sets | 1 | 8.00 | 84 | 0.74 |
| Demolition | Cranes | 1 | 8.00 | 231 | 0.29 |
| Demolition | Forklifts | 2 | 7.00 | 89 | 0.20 |
| Site Preparation | Graders | 1 | 8.00 | 187 | 0.41 |
| Paving | Pavers | 1 | 8.00 | 130 | 0.42 |
| Paving | Rollers | 2 | 8.00 | 80 | 0.38 |
| Demolition | Rubber Tired Dozers | 1 | 8.00 | 247 | 0.40 |

| | | | | | |
|---|---|---|---|---|---|
| Site Preparation | Rubber Tired Dozers | 1 | 8.00 | 247 | 0.40 |
| Demolition | Tractors/Loaders/Backhoes | 1 | 6.00 | 97 | 0.37 |
| Demolition | Tractors/Loaders/Backhoes | 3 | 8.00 | 97 | 0.37 |
| Site Preparation | Tractors/Loaders/Backhoes | 2 | 7.00 | 97 | 0.37 |
| Paving | Tractors/Loaders/Backhoes | 1 | 8.00 | 97 | 0.37 |
| Site Preparation | Tractors/Loaders/Backhoes | 1 | 7.00 | 97 | 0.37 |
| Site Preparation | Graders | 1 | 8.00 | 187 | 0.41 |
| Paving | Paving Equipment | 1 | 8.00 | 132 | 0.36 |
| Site Preparation | Scrapers | 1 | 8.00 | 367 | 0.48 |
| Demolition | Welders | 3 | 8.00 | 46 | 0.45 |
| Architectural Coating | Air Compressors | 1 | 6.00 | 78 | 0.48 |
| Building Construction | Cranes | 1 | 8.00 | 231 | 0.29 |
| Building Construction | Forklifts | 2 | 7.00 | 89 | 0.20 |
| Building Construction | Generator Sets | 1 | 8.00 | 84 | 0.74 |
| Grading | Graders | 1 | 8.00 | 187 | 0.41 |
| Grading | Rubber Tired Dozers | 1 | 8.00 | 247 | 0.40 |
| Building Construction | Tractors/Loaders/Backhoes | 1 | 6.00 | 97 | 0.37 |
| Grading | Tractors/Loaders/Backhoes | 2 | 7.00 | 97 | 0.37 |
| Building Construction | Welders | 3 | 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 |
|---|---|---|---|---|---|---|---|---|---|---|
| Demolition | 13 | 13.00 | 0.00 | 38.00 | 13.00 | 5.00 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Site Preparation | 7 | 8.00 | 0.00 | 0.00 | 13.00 | 5.00 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Site Preparation | 7 | 10.00 | 0.00 | 0.00 | 13.00 | 5.00 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Demolition | 13 | 36.00 | 18.00 | 38.00 | 13.00 | 5.00 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Paving | 7 | 15.00 | 0.00 | 0.00 | 13.00 | 5.00 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Paving | 7 | 7.00 | 0.00 | 0.00 | 13.00 | 5.00 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Architectural Coating | 1 | 7.00 | 0.00 | 0.00 | 13.00 | 5.00 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Building Construction | 8 | 36.00 | 18.00 | 0.00 | 13.00 | 5.00 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Grading | 4 | 10.00 | 0.00 | 3,406.00 | 13.00 | 5.00 | 20.00 | LD_Mix | HDT_Mix | HHDT |

## 3.1 Mitigation Measures Construction

## 3.2 Demolition - 2019

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 4.2200e-003 | 0.0000 | 4.2200e-003 | 6.4000e-004 | 0.0000 | 6.4000e-004 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0971 | 0.8317 | 0.6030 | 9.8000e-004 | | 0.0475 | 0.0475 | | 0.0449 | 0.0449 | 0.0000 | 84.7830 | 84.7830 | 0.0196 | 0.0000 | 85.2739 |
| **Total** | **0.0971** | **0.8317** | **0.6030** | **9.8000e-004** | **4.2200e-003** | **0.0475** | **0.0518** | **6.4000e-004** | **0.0449** | **0.0456** | **0.0000** | **84.7830** | **84.7830** | **0.0196** | **0.0000** | **85.2739** |

## 3.2 Demolition - 2019

### 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 | 3.9000e-004 | 0.0134 | 2.8900e-003 | 3.0000e-005 | 1.1300e-003 | 8.0000e-005 | 1.2100e-003 | 3.0000e-004 | 8.0000e-005 | 3.7000e-004 | 0.0000 | 2.9488 | 2.9488 | 1.7000e-004 | 0.0000 | 2.9530 |
| Vendor | 1.6900e-003 | 0.0411 | 0.0129 | 7.0000e-005 | 2.7900e-003 | 3.3000e-004 | 3.1200e-003 | 7.6000e-004 | 3.1000e-004 | 1.0700e-003 | 0.0000 | 6.9355 | 6.9355 | 4.5000e-004 | 0.0000 | 6.9466 |
| Worker | 4.7100e-003 | 4.4200e-003 | 0.0383 | 9.0000e-005 | 0.0176 | 6.0000e-005 | 0.0177 | 4.5100e-003 | 6.0000e-005 | 4.5700e-003 | 0.0000 | 8.1450 | 8.1450 | 3.0000e-004 | 0.0000 | 8.1526 |
| **Total** | **6.7900e-003** | **0.0588** | **0.0541** | **1.9000e-004** | **0.0215** | **4.7000e-004** | **0.0220** | **5.5700e-003** | **4.5000e-004** | **6.0100e-003** | **0.0000** | **18.0293** | **18.0293** | **9.2000e-004** | **0.0000** | **18.0522** |

### 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 | | | | | 4.2200e-003 | 0.0000 | 4.2200e-003 | 6.4000e-004 | 0.0000 | 6.4000e-004 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0971 | 0.8317 | 0.6030 | 9.8000e-004 | | 0.0475 | 0.0475 | | 0.0449 | 0.0449 | 0.0000 | 84.7829 | 84.7829 | 0.0196 | 0.0000 | 85.2738 |
| **Total** | **0.0971** | **0.8317** | **0.6030** | **9.8000e-004** | **4.2200e-003** | **0.0475** | **0.0518** | **6.4000e-004** | **0.0449** | **0.0456** | **0.0000** | **84.7829** | **84.7829** | **0.0196** | **0.0000** | **85.2738** |

## 3.2 Demolition - 2019

**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 | 3.9000e-004 | 0.0134 | 2.8900e-003 | 3.0000e-005 | 1.1300e-003 | 8.0000e-005 | 1.2100e-003 | 3.0000e-004 | 8.0000e-005 | 3.7000e-004 | 0.0000 | 2.9488 | 2.9488 | 1.7000e-004 | 0.0000 | 2.9530 |
| Vendor | 1.6900e-003 | 0.0411 | 0.0129 | 7.0000e-005 | 2.7900e-003 | 3.3000e-004 | 3.1200e-003 | 7.6000e-004 | 3.1000e-004 | 1.0700e-003 | 0.0000 | 6.9355 | 6.9355 | 4.5000e-004 | 0.0000 | 6.9466 |
| Worker | 4.7100e-003 | 4.4200e-003 | 0.0383 | 9.0000e-005 | 0.0176 | 6.0000e-005 | 0.0177 | 4.5100e-003 | 6.0000e-005 | 4.5700e-003 | 0.0000 | 8.1450 | 8.1450 | 3.0000e-004 | 0.0000 | 8.1526 |
| **Total** | **6.7900e-003** | **0.0588** | **0.0541** | **1.9000e-004** | **0.0215** | **4.7000e-004** | **0.0220** | **5.5700e-003** | **4.5000e-004** | **6.0100e-003** | **0.0000** | **18.0293** | **18.0293** | **9.2000e-004** | **0.0000** | **18.0522** |

## 3.3 Site Preparation - 2019

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0468 | 0.0000 | 0.0468 | 0.0237 | 0.0000 | 0.0237 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0133 | 0.1550 | 0.0772 | 1.6000e-004 | | 6.7400e-003 | 6.7400e-003 | | 6.2000e-003 | 6.2000e-003 | 0.0000 | 14.1859 | 14.1859 | 4.4900e-003 | 0.0000 | 14.2981 |
| **Total** | **0.0133** | **0.1550** | **0.0772** | **1.6000e-004** | **0.0468** | **6.7400e-003** | **0.0535** | **0.0237** | **6.2000e-003** | **0.0299** | **0.0000** | **14.1859** | **14.1859** | **4.4900e-003** | **0.0000** | **14.2981** |

## 3.3 Site Preparation - 2019

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 3.0000e-004 | 2.8000e-004 | 2.4600e-003 | 1.0000e-005 | 1.1300e-003 | 0.0000 | 1.1400e-003 | 2.9000e-004 | 0.0000 | 2.9000e-004 | 0.0000 | 0.5236 | 0.5236 | 2.0000e-005 | 0.0000 | 0.5241 |
| **Total** | **3.0000e-004** | **2.8000e-004** | **2.4600e-003** | **1.0000e-005** | **1.1300e-003** | **0.0000** | **1.1400e-003** | **2.9000e-004** | **0.0000** | **2.9000e-004** | **0.0000** | **0.5236** | **0.5236** | **2.0000e-005** | **0.0000** | **0.5241** |

### 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 | | | | | 0.0468 | 0.0000 | 0.0468 | 0.0237 | 0.0000 | 0.0237 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0133 | 0.1550 | 0.0772 | 1.6000e-004 | | 6.7400e-003 | 6.7400e-003 | | 6.2000e-003 | 6.2000e-003 | 0.0000 | 14.1859 | 14.1859 | 4.4900e-003 | 0.0000 | 14.2981 |
| **Total** | **0.0133** | **0.1550** | **0.0772** | **1.6000e-004** | **0.0468** | **6.7400e-003** | **0.0535** | **0.0237** | **6.2000e-003** | **0.0299** | **0.0000** | **14.1859** | **14.1859** | **4.4900e-003** | **0.0000** | **14.2981** |

## 3.3 Site Preparation - 2019

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 3.0000e-004 | 2.8000e-004 | 2.4600e-003 | 1.0000e-005 | 1.1300e-003 | 0.0000 | 1.1400e-003 | 2.9000e-004 | 0.0000 | 2.9000e-004 | 0.0000 | 0.5236 | 0.5236 | 2.0000e-005 | 0.0000 | 0.5241 |
| **Total** | **3.0000e-004** | **2.8000e-004** | **2.4600e-003** | **1.0000e-005** | **1.1300e-003** | **0.0000** | **1.1400e-003** | **2.9000e-004** | **0.0000** | **2.9000e-004** | **0.0000** | **0.5236** | **0.5236** | **2.0000e-005** | **0.0000** | **0.5241** |

## 3.4 Grading - 2019

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0402 | 0.0000 | 0.0402 | 0.0204 | 0.0000 | 0.0204 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0122 | 0.1365 | 0.0609 | 1.2000e-004 | | 6.4400e-003 | 6.4400e-003 | | 5.9200e-003 | 5.9200e-003 | 0.0000 | 11.1108 | 11.1108 | 3.5200e-003 | 0.0000 | 11.1987 |
| **Total** | **0.0122** | **0.1365** | **0.0609** | **1.2000e-004** | **0.0402** | **6.4400e-003** | **0.0467** | **0.0204** | **5.9200e-003** | **0.0263** | **0.0000** | **11.1108** | **11.1108** | **3.5200e-003** | **0.0000** | **11.1987** |

## 3.4 Grading - 2019

### 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 | 0.0175 | 0.5981 | 0.1297 | 1.3500e-003 | 0.0290 | 3.5600e-003 | 0.0326 | 7.9700e-003 | 3.4100e-003 | 0.0114 | 0.0000 | 132.1517 | 132.1517 | 7.5100e-003 | 0.0000 | 132.3393 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 2.9000e-004 | 2.7000e-004 | 2.3500e-003 | 1.0000e-005 | 5.8000e-004 | 0.0000 | 5.8000e-004 | 1.5000e-004 | 0.0000 | 1.6000e-004 | 0.0000 | 0.4987 | 0.4987 | 2.0000e-005 | 0.0000 | 0.4991 |
| **Total** | **0.0178** | **0.5984** | **0.1320** | **1.3600e-003** | **0.0296** | **3.5600e-003** | **0.0332** | **8.1200e-003** | **3.4100e-003** | **0.0115** | **0.0000** | **132.6503** | **132.6503** | **7.5300e-003** | **0.0000** | **132.8385** |

### 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 | | | | | 0.0402 | 0.0000 | 0.0402 | 0.0204 | 0.0000 | 0.0204 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0122 | 0.1365 | 0.0609 | 1.2000e-004 | | 6.4400e-003 | 6.4400e-003 | | 5.9200e-003 | 5.9200e-003 | 0.0000 | 11.1108 | 11.1108 | 3.5200e-003 | 0.0000 | 11.1986 |
| **Total** | **0.0122** | **0.1365** | **0.0609** | **1.2000e-004** | **0.0402** | **6.4400e-003** | **0.0467** | **0.0204** | **5.9200e-003** | **0.0263** | **0.0000** | **11.1108** | **11.1108** | **3.5200e-003** | **0.0000** | **11.1986** |

## 3.4 Grading - 2019

**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 | 0.0175 | 0.5981 | 0.1297 | 1.3500e-003 | 0.0290 | 3.5600e-003 | 0.0326 | 7.9700e-003 | 3.4100e-003 | 0.0114 | 0.0000 | 132.1517 | 132.1517 | 7.5100e-003 | 0.0000 | 132.3393 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 2.9000e-004 | 2.7000e-004 | 2.3500e-003 | 1.0000e-005 | 5.8000e-004 | 0.0000 | 5.8000e-004 | 1.5000e-004 | 0.0000 | 1.6000e-004 | 0.0000 | 0.4987 | 0.4987 | 2.0000e-005 | 0.0000 | 0.4991 |
| **Total** | **0.0178** | **0.5984** | **0.1320** | **1.3600e-003** | **0.0296** | **3.5600e-003** | **0.0332** | **8.1200e-003** | **3.4100e-003** | **0.0115** | **0.0000** | **132.6503** | **132.6503** | **7.5300e-003** | **0.0000** | **132.8385** |

## 3.5 Building Construction - 2019

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.0947 | 0.6997 | 0.5644 | 9.3000e-004 | | 0.0403 | 0.0403 | | 0.0387 | 0.0387 | 0.0000 | 77.6091 | 77.6091 | 0.0162 | 0.0000 | 78.0127 |
| **Total** | **0.0947** | **0.6997** | **0.5644** | **9.3000e-004** | | **0.0403** | **0.0403** | | **0.0387** | **0.0387** | **0.0000** | **77.6091** | **77.6091** | **0.0162** | **0.0000** | **78.0127** |

## 3.5 Building Construction - 2019

### 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 | 3.1200e-003 | 0.0760 | 0.0238 | 1.3000e-004 | 3.0200e-003 | 6.1000e-004 | 3.6300e-003 | 8.7000e-004 | 5.8000e-004 | 1.4600e-003 | 0.0000 | 12.8306 | 12.8306 | 8.2000e-004 | 0.0000 | 12.8512 |
| Worker | 6.4000e-003 | 6.0100e-003 | 0.0521 | 1.2000e-004 | 0.0128 | 9.0000e-005 | 0.0129 | 3.4100e-003 | 8.0000e-005 | 3.4900e-003 | 0.0000 | 11.0706 | 11.0706 | 4.1000e-004 | 0.0000 | 11.0809 |
| **Total** | **9.5200e-003** | **0.0820** | **0.0759** | **2.5000e-004** | **0.0158** | **7.0000e-004** | **0.0165** | **4.2800e-003** | **6.6000e-004** | **4.9500e-003** | **0.0000** | **23.9012** | **23.9012** | **1.2300e-003** | **0.0000** | **23.9322** |

### 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 | 0.0947 | 0.6997 | 0.5644 | 9.3000e-004 | | 0.0403 | 0.0403 | | 0.0387 | 0.0387 | 0.0000 | 77.6090 | 77.6090 | 0.0162 | 0.0000 | 78.0126 |
| **Total** | **0.0947** | **0.6997** | **0.5644** | **9.3000e-004** | | **0.0403** | **0.0403** | | **0.0387** | **0.0387** | **0.0000** | **77.6090** | **77.6090** | **0.0162** | **0.0000** | **78.0126** |

## 3.5 Building Construction - 2019

**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 | 3.1200e-003 | 0.0760 | 0.0238 | 1.3000e-004 | 3.0200e-003 | 6.1000e-004 | 3.6300e-003 | 8.7000e-004 | 5.8000e-004 | 1.4600e-003 | 0.0000 | 12.8306 | 12.8306 | 8.2000e-004 | 0.0000 | 12.8512 |
| Worker | 6.4000e-003 | 6.0100e-003 | 0.0521 | 1.2000e-004 | 0.0128 | 9.0000e-005 | 0.0129 | 3.4100e-003 | 8.0000e-005 | 3.4900e-003 | 0.0000 | 11.0706 | 11.0706 | 4.1000e-004 | 0.0000 | 11.0809 |
| **Total** | **9.5200e-003** | **0.0820** | **0.0759** | **2.5000e-004** | **0.0158** | **7.0000e-004** | **0.0165** | **4.2800e-003** | **6.6000e-004** | **4.9500e-003** | **0.0000** | **23.9012** | **23.9012** | **1.2300e-003** | **0.0000** | **23.9322** |

## 3.5 Building Construction - 2020

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.2997 | 2.2838 | 1.9515 | 3.2800e-003 | | 0.1242 | 0.1242 | | 0.1191 | 0.1191 | 0.0000 | 272.0142 | 272.0142 | 0.0552 | 0.0000 | 273.3944 |
| **Total** | **0.2997** | **2.2838** | **1.9515** | **3.2800e-003** | | **0.1242** | **0.1242** | | **0.1191** | **0.1191** | **0.0000** | **272.0142** | **272.0142** | **0.0552** | **0.0000** | **273.3944** |

## 3.5 Building Construction - 2020

### 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 | 8.7700e-003 | 0.2455 | 0.0744 | 4.7000e-004 | 0.0107 | 1.3400e-003 | 0.0121 | 3.0900e-003 | 1.2800e-003 | 4.3800e-003 | 0.0000 | 45.3652 | 45.3652 | 2.7300e-003 | 0.0000 | 45.4334 |
| Worker | 0.0206 | 0.0187 | 0.1622 | 4.2000e-004 | 0.0454 | 3.0000e-004 | 0.0457 | 0.0121 | 2.8000e-004 | 0.0123 | 0.0000 | 37.9831 | 37.9831 | 1.2500e-003 | 0.0000 | 38.0143 |
| **Total** | **0.0294** | **0.2642** | **0.2366** | **8.9000e-004** | **0.0561** | **1.6400e-003** | **0.0578** | **0.0152** | **1.5600e-003** | **0.0167** | **0.0000** | **83.3482** | **83.3482** | **3.9800e-003** | **0.0000** | **83.4477** |

### 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 | 0.2997 | 2.2838 | 1.9515 | 3.2800e-003 | | 0.1242 | 0.1242 | | 0.1191 | 0.1191 | 0.0000 | 272.0138 | 272.0138 | 0.0552 | 0.0000 | 273.3940 |
| **Total** | **0.2997** | **2.2838** | **1.9515** | **3.2800e-003** | | **0.1242** | **0.1242** | | **0.1191** | **0.1191** | **0.0000** | **272.0138** | **272.0138** | **0.0552** | **0.0000** | **273.3940** |

## 3.5 Building Construction - 2020

**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 | 8.7700e-003 | 0.2455 | 0.0744 | 4.7000e-004 | 0.0107 | 1.3400e-003 | 0.0121 | 3.0900e-003 | 1.2800e-003 | 4.3800e-003 | 0.0000 | 45.3652 | 45.3652 | 2.7300e-003 | 0.0000 | 45.4334 |
| Worker | 0.0206 | 0.0187 | 0.1622 | 4.2000e-004 | 0.0454 | 3.0000e-004 | 0.0457 | 0.0121 | 2.8000e-004 | 0.0123 | 0.0000 | 37.9831 | 37.9831 | 1.2500e-003 | 0.0000 | 38.0143 |
| **Total** | **0.0294** | **0.2642** | **0.2366** | **8.9000e-004** | **0.0561** | **1.6400e-003** | **0.0578** | **0.0152** | **1.5600e-003** | **0.0167** | **0.0000** | **83.3482** | **83.3482** | **3.9800e-003** | **0.0000** | **83.4477** |

## 3.5 Building Construction - 2021

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.1063 | 0.8334 | 0.7573 | 1.3000e-003 | | 0.0425 | 0.0425 | | 0.0407 | 0.0407 | 0.0000 | 107.9773 | 107.9773 | 0.0212 | 0.0000 | 108.5084 |
| **Total** | **0.1063** | **0.8334** | **0.7573** | **1.3000e-003** | | **0.0425** | **0.0425** | | **0.0407** | **0.0407** | **0.0000** | **107.9773** | **107.9773** | **0.0212** | **0.0000** | **108.5084** |

## 3.5 Building Construction - 2021

### 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 | 2.8500e-003 | 0.0891 | 0.0261 | 1.9000e-004 | 4.2500e-003 | 2.5000e-004 | 4.5100e-003 | 1.2300e-003 | 2.4000e-004 | 1.4700e-003 | 0.0000 | 17.8996 | 17.8996 | 1.0600e-003 | 0.0000 | 17.9260 |
| Worker | 7.6300e-003 | 6.6500e-003 | 0.0584 | 1.6000e-004 | 0.0180 | 1.1000e-004 | 0.0181 | 4.7900e-003 | 1.1000e-004 | 4.9000e-003 | 0.0000 | 14.5634 | 14.5634 | 4.4000e-004 | 0.0000 | 14.5744 |
| **Total** | **0.0105** | **0.0958** | **0.0845** | **3.5000e-004** | **0.0223** | **3.6000e-004** | **0.0227** | **6.0200e-003** | **3.5000e-004** | **6.3700e-003** | **0.0000** | **32.4630** | **32.4630** | **1.5000e-003** | **0.0000** | **32.5004** |

### 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 | 0.1063 | 0.8334 | 0.7573 | 1.3000e-003 | | 0.0425 | 0.0425 | | 0.0407 | 0.0407 | 0.0000 | 107.9772 | 107.9772 | 0.0212 | 0.0000 | 108.5083 |
| **Total** | **0.1063** | **0.8334** | **0.7573** | **1.3000e-003** | | **0.0425** | **0.0425** | | **0.0407** | **0.0407** | **0.0000** | **107.9772** | **107.9772** | **0.0212** | **0.0000** | **108.5083** |

## 3.5 Building Construction - 2021

**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 | 2.8500e-003 | 0.0891 | 0.0261 | 1.9000e-004 | 4.2500e-003 | 2.5000e-004 | 4.5100e-003 | 1.2300e-003 | 2.4000e-004 | 1.4700e-003 | 0.0000 | 17.8996 | 17.8996 | 1.0600e-003 | 0.0000 | 17.9260 |
| Worker | 7.6300e-003 | 6.6500e-003 | 0.0584 | 1.6000e-004 | 0.0180 | 1.1000e-004 | 0.0181 | 4.7900e-003 | 1.1000e-004 | 4.9000e-003 | 0.0000 | 14.5634 | 14.5634 | 4.4000e-004 | 0.0000 | 14.5744 |
| **Total** | **0.0105** | **0.0958** | **0.0845** | **3.5000e-004** | **0.0223** | **3.6000e-004** | **0.0227** | **6.0200e-003** | **3.5000e-004** | **6.3700e-003** | **0.0000** | **32.4630** | **32.4630** | **1.5000e-003** | **0.0000** | **32.5004** |

## 3.6 Paving - 2021

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 0.0128 | 0.1218 | 0.1359 | 2.1000e-004 | | 6.7700e-003 | 6.7700e-003 | | 6.3100e-003 | 6.3100e-003 | 0.0000 | 18.0581 | 18.0581 | 5.0900e-003 | 0.0000 | 18.1853 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.0128** | **0.1218** | **0.1359** | **2.1000e-004** | | **6.7700e-003** | **6.7700e-003** | | **6.3100e-003** | **6.3100e-003** | **0.0000** | **18.0581** | **18.0581** | **5.0900e-003** | **0.0000** | **18.1853** |

## 3.6 Paving - 2021

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 9.0000e-004 | 7.8000e-004 | 6.8600e-003 | 2.0000e-005 | 3.9500e-003 | 1.0000e-005 | 3.9700e-003 | 1.0100e-003 | 1.0000e-005 | 1.0300e-003 | 0.0000 | 1.7115 | 1.7115 | 5.0000e-005 | 0.0000 | 1.7128 |
| **Total** | **9.0000e-004** | **7.8000e-004** | **6.8600e-003** | **2.0000e-005** | **3.9500e-003** | **1.0000e-005** | **3.9700e-003** | **1.0100e-003** | **1.0000e-005** | **1.0300e-003** | **0.0000** | **1.7115** | **1.7115** | **5.0000e-005** | **0.0000** | **1.7128** |

### 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 | 0.0128 | 0.1218 | 0.1359 | 2.1000e-004 | | 6.7700e-003 | 6.7700e-003 | | 6.3100e-003 | 6.3100e-003 | 0.0000 | 18.0580 | 18.0580 | 5.0900e-003 | 0.0000 | 18.1853 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.0128** | **0.1218** | **0.1359** | **2.1000e-004** | | **6.7700e-003** | **6.7700e-003** | | **6.3100e-003** | **6.3100e-003** | **0.0000** | **18.0580** | **18.0580** | **5.0900e-003** | **0.0000** | **18.1853** |

## 3.6 Paving - 2021

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 9.0000e-004 | 7.8000e-004 | 6.8600e-003 | 2.0000e-005 | 3.9500e-003 | 1.0000e-005 | 3.9700e-003 | 1.0100e-003 | 1.0000e-005 | 1.0300e-003 | 0.0000 | 1.7115 | 1.7115 | 5.0000e-005 | 0.0000 | 1.7128 |
| **Total** | **9.0000e-004** | **7.8000e-004** | **6.8600e-003** | **2.0000e-005** | **3.9500e-003** | **1.0000e-005** | **3.9700e-003** | **1.0100e-003** | **1.0000e-005** | **1.0300e-003** | **0.0000** | **1.7115** | **1.7115** | **5.0000e-005** | **0.0000** | **1.7128** |

## 3.7 Architectural Coating - 2021

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Archit. Coating | 0.5607 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 2.1900e-003 | 0.0153 | 0.0182 | 3.0000e-005 | | 9.4000e-004 | 9.4000e-004 | | 9.4000e-004 | 9.4000e-004 | 0.0000 | 2.5533 | 2.5533 | 1.8000e-004 | 0.0000 | 2.5576 |
| **Total** | **0.5628** | **0.0153** | **0.0182** | **3.0000e-005** | | **9.4000e-004** | **9.4000e-004** | | **9.4000e-004** | **9.4000e-004** | **0.0000** | **2.5533** | **2.5533** | **1.8000e-004** | **0.0000** | **2.5576** |

## 3.7 Architectural Coating - 2021

### 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 | 2.9000e-004 | 2.5000e-004 | 2.1800e-003 | 1.0000e-005 | 6.7000e-004 | 0.0000 | 6.8000e-004 | 1.8000e-004 | 0.0000 | 1.8000e-004 | 0.0000 | 0.5446 | 0.5446 | 2.0000e-005 | 0.0000 | 0.5450 |
| **Total** | **2.9000e-004** | **2.5000e-004** | **2.1800e-003** | **1.0000e-005** | **6.7000e-004** | **0.0000** | **6.8000e-004** | **1.8000e-004** | **0.0000** | **1.8000e-004** | **0.0000** | **0.5446** | **0.5446** | **2.0000e-005** | **0.0000** | **0.5450** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Archit. Coating | 0.5607 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 2.1900e-003 | 0.0153 | 0.0182 | 3.0000e-005 | | 9.4000e-004 | 9.4000e-004 | | 9.4000e-004 | 9.4000e-004 | 0.0000 | 2.5533 | 2.5533 | 1.8000e-004 | 0.0000 | 2.5576 |
| **Total** | **0.5628** | **0.0153** | **0.0182** | **3.0000e-005** | | **9.4000e-004** | **9.4000e-004** | | **9.4000e-004** | **9.4000e-004** | **0.0000** | **2.5533** | **2.5533** | **1.8000e-004** | **0.0000** | **2.5576** |

### 3.7 Architectural Coating - 2021

**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 | 2.9000e-004 | 2.5000e-004 | 2.1800e-003 | 1.0000e-005 | 6.7000e-004 | 0.0000 | 6.8000e-004 | 1.8000e-004 | 0.0000 | 1.8000e-004 | 0.0000 | 0.5446 | 0.5446 | 2.0000e-005 | 0.0000 | 0.5450 |
| **Total** | **2.9000e-004** | **2.5000e-004** | **2.1800e-003** | **1.0000e-005** | **6.7000e-004** | **0.0000** | **6.8000e-004** | **1.8000e-004** | **0.0000** | **1.8000e-004** | **0.0000** | **0.5446** | **0.5446** | **2.0000e-005** | **0.0000** | **0.5450** |

## 4.0 Operational Detail - Mobile

### 4.1 Mitigation Measures Mobile

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Mitigated | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Unmitigated | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |

## 4.2 Trip Summary Information

| | Average Daily Trip Rate | | | Unmitigated | Mitigated |
|---|---|---|---|---|---|
| Land Use | Weekday | Saturday | Sunday | Annual VMT | Annual VMT |
| Research & Development | 0.00 | 0.00 | 0.00 | | |
| Research & Development | 0.00 | 0.00 | 0.00 | | |
| Research & Development | 0.00 | 0.00 | 0.00 | | |
| Other Non-Asphalt Surfaces | 0.00 | 0.00 | 0.00 | | |
| Total | 0.00 | 0.00 | 0.00 | | |

## 4.3 Trip Type Information

| | Miles | | | Trip % | | | Trip Purpose % | | |
|---|---|---|---|---|---|---|---|---|---|
| Land Use | H-W or C-W | H-S or C-C | H-O or C-NW | H-W or C-W | H-S or C-C | H-O or C-NW | Primary | Diverted | Pass-by |
| Research & Development | 13.00 | 5.00 | 5.00 | 33.00 | 48.00 | 19.00 | 82 | 15 | 3 |
| Research & Development | 13.00 | 5.00 | 5.00 | 33.00 | 48.00 | 19.00 | 82 | 15 | 3 |
| Research & Development | 13.00 | 5.00 | 5.00 | 33.00 | 48.00 | 19.00 | 82 | 15 | 3 |
| Other Non-Asphalt Surfaces | 13.00 | 5.00 | 5.00 | 0.00 | 0.00 | 0.00 | 0 | 0 | 0 |

## 4.4 Fleet Mix

| Land Use | LDA | LDT1 | LDT2 | MDV | LHD1 | LHD2 | MHD | HHD | OBUS | UBUS | MCY | SBUS | MH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Research & Development | 0.575581 | 0.029595 | 0.198288 | 0.120539 | 0.026172 | 0.006482 | 0.012911 | 0.019591 | 0.002354 | 0.001214 | 0.005068 | 0.000784 | 0.001422 |
| Other Non-Asphalt Surfaces | 0.575581 | 0.029595 | 0.198288 | 0.120539 | 0.026172 | 0.006482 | 0.012911 | 0.019591 | 0.002354 | 0.001214 | 0.005068 | 0.000784 | 0.001422 |

## 5.0 Energy Detail

Historical Energy Use: N

### 5.1 Mitigation Measures Energy

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Electricity Mitigated | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 258.0745 | 258.0745 | 0.0117 | 2.4100e-003 | 259.0858 |
| Electricity Unmitigated | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 258.0745 | 258.0745 | 0.0117 | 2.4100e-003 | 259.0858 |
| NaturalGas Mitigated | 0.0153 | 0.1389 | 0.1167 | 8.3000e-004 | | 0.0106 | 0.0106 | | 0.0106 | 0.0106 | 0.0000 | 151.1910 | 151.1910 | 2.9000e-003 | 2.7700e-003 | 152.0894 |
| NaturalGas Unmitigated | 0.0153 | 0.1389 | 0.1167 | 8.3000e-004 | | 0.0106 | 0.0106 | | 0.0106 | 0.0106 | 0.0000 | 151.1910 | 151.1910 | 2.9000e-003 | 2.7700e-003 | 152.0894 |

## 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 | | | | | |
| Other Non-Asphalt Surfaces | 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 |
| Research & Development | 2.7145e+006 | 0.0146 | 0.1331 | 0.1118 | 8.0000e-004 | | 0.0101 | 0.0101 | | 0.0101 | 0.0101 | 0.0000 | 144.8562 | 144.8562 | 2.7800e-003 | 2.6600e-003 | 145.7170 |
| Research & Development | 39570 | 2.1000e-004 | 1.9400e-003 | 1.6300e-003 | 1.0000e-005 | | 1.5000e-004 | 1.5000e-004 | | 1.5000e-004 | 1.5000e-004 | 0.0000 | 2.1116 | 2.1116 | 4.0000e-005 | 4.0000e-005 | 2.1242 |
| Research & Development | 79140 | 4.3000e-004 | 3.8800e-003 | 3.2600e-003 | 2.0000e-005 | | 2.9000e-004 | 2.9000e-004 | | 2.9000e-004 | 2.9000e-004 | 0.0000 | 4.2232 | 4.2232 | 8.0000e-005 | 8.0000e-005 | 4.2483 |
| **Total** | | **0.0153** | **0.1389** | **0.1167** | **8.3000e-004** | | **0.0106** | **0.0106** | | **0.0106** | **0.0106** | **0.0000** | **151.1910** | **151.1910** | **2.9000e-003** | **2.7800e-003** | **152.0894** |

## 5.2 Energy by Land Use - NaturalGas

**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 | | | | | |
| Other Non-Asphalt Surfaces | 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 |
| Research & Development | 2.7145e+006 | 0.0146 | 0.1331 | 0.1118 | 8.0000e-004 | | 0.0101 | 0.0101 | | 0.0101 | 0.0101 | 0.0000 | 144.8562 | 144.8562 | 2.7800e-003 | 2.6600e-003 | 145.7170 |
| Research & Development | 39570 | 2.1000e-004 | 1.9400e-003 | 1.6300e-003 | 1.0000e-005 | | 1.5000e-004 | 1.5000e-004 | | 1.5000e-004 | 1.5000e-004 | 0.0000 | 2.1116 | 2.1116 | 4.0000e-005 | 4.0000e-005 | 2.1242 |
| Research & Development | 79140 | 4.3000e-004 | 3.8800e-003 | 3.2600e-003 | 2.0000e-005 | | 2.9000e-004 | 2.9000e-004 | | 2.9000e-004 | 2.9000e-004 | 0.0000 | 4.2232 | 4.2232 | 8.0000e-005 | 8.0000e-005 | 4.2483 |
| **Total** | | **0.0153** | **0.1389** | **0.1167** | **8.3000e-004** | | **0.0106** | **0.0106** | | **0.0106** | **0.0106** | **0.0000** | **151.1910** | **151.1910** | **2.9000e-003** | **2.7800e-003** | **152.0894** |

## 5.3 Energy by Land Use - Electricity

**Unmitigated**

| | Electricity Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | kWh/yr | MT/yr | | | |
| Other Non-Asphalt Surfaces | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Research & Development | 12390 | 3.6044 | 1.6000e-004 | 3.0000e-005 | 3.6185 |
| Research & Development | 24780 | 7.2088 | 3.3000e-004 | 7.0000e-005 | 7.2370 |
| Research & Development | 849954 | 247.2614 | 0.0112 | 2.3100e-003 | 248.2302 |
| **Total** | | **258.0745** | **0.0117** | **2.4100e-003** | **259.0858** |

## 5.3 Energy by Land Use - Electricity

**Mitigated**

| | Electricity Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | kWh/yr | MT/yr | | | |
| Other Non-Asphalt Surfaces | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Research & Development | 12390 | 3.6044 | 1.6000e-004 | 3.0000e-005 | 3.6185 |
| Research & Development | 24780 | 7.2088 | 3.3000e-004 | 7.0000e-005 | 7.2370 |
| Research & Development | 849954 | 247.2614 | 0.0112 | 2.3100e-003 | 248.2302 |
| **Total** | | **258.0745** | **0.0117** | **2.4100e-003** | **259.0858** |

# 6.0 Area Detail

## 6.1 Mitigation Measures Area

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Mitigated | 0.4759 | 2.0000e-005 | 1.8600e-003 | 0.0000 | | 1.0000e-005 | 1.0000e-005 | | 1.0000e-005 | 1.0000e-005 | 0.0000 | 3.6200e-003 | 3.6200e-003 | 1.0000e-005 | 0.0000 | 3.8600e-003 |
| Unmitigated | 0.4759 | 2.0000e-005 | 1.8600e-003 | 0.0000 | | 1.0000e-005 | 1.0000e-005 | | 1.0000e-005 | 1.0000e-005 | 0.0000 | 3.6200e-003 | 3.6200e-003 | 1.0000e-005 | 0.0000 | 3.8600e-003 |

## 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 | 0.0561 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Consumer Products | 0.4196 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Landscaping | 1.7000e-004 | 2.0000e-005 | 1.8600e-003 | 0.0000 | | 1.0000e-005 | 1.0000e-005 | | 1.0000e-005 | 1.0000e-005 | 0.0000 | 3.6200e-003 | 3.6200e-003 | 1.0000e-005 | 0.0000 | 3.8600e-003 |
| **Total** | **0.4759** | **2.0000e-005** | **1.8600e-003** | **0.0000** | | **1.0000e-005** | **1.0000e-005** | | **1.0000e-005** | **1.0000e-005** | **0.0000** | **3.6200e-003** | **3.6200e-003** | **1.0000e-005** | **0.0000** | **3.8600e-003** |

### 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 | 0.0561 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Consumer Products | 0.4196 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Landscaping | 1.7000e-004 | 2.0000e-005 | 1.8600e-003 | 0.0000 | | 1.0000e-005 | 1.0000e-005 | | 1.0000e-005 | 1.0000e-005 | 0.0000 | 3.6200e-003 | 3.6200e-003 | 1.0000e-005 | 0.0000 | 3.8600e-003 |
| **Total** | **0.4759** | **2.0000e-005** | **1.8600e-003** | **0.0000** | | **1.0000e-005** | **1.0000e-005** | | **1.0000e-005** | **1.0000e-005** | **0.0000** | **3.6200e-003** | **3.6200e-003** | **1.0000e-005** | **0.0000** | **3.8600e-003** |

## 7.0 Water Detail

### 7.1 Mitigation Measures Water

| | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|
| Category | MT/yr | | | |
| Mitigated | 99.8796 | 1.7245 | 0.0414 | 155.3319 |
| Unmitigated | 99.8796 | 1.7245 | 0.0414 | 155.3319 |

## 7.2 Water by Land Use

**Unmitigated**

| | Indoor/Outdoor Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | Mgal | MT/yr | | | |
| Other Non-Asphalt Surfaces | 0 / 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Research & Development | 52.8079 / 0 | 99.8796 | 1.7245 | 0.0414 | 155.3319 |
| **Total** | | **99.8796** | **1.7245** | **0.0414** | **155.3319** |

### 7.2 Water by Land Use

**Mitigated**

| | Indoor/Outdoor Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | Mgal | MT/yr | | | |
| Other Non-Asphalt Surfaces | 0 / 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Research & Development | 52.8079 / 0 | 99.8796 | 1.7245 | 0.0414 | 155.3319 |
| **Total** | | **99.8796** | **1.7245** | **0.0414** | **155.3319** |

## 8.0 Waste Detail

### 8.1 Mitigation Measures Waste

**Category/Year**

| | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|
| | MT/yr | | | |
| Mitigated | 1.6564 | 0.0979 | 0.0000 | 4.1037 |
| Unmitigated | 1.6564 | 0.0979 | 0.0000 | 4.1037 |

## 8.2 Waste by Land Use

**Unmitigated**

| | Waste Disposed | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | tons | MT/yr | | | |
| Other Non-Asphalt Surfaces | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Research & Development | 8.16 | 1.6564 | 0.0979 | 0.0000 | 4.1037 |
| **Total** | | **1.6564** | **0.0979** | **0.0000** | **4.1037** |

**Mitigated**

| | Waste Disposed | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | tons | MT/yr | | | |
| Other Non-Asphalt Surfaces | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Research & Development | 8.16 | 1.6564 | 0.0979 | 0.0000 | 4.1037 |
| **Total** | | **1.6564** | **0.0979** | **0.0000** | **4.1037** |

## 9.0 Operational Offroad

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

## 10.0 Stationary Equipment

### Fire Pumps and Emergency Generators

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

### Boilers

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

### User Defined Equipment

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

## 11.0 Vegetation

# Science and Agriculture Teaching and Research Complex Project

**San Luis Obispo County, Summer**

## 1.0 Project Characteristics

### 1.1 Land Usage

| Land Uses | Size | Metric | Lot Acreage | Floor Surface Area | Population |
|---|---|---|---|---|---|
| Research & Development | 102.90 | 1000sqft | 2.36 | 102,900.00 | 0 |
| Research & Development | 3.00 | 1000sqft | 0.07 | 3,000.00 | 0 |
| Research & Development | 1.50 | 1000sqft | 0.03 | 1,500.00 | 0 |
| Other Non-Asphalt Surfaces | 3.00 | 1000sqft | 0.07 | 3,000.00 | 0 |

### 1.2 Other Project Characteristics

| | | | | | |
|---|---|---|---|---|---|
| **Urbanization** | Urban | **Wind Speed (m/s)** | 3.2 | **Precipitation Freq (Days)** | 44 |
| **Climate Zone** | 4 | | | **Operational Year** | 2022 |
| **Utility Company** | Pacific Gas & Electric Company | | | | |
| **CO2 Intensity (lb/MWhr)** | 641.35 | **CH4 Intensity (lb/MWhr)** | 0.029 | **N2O Intensity (lb/MWhr)** | 0.006 |

### 1.3 User Entered Comments & Non-Default Data

Science and Agriculture Teaching and Research Complex Project - San Luis Obispo County, Summer

Project Characteristics -

Land Use -

Construction Phase - Construction July 2019 through July 2021

Grading - project description: 27,251 cy

Demolition -

Vehicle Trips - no student increase anticipated

Architectural Coating - Rule 433 SLOAPCD flat and nonflat coatings

Area Coating - Rule 433 SLOAPCD

Water And Wastewater -

Land Use Change -

Construction Off-road Equipment Mitigation -

| Table Name | Column Name | Default Value | New Value |
|---|---|---|---|
| tblArchitecturalCoating | EF_Nonresidential_Exterior | 250.00 | 150.00 |
| tblArchitecturalCoating | EF_Nonresidential_Interior | 250.00 | 100.00 |
| tblArchitecturalCoating | EF_Residential_Exterior | 250.00 | 150.00 |
| tblArchitecturalCoating | EF_Residential_Interior | 250.00 | 100.00 |
| tblAreaCoating | Area_EF_Nonresidential_Exterior | 250 | 150 |
| tblAreaCoating | Area_EF_Nonresidential_Interior | 250 | 100 |
| tblAreaCoating | Area_EF_Residential_Exterior | 250 | 150 |
| tblAreaCoating | Area_EF_Residential_Interior | 250 | 100 |
| tblConstructionPhase | NumDays | 10.00 | 20.00 |
| tblConstructionPhase | NumDays | 220.00 | 440.00 |
| tblConstructionPhase | NumDays | 20.00 | 40.00 |
| tblConstructionPhase | NumDays | 6.00 | 12.00 |
| tblConstructionPhase | NumDays | 10.00 | 20.00 |
| tblConstructionPhase | NumDays | 3.00 | 6.00 |

| | | | |
|---|---|---|---|
| tblConstructionPhase | PhaseEndDate | 7/9/2020 | 7/21/2021 |
| tblConstructionPhase | PhaseEndDate | 6/11/2020 | 5/26/2021 |
| tblConstructionPhase | PhaseEndDate | 7/26/2019 | 8/23/2019 |
| tblConstructionPhase | PhaseEndDate | 8/8/2019 | 9/18/2019 |
| tblConstructionPhase | PhaseEndDate | 6/25/2020 | 6/23/2021 |
| tblConstructionPhase | PhaseEndDate | 7/31/2019 | 9/3/2019 |
| tblConstructionPhase | PhaseStartDate | 6/26/2020 | 6/24/2021 |
| tblConstructionPhase | PhaseStartDate | 8/9/2019 | 9/19/2019 |
| tblConstructionPhase | PhaseStartDate | 8/1/2019 | 9/3/2019 |
| tblConstructionPhase | PhaseStartDate | 6/12/2020 | 5/27/2021 |
| tblConstructionPhase | PhaseStartDate | 7/27/2019 | 8/26/2019 |
| tblGrading | AcresOfGrading | 9.00 | 3.00 |
| tblGrading | AcresOfGrading | 9.00 | 4.50 |
| tblGrading | AcresOfGrading | 6.00 | 3.00 |
| tblGrading | MaterialExported | 0.00 | 27,251.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 3.00 | 1.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 2.00 |
| tblOffRoadEquipment | UsageHours | 8.00 | 6.00 |
| tblTripsAndVMT | VendorTripNumber | 0.00 | 18.00 |
| tblTripsAndVMT | WorkerTripNumber | 33.00 | 13.00 |
| tblTripsAndVMT | WorkerTripNumber | 18.00 | 8.00 |
| tblTripsAndVMT | WorkerTripNumber | 18.00 | 10.00 |
| tblTripsAndVMT | WorkerTripNumber | 33.00 | 36.00 |
| tblTripsAndVMT | WorkerTripNumber | 18.00 | 15.00 |
| tblTripsAndVMT | WorkerTripNumber | 18.00 | 7.00 |
| tblVehicleTrips | ST_TR | 1.90 | 0.00 |
| tblVehicleTrips | SU_TR | 1.11 | 0.00 |

| | | | |
|---|---|---|---|
| tblVehicleTrips | WD_TR | 8.11 | 0.00 |

## 2.0 Emissions Summary

## 2.1 Overall Construction (Maximum Daily Emission)

### Unmitigated Construction

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | lb/day | | | | | | | | | | lb/day | | | | | |
| 2019 | 8.8326 | 164.8519 | 54.3474 | 0.2954 | 25.4572 | 3.5894 | 29.0466 | 11.6331 | 3.3239 | 14.9570 | 0.0000 | 31,199.1551 | 31,199.1551 | 3.4273 | 0.0000 | 31,284.8388 |
| 2020 | 2.5071 | 19.4197 | 16.7074 | 0.0320 | 0.4395 | 0.9606 | 1.4000 | 0.1185 | 0.9206 | 1.0391 | 0.0000 | 3,008.1301 | 3,008.1301 | 0.4976 | 0.0000 | 3,020.5707 |
| 2021 | 56.3117 | 17.8438 | 16.1929 | 0.0319 | 0.4395 | 0.8242 | 1.2637 | 0.1185 | 0.7897 | 0.9082 | 0.0000 | 2,994.6019 | 2,994.6019 | 0.5669 | 0.0000 | 3,006.6426 |
| **Maximum** | **56.3117** | **164.8519** | **54.3474** | **0.2954** | **25.4572** | **3.5894** | **29.0466** | **11.6331** | **3.3239** | **14.9570** | **0.0000** | **31,199.1551** | **31,199.1551** | **3.4273** | **0.0000** | **31,284.8388** |

### Mitigated Construction

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | lb/day | | | | | | | | | | lb/day | | | | | |
| 2019 | 8.8326 | 164.8519 | 54.3474 | 0.2954 | 25.4572 | 3.5894 | 29.0466 | 11.6331 | 3.3239 | 14.9570 | 0.0000 | 31,199.1551 | 31,199.1551 | 3.4273 | 0.0000 | 31,284.8388 |
| 2020 | 2.5071 | 19.4197 | 16.7074 | 0.0320 | 0.4395 | 0.9606 | 1.4000 | 0.1185 | 0.9206 | 1.0391 | 0.0000 | 3,008.1301 | 3,008.1301 | 0.4976 | 0.0000 | 3,020.5707 |
| 2021 | 56.3117 | 17.8438 | 16.1929 | 0.0319 | 0.4395 | 0.8242 | 1.2637 | 0.1185 | 0.7897 | 0.9082 | 0.0000 | 2,994.6019 | 2,994.6019 | 0.5669 | 0.0000 | 3,006.6426 |
| **Maximum** | **56.3117** | **164.8519** | **54.3474** | **0.2954** | **25.4572** | **3.5894** | **29.0466** | **11.6331** | **3.3239** | **14.9570** | **0.0000** | **31,199.1551** | **31,199.1551** | **3.4273** | **0.0000** | **31,284.8388** |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Percent Reduction | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

## 2.2 Overall Operational

### Unmitigated Operational

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Area | 2.6077 | 1.0000e-004 | 0.0113 | 0.0000 | | 4.0000e-005 | 4.0000e-005 | | 4.0000e-005 | 4.0000e-005 | | 0.0242 | 0.0242 | 6.0000e-005 | | 0.0258 |
| Energy | 0.0837 | 0.7610 | 0.6392 | 4.5700e-003 | | 0.0578 | 0.0578 | | 0.0578 | 0.0578 | | 913.2029 | 913.2029 | 0.0175 | 0.0167 | 918.6296 |
| Mobile | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| **Total** | **2.6914** | **0.7611** | **0.6505** | **4.5700e-003** | **0.0000** | **0.0579** | **0.0579** | **0.0000** | **0.0579** | **0.0579** | | **913.2271** | **913.2271** | **0.0176** | **0.0167** | **918.6554** |

### Mitigated Operational

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Area | 2.6077 | 1.0000e-004 | 0.0113 | 0.0000 | | 4.0000e-005 | 4.0000e-005 | | 4.0000e-005 | 4.0000e-005 | | 0.0242 | 0.0242 | 6.0000e-005 | | 0.0258 |
| Energy | 0.0837 | 0.7610 | 0.6392 | 4.5700e-003 | | 0.0578 | 0.0578 | | 0.0578 | 0.0578 | | 913.2029 | 913.2029 | 0.0175 | 0.0167 | 918.6296 |
| Mobile | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| **Total** | **2.6914** | **0.7611** | **0.6505** | **4.5700e-003** | **0.0000** | **0.0579** | **0.0579** | **0.0000** | **0.0579** | **0.0579** | | **913.2271** | **913.2271** | **0.0176** | **0.0167** | **918.6554** |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Percent Reduction | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

## 3.0 Construction Detail

### Construction Phase

| Phase Number | Phase Name | Phase Type | Start Date | End Date | Num Days Week | Num Days | Phase Description |
|---|---|---|---|---|---|---|---|
| 1 | Demolition | Demolition | 7/1/2019 | 8/23/2019 | 5 | 40 | |
| 2 | Site Preparation | Site Preparation | 8/26/2019 | 9/3/2019 | 5 | 6 | |
| 3 | Grading | Grading | 9/3/2019 | 9/18/2019 | 5 | 12 | |
| 4 | Building Construction | Building Construction | 9/19/2019 | 5/26/2021 | 5 | 440 | |
| 5 | Paving | Paving | 5/27/2021 | 6/23/2021 | 5 | 20 | |
| 6 | Architectural Coating | Architectural Coating | 6/24/2021 | 7/21/2021 | 5 | 20 | |

**Acres of Grading (Site Preparation Phase): 3**

**Acres of Grading (Grading Phase): 3**

**Acres of Paving: 0.07**

**Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 161,100; Non-Residential Outdoor: 53,700; Striped Parking Area: 180 (Architectural Coating – sqft)**

### OffRoad Equipment

| Phase Name | Offroad Equipment Type | Amount | Usage Hours | Horse Power | Load Factor |
|---|---|---|---|---|---|
| Paving | Air Compressors | 1 | 6.00 | 78 | 0.48 |
| Paving | Cement and Mortar Mixers | 1 | 8.00 | 9 | 0.56 |
| Demolition | Concrete/Industrial Saws | 1 | 8.00 | 81 | 0.73 |
| Demolition | Generator Sets | 1 | 8.00 | 84 | 0.74 |

| | | | | | |
|---|---|---|---|---|---|
| Demolition | Cranes | 1 | 8.00 | 231 | 0.29 |
| Demolition | Forklifts | 2 | 7.00 | 89 | 0.20 |
| Site Preparation | Graders | 1 | 8.00 | 187 | 0.41 |
| Paving | Pavers | 1 | 8.00 | 130 | 0.42 |
| Paving | Rollers | 2 | 8.00 | 80 | 0.38 |
| Demolition | Rubber Tired Dozers | 1 | 8.00 | 247 | 0.40 |
| Site Preparation | Rubber Tired Dozers | 1 | 8.00 | 247 | 0.40 |
| Demolition | Tractors/Loaders/Backhoes | 1 | 6.00 | 97 | 0.37 |
| Demolition | Tractors/Loaders/Backhoes | 3 | 8.00 | 97 | 0.37 |
| Site Preparation | Tractors/Loaders/Backhoes | 2 | 7.00 | 97 | 0.37 |
| Paving | Tractors/Loaders/Backhoes | 1 | 8.00 | 97 | 0.37 |
| Site Preparation | Tractors/Loaders/Backhoes | 1 | 7.00 | 97 | 0.37 |
| Site Preparation | Graders | 1 | 8.00 | 187 | 0.41 |
| Paving | Paving Equipment | 1 | 8.00 | 132 | 0.36 |
| Site Preparation | Scrapers | 1 | 8.00 | 367 | 0.48 |
| Demolition | Welders | 3 | 8.00 | 46 | 0.45 |
| Architectural Coating | Air Compressors | 1 | 6.00 | 78 | 0.48 |
| Building Construction | Cranes | 1 | 8.00 | 231 | 0.29 |
| Building Construction | Forklifts | 2 | 7.00 | 89 | 0.20 |
| Building Construction | Generator Sets | 1 | 8.00 | 84 | 0.74 |
| Grading | Graders | 1 | 8.00 | 187 | 0.41 |
| Grading | Rubber Tired Dozers | 1 | 8.00 | 247 | 0.40 |
| Building Construction | Tractors/Loaders/Backhoes | 1 | 6.00 | 97 | 0.37 |
| Grading | Tractors/Loaders/Backhoes | 2 | 7.00 | 97 | 0.37 |
| Building Construction | Welders | 3 | 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 |
|---|---|---|---|---|---|---|---|---|---|---|
| Demolition | 13 | 13.00 | 0.00 | 38.00 | 13.00 | 5.00 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Site Preparation | 7 | 8.00 | 0.00 | 0.00 | 13.00 | 5.00 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Site Preparation | 7 | 10.00 | 0.00 | 0.00 | 13.00 | 5.00 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Demolition | 13 | 36.00 | 18.00 | 38.00 | 13.00 | 5.00 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Paving | 7 | 15.00 | 0.00 | 0.00 | 13.00 | 5.00 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Paving | 7 | 7.00 | 0.00 | 0.00 | 13.00 | 5.00 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Architectural Coating | 1 | 7.00 | 0.00 | 0.00 | 13.00 | 5.00 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Building Construction | 8 | 36.00 | 18.00 | 0.00 | 13.00 | 5.00 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Grading | 4 | 10.00 | 0.00 | 3,406.00 | 13.00 | 5.00 | 20.00 | LD_Mix | HDT_Mix | HHDT |

## 3.1 Mitigation Measures Construction

## 3.2 Demolition - 2019

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 0.2108 | 0.0000 | 0.2108 | 0.0319 | 0.0000 | 0.0319 | | | 0.0000 | | | 0.0000 |
| Off-Road | 4.8531 | 41.5853 | 30.1488 | 0.0491 | | 2.3764 | 2.3764 | | 2.2467 | 2.2467 | | 4,672.8652 | 4,672.8652 | 1.0821 | | 4,699.9180 |
| **Total** | **4.8531** | **41.5853** | **30.1488** | **0.0491** | **0.2108** | **2.3764** | **2.5873** | **0.0319** | **2.2467** | **2.2786** | | **4,672.8652** | **4,672.8652** | **1.0821** | | **4,699.9180** |

## 3.2 Demolition - 2019

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0193 | 0.6541 | 0.1406 | 1.5200e-003 | 0.0583 | 3.9400e-003 | 0.0622 | 0.0152 | 3.7700e-003 | 0.0190 | | 163.4904 | 163.4904 | 9.0900e-003 | | 163.7177 |
| Vendor | 0.0824 | 2.0326 | 0.6050 | 3.6400e-003 | 0.1430 | 0.0162 | 0.1593 | 0.0387 | 0.0155 | 0.0542 | | 387.0102 | 387.0102 | 0.0238 | | 387.6045 |
| Worker | 0.2302 | 0.1985 | 1.9691 | 4.6900e-003 | 0.9055 | 3.2000e-003 | 0.9087 | 0.2318 | 2.9600e-003 | 0.2348 | | 467.1407 | 467.1407 | 0.0172 | | 467.5697 |
| **Total** | **0.3319** | **2.8851** | **2.7147** | **9.8500e-003** | **1.1068** | **0.0234** | **1.1302** | **0.2857** | **0.0223** | **0.3080** | | **1,017.6413** | **1,017.6413** | **0.0500** | | **1,018.8919** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 0.2108 | 0.0000 | 0.2108 | 0.0319 | 0.0000 | 0.0319 | | | 0.0000 | | | 0.0000 |
| Off-Road | 4.8531 | 41.5853 | 30.1488 | 0.0491 | | 2.3764 | 2.3764 | | 2.2467 | 2.2467 | 0.0000 | 4,672.8652 | 4,672.8652 | 1.0821 | | 4,699.9180 |
| **Total** | **4.8531** | **41.5853** | **30.1488** | **0.0491** | **0.2108** | **2.3764** | **2.5873** | **0.0319** | **2.2467** | **2.2786** | **0.0000** | **4,672.8652** | **4,672.8652** | **1.0821** | | **4,699.9180** |

## 3.2 Demolition - 2019

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0193 | 0.6541 | 0.1406 | 1.5200e-003 | 0.0583 | 3.9400e-003 | 0.0622 | 0.0152 | 3.7700e-003 | 0.0190 | | 163.4904 | 163.4904 | 9.0900e-003 | | 163.7177 |
| Vendor | 0.0824 | 2.0326 | 0.6050 | 3.6400e-003 | 0.1430 | 0.0162 | 0.1593 | 0.0387 | 0.0155 | 0.0542 | | 387.0102 | 387.0102 | 0.0238 | | 387.6045 |
| Worker | 0.2302 | 0.1985 | 1.9691 | 4.6900e-003 | 0.9055 | 3.2000e-003 | 0.9087 | 0.2318 | 2.9600e-003 | 0.2348 | | 467.1407 | 467.1407 | 0.0172 | | 467.5697 |
| **Total** | **0.3319** | **2.8851** | **2.7147** | **9.8500e-003** | **1.1068** | **0.0234** | **1.1302** | **0.2857** | **0.0223** | **0.3080** | | **1,017.6413** | **1,017.6413** | **0.0500** | | **1,018.8919** |

## 3.3 Site Preparation - 2019

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 13.3698 | 0.0000 | 13.3698 | 6.7636 | 0.0000 | 6.7636 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.7844 | 44.2830 | 22.0661 | 0.0451 | | 1.9267 | 1.9267 | | 1.7725 | 1.7725 | | 4,467.7946 | 4,467.7946 | 1.4136 | | 4,503.1337 |
| **Total** | **3.7844** | **44.2830** | **22.0661** | **0.0451** | **13.3698** | **1.9267** | **15.2965** | **6.7636** | **1.7725** | **8.5361** | | **4,467.7946** | **4,467.7946** | **1.4136** | | **4,503.1337** |

## 3.3 Site Preparation - 2019

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0846 | 0.0729 | 0.7233 | 1.7200e-003 | 0.3326 | 1.1800e-003 | 0.3338 | 0.0852 | 1.0900e-003 | 0.0863 | | 171.6027 | 171.6027 | 6.3000e-003 | | 171.7603 |
| **Total** | **0.0846** | **0.0729** | **0.7233** | **1.7200e-003** | **0.3326** | **1.1800e-003** | **0.3338** | **0.0852** | **1.0900e-003** | **0.0863** | | **171.6027** | **171.6027** | **6.3000e-003** | | **171.7603** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 13.3698 | 0.0000 | 13.3698 | 6.7636 | 0.0000 | 6.7636 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.7844 | 44.2830 | 22.0661 | 0.0451 | | 1.9267 | 1.9267 | | 1.7725 | 1.7725 | 0.0000 | 4,467.7946 | 4,467.7946 | 1.4136 | | 4,503.1337 |
| **Total** | **3.7844** | **44.2830** | **22.0661** | **0.0451** | **13.3698** | **1.9267** | **15.2965** | **6.7636** | **1.7725** | **8.5361** | **0.0000** | **4,467.7946** | **4,467.7946** | **1.4136** | | **4,503.1337** |

## 3.3 Site Preparation - 2019

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0846 | 0.0729 | 0.7233 | 1.7200e-003 | 0.3326 | 1.1800e-003 | 0.3338 | 0.0852 | 1.0900e-003 | 0.0863 | | 171.6027 | 171.6027 | 6.3000e-003 | | 171.7603 |
| **Total** | **0.0846** | **0.0729** | **0.7233** | **1.7200e-003** | **0.3326** | **1.1800e-003** | **0.3338** | **0.0852** | **1.0900e-003** | **0.0863** | | **171.6027** | **171.6027** | **6.3000e-003** | | **171.7603** |

## 3.4 Grading - 2019

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 6.7052 | 0.0000 | 6.7052 | 3.4022 | 0.0000 | 3.4022 | | | 0.0000 | | | 0.0000 |
| Off-Road | 2.0287 | 22.7444 | 10.1518 | 0.0206 | | 1.0730 | 1.0730 | | 0.9871 | 0.9871 | | 2,041.2539 | 2,041.2539 | 0.6458 | | 2,057.3997 |
| **Total** | **2.0287** | **22.7444** | **10.1518** | **0.0206** | **6.7052** | **1.0730** | **7.7782** | **3.4022** | **0.9871** | **4.3893** | | **2,041.2539** | **2,041.2539** | **0.6458** | | **2,057.3997** |

## 3.4 Grading - 2019

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 2.8879 | 97.7110 | 21.0043 | 0.2270 | 4.9507 | 0.5880 | 5.5386 | 1.3560 | 0.5625 | 1.9185 | | 24,423.1691 | 24,423.1691 | 1.3582 | | 24,457.1227 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0470 | 0.0405 | 0.4019 | 9.6000e-004 | 0.0989 | 6.5000e-004 | 0.0995 | 0.0262 | 6.0000e-004 | 0.0268 | | 95.3348 | 95.3348 | 3.5000e-003 | | 95.4224 |
| **Total** | **2.9349** | **97.7515** | **21.4061** | **0.2279** | **5.0495** | **0.5886** | **5.6381** | **1.3822** | **0.5631** | **1.9453** | | **24,518.5039** | **24,518.5039** | **1.3617** | | **24,552.5451** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 6.7052 | 0.0000 | 6.7052 | 3.4022 | 0.0000 | 3.4022 | | | 0.0000 | | | 0.0000 |
| Off-Road | 2.0287 | 22.7444 | 10.1518 | 0.0206 | | 1.0730 | 1.0730 | | 0.9871 | 0.9871 | 0.0000 | 2,041.2539 | 2,041.2539 | 0.6458 | | 2,057.3997 |
| **Total** | **2.0287** | **22.7444** | **10.1518** | **0.0206** | **6.7052** | **1.0730** | **7.7782** | **3.4022** | **0.9871** | **4.3893** | **0.0000** | **2,041.2539** | **2,041.2539** | **0.6458** | | **2,057.3997** |

## 3.4 Grading - 2019

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 2.8879 | 97.7110 | 21.0043 | 0.2270 | 4.9507 | 0.5880 | 5.5386 | 1.3560 | 0.5625 | 1.9185 | | 24,423.1691 | 24,423.1691 | 1.3582 | | 24,457.1227 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0470 | 0.0405 | 0.4019 | 9.6000e-004 | 0.0989 | 6.5000e-004 | 0.0995 | 0.0262 | 6.0000e-004 | 0.0268 | | 95.3348 | 95.3348 | 3.5000e-003 | | 95.4224 |
| **Total** | **2.9349** | **97.7515** | **21.4061** | **0.2279** | **5.0495** | **0.5886** | **5.6381** | **1.3822** | **0.5631** | **1.9453** | | **24,518.5039** | **24,518.5039** | **1.3617** | | **24,552.5451** |

## 3.5 Building Construction - 2019

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 2.5581 | 18.9103 | 15.2545 | 0.0250 | | 1.0901 | 1.0901 | | 1.0449 | 1.0449 | | 2,312.1454 | 2,312.1454 | 0.4810 | | 2,324.1705 |
| **Total** | **2.5581** | **18.9103** | **15.2545** | **0.0250** | | **1.0901** | **1.0901** | | **1.0449** | **1.0449** | | **2,312.1454** | **2,312.1454** | **0.4810** | | **2,324.1705** |

## 3.5 Building Construction - 2019

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0824 | 2.0326 | 0.6050 | 3.6400e-003 | 0.0835 | 0.0162 | 0.0998 | 0.0241 | 0.0155 | 0.0396 | | 387.0102 | 387.0102 | 0.0238 | | 387.6045 |
| Worker | 0.1691 | 0.1458 | 1.4467 | 3.4500e-003 | 0.3559 | 2.3500e-003 | 0.3583 | 0.0944 | 2.1700e-003 | 0.0966 | | 343.2054 | 343.2054 | 0.0126 | | 343.5206 |
| **Total** | **0.2515** | **2.1784** | **2.0516** | **7.0900e-003** | **0.4394** | **0.0186** | **0.4580** | **0.1185** | **0.0177** | **0.1362** | | **730.2156** | **730.2156** | **0.0364** | | **731.1251** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 2.5581 | 18.9103 | 15.2545 | 0.0250 | | 1.0901 | 1.0901 | | 1.0449 | 1.0449 | 0.0000 | 2,312.1454 | 2,312.1454 | 0.4810 | | 2,324.1705 |
| **Total** | **2.5581** | **18.9103** | **15.2545** | **0.0250** | | **1.0901** | **1.0901** | | **1.0449** | **1.0449** | **0.0000** | **2,312.1454** | **2,312.1454** | **0.4810** | | **2,324.1705** |

## 3.5 Building Construction - 2019

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0824 | 2.0326 | 0.6050 | 3.6400e-003 | 0.0835 | 0.0162 | 0.0998 | 0.0241 | 0.0155 | 0.0396 | | 387.0102 | 387.0102 | 0.0238 | | 387.6045 |
| Worker | 0.1691 | 0.1458 | 1.4467 | 3.4500e-003 | 0.3559 | 2.3500e-003 | 0.3583 | 0.0944 | 2.1700e-003 | 0.0966 | | 343.2054 | 343.2054 | 0.0126 | | 343.5206 |
| **Total** | **0.2515** | **2.1784** | **2.0516** | **7.0900e-003** | **0.4394** | **0.0186** | **0.4580** | **0.1185** | **0.0177** | **0.1362** | | **730.2156** | **730.2156** | **0.0364** | | **731.1251** |

## 3.5 Building Construction - 2020

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 2.2879 | 17.4336 | 14.8972 | 0.0250 | | 0.9482 | 0.9482 | | 0.9089 | 0.9089 | | 2,288.8877 | 2,288.8877 | 0.4646 | | 2,300.5014 |
| **Total** | **2.2879** | **17.4336** | **14.8972** | **0.0250** | | **0.9482** | **0.9482** | | **0.9089** | **0.9089** | | **2,288.8877** | **2,288.8877** | **0.4646** | | **2,300.5014** |

## 3.5 Building Construction - 2020

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0653 | 1.8577 | 0.5324 | 3.6300e-003 | 0.0836 | 0.0101 | 0.0936 | 0.0241 | 9.6500e-003 | 0.0337 | | 386.6430 | 386.6430 | 0.0222 | | 387.1988 |
| Worker | 0.1540 | 0.1284 | 1.2779 | 3.3400e-003 | 0.3559 | 2.2800e-003 | 0.3582 | 0.0944 | 2.1000e-003 | 0.0965 | | 332.5994 | 332.5994 | 0.0108 | | 332.8705 |
| **Total** | **0.2193** | **1.9861** | **1.8102** | **6.9700e-003** | **0.4395** | **0.0124** | **0.4518** | **0.1185** | **0.0118** | **0.1302** | | **719.2424** | **719.2424** | **0.0331** | | **720.0693** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 2.2879 | 17.4336 | 14.8972 | 0.0250 | | 0.9482 | 0.9482 | | 0.9089 | 0.9089 | 0.0000 | 2,288.8877 | 2,288.8877 | 0.4646 | | 2,300.5014 |
| **Total** | **2.2879** | **17.4336** | **14.8972** | **0.0250** | | **0.9482** | **0.9482** | | **0.9089** | **0.9089** | **0.0000** | **2,288.8877** | **2,288.8877** | **0.4646** | | **2,300.5014** |

## 3.5 Building Construction - 2020

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0653 | 1.8577 | 0.5324 | 3.6300e-003 | 0.0836 | 0.0101 | 0.0936 | 0.0241 | 9.6500e-003 | 0.0337 | | 386.6430 | 386.6430 | 0.0222 | | 387.1988 |
| Worker | 0.1540 | 0.1284 | 1.2779 | 3.3400e-003 | 0.3559 | 2.2800e-003 | 0.3582 | 0.0944 | 2.1000e-003 | 0.0965 | | 332.5994 | 332.5994 | 0.0108 | | 332.8705 |
| **Total** | **0.2193** | **1.9861** | **1.8102** | **6.9700e-003** | **0.4395** | **0.0124** | **0.4518** | **0.1185** | **0.0118** | **0.1302** | | **719.2424** | **719.2424** | **0.0331** | | **720.0693** |

## 3.5 Building Construction - 2021

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 2.0451 | 16.0275 | 14.5629 | 0.0250 | | 0.8173 | 0.8173 | | 0.7831 | 0.7831 | | 2,288.9355 | 2,288.9355 | 0.4503 | | 2,300.1935 |
| **Total** | **2.0451** | **16.0275** | **14.5629** | **0.0250** | | **0.8173** | **0.8173** | | **0.7831** | **0.7831** | | **2,288.9355** | **2,288.9355** | **0.4503** | | **2,300.1935** |

## 3.5 Building Construction - 2021

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0534 | 1.7014 | 0.4695 | 3.6100e-003 | 0.0836 | 4.7700e-003 | 0.0883 | 0.0241 | 4.5700e-003 | 0.0286 | | 384.4016 | 384.4016 | 0.0217 | | 384.9430 |
| Worker | 0.1434 | 0.1149 | 1.1605 | 3.2300e-003 | 0.3559 | 2.2000e-003 | 0.3581 | 0.0944 | 2.0300e-003 | 0.0964 | | 321.2648 | 321.2648 | 9.6500e-003 | | 321.5060 |
| **Total** | **0.1968** | **1.8163** | **1.6299** | **6.8400e-003** | **0.4395** | **6.9700e-003** | **0.4464** | **0.1185** | **6.6000e-003** | **0.1251** | | **705.6664** | **705.6664** | **0.0313** | | **706.4490** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 2.0451 | 16.0275 | 14.5629 | 0.0250 | | 0.8173 | 0.8173 | | 0.7831 | 0.7831 | 0.0000 | 2,288.9355 | 2,288.9355 | 0.4503 | | 2,300.1935 |
| **Total** | **2.0451** | **16.0275** | **14.5629** | **0.0250** | | **0.8173** | **0.8173** | | **0.7831** | **0.7831** | **0.0000** | **2,288.9355** | **2,288.9355** | **0.4503** | | **2,300.1935** |

## 3.5 Building Construction - 2021

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0534 | 1.7014 | 0.4695 | 3.6100e-003 | 0.0836 | 4.7700e-003 | 0.0883 | 0.0241 | 4.5700e-003 | 0.0286 | | 384.4016 | 384.4016 | 0.0217 | | 384.9430 |
| Worker | 0.1434 | 0.1149 | 1.1605 | 3.2300e-003 | 0.3559 | 2.2000e-003 | 0.3581 | 0.0944 | 2.0300e-003 | 0.0964 | | 321.2648 | 321.2648 | 9.6500e-003 | | 321.5060 |
| **Total** | **0.1968** | **1.8163** | **1.6299** | **6.8400e-003** | **0.4395** | **6.9700e-003** | **0.4464** | **0.1185** | **6.6000e-003** | **0.1251** | | **705.6664** | **705.6664** | **0.0313** | | **706.4490** |

## 3.6 Paving - 2021

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.2822 | 12.1746 | 13.5932 | 0.0208 | | 0.6767 | 0.6767 | | 0.6312 | 0.6312 | | 1,990.5588 | 1,990.5588 | 0.5610 | | 2,004.5833 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **1.2822** | **12.1746** | **13.5932** | **0.0208** | | **0.6767** | **0.6767** | | **0.6312** | **0.6312** | | **1,990.5588** | **1,990.5588** | **0.5610** | | **2,004.5833** |

## 3.6 Paving - 2021

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0876 | 0.0702 | 0.7092 | 1.9700e-003 | 0.4066 | 1.3500e-003 | 0.4079 | 0.1041 | 1.2400e-003 | 0.1053 | | 196.3285 | 196.3285 | 5.9000e-003 | | 196.4759 |
| **Total** | **0.0876** | **0.0702** | **0.7092** | **1.9700e-003** | **0.4066** | **1.3500e-003** | **0.4079** | **0.1041** | **1.2400e-003** | **0.1053** | | **196.3285** | **196.3285** | **5.9000e-003** | | **196.4759** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.2822 | 12.1746 | 13.5932 | 0.0208 | | 0.6767 | 0.6767 | | 0.6312 | 0.6312 | 0.0000 | 1,990.5588 | 1,990.5588 | 0.5610 | | 2,004.5833 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **1.2822** | **12.1746** | **13.5932** | **0.0208** | | **0.6767** | **0.6767** | | **0.6312** | **0.6312** | **0.0000** | **1,990.5588** | **1,990.5588** | **0.5610** | | **2,004.5833** |

## 3.6 Paving - 2021

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0876 | 0.0702 | 0.7092 | 1.9700e-003 | 0.4066 | 1.3500e-003 | 0.4079 | 0.1041 | 1.2400e-003 | 0.1053 | | 196.3285 | 196.3285 | 5.9000e-003 | | 196.4759 |
| **Total** | **0.0876** | **0.0702** | **0.7092** | **1.9700e-003** | **0.4066** | **1.3500e-003** | **0.4079** | **0.1041** | **1.2400e-003** | **0.1053** | | **196.3285** | **196.3285** | **5.9000e-003** | | **196.4759** |

## 3.7 Architectural Coating - 2021

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Archit. Coating | 56.0650 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.2189 | 1.5268 | 1.8176 | 2.9700e-003 | | 0.0941 | 0.0941 | | 0.0941 | 0.0941 | | 281.4481 | 281.4481 | 0.0193 | | 281.9309 |
| **Total** | **56.2839** | **1.5268** | **1.8176** | **2.9700e-003** | | **0.0941** | **0.0941** | | **0.0941** | **0.0941** | | **281.4481** | **281.4481** | **0.0193** | | **281.9309** |

## 3.7 Architectural Coating - 2021

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0279 | 0.0223 | 0.2256 | 6.3000e-004 | 0.0692 | 4.3000e-004 | 0.0696 | 0.0184 | 4.0000e-004 | 0.0188 | | 62.4682 | 62.4682 | 1.8800e-003 | | 62.5151 |
| **Total** | **0.0279** | **0.0223** | **0.2256** | **6.3000e-004** | **0.0692** | **4.3000e-004** | **0.0696** | **0.0184** | **4.0000e-004** | **0.0188** | | **62.4682** | **62.4682** | **1.8800e-003** | | **62.5151** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Archit. Coating | 56.0650 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.2189 | 1.5268 | 1.8176 | 2.9700e-003 | | 0.0941 | 0.0941 | | 0.0941 | 0.0941 | 0.0000 | 281.4481 | 281.4481 | 0.0193 | | 281.9309 |
| **Total** | **56.2839** | **1.5268** | **1.8176** | **2.9700e-003** | | **0.0941** | **0.0941** | | **0.0941** | **0.0941** | **0.0000** | **281.4481** | **281.4481** | **0.0193** | | **281.9309** |

### 3.7 Architectural Coating - 2021

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0279 | 0.0223 | 0.2256 | 6.3000e-004 | 0.0692 | 4.3000e-004 | 0.0696 | 0.0184 | 4.0000e-004 | 0.0188 | | 62.4682 | 62.4682 | 1.8800e-003 | | 62.5151 |
| **Total** | **0.0279** | **0.0223** | **0.2256** | **6.3000e-004** | **0.0692** | **4.3000e-004** | **0.0696** | **0.0184** | **4.0000e-004** | **0.0188** | | **62.4682** | **62.4682** | **1.8800e-003** | | **62.5151** |

## 4.0 Operational Detail - Mobile

### 4.1 Mitigation Measures Mobile

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Mitigated | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Unmitigated | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |

## 4.2 Trip Summary Information

| | Average Daily Trip Rate | | | Unmitigated | Mitigated |
|---|---|---|---|---|---|
| Land Use | Weekday | Saturday | Sunday | Annual VMT | Annual VMT |
| Research & Development | 0.00 | 0.00 | 0.00 | | |
| Research & Development | 0.00 | 0.00 | 0.00 | | |
| Research & Development | 0.00 | 0.00 | 0.00 | | |
| Other Non-Asphalt Surfaces | 0.00 | 0.00 | 0.00 | | |
| Total | 0.00 | 0.00 | 0.00 | | |

## 4.3 Trip Type Information

| | Miles | | | Trip % | | | Trip Purpose % | | |
|---|---|---|---|---|---|---|---|---|---|
| Land Use | H-W or C-W | H-S or C-C | H-O or C-NW | H-W or C-W | H-S or C-C | H-O or C-NW | Primary | Diverted | Pass-by |
| Research & Development | 13.00 | 5.00 | 5.00 | 33.00 | 48.00 | 19.00 | 82 | 15 | 3 |
| Research & Development | 13.00 | 5.00 | 5.00 | 33.00 | 48.00 | 19.00 | 82 | 15 | 3 |
| Research & Development | 13.00 | 5.00 | 5.00 | 33.00 | 48.00 | 19.00 | 82 | 15 | 3 |
| Other Non-Asphalt Surfaces | 13.00 | 5.00 | 5.00 | 0.00 | 0.00 | 0.00 | 0 | 0 | 0 |

## 4.4 Fleet Mix

| Land Use | LDA | LDT1 | LDT2 | MDV | LHD1 | LHD2 | MHD | HHD | OBUS | UBUS | MCY | SBUS | MH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Research & Development | 0.575581 | 0.029595 | 0.198288 | 0.120539 | 0.026172 | 0.006482 | 0.012911 | 0.019591 | 0.002354 | 0.001214 | 0.005068 | 0.000784 | 0.001422 |
| Other Non-Asphalt Surfaces | 0.575581 | 0.029595 | 0.198288 | 0.120539 | 0.026172 | 0.006482 | 0.012911 | 0.019591 | 0.002354 | 0.001214 | 0.005068 | 0.000784 | 0.001422 |

## 5.0 Energy Detail

Historical Energy Use: N

### 5.1 Mitigation Measures Energy

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| NaturalGas Mitigated | 0.0837 | 0.7610 | 0.6392 | 4.5700e-003 | | 0.0578 | 0.0578 | | 0.0578 | 0.0578 | | 913.2029 | 913.2029 | 0.0175 | 0.0167 | 918.6296 |
| NaturalGas Unmitigated | 0.0837 | 0.7610 | 0.6392 | 4.5700e-003 | | 0.0578 | 0.0578 | | 0.0578 | 0.0578 | | 913.2029 | 913.2029 | 0.0175 | 0.0167 | 918.6296 |

## 5.2 Energy by Land Use - NaturalGas

**Unmitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | lb/day | | | | | | | | | | lb/day | | | | | |
| Other Non-Asphalt Surfaces | 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 |
| Research & Development | 108.411 | 1.1700e-003 | 0.0106 | 8.9300e-003 | 6.0000e-005 | | 8.1000e-004 | 8.1000e-004 | | 8.1000e-004 | 8.1000e-004 | | 12.7542 | 12.7542 | 2.4000e-004 | 2.3000e-004 | 12.8300 |
| Research & Development | 216.822 | 2.3400e-003 | 0.0213 | 0.0179 | 1.3000e-004 | | 1.6200e-003 | 1.6200e-003 | | 1.6200e-003 | 1.6200e-003 | | 25.5085 | 25.5085 | 4.9000e-004 | 4.7000e-004 | 25.6600 |
| Research & Development | 7436.99 | 0.0802 | 0.7291 | 0.6125 | 4.3700e-003 | | 0.0554 | 0.0554 | | 0.0554 | 0.0554 | | 874.9402 | 874.9402 | 0.0168 | 0.0160 | 880.1395 |
| **Total** | | **0.0837** | **0.7610** | **0.6393** | **4.5600e-003** | | **0.0578** | **0.0578** | | **0.0578** | **0.0578** | | **913.2029** | **913.2029** | **0.0175** | **0.0167** | **918.6296** |

## 5.2 Energy by Land Use - NaturalGas

**Mitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | lb/day | | | | | | | | | | lb/day | | | | | |
| Other Non-Asphalt Surfaces | 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 |
| Research & Development | 0.108411 | 1.1700e-003 | 0.0106 | 8.9300e-003 | 6.0000e-005 | | 8.1000e-004 | 8.1000e-004 | | 8.1000e-004 | 8.1000e-004 | | 12.7542 | 12.7542 | 2.4000e-004 | 2.3000e-004 | 12.8300 |
| Research & Development | 0.216822 | 2.3400e-003 | 0.0213 | 0.0179 | 1.3000e-004 | | 1.6200e-003 | 1.6200e-003 | | 1.6200e-003 | 1.6200e-003 | | 25.5085 | 25.5085 | 4.9000e-004 | 4.7000e-004 | 25.6600 |
| Research & Development | 7.43699 | 0.0802 | 0.7291 | 0.6125 | 4.3700e-003 | | 0.0554 | 0.0554 | | 0.0554 | 0.0554 | | 874.9402 | 874.9402 | 0.0168 | 0.0160 | 880.1395 |
| **Total** | | **0.0837** | **0.7610** | **0.6393** | **4.5600e-003** | | **0.0578** | **0.0578** | | **0.0578** | **0.0578** | | **913.2029** | **913.2029** | **0.0175** | **0.0167** | **918.6296** |

# 6.0 Area Detail

## 6.1 Mitigation Measures Area

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Mitigated | 2.6077 | 1.0000e-004 | 0.0113 | 0.0000 | | 4.0000e-005 | 4.0000e-005 | | 4.0000e-005 | 4.0000e-005 | | 0.0242 | 0.0242 | 6.0000e-005 | | 0.0258 |
| Unmitigated | 2.6077 | 1.0000e-004 | 0.0113 | 0.0000 | | 4.0000e-005 | 4.0000e-005 | | 4.0000e-005 | 4.0000e-005 | | 0.0242 | 0.0242 | 6.0000e-005 | | 0.0258 |

## 6.2 Area by SubCategory

**Unmitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | lb/day | | | | | | | | | | lb/day | | | | | |
| Architectural Coating | 0.3072 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Consumer Products | 2.2994 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Landscaping | 1.0500e-003 | 1.0000e-004 | 0.0113 | 0.0000 | | 4.0000e-005 | 4.0000e-005 | | 4.0000e-005 | 4.0000e-005 | | 0.0242 | 0.0242 | 6.0000e-005 | | 0.0258 |
| **Total** | **2.6077** | **1.0000e-004** | **0.0113** | **0.0000** | | **4.0000e-005** | **4.0000e-005** | | **4.0000e-005** | **4.0000e-005** | | **0.0242** | **0.0242** | **6.0000e-005** | | **0.0258** |

### 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 | lb/day | | | | | | | | | | lb/day | | | | | |
| Architectural Coating | 0.3072 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Consumer Products | 2.2994 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Landscaping | 1.0500e-003 | 1.0000e-004 | 0.0113 | 0.0000 | | 4.0000e-005 | 4.0000e-005 | | 4.0000e-005 | 4.0000e-005 | | 0.0242 | 0.0242 | 6.0000e-005 | | 0.0258 |
| **Total** | **2.6077** | **1.0000e-004** | **0.0113** | **0.0000** | | **4.0000e-005** | **4.0000e-005** | | **4.0000e-005** | **4.0000e-005** | | **0.0242** | **0.0242** | **6.0000e-005** | | **0.0258** |

## 7.0 Water Detail

### 7.1 Mitigation Measures Water

## 8.0 Waste Detail

### 8.1 Mitigation Measures Waste

## 9.0 Operational Offroad

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

## 10.0 Stationary Equipment

**Fire Pumps and Emergency Generators**

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

**Boilers**

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

**User Defined Equipment**

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

## 11.0 Vegetation

# Science and Agriculture Teaching and Research Complex Project

**San Luis Obispo County, Winter**

## 1.0 Project Characteristics

### 1.1 Land Usage

| Land Uses | Size | Metric | Lot Acreage | Floor Surface Area | Population |
|---|---|---|---|---|---|
| Research & Development | 102.90 | 1000sqft | 2.36 | 102,900.00 | 0 |
| Research & Development | 3.00 | 1000sqft | 0.07 | 3,000.00 | 0 |
| Research & Development | 1.50 | 1000sqft | 0.03 | 1,500.00 | 0 |
| Other Non-Asphalt Surfaces | 3.00 | 1000sqft | 0.07 | 3,000.00 | 0 |

### 1.2 Other Project Characteristics

| | | | | | |
|---|---|---|---|---|---|
| **Urbanization** | Urban | **Wind Speed (m/s)** | 3.2 | **Precipitation Freq (Days)** | 44 |
| **Climate Zone** | 4 | | | **Operational Year** | 2022 |
| **Utility Company** | Pacific Gas & Electric Company | | | | |
| **CO2 Intensity (lb/MWhr)** | 641.35 | **CH4 Intensity (lb/MWhr)** | 0.029 | **N2O Intensity (lb/MWhr)** | 0.006 |

### 1.3 User Entered Comments & Non-Default Data

Science and Agriculture Teaching and Research Complex Project - San Luis Obispo County, Winter

Project Characteristics -

Land Use -

Construction Phase - Construction July 2019 through July 2021

Grading - project description: 27,251 cy

Demolition -

Vehicle Trips - no student increase anticipated

Architectural Coating - Rule 433 SLOAPCD flat and nonflat coatings

Area Coating - Rule 433 SLOAPCD

Water And Wastewater -

Land Use Change -

Construction Off-road Equipment Mitigation -

| Table Name | Column Name | Default Value | New Value |
|---|---|---|---|
| tblArchitecturalCoating | EF_Nonresidential_Exterior | 250.00 | 150.00 |
| tblArchitecturalCoating | EF_Nonresidential_Interior | 250.00 | 100.00 |
| tblArchitecturalCoating | EF_Residential_Exterior | 250.00 | 150.00 |
| tblArchitecturalCoating | EF_Residential_Interior | 250.00 | 100.00 |
| tblAreaCoating | Area_EF_Nonresidential_Exterior | 250 | 150 |
| tblAreaCoating | Area_EF_Nonresidential_Interior | 250 | 100 |
| tblAreaCoating | Area_EF_Residential_Exterior | 250 | 150 |
| tblAreaCoating | Area_EF_Residential_Interior | 250 | 100 |
| tblConstructionPhase | NumDays | 10.00 | 20.00 |
| tblConstructionPhase | NumDays | 220.00 | 440.00 |
| tblConstructionPhase | NumDays | 20.00 | 40.00 |
| tblConstructionPhase | NumDays | 6.00 | 12.00 |
| tblConstructionPhase | NumDays | 10.00 | 20.00 |
| tblConstructionPhase | NumDays | 3.00 | 6.00 |

| | | | |
|---|---|---|---|
| tblConstructionPhase | PhaseEndDate | 7/9/2020 | 7/21/2021 |
| tblConstructionPhase | PhaseEndDate | 6/11/2020 | 5/26/2021 |
| tblConstructionPhase | PhaseEndDate | 7/26/2019 | 8/23/2019 |
| tblConstructionPhase | PhaseEndDate | 8/8/2019 | 9/18/2019 |
| tblConstructionPhase | PhaseEndDate | 6/25/2020 | 6/23/2021 |
| tblConstructionPhase | PhaseEndDate | 7/31/2019 | 9/3/2019 |
| tblConstructionPhase | PhaseStartDate | 6/26/2020 | 6/24/2021 |
| tblConstructionPhase | PhaseStartDate | 8/9/2019 | 9/19/2019 |
| tblConstructionPhase | PhaseStartDate | 8/1/2019 | 9/3/2019 |
| tblConstructionPhase | PhaseStartDate | 6/12/2020 | 5/27/2021 |
| tblConstructionPhase | PhaseStartDate | 7/27/2019 | 8/26/2019 |
| tblGrading | AcresOfGrading | 9.00 | 3.00 |
| tblGrading | AcresOfGrading | 9.00 | 4.50 |
| tblGrading | AcresOfGrading | 6.00 | 3.00 |
| tblGrading | MaterialExported | 0.00 | 27,251.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 3.00 | 1.00 |
| tblOffRoadEquipment | OffRoadEquipmentUnitAmount | 1.00 | 2.00 |
| tblOffRoadEquipment | UsageHours | 8.00 | 6.00 |
| tblTripsAndVMT | VendorTripNumber | 0.00 | 18.00 |
| tblTripsAndVMT | WorkerTripNumber | 33.00 | 13.00 |
| tblTripsAndVMT | WorkerTripNumber | 18.00 | 8.00 |
| tblTripsAndVMT | WorkerTripNumber | 18.00 | 10.00 |
| tblTripsAndVMT | WorkerTripNumber | 33.00 | 36.00 |
| tblTripsAndVMT | WorkerTripNumber | 18.00 | 15.00 |
| tblTripsAndVMT | WorkerTripNumber | 18.00 | 7.00 |
| tblVehicleTrips | ST_TR | 1.90 | 0.00 |
| tblVehicleTrips | SU_TR | 1.11 | 0.00 |

| | | | |
|---|---|---|---|
| tblVehicleTrips | WD_TR | 8.11 | 0.00 |

## 2.0 Emissions Summary

## 2.1 Overall Construction (Maximum Daily Emission)

### Unmitigated Construction

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | lb/day | | | | | | | | | | lb/day | | | | | |
| 2019 | 8.9275 | 165.6286 | 55.6848 | 0.2920 | 25.4572 | 3.6020 | 29.0592 | 11.6331 | 3.3359 | 14.9690 | 0.0000 | 30,842.7225 | 30,842.7225 | 3.4730 | 0.0000 | 30,929.5463 |
| 2020 | 2.5324 | 19.4278 | 16.7399 | 0.0317 | 0.4395 | 0.9609 | 1.4003 | 0.1185 | 0.9209 | 1.0394 | 0.0000 | 2,980.8727 | 2,980.8727 | 0.4988 | 0.0000 | 2,993.3427 |
| 2021 | 56.3157 | 17.8481 | 16.2205 | 0.0316 | 0.4395 | 0.8245 | 1.2640 | 0.1185 | 0.7900 | 0.9084 | 0.0000 | 2,967.7629 | 2,967.7629 | 0.5667 | 0.0000 | 2,979.8335 |
| **Maximum** | **56.3157** | **165.6286** | **55.6848** | **0.2920** | **25.4572** | **3.6020** | **29.0592** | **11.6331** | **3.3359** | **14.9690** | **0.0000** | **30,842.7225** | **30,842.7225** | **3.4730** | **0.0000** | **30,929.5463** |

### Mitigated Construction

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | lb/day | | | | | | | | | | lb/day | | | | | |
| 2019 | 8.9275 | 165.6286 | 55.6848 | 0.2920 | 25.4572 | 3.6020 | 29.0592 | 11.6331 | 3.3359 | 14.9690 | 0.0000 | 30,842.7225 | 30,842.7225 | 3.4730 | 0.0000 | 30,929.5463 |
| 2020 | 2.5324 | 19.4278 | 16.7399 | 0.0317 | 0.4395 | 0.9609 | 1.4003 | 0.1185 | 0.9209 | 1.0394 | 0.0000 | 2,980.8727 | 2,980.8727 | 0.4988 | 0.0000 | 2,993.3427 |
| 2021 | 56.3157 | 17.8481 | 16.2205 | 0.0316 | 0.4395 | 0.8245 | 1.2640 | 0.1185 | 0.7900 | 0.9084 | 0.0000 | 2,967.7629 | 2,967.7629 | 0.5667 | 0.0000 | 2,979.8335 |
| **Maximum** | **56.3157** | **165.6286** | **55.6848** | **0.2920** | **25.4572** | **3.6020** | **29.0592** | **11.6331** | **3.3359** | **14.9690** | **0.0000** | **30,842.7225** | **30,842.7225** | **3.4730** | **0.0000** | **30,929.5463** |

Science and Agriculture Teaching and Research Complex Project - San Luis Obispo County, Winter

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

## 2.2 Overall Operational

### Unmitigated Operational

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Area | 2.6077 | 1.0000e-004 | 0.0113 | 0.0000 | | 4.0000e-005 | 4.0000e-005 | | 4.0000e-005 | 4.0000e-005 | | 0.0242 | 0.0242 | 6.0000e-005 | | 0.0258 |
| Energy | 0.0837 | 0.7610 | 0.6392 | 4.5700e-003 | | 0.0578 | 0.0578 | | 0.0578 | 0.0578 | | 913.2029 | 913.2029 | 0.0175 | 0.0167 | 918.6296 |
| Mobile | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| **Total** | **2.6914** | **0.7611** | **0.6505** | **4.5700e-003** | **0.0000** | **0.0579** | **0.0579** | **0.0000** | **0.0579** | **0.0579** | | **913.2271** | **913.2271** | **0.0176** | **0.0167** | **918.6554** |

### Mitigated Operational

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Area | 2.6077 | 1.0000e-004 | 0.0113 | 0.0000 | | 4.0000e-005 | 4.0000e-005 | | 4.0000e-005 | 4.0000e-005 | | 0.0242 | 0.0242 | 6.0000e-005 | | 0.0258 |
| Energy | 0.0837 | 0.7610 | 0.6392 | 4.5700e-003 | | 0.0578 | 0.0578 | | 0.0578 | 0.0578 | | 913.2029 | 913.2029 | 0.0175 | 0.0167 | 918.6296 |
| Mobile | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| **Total** | **2.6914** | **0.7611** | **0.6505** | **4.5700e-003** | **0.0000** | **0.0579** | **0.0579** | **0.0000** | **0.0579** | **0.0579** | | **913.2271** | **913.2271** | **0.0176** | **0.0167** | **918.6554** |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Percent Reduction | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

## 3.0 Construction Detail

### Construction Phase

| Phase Number | Phase Name | Phase Type | Start Date | End Date | Num Days Week | Num Days | Phase Description |
|---|---|---|---|---|---|---|---|
| 1 | Demolition | Demolition | 7/1/2019 | 8/23/2019 | 5 | 40 | |
| 2 | Site Preparation | Site Preparation | 8/26/2019 | 9/3/2019 | 5 | 6 | |
| 3 | Grading | Grading | 9/3/2019 | 9/18/2019 | 5 | 12 | |
| 4 | Building Construction | Building Construction | 9/19/2019 | 5/26/2021 | 5 | 440 | |
| 5 | Paving | Paving | 5/27/2021 | 6/23/2021 | 5 | 20 | |
| 6 | Architectural Coating | Architectural Coating | 6/24/2021 | 7/21/2021 | 5 | 20 | |

**Acres of Grading (Site Preparation Phase): 3**

**Acres of Grading (Grading Phase): 3**

**Acres of Paving: 0.07**

**Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 161,100; Non-Residential Outdoor: 53,700; Striped Parking Area: 180 (Architectural Coating – sqft)**

### OffRoad Equipment

| Phase Name | Offroad Equipment Type | Amount | Usage Hours | Horse Power | Load Factor |
|---|---|---|---|---|---|
| Paving | Air Compressors | 1 | 6.00 | 78 | 0.48 |
| Paving | Cement and Mortar Mixers | 1 | 8.00 | 9 | 0.56 |
| Demolition | Concrete/Industrial Saws | 1 | 8.00 | 81 | 0.73 |
| Demolition | Generator Sets | 1 | 8.00 | 84 | 0.74 |

| | | | | | |
|---|---|---|---|---|---|
| Demolition | Cranes | 1 | 8.00 | 231 | 0.29 |
| Demolition | Forklifts | 2 | 7.00 | 89 | 0.20 |
| Site Preparation | Graders | 1 | 8.00 | 187 | 0.41 |
| Paving | Pavers | 1 | 8.00 | 130 | 0.42 |
| Paving | Rollers | 2 | 8.00 | 80 | 0.38 |
| Demolition | Rubber Tired Dozers | 1 | 8.00 | 247 | 0.40 |
| Site Preparation | Rubber Tired Dozers | 1 | 8.00 | 247 | 0.40 |
| Demolition | Tractors/Loaders/Backhoes | 1 | 6.00 | 97 | 0.37 |
| Demolition | Tractors/Loaders/Backhoes | 3 | 8.00 | 97 | 0.37 |
| Site Preparation | Tractors/Loaders/Backhoes | 2 | 7.00 | 97 | 0.37 |
| Paving | Tractors/Loaders/Backhoes | 1 | 8.00 | 97 | 0.37 |
| Site Preparation | Tractors/Loaders/Backhoes | 1 | 7.00 | 97 | 0.37 |
| Site Preparation | Graders | 1 | 8.00 | 187 | 0.41 |
| Paving | Paving Equipment | 1 | 8.00 | 132 | 0.36 |
| Site Preparation | Scrapers | 1 | 8.00 | 367 | 0.48 |
| Demolition | Welders | 3 | 8.00 | 46 | 0.45 |
| Architectural Coating | Air Compressors | 1 | 6.00 | 78 | 0.48 |
| Building Construction | Cranes | 1 | 8.00 | 231 | 0.29 |
| Building Construction | Forklifts | 2 | 7.00 | 89 | 0.20 |
| Building Construction | Generator Sets | 1 | 8.00 | 84 | 0.74 |
| Grading | Graders | 1 | 8.00 | 187 | 0.41 |
| Grading | Rubber Tired Dozers | 1 | 8.00 | 247 | 0.40 |
| Building Construction | Tractors/Loaders/Backhoes | 1 | 6.00 | 97 | 0.37 |
| Grading | Tractors/Loaders/Backhoes | 2 | 7.00 | 97 | 0.37 |
| Building Construction | Welders | 3 | 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 |
|---|---|---|---|---|---|---|---|---|---|---|
| Demolition | 13 | 13.00 | 0.00 | 38.00 | 13.00 | 5.00 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Site Preparation | 7 | 8.00 | 0.00 | 0.00 | 13.00 | 5.00 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Site Preparation | 7 | 10.00 | 0.00 | 0.00 | 13.00 | 5.00 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Demolition | 13 | 36.00 | 18.00 | 38.00 | 13.00 | 5.00 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Paving | 7 | 15.00 | 0.00 | 0.00 | 13.00 | 5.00 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Paving | 7 | 7.00 | 0.00 | 0.00 | 13.00 | 5.00 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Architectural Coating | 1 | 7.00 | 0.00 | 0.00 | 13.00 | 5.00 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Building Construction | 8 | 36.00 | 18.00 | 0.00 | 13.00 | 5.00 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Grading | 4 | 10.00 | 0.00 | 3,406.00 | 13.00 | 5.00 | 20.00 | LD_Mix | HDT_Mix | HHDT |

## 3.1 Mitigation Measures Construction

## 3.2 Demolition - 2019

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 0.2108 | 0.0000 | 0.2108 | 0.0319 | 0.0000 | 0.0319 | | | 0.0000 | | | 0.0000 |
| Off-Road | 4.8531 | 41.5853 | 30.1488 | 0.0491 | | 2.3764 | 2.3764 | | 2.2467 | 2.2467 | | 4,672.8652 | 4,672.8652 | 1.0821 | | 4,699.9180 |
| **Total** | **4.8531** | **41.5853** | **30.1488** | **0.0491** | **0.2108** | **2.3764** | **2.5873** | **0.0319** | **2.2467** | **2.2786** | | **4,672.8652** | **4,672.8652** | **1.0821** | | **4,699.9180** |

## 3.2 Demolition - 2019

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0199 | 0.6592 | 0.1497 | 1.5000e-003 | 0.0583 | 4.0200e-003 | 0.0623 | 0.0152 | 3.8500e-003 | 0.0191 | | 161.1880 | 161.1880 | 9.4000e-003 | | 161.4230 |
| Vendor | 0.0866 | 2.0255 | 0.6799 | 3.5400e-003 | 0.1430 | 0.0167 | 0.1597 | 0.0387 | 0.0160 | 0.0546 | | 375.6986 | 375.6986 | 0.0254 | | 376.3340 |
| Worker | 0.2619 | 0.2254 | 1.9260 | 4.4800e-003 | 0.9055 | 3.2000e-003 | 0.9087 | 0.2318 | 2.9600e-003 | 0.2348 | | 445.2899 | 445.2899 | 0.0167 | | 445.7077 |
| **Total** | **0.3684** | **2.9100** | **2.7557** | **9.5200e-003** | **1.1068** | **0.0239** | **1.1307** | **0.2857** | **0.0228** | **0.3085** | | **982.1765** | **982.1765** | **0.0515** | | **983.4647** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 0.2108 | 0.0000 | 0.2108 | 0.0319 | 0.0000 | 0.0319 | | | 0.0000 | | | 0.0000 |
| Off-Road | 4.8531 | 41.5853 | 30.1488 | 0.0491 | | 2.3764 | 2.3764 | | 2.2467 | 2.2467 | 0.0000 | 4,672.8652 | 4,672.8652 | 1.0821 | | 4,699.9180 |
| **Total** | **4.8531** | **41.5853** | **30.1488** | **0.0491** | **0.2108** | **2.3764** | **2.5873** | **0.0319** | **2.2467** | **2.2786** | **0.0000** | **4,672.8652** | **4,672.8652** | **1.0821** | | **4,699.9180** |

## 3.2 Demolition - 2019

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0199 | 0.6592 | 0.1497 | 1.5000e-003 | 0.0583 | 4.0200e-003 | 0.0623 | 0.0152 | 3.8500e-003 | 0.0191 | | 161.1880 | 161.1880 | 9.4000e-003 | | 161.4230 |
| Vendor | 0.0866 | 2.0255 | 0.6799 | 3.5400e-003 | 0.1430 | 0.0167 | 0.1597 | 0.0387 | 0.0160 | 0.0546 | | 375.6986 | 375.6986 | 0.0254 | | 376.3340 |
| Worker | 0.2619 | 0.2254 | 1.9260 | 4.4800e-003 | 0.9055 | 3.2000e-003 | 0.9087 | 0.2318 | 2.9600e-003 | 0.2348 | | 445.2899 | 445.2899 | 0.0167 | | 445.7077 |
| **Total** | **0.3684** | **2.9100** | **2.7557** | **9.5200e-003** | **1.1068** | **0.0239** | **1.1307** | **0.2857** | **0.0228** | **0.3085** | | **982.1765** | **982.1765** | **0.0515** | | **983.4647** |

## 3.3 Site Preparation - 2019

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 13.3698 | 0.0000 | 13.3698 | 6.7636 | 0.0000 | 6.7636 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.7844 | 44.2830 | 22.0661 | 0.0451 | | 1.9267 | 1.9267 | | 1.7725 | 1.7725 | | 4,467.7946 | 4,467.7946 | 1.4136 | | 4,503.1337 |
| **Total** | **3.7844** | **44.2830** | **22.0661** | **0.0451** | **13.3698** | **1.9267** | **15.2965** | **6.7636** | **1.7725** | **8.5361** | | **4,467.7946** | **4,467.7946** | **1.4136** | | **4,503.1337** |

## 3.3 Site Preparation - 2019

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0962 | 0.0828 | 0.7075 | 1.6400e-003 | 0.3326 | 1.1800e-003 | 0.3338 | 0.0852 | 1.0900e-003 | 0.0863 | | 163.5759 | 163.5759 | 6.1400e-003 | | 163.7294 |
| **Total** | **0.0962** | **0.0828** | **0.7075** | **1.6400e-003** | **0.3326** | **1.1800e-003** | **0.3338** | **0.0852** | **1.0900e-003** | **0.0863** | | **163.5759** | **163.5759** | **6.1400e-003** | | **163.7294** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 13.3698 | 0.0000 | 13.3698 | 6.7636 | 0.0000 | 6.7636 | | | 0.0000 | | | 0.0000 |
| Off-Road | 3.7844 | 44.2830 | 22.0661 | 0.0451 | | 1.9267 | 1.9267 | | 1.7725 | 1.7725 | 0.0000 | 4,467.7946 | 4,467.7946 | 1.4136 | | 4,503.1337 |
| **Total** | **3.7844** | **44.2830** | **22.0661** | **0.0451** | **13.3698** | **1.9267** | **15.2965** | **6.7636** | **1.7725** | **8.5361** | **0.0000** | **4,467.7946** | **4,467.7946** | **1.4136** | | **4,503.1337** |

## 3.3 Site Preparation - 2019

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0962 | 0.0828 | 0.7075 | 1.6400e-003 | 0.3326 | 1.1800e-003 | 0.3338 | 0.0852 | 1.0900e-003 | 0.0863 | | 163.5759 | 163.5759 | 6.1400e-003 | | 163.7294 |
| **Total** | **0.0962** | **0.0828** | **0.7075** | **1.6400e-003** | **0.3326** | **1.1800e-003** | **0.3338** | **0.0852** | **1.0900e-003** | **0.0863** | | **163.5759** | **163.5759** | **6.1400e-003** | | **163.7294** |

## 3.4 Grading - 2019

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 6.7052 | 0.0000 | 6.7052 | 3.4022 | 0.0000 | 3.4022 | | | 0.0000 | | | 0.0000 |
| Off-Road | 2.0287 | 22.7444 | 10.1518 | 0.0206 | | 1.0730 | 1.0730 | | 0.9871 | 0.9871 | | 2,041.2539 | 2,041.2539 | 0.6458 | | 2,057.3997 |
| **Total** | **2.0287** | **22.7444** | **10.1518** | **0.0206** | **6.7052** | **1.0730** | **7.7782** | **3.4022** | **0.9871** | **4.3893** | | **2,041.2539** | **2,041.2539** | **0.6458** | | **2,057.3997** |

## 3.4 Grading - 2019

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 2.9647 | 98.4724 | 22.3662 | 0.2238 | 4.9507 | 0.6005 | 5.5512 | 1.3560 | 0.5746 | 1.9306 | | 24,079.2227 | 24,079.2227 | 1.4040 | | 24,114.3228 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0534 | 0.0460 | 0.3931 | 9.1000e-004 | 0.0989 | 6.5000e-004 | 0.0995 | 0.0262 | 6.0000e-004 | 0.0268 | | 90.8755 | 90.8755 | 3.4100e-003 | | 90.9608 |
| **Total** | **3.0182** | **98.5184** | **22.7593** | **0.2247** | **5.0495** | **0.6012** | **5.6507** | **1.3822** | **0.5752** | **1.9574** | | **24,170.0982** | **24,170.0982** | **1.4074** | | **24,205.2836** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 6.7052 | 0.0000 | 6.7052 | 3.4022 | 0.0000 | 3.4022 | | | 0.0000 | | | 0.0000 |
| Off-Road | 2.0287 | 22.7444 | 10.1518 | 0.0206 | | 1.0730 | 1.0730 | | 0.9871 | 0.9871 | 0.0000 | 2,041.2539 | 2,041.2539 | 0.6458 | | 2,057.3997 |
| **Total** | **2.0287** | **22.7444** | **10.1518** | **0.0206** | **6.7052** | **1.0730** | **7.7782** | **3.4022** | **0.9871** | **4.3893** | **0.0000** | **2,041.2539** | **2,041.2539** | **0.6458** | | **2,057.3997** |

## 3.4 Grading - 2019

### Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 2.9647 | 98.4724 | 22.3662 | 0.2238 | 4.9507 | 0.6005 | 5.5512 | 1.3560 | 0.5746 | 1.9306 | | 24,079.2227 | 24,079.2227 | 1.4040 | | 24,114.3228 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0534 | 0.0460 | 0.3931 | 9.1000e-004 | 0.0989 | 6.5000e-004 | 0.0995 | 0.0262 | 6.0000e-004 | 0.0268 | | 90.8755 | 90.8755 | 3.4100e-003 | | 90.9608 |
| **Total** | **3.0182** | **98.5184** | **22.7593** | **0.2247** | **5.0495** | **0.6012** | **5.6507** | **1.3822** | **0.5752** | **1.9574** | | **24,170.0982** | **24,170.0982** | **1.4074** | | **24,205.2836** |

## 3.5 Building Construction - 2019

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 2.5581 | 18.9103 | 15.2545 | 0.0250 | | 1.0901 | 1.0901 | | 1.0449 | 1.0449 | | 2,312.1454 | 2,312.1454 | 0.4810 | | 2,324.1705 |
| **Total** | **2.5581** | **18.9103** | **15.2545** | **0.0250** | | **1.0901** | **1.0901** | | **1.0449** | **1.0449** | | **2,312.1454** | **2,312.1454** | **0.4810** | | **2,324.1705** |

## 3.5 Building Construction - 2019

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0866 | 2.0255 | 0.6799 | 3.5400e-003 | 0.0835 | 0.0167 | 0.1002 | 0.0241 | 0.0160 | 0.0400 | | 375.6986 | 375.6986 | 0.0254 | | 376.3340 |
| Worker | 0.1924 | 0.1656 | 1.4151 | 3.2900e-003 | 0.3559 | 2.3500e-003 | 0.3583 | 0.0944 | 2.1700e-003 | 0.0966 | | 327.1517 | 327.1517 | 0.0123 | | 327.4587 |
| **Total** | **0.2790** | **2.1911** | **2.0950** | **6.8300e-003** | **0.4394** | **0.0190** | **0.4585** | **0.1185** | **0.0181** | **0.1366** | | **702.8504** | **702.8504** | **0.0377** | | **703.7928** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 2.5581 | 18.9103 | 15.2545 | 0.0250 | | 1.0901 | 1.0901 | | 1.0449 | 1.0449 | 0.0000 | 2,312.1454 | 2,312.1454 | 0.4810 | | 2,324.1705 |
| **Total** | **2.5581** | **18.9103** | **15.2545** | **0.0250** | | **1.0901** | **1.0901** | | **1.0449** | **1.0449** | **0.0000** | **2,312.1454** | **2,312.1454** | **0.4810** | | **2,324.1705** |

## 3.5 Building Construction - 2019

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0866 | 2.0255 | 0.6799 | 3.5400e-003 | 0.0835 | 0.0167 | 0.1002 | 0.0241 | 0.0160 | 0.0400 | | 375.6986 | 375.6986 | 0.0254 | | 376.3340 |
| Worker | 0.1924 | 0.1656 | 1.4151 | 3.2900e-003 | 0.3559 | 2.3500e-003 | 0.3583 | 0.0944 | 2.1700e-003 | 0.0966 | | 327.1517 | 327.1517 | 0.0123 | | 327.4587 |
| **Total** | **0.2790** | **2.1911** | **2.0950** | **6.8300e-003** | **0.4394** | **0.0190** | **0.4585** | **0.1185** | **0.0181** | **0.1366** | | **702.8504** | **702.8504** | **0.0377** | | **703.7928** |

## 3.5 Building Construction - 2020

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 2.2879 | 17.4336 | 14.8972 | 0.0250 | | 0.9482 | 0.9482 | | 0.9089 | 0.9089 | | 2,288.8877 | 2,288.8877 | 0.4646 | | 2,300.5014 |
| **Total** | **2.2879** | **17.4336** | **14.8972** | **0.0250** | | **0.9482** | **0.9482** | | **0.9089** | **0.9089** | | **2,288.8877** | **2,288.8877** | **0.4646** | | **2,300.5014** |

## 3.5 Building Construction - 2020

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0690 | 1.8484 | 0.5994 | 3.5300e-003 | 0.0836 | 0.0104 | 0.0940 | 0.0241 | 9.9500e-003 | 0.0340 | | 374.9592 | 374.9592 | 0.0238 | | 375.5535 |
| Worker | 0.1755 | 0.1458 | 1.2432 | 3.1800e-003 | 0.3559 | 2.2800e-003 | 0.3582 | 0.0944 | 2.1000e-003 | 0.0965 | | 317.0258 | 317.0258 | 0.0105 | | 317.2879 |
| **Total** | **0.2446** | **1.9942** | **1.8427** | **6.7100e-003** | **0.4395** | **0.0127** | **0.4521** | **0.1185** | **0.0121** | **0.1305** | | **691.9849** | **691.9849** | **0.0343** | | **692.8413** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 2.2879 | 17.4336 | 14.8972 | 0.0250 | | 0.9482 | 0.9482 | | 0.9089 | 0.9089 | 0.0000 | 2,288.8877 | 2,288.8877 | 0.4646 | | 2,300.5014 |
| **Total** | **2.2879** | **17.4336** | **14.8972** | **0.0250** | | **0.9482** | **0.9482** | | **0.9089** | **0.9089** | **0.0000** | **2,288.8877** | **2,288.8877** | **0.4646** | | **2,300.5014** |

## 3.5 Building Construction - 2020

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0690 | 1.8484 | 0.5994 | 3.5300e-003 | 0.0836 | 0.0104 | 0.0940 | 0.0241 | 9.9500e-003 | 0.0340 | | 374.9592 | 374.9592 | 0.0238 | | 375.5535 |
| Worker | 0.1755 | 0.1458 | 1.2432 | 3.1800e-003 | 0.3559 | 2.2800e-003 | 0.3582 | 0.0944 | 2.1000e-003 | 0.0965 | | 317.0258 | 317.0258 | 0.0105 | | 317.2879 |
| **Total** | **0.2446** | **1.9942** | **1.8427** | **6.7100e-003** | **0.4395** | **0.0127** | **0.4521** | **0.1185** | **0.0121** | **0.1305** | | **691.9849** | **691.9849** | **0.0343** | | **692.8413** |

## 3.5 Building Construction - 2021

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 2.0451 | 16.0275 | 14.5629 | 0.0250 | | 0.8173 | 0.8173 | | 0.7831 | 0.7831 | | 2,288.9355 | 2,288.9355 | 0.4503 | | 2,300.1935 |
| **Total** | **2.0451** | **16.0275** | **14.5629** | **0.0250** | | **0.8173** | **0.8173** | | **0.7831** | **0.7831** | | **2,288.9355** | **2,288.9355** | **0.4503** | | **2,300.1935** |

## 3.5 Building Construction - 2021

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0568 | 1.6903 | 0.5316 | 3.5000e-003 | 0.0836 | 5.0500e-003 | 0.0886 | 0.0241 | 4.8300e-003 | 0.0289 | | 372.6064 | 372.6064 | 0.0232 | | 373.1863 |
| Worker | 0.1638 | 0.1304 | 1.1260 | 3.0700e-003 | 0.3559 | 2.2000e-003 | 0.3581 | 0.0944 | 2.0300e-003 | 0.0964 | | 306.2210 | 306.2210 | 9.3100e-003 | | 306.4537 |
| **Total** | **0.2206** | **1.8206** | **1.6575** | **6.5700e-003** | **0.4395** | **7.2500e-003** | **0.4467** | **0.1185** | **6.8600e-003** | **0.1253** | | **678.8274** | **678.8274** | **0.0325** | | **679.6399** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 2.0451 | 16.0275 | 14.5629 | 0.0250 | | 0.8173 | 0.8173 | | 0.7831 | 0.7831 | 0.0000 | 2,288.9355 | 2,288.9355 | 0.4503 | | 2,300.1935 |
| **Total** | **2.0451** | **16.0275** | **14.5629** | **0.0250** | | **0.8173** | **0.8173** | | **0.7831** | **0.7831** | **0.0000** | **2,288.9355** | **2,288.9355** | **0.4503** | | **2,300.1935** |

## 3.5 Building Construction - 2021

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0568 | 1.6903 | 0.5316 | 3.5000e-003 | 0.0836 | 5.0500e-003 | 0.0886 | 0.0241 | 4.8300e-003 | 0.0289 | | 372.6064 | 372.6064 | 0.0232 | | 373.1863 |
| Worker | 0.1638 | 0.1304 | 1.1260 | 3.0700e-003 | 0.3559 | 2.2000e-003 | 0.3581 | 0.0944 | 2.0300e-003 | 0.0964 | | 306.2210 | 306.2210 | 9.3100e-003 | | 306.4537 |
| **Total** | **0.2206** | **1.8206** | **1.6575** | **6.5700e-003** | **0.4395** | **7.2500e-003** | **0.4467** | **0.1185** | **6.8600e-003** | **0.1253** | | **678.8274** | **678.8274** | **0.0325** | | **679.6399** |

## 3.6 Paving - 2021

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.2822 | 12.1746 | 13.5932 | 0.0208 | | 0.6767 | 0.6767 | | 0.6312 | 0.6312 | | 1,990.5588 | 1,990.5588 | 0.5610 | | 2,004.5833 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **1.2822** | **12.1746** | **13.5932** | **0.0208** | | **0.6767** | **0.6767** | | **0.6312** | **0.6312** | | **1,990.5588** | **1,990.5588** | **0.5610** | | **2,004.5833** |

## 3.6 Paving - 2021

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.1001 | 0.0797 | 0.6881 | 1.8800e-003 | 0.4066 | 1.3500e-003 | 0.4079 | 0.1041 | 1.2400e-003 | 0.1053 | | 187.1351 | 187.1351 | 5.6900e-003 | | 187.2772 |
| **Total** | **0.1001** | **0.0797** | **0.6881** | **1.8800e-003** | **0.4066** | **1.3500e-003** | **0.4079** | **0.1041** | **1.2400e-003** | **0.1053** | | **187.1351** | **187.1351** | **5.6900e-003** | | **187.2772** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.2822 | 12.1746 | 13.5932 | 0.0208 | | 0.6767 | 0.6767 | | 0.6312 | 0.6312 | 0.0000 | 1,990.5588 | 1,990.5588 | 0.5610 | | 2,004.5833 |
| Paving | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| **Total** | **1.2822** | **12.1746** | **13.5932** | **0.0208** | | **0.6767** | **0.6767** | | **0.6312** | **0.6312** | **0.0000** | **1,990.5588** | **1,990.5588** | **0.5610** | | **2,004.5833** |

## 3.6 Paving - 2021

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.1001 | 0.0797 | 0.6881 | 1.8800e-003 | 0.4066 | 1.3500e-003 | 0.4079 | 0.1041 | 1.2400e-003 | 0.1053 | | 187.1351 | 187.1351 | 5.6900e-003 | | 187.2772 |
| **Total** | **0.1001** | **0.0797** | **0.6881** | **1.8800e-003** | **0.4066** | **1.3500e-003** | **0.4079** | **0.1041** | **1.2400e-003** | **0.1053** | | **187.1351** | **187.1351** | **5.6900e-003** | | **187.2772** |

## 3.7 Architectural Coating - 2021

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Archit. Coating | 56.0650 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.2189 | 1.5268 | 1.8176 | 2.9700e-003 | | 0.0941 | 0.0941 | | 0.0941 | 0.0941 | | 281.4481 | 281.4481 | 0.0193 | | 281.9309 |
| **Total** | **56.2839** | **1.5268** | **1.8176** | **2.9700e-003** | | **0.0941** | **0.0941** | | **0.0941** | **0.0941** | | **281.4481** | **281.4481** | **0.0193** | | **281.9309** |

## 3.7 Architectural Coating - 2021

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0319 | 0.0254 | 0.2189 | 6.0000e-004 | 0.0692 | 4.3000e-004 | 0.0696 | 0.0184 | 4.0000e-004 | 0.0188 | | 59.5430 | 59.5430 | 1.8100e-003 | | 59.5882 |
| **Total** | **0.0319** | **0.0254** | **0.2189** | **6.0000e-004** | **0.0692** | **4.3000e-004** | **0.0696** | **0.0184** | **4.0000e-004** | **0.0188** | | **59.5430** | **59.5430** | **1.8100e-003** | | **59.5882** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Archit. Coating | 56.0650 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.2189 | 1.5268 | 1.8176 | 2.9700e-003 | | 0.0941 | 0.0941 | | 0.0941 | 0.0941 | 0.0000 | 281.4481 | 281.4481 | 0.0193 | | 281.9309 |
| **Total** | **56.2839** | **1.5268** | **1.8176** | **2.9700e-003** | | **0.0941** | **0.0941** | | **0.0941** | **0.0941** | **0.0000** | **281.4481** | **281.4481** | **0.0193** | | **281.9309** |

### 3.7 Architectural Coating - 2021

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Worker | 0.0319 | 0.0254 | 0.2189 | 6.0000e-004 | 0.0692 | 4.3000e-004 | 0.0696 | 0.0184 | 4.0000e-004 | 0.0188 | | 59.5430 | 59.5430 | 1.8100e-003 | | 59.5882 |
| **Total** | **0.0319** | **0.0254** | **0.2189** | **6.0000e-004** | **0.0692** | **4.3000e-004** | **0.0696** | **0.0184** | **4.0000e-004** | **0.0188** | | **59.5430** | **59.5430** | **1.8100e-003** | | **59.5882** |

## 4.0 Operational Detail - Mobile

### 4.1 Mitigation Measures Mobile

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Mitigated | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |
| Unmitigated | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | | 0.0000 |

## 4.2 Trip Summary Information

| | Average Daily Trip Rate | | | Unmitigated | Mitigated |
|---|---|---|---|---|---|
| Land Use | Weekday | Saturday | Sunday | Annual VMT | Annual VMT |
| Research & Development | 0.00 | 0.00 | 0.00 | | |
| Research & Development | 0.00 | 0.00 | 0.00 | | |
| Research & Development | 0.00 | 0.00 | 0.00 | | |
| Other Non-Asphalt Surfaces | 0.00 | 0.00 | 0.00 | | |
| Total | 0.00 | 0.00 | 0.00 | | |

## 4.3 Trip Type Information

| | Miles | | | Trip % | | | Trip Purpose % | | |
|---|---|---|---|---|---|---|---|---|---|
| Land Use | H-W or C-W | H-S or C-C | H-O or C-NW | H-W or C-W | H-S or C-C | H-O or C-NW | Primary | Diverted | Pass-by |
| Research & Development | 13.00 | 5.00 | 5.00 | 33.00 | 48.00 | 19.00 | 82 | 15 | 3 |
| Research & Development | 13.00 | 5.00 | 5.00 | 33.00 | 48.00 | 19.00 | 82 | 15 | 3 |
| Research & Development | 13.00 | 5.00 | 5.00 | 33.00 | 48.00 | 19.00 | 82 | 15 | 3 |
| Other Non-Asphalt Surfaces | 13.00 | 5.00 | 5.00 | 0.00 | 0.00 | 0.00 | 0 | 0 | 0 |

## 4.4 Fleet Mix

| Land Use | LDA | LDT1 | LDT2 | MDV | LHD1 | LHD2 | MHD | HHD | OBUS | UBUS | MCY | SBUS | MH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Research & Development | 0.575581 | 0.029595 | 0.198288 | 0.120539 | 0.026172 | 0.006482 | 0.012911 | 0.019591 | 0.002354 | 0.001214 | 0.005068 | 0.000784 | 0.001422 |
| Other Non-Asphalt Surfaces | 0.575581 | 0.029595 | 0.198288 | 0.120539 | 0.026172 | 0.006482 | 0.012911 | 0.019591 | 0.002354 | 0.001214 | 0.005068 | 0.000784 | 0.001422 |

## 5.0 Energy Detail

Historical Energy Use: N

### 5.1 Mitigation Measures Energy

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| NaturalGas Mitigated | 0.0837 | 0.7610 | 0.6392 | 4.5700e-003 | | 0.0578 | 0.0578 | | 0.0578 | 0.0578 | | 913.2029 | 913.2029 | 0.0175 | 0.0167 | 918.6296 |
| NaturalGas Unmitigated | 0.0837 | 0.7610 | 0.6392 | 4.5700e-003 | | 0.0578 | 0.0578 | | 0.0578 | 0.0578 | | 913.2029 | 913.2029 | 0.0175 | 0.0167 | 918.6296 |

## 5.2 Energy by Land Use - NaturalGas

**Unmitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | lb/day | | | | | | | | | | lb/day | | | | | |
| Other Non-Asphalt Surfaces | 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 |
| Research & Development | 108.411 | 1.1700e-003 | 0.0106 | 8.9300e-003 | 6.0000e-005 | | 8.1000e-004 | 8.1000e-004 | | 8.1000e-004 | 8.1000e-004 | | 12.7542 | 12.7542 | 2.4000e-004 | 2.3000e-004 | 12.8300 |
| Research & Development | 216.822 | 2.3400e-003 | 0.0213 | 0.0179 | 1.3000e-004 | | 1.6200e-003 | 1.6200e-003 | | 1.6200e-003 | 1.6200e-003 | | 25.5085 | 25.5085 | 4.9000e-004 | 4.7000e-004 | 25.6600 |
| Research & Development | 7436.99 | 0.0802 | 0.7291 | 0.6125 | 4.3700e-003 | | 0.0554 | 0.0554 | | 0.0554 | 0.0554 | | 874.9402 | 874.9402 | 0.0168 | 0.0160 | 880.1395 |
| **Total** | | **0.0837** | **0.7610** | **0.6393** | **4.5600e-003** | | **0.0578** | **0.0578** | | **0.0578** | **0.0578** | | **913.2029** | **913.2029** | **0.0175** | **0.0167** | **918.6296** |

## 5.2 Energy by Land Use - NaturalGas

**Mitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | lb/day | | | | | | | | | | lb/day | | | | | |
| Other Non-Asphalt Surfaces | 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 |
| Research & Development | 0.108411 | 1.1700e-003 | 0.0106 | 8.9300e-003 | 6.0000e-005 | | 8.1000e-004 | 8.1000e-004 | | 8.1000e-004 | 8.1000e-004 | | 12.7542 | 12.7542 | 2.4000e-004 | 2.3000e-004 | 12.8300 |
| Research & Development | 0.216822 | 2.3400e-003 | 0.0213 | 0.0179 | 1.3000e-004 | | 1.6200e-003 | 1.6200e-003 | | 1.6200e-003 | 1.6200e-003 | | 25.5085 | 25.5085 | 4.9000e-004 | 4.7000e-004 | 25.6600 |
| Research & Development | 7.43699 | 0.0802 | 0.7291 | 0.6125 | 4.3700e-003 | | 0.0554 | 0.0554 | | 0.0554 | 0.0554 | | 874.9402 | 874.9402 | 0.0168 | 0.0160 | 880.1395 |
| **Total** | | **0.0837** | **0.7610** | **0.6393** | **4.5600e-003** | | **0.0578** | **0.0578** | | **0.0578** | **0.0578** | | **913.2029** | **913.2029** | **0.0175** | **0.0167** | **918.6296** |

# 6.0 Area Detail

## 6.1 Mitigation Measures Area

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Mitigated | 2.6077 | 1.0000e-004 | 0.0113 | 0.0000 | | 4.0000e-005 | 4.0000e-005 | | 4.0000e-005 | 4.0000e-005 | | 0.0242 | 0.0242 | 6.0000e-005 | | 0.0258 |
| Unmitigated | 2.6077 | 1.0000e-004 | 0.0113 | 0.0000 | | 4.0000e-005 | 4.0000e-005 | | 4.0000e-005 | 4.0000e-005 | | 0.0242 | 0.0242 | 6.0000e-005 | | 0.0258 |

## 6.2 Area by SubCategory

**Unmitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | lb/day | | | | | | | | | | lb/day | | | | | |
| Architectural Coating | 0.3072 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Consumer Products | 2.2994 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Landscaping | 1.0500e-003 | 1.0000e-004 | 0.0113 | 0.0000 | | 4.0000e-005 | 4.0000e-005 | | 4.0000e-005 | 4.0000e-005 | | 0.0242 | 0.0242 | 6.0000e-005 | | 0.0258 |
| **Total** | **2.6077** | **1.0000e-004** | **0.0113** | **0.0000** | | **4.0000e-005** | **4.0000e-005** | | **4.0000e-005** | **4.0000e-005** | | **0.0242** | **0.0242** | **6.0000e-005** | | **0.0258** |

### 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 | lb/day | | | | | | | | | | lb/day | | | | | |
| Architectural Coating | 0.3072 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Consumer Products | 2.2994 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Landscaping | 1.0500e-003 | 1.0000e-004 | 0.0113 | 0.0000 | | 4.0000e-005 | 4.0000e-005 | | 4.0000e-005 | 4.0000e-005 | | 0.0242 | 0.0242 | 6.0000e-005 | | 0.0258 |
| **Total** | **2.6077** | **1.0000e-004** | **0.0113** | **0.0000** | | **4.0000e-005** | **4.0000e-005** | | **4.0000e-005** | **4.0000e-005** | | **0.0242** | **0.0242** | **6.0000e-005** | | **0.0258** |

## 7.0 Water Detail

### 7.1 Mitigation Measures Water

## 8.0 Waste Detail

### 8.1 Mitigation Measures Waste

## 9.0 Operational Offroad

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

## 10.0 Stationary Equipment

**Fire Pumps and Emergency Generators**

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

**Boilers**

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

**User Defined Equipment**

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

## 11.0 Vegetation

# Appendix B

Geotechnical Engineering Report

# GEOTECHNICAL ENGINEERING REPORT
# SCIENCE AND AGRICULTURE
# TEACHING AND RESEARCH COMPLEX
# CAL POLY STATE UNIVERSITY
# SAN LUIS OBISPO, CALIFORNIA

May 17, 2018

Prepared for

Cal Poly State University
Facilities Planning and Capital Projects

Prepared by

Earth Systems Pacific
4378 Old Santa Fe Road
San Luis Obispo, CA 93401

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May 17, 2018

Job No.: 300986-017

Mrs. Carla Brown
Facilities Planning and Capital Projects, Bldg. 70
Cal Poly State University
San Luis Obispo, CA 93407

PROJECT: SCIENCE AND AGRICULTURE TEACHING AND RESEARCH COMPLEX
NORTH POLY VIEW DRIVE
CAL POLY SATE UNIVERSITY
SAN LUIS OBISPO, CALIFORNIA

SUBJECT: Updated Geotechnical Engineering Report

CONTRACT REF: Purchase Order 2000015433, MAJ 16-MJ0060 – Science and Agriculture Teaching and Research Complex – Geotechnical, Dated March 12, 2018

Dear Mrs. Brown:

As per the above referenced purchase order, this updated geotechnical engineering report has been prepared for use in the development of plans and specifications for your proposed Science and Agriculture Teaching and Research Complex planned for the Cal Poly Campus in San Luis Obispo, California. Preliminary geotechnical engineering recommendations for site preparation, grading, utility trenches, foundations, interior slabs-on-grade and exterior pedestrian flatwork, retaining walls, drainage and maintenance, and observation and testing are presented herein. One electronic and one bound copy of this report are being provided to you. This report was issued to update the original geotechnical engineering report (ESP 2016) based upon additional information regarding the proposed project generated during the design phase.

We appreciate the opportunity to have provided professional services for this project and look forward to working with you again in the future. If there are any questions concerning this report, please do not hesitate to contact the undersigned.

Sincerely,

Earth Systems Pacific

Robert Down, PE
Senior Engineer
5/17/18

REGISTERED PROFESSIONAL ENGINEER
ROBERT W. DOWN
No. 70206
Exp. 9/30/18
CIVIL
STATE OF CALIFORNIA

Doc. No.: 1805-067.SER/pm

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### APPENDICES

## 1.0 INTRODUCTION AND SITE SETTING

The project addressed herein includes the construction of the proposed Science and Agriculture Teaching and Research Complex Building on the Cal Poly Campus, in San Luis Obispo, California. The project will be constructed in the predominately-landscaped area north of Building 180 (Baker Science) and Poly View Drive and south of Buildings 10 (Erhart Agriculture), 22 (English), and 47 (Faculty Offices); however, the project will also extend east into the area currently occupied by Building 53A (Science North Annex). Building 53A will be demolished prior to construction of the project. Building 10 also extends to the west of the project site with Building 53 (Science North) to the east.

The complex will consist of a 6-story research and classroom building, constructed of concrete, masonry and/or wood or light gauge steel framing with slabs-on-grade. The building is preliminarily planned to be constructed in two phases, A and B. We understand that the first floor elevation on the northwest side of the building will be near the same elevation of the first floor of Building 10, approximately elevation 330 feet. The building will extend east toward the existing Building 53A at this elevation. This portion of the building is the planned footprint for Phase A. Phase B includes one research lab and attached corridor about half the width of the first floor level of Phase A and with a footprint of approximately 2,000 square feet and will continue elevation 330 feet into the area of Building 53A and will then step up approximately 19 where the second floor elevation is planned to be 349 feet. At this elevation, the building footprint will expand by approximately 4,500 square feet to the north in the area of Building 53A and will include a concrete flatwork yard and site retaining wall.

We understand that the use of conventional shallow continuous and spread foundations are desired to support the building. Maximum continuous foundation loads of 10 klf and maximum isolated foundation loads of 500 kips have been assumed for the purposes of this report. We anticipate retaining walls, both as part of the building and as site work retaining walls will be included, as well as cuts and fills of up to 20 feet in depth at these walls. Cuts and fills across the rest of the site are anticipated to be less than 5 feet. To our knowledge, no infiltration type bioswales or other LID features are planned. The site will be served by the local utility systems.

## 2.0 SCOPE OF SERVICES

The authorized scope of work for this report included a general site reconnaissance, field exploration, laboratory testing, review of the of the original report (ESP 2016) and the 75 percent schematic design plans, geotechnical analysis of the data gathered, and preparation of this updated report.

This report and recommendations are intended to comply with the applicable considerations of Sections 1803.2 through 1803.6, J104.3, and J104.4 of the 2016 California Building Code (CBC), and common geotechnical engineering practice in this area under similar conditions at this time. The test procedures were accomplished in general conformance with the standards noted, as modified by common geotechnical engineering practice in this area under similar conditions at this time.

Preliminary geotechnical recommendations for site preparation, grading, utility trenches, foundations, interior slabs-on-grade and exterior pedestrian flatwork, retaining walls, drainage and maintenance, and observation and testing are presented to guide the development of project plans and specifications. As there may be geotechnical issues yet to be resolved, the geotechnical engineer should be retained to provide consultation as the design progresses, to assist in verifying that pertinent geotechnical issues have been addressed and to aid in conformance with the intent of this report. It may also be advantageous to retain the geotechnical engineer to review the project plans, as they near completion to further aid in conformance of the plans with the intent of this report.

It is our intent that this report be used exclusively by the client to form the geotechnical basis of the design of the project and in the preparation of plans and specifications. Application beyond this intent is strictly at the user's risk.

This report does not address issues in the domain of contractors such as, but not limited to, site safety, loss of volume due to stripping of the site, shrinkage of soils during compaction, excavatability, dewatering, temporary slope angles, shoring, construction means and methods, etc. Analyses of areal or site geology and of the soil for lead or mold potential, man-made asbestos, radioisotopes, hydrocarbons, or chemical properties, including corrosivity, are beyond the scope of this report. A report addressing the potential for naturally-occurring asbestos will be presented under separate cover. Ancillary features such as flag or light poles, nonstructural fills, etc. are not within our scope and are also not addressed.

In the event that there are any changes in the nature, design, or location of improvements, or if any assumptions used in the preparation of this report prove to be incorrect, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed and the conclusions of this report modified or verified by the geotechnical engineer in

writing. The criteria presented in this report are considered preliminary until such time as any peer review or review by any jurisdiction has been completed, conditions have been observed by the geotechnical engineer in the field during construction, and the recommendations have been verified as appropriate, or modified by the geotechnical engineer in writing.

## 3.0 FIELD INVESTIGATION AND LABORATORY ANALYSIS

On March 22, 2016, nine exploratory borings (Borings 1 through 9) were drilled on the site by this firm using a Mobile Drill, Model B-53, rig equipped with a 6-inch outside diameter hollow stem auger, and a Simco EP200 drilling rig equipped with a 6-inch outside diameter solid stem auger; each were also equipped with an automatic trip hammer for sampling. These borings were drilled to a maximum depth of 16.5 feet below the existing ground surface. On March 29, 2018 five additional borings (Borings 10 through 14) were drilled on the site using the same drill rigs mentioned above with the exception of Boring 14 which was drilled with hand auger equipment due to access constraints. These borings were drilled to a maximum depth of 11.5 feet below the existing ground surface. The approximate locations of the borings are shown on Figure 1 - Exploration Location Map in Appendix A. As the borings were drilled, soil samples were obtained using a ring-lined barrel sampler (ASTM D 3550-01/07 with shoe similar to ASTM D 2937-10) and Standard Penetration Tests (ASTM D 1586-11) were conducted at selected depths. Bulk samples were obtained from the auger cuttings.

Soils encountered in the borings were categorized and logged in general accordance with the Unified Soil Classification System and ASTM D 2488-09a. Where bedrock was encountered, its properties were described based upon observation of ring and/or Standard Penetration Test samples, observation of the auger cuttings, the effort required to drill into the bedrock, and the effort required to drive samplers into the bedrock. Logs of the borings are presented in Appendix A, along with a Boring Log Legend. In reviewing the boring logs and legend, the reader should recognize that the legend is intended as a guideline only, and there are a number of conditions that may influence the characteristics observed during drilling. These include, but are not limited to, the presence of cobbles or boulders, cementation, variations in soil moisture, presence of groundwater, and other factors. Consequently, the logger must exercise judgment in interpreting soil and bedrock characteristics, possibly resulting in soil or bedrock descriptions that vary from the legend. It should be noted that the descriptions of bedrock must span a much wider range of density and strength characteristics than soil, and are relative to other *bedrock* strata. For example, fractured and weathered bedrock may be described as "soft", yet will be considerably harder than almost any type of soil. Conversely, a clay soil may be described as "stiff", however it will not be nearly as hard as even "soft" bedrock.

The ring samples were tested for unit weight and moisture (ASTM D 2937-10, as modified for ring liners). One ring sample was also tested for were tested for cohesion and angle of shearing resistance by direct shear (ASTM D 3080-11/D 3080M-11). Four bulk samples were tested for maximum density and optimum moisture (ASTM D 1557-12 or D 1557-17), and three for expansion index (ASTM D 4829-11). The laboratory data are presented in Appendix B.

## 4.0 GENERAL SUBSURFACE PROFILE

Based on our field investigations, the proposed site is underlain by varying amounts artificial fill, topsoil, residual soils, alluvium, and Franciscan Melange sandstone bedrock. Detailed stratigraphic logs of each boring are located in Appendix A.

In the areas explored, the artificial fill consists of clayey sand, sandy fat clay, and sandy lean clay. The Coarse grained soils were characterized as loose to medium dense while the fine grained soils were logged as being stiff. The fill was also logged as being slightly moist to moist. Fill was observed in Borings 1, 3, 4, 5, 8, 9, 13, and 14 in the upper 3.5 to 8 feet.

The topsoil consisted of sandy lean clay and clayey sand which ranges from loose to medium dense or stiff and moist. Topsoil was observed in the upper1.5 to 2.5 feet of Borings 2, 6, and 7.

The residual soils consist of sandy lean clay, clayey sand, and clayey gravelly sand. The soils are characterized as medium dense or stiff to very stiff and moist with trace gravel. Residual soil was observed within the upper 10 feet in Borings 5, 9, 10, 11, 12, and 13.

The alluvium consists of sandy lean clay and ranged from medium dense or stiff and moist. This alluvial material was only observed to underlie the artificial fill in Boring 1 to a maximum depth of 11 feet.

Underlying the soil in all borings, with the exception of Boring 14 which was terminated at 4.5 feet due to practical refusal, we encountered sandstone bedrock. In the areas explored, the depth to bedrock ranged from 1.5 to 11 feet below the ground surface. The sandstone was generally observed to be very soft to hard and slightly moist to moist. It was also characterized as moderately to intensely weathered, fractured to very fractured, friable, and mostly massive with some thinly bedded claystone interbeds observed in Boring 12.

Subsurface water was not encountered to the maximum depth explored of 16.5 feet. However, it should be noted that it is common to encounter subsurface water at the soil/bedrock contact throughout campus. Further, some of the surrounding buildings have subsurface drainage improvements to accommodate a potential perched water condition.

## 5.0 CONCLUSIONS

In our opinion, the site is suitable, from a geotechnical engineering standpoint, for the proposed project, provided the recommendations contained herein are implemented in the design and construction. The primary geotechnical engineering concerns are the potential for differential settlement, the potential for subsurface water, and the expansive potential of the site soils. Additionally, the erodible nature of the soils above the bedrock, seismic analysis, and the potential for liquefaction are discussed below.

### Differential Settlement

Differential settlement can occur when a foundation spans two or more materials having variable consolidation and settlement characteristics, such as native and fill soil, or soil and bedrock. Native and fill soils typically consolidate at different rates and generally experience varying amounts of settlement. Bedrock is not expected to experience significant consolidation or settlement from the anticipated loads. These variable conditions could stress and possibly damage foundations, often resulting in severe cracks and displacement. To reduce this potential, it is necessary for all foundations bear in sufficiently uniform material. Due to the relatively shallow depth to bedrock across the majority of the site, foundations bearing in the bedrock are recommended to achieve this uniform condition.

There are a number of other options available to reduce the potential for differential settlement, including creating a uniformly graded pad constructed of compacted structural fill below the foundation, or supporting the entire building on caissons and grade beams. These types of solutions, however, are expected to not be as cost-effective for this project as the method discussed previously and, therefore, are not addressed in this report. If discussion of these alternate options or other options is desired, the geotechnical engineer should be contacted for additional consultation.

### Subsurface Water

Subsurface water is commonly found across the campus at the soil and bedrock contact. Furthermore, we understand some of the existing buildings in the immediate area have had subsurface drainage improvements installed to accommodate this water. Due to the stepped

finish floor elevations and that the upslope side of the slabs-on-grade at the first level is anticipated to intersect the soil/bedrock contact, it is recommended that a sub-slab drain be incorporated into the project design. Thorough waterproofing and drainage of retaining walls will also be essential.

Expansive Soils

Expansion index tests performed on three samples of the site soils yielded values of 35, 56, and 94. Per CBC section 1803.5.3, these value indicate that the soils tested are expansive. Expansive soils tend to swell with seasonal increases in soil moisture and shrink during the dry season as soil moisture decreases. The volume changes that the soils undergo in this cyclical pattern can stress and damage slabs, flatwork, and foundations if precautionary measures are not incorporated into the design and construction procedure. Use of deepened foundations and a layer of nonexpansive material beneath slabs are recommended to reduce the potential for damage related to expansive soils. Thickened edges and a layer of nonexpansive material beneath the flatwork are also suggested.

The recommendations for mitigation of expansive soils, as described above, reflect methods that have been used in this geographical area for some time. There are a number of other options available, including caissons and grade beams, post-tensioned slab foundations, conventionally reinforced mat foundations, and deep nonexpansive pads. These types of solutions, however, are expected to not be as practical or as cost-effective for this project as the method discussed previously and, therefore, are not addressed in this report. The economics of these options may, however, change with time, or specific solutions may be applicable for specific situations at the subject site. If discussion of other options is desired, the geotechnical engineer should be contacted for additional consultation.

Erosion Potential

The soils above the bedrock are considered erodible. Caution should be exercised to protect the soil from erosion during and following construction.

Seismic Analysis

Seismic analysis was undertaken to provide seismic acceleration design parameters. The 2010 ASCE 7 method with 2013 updates (ASCE 2013), available on the United States Geological Survey Earthquake Hazards Program website (USGS 2016), was used. The project was considered to be a "nonessential" facility from the perspective of risk category as described by ASCE 7. Site coordinates of 35.3017 degrees north and 120.6609 degrees west as taken from the Google Earth

website (Europa Technologies 2016) were used in the analysis. Based upon the subsurface conditions encountered during our investigation, Site Class C was used. The results of the seismic hazard analysis are presented in the "Foundations" section of this report.

Liquefaction Potential

Due to the relatively shallow depth to bedrock and the clayey overlying soil, it is our opinion that the potential for liquefaction to affect the site is nil.

## 6.0 PRELIMINARY GEOTECHNICAL RECOMMENDATIONS

These recommendations are applicable for the proposed building and other improvements as discussed in the "Introduction and Site Setting" section of this report. If any improvements not previously noted are included, the geotechnical engineer should be contacted for revised recommendations. In developing these recommendations, it was assumed that irrigated landscaping, flatwork or other features that will keep the soils at relatively uniform, year-round moisture will be installed for a zone of at least 5 feet around the perimeters of the proposed building.

Unless otherwise noted, the following definitions are used in the recommendations presented below. Where terms are not defined, definitions commonly used in the construction industry are intended.

- **Building Area:** The area within and extending to the perimeter of the foundation of the proposed building. The building area also includes the footprint of any improvements which are connected to the structure and that are expected to perform in a manner similar to it.
- **Flatwork Areas:** The footprint of the planned exterior pedestrian flatwork.
- **Sitework Retaining Wall Foundation Areas:** The areas within and extending a minimum of 1 foot beyond the footprint of the sitework retaining wall foundations.
- **Grading Area:** The entire area to be graded, including building area, flatwork areas, sitework retaining wall foundation areas, and any areas where fill will be placed or surface improvements will be constructed.
- **Pad Grade:** The elevation of the building pad as shown on the grading plan; if no elevation is shown on the grading plan, the elevation to which the grading contractor typically will place compacted fill in the building area. This does not include any sand or gravel layer specified by the architect/engineer for protection of slabs from subsurface moisture.

- **Existing Grade:** The elevation that existed as of the date of this report.
- **Scarified:** Thoroughly plowed or ripped in two orthogonal directions to a depth of not less than 8 inches.
- **Moisture Conditioned:** Soil moisture content adjusted to optimum moisture content, or just above, prior to application of compactive effort.
- **Compacted / Recompacted:** Soils placed in level lifts not exceeding 8 inches in loose thickness and compacted to a minimum of 90 percent of maximum dry density, unless specified otherwise. The standard tests used to establish maximum dry density and field density should be ASTM D 1557-12 and ASTM D 6938-17a, respectively, or other methods acceptable to the geotechnical engineer and jurisdiction.

**Site Preparation**

1. The existing ground surface in the building area should be prepared for construction by removing the existing buildings, foundations, flatwork, as well as all vegetation, debris, and other deleterious material. Any existing utilities and improvements that will not be serving the new development should be removed or properly abandoned. The appropriate method of utility abandonment will depend upon the type and depth of the utility. Recommendations for abandonment can be made as necessary.

2. Voids created by the removal of materials or utilities described above should be called to the attention of the geotechnical engineer. No fill should be placed unless the underlying soil has been observed by the geotechnical engineer.

**Grading**

1. Following site preparation, the building area should be overexcavated to a minimum depth of 18 inches below bottom-of-slab elevation, or 18 inches below existing grade where fill is needed to reach pad grade. The resulting surface should be scarified, moisture conditioned, and recompacted. Where *in situ* bedrock is encountered, the depth of overexcavation may be reduced to 12 inches below bottom-of-slab elevation. The bedrock surface need not be scarified, however it should be moisture conditioned and recompacted.

2. Within the building area, all soils used as fill in the final 18 inches below bottom of slab elevation should be nonexpansive soils. Nonexpansive soils are defined as falling into the GP, GW, GM, GC, SM, SC, SP, OR SW categories (ASTM D 2487-17) and having an expansion

index of 10 or less (ASTM D 4829-11). All proposed imported fill should be approved by the geotechnical engineer before being transported to the site. The upper 6 inches below the vapor retarder (see discussion below), should consist of a free draining granular gravel with a maximum size of 1-inch. If a sand cushion is needed below the vapor retarder, a filter fabric should be placed between the sand and gravel.

3. In sitework retaining wall foundation areas, where bedrock is exposed at the bottom-of-foundation elevation, no remedial earthwork is considered necessary. If bedrock is not exposed, the foundation area should be overexcavated to a minimum depth of 2 feet below the bottom-of-foundation elevation, not including any keyway. The exposed soil surfaces should be scarified, moisture conditioned, and recompacted. If a wall foundation will span from bearing in compacted soil to bearing in bedrock, a construction joint should be placed in the wall and the wall's foundation at the transition point.

4. Following site preparation, exterior pedestrian flatwork areas should be overexcavated to allow for placement of nonexpansive material beneath the flatwork. The soil surface exposed by overexcavation should be scarified, moisture conditioned, and recompacted prior to placement of the nonexpansive material. If fill is required to reach the elevation of the bottom of the nonexpansive layer, the prepared soil surface should be scarified, moisture conditioned, and recompacted prior to placement of fill. Nonexpansive material is described below; for thickness criteria for the nonexpansive material, please see the "Interior Slabs-on-Grade and Exterior Pedestrian Flatwork" section of this report.

5. In the remainder of the grading area, the exposed and prepared soils should be scarified, moisture conditioned, and recompacted. Where bedrock is exposed scarification should not be necessary.

6. Voids created by dislodging cobbles and/or debris during scarification should be backfilled and recompacted, and the dislodged materials should be removed from the area of work.

7. Previously removed site soils and other similar soils may be used as fill beyond the building area, and within the building area to 18 inches below bottom of slab elevation, as discussed above.

8. Where improvements will be constructed above retaining wall backfill, all soil backfill should be compacted to a minimum of 95 percent of maximum dry density. Where gravel backfill is utilized, it should be consolidated every lift by means of a vibratory compacter greater than 500 pounds.

9. Where fill will be placed on slopes that exceed a gradient of 10 percent, the prepared surface should first be excavated into benches cut into firm soil or bedrock. Where fill will be placed on slopes that exceed a gradient of 20 percent, a keyway should be constructed at the toe of the fill. The keyway should penetrate a minimum of 2 feet into bedrock, as recommended by the geotechnical engineer during construction. Benches and keyways should be a minimum of 10 feet wide and should be essentially flat or angled into the slope. A drain should be placed at the back of all keyways and benches. Typical bench and keyway, and back drain details are included in Appendix C.

10. Proposed imported soils should be evaluated by the geotechnical engineer before being used and on an intermittent basis during placement on the site.

11. All fill should be cleaned of any rocks, debris, and irreducible material larger than 6 inches in diameter. When fill contains rocks, they should be placed in a sufficient soil matrix to ensure that voids caused by nesting of the rocks do not occur and that the material can be properly compacted.

12. The upper foot of subgrade and all aggregate base in areas to be paved should be compacted to a minimum of 95 percent of maximum dry density. The degree to which excavated bedrock rock is to be compacted, if at all, should be determined by the geotechnical engineer at the time of construction. Subgrade and aggregate base should be firm and unyielding when proofrolled with heavy, rubber-tired grading equipment prior to continuing construction.

13. If the soils are overly moist so that they become unstable, or if the recommended compaction cannot be readily achieved, drying the soil to optimum moisture content, or just above, may be necessary. Placement of gravel layers or geotextiles may also be necessary to help stabilize unstable soils. Soils that are disturbed in any manner should be removed, moisture conditioned, and recompacted.

**Utility Trenches**

1. Unless otherwise recommended, utility trenches adjacent to foundations should not be excavated within the zone of foundation influence, as shown in Typical Detail A in Appendix C.

2. Utilities that must pass beneath a foundation should be placed with properly compacted utility trench backfill and the foundation should be designed to span the trench.

3. A select, noncorrosive, easily compacted sand should be used as bedding and shading immediately around utilities. Trench backfill, above the select material, within the building area should also be nonexpansive sand up to the drainage layer; beyond the building area the site soils may be used.

4. In general, trench backfill should be compacted to a minimum of 90 percent of maximum dry density. Trenches located within areas to be paved should be compacted to a minimum of 95 percent of maximum dry density within the upper foot of subgrade and all aggregate base.

5. Trench backfill should be placed in level lifts not exceeding 6 inches in loose thickness, moisture conditioned, and compacted to the minimums noted above.

6. Long-term settlement of properly compacted, imported sand or crushed gravel trench backfill should be assumed to be about 0.2 to 0.5 percent of the depth of the backfill; long-term settlement of properly compacted site soil or crushed sandstone trench backfill should be assumed to be about 0.5 to 1 percent of the depth of the backfill. Improvements that are constructed over or near trenches should be designed to accommodate long-term settlement.

7. Compaction of trench backfill by jetting or flooding is not recommended except under extraordinary circumstances. However, to aid in *encasing* utility conduits, particularly corrugated drain pipes, and multiple, closely-spaced conduits in a single trench, jetting or flooding may be useful. Flooding or jetting should only be attempted with extreme caution, and any jetting operation should be subject to review by the geotechnical engineer.

8. The recommendations of this section are minimums only, and may be superseded by the requirements of the client, pipe manufacturers, utility companies, or the governing jurisdiction based upon soil corrosivity or other factors.

**Foundations**

1. Continuous and spread footings bearing a minimum of 12 inches into the bedrock may be used to support the proposed building. All footings should have minimum depths of 21 inches below lowest adjacent grade within 8 feet of the footing. Footing reinforcement should be in accordance with the requirements of the architect/engineer.

2. Footings bearing 12 inches into bedrock may be designed using maximum allowable bearing capacities of 3,500 psf dead load and 4,500 dead plus live loads. Using these values, settlement is expected to be minimal. If the depth to bedrock becomes excessive, lean concrete may be placed in excavations for footings subject only to sustained vertical loads to extend the footings into the bedrock. The structural footing should be cast atop the lean concrete surface. Lean concrete should not be used beneath retaining wall footings or other footings subject to sustained lateral loads. Specification of the lean concrete mix, vibration criteria, etc. is left to the architect/engineer. As an alternate to the use of deepened foundation and lean concrete, caissons a minimum of 24 in diameter and drilled a minimum of 5 feet into the underlying bedrock may be used. The geotechnical engineer should be consulted for recommendations based upon the specific location and loading where caissons are desired.

3. Where heavier loads are planned, increased bearing capacity may be realized by deeper penetration into the bedrock. For footings extending a minimum depth of 2 feet into sound bedrock, maximum allowable bearing capacities of 6,000 psf dead load and 7,500 psf dead plus live load may be used. With a minimum penetration of 3 feet into sound bedrock, design may be based upon maximum allowable bearing capacities of 8,000 psf dead load and 10,500 psf dead plus live loads. Using these criteria, maximum settlement and differential settlement under static conditions are expected to be on the order of 1/2 inch.

4. Allowable capacities may be increased by one-third when transient loads such as wind or seismicity are included. Foundations may be designed using the following 2016 CBC seismic parameters.

**SEISMIC PARAMETERS**

| Mapped Spectral Response Acceleration for Site Class B | | Site Coefficients for Site Class C | | Adjusted MCE Spectral Response Accelerations for Site Class C | | Design Spectral Response Accelerations for Site Class C | |
|---|---|---|---|---|---|---|---|
| Seismic Parameter | Value (g) | Site Coefficient | Value | Seismic Parameter | Value (g) | Seismic Parameter | Value (g) |
| $S_S$ | 1.124 | $F_a$ | 1.000 | $S_{MS}$ | 1.124 | $S_{DS}$ | 0.750 |
| $S_1$ | 0.429 | $F_v$ | 1.371 | $S_{M1}$ | 0.588 | $S_{D1}$ | 0.392 |
| Peak Mean Ground Acceleration ($PGA_m$) : 0.445 g | | | | | | | |
| Seismic Design Category = D | | | | | | | |

5. To calculate resistance to lateral loads, please see the values presented in the "Retaining Walls" section of this report. Lateral capacity is based on the assumption that all bedrock is undisturbed. Passive and friction components of resistance may be combined in the analysis without reduction to either value.

6. Footings should not be constructed within 5 feet of any slope that descends steeper than 20 percent. In some cases, a greater setback may be warranted. The geotechnical engineer should evaluate, on an individual basis, any footing that will be constructed within 10 feet of a descending slope.

7. Foundation excavations should be observed by the geotechnical engineer during excavation and prior to placement of formwork, reinforcing steel, or concrete.

**Interior Slabs-on-Grade and Exterior Pedestrian Flatwork**

Interior Slabs-On-Grade

1. All interior slabs should have a minimum thickness of 4 inches. They should be reinforced and doweled to foundations per the specifications of the architect/engineer; minimum slab reinforcement should consist of No. 4 rebar placed at 24 inches on-center each way. Structural slabs should contain minimum rebar meeting the criteria of ACI 318, Section 7.6.1.1 (ACI 2014). At a minimum, foundation dowels should be lap spliced to the slab rebar. The size and spacing of the dowels should match the size and spacing of the slab rebar.

2. Where the interior slab is not surrounded by continuous footings, the slab edge should be deepened to provide a minimum embedment of 12 inches into bedrock or 21 inches into soil, whichever is less.

3. Due to the current use of impermeable floor coverings, water-soluble flooring adhesives, and the speed at which buildings are now constructed, moisture vapor transmission through slabs is a much more common problem than in past years. Where moisture vapor transmitted from the underlying soil would be undesirable, such as where interior slabs are planned, the slabs should be protected from subsurface moisture vapor. A number of options for vapor protection are discussed below; however, the means of vapor protection, including the type and thickness of the vapor retarder, if specified, are left to the discretion of the architect/engineer.

4. Where specified, vapor retarders should conform to ASTM Standard E 1745-17. This standard specifies properties for three performance classes; Class A, B and C. The appropriate class should be selected based on the potential for damage to the vapor retarder during placement of slab reinforcement and concrete. Unless it is determined that a permeance of 0.10 perms will not allow vapor to accumulate beneath moisture-sensitive flooring, adhesives, stored products and/or equipment, then a vapor retarder permeance of 0.010 perms is recommended, per ACI 302.1-15. Permeance of vapor retarders should remain below 0.010 perms after the conditioning tests of ASTM E 1745-17.

   ASTM E 1745-17 has the same permeance threshold for Class A through Class C (0.1 perms). The class that is chosen will make a difference in how resistant the vapor retarder is to punctures and tears, but it will not insure any better permeance values to protect floor coverings.

5. Several recent studies, including those of American Concrete Institute Committee 302 (ACI 2015) have concluded that excess water above the vapor retarder increases the potential for moisture damage to floor coverings and could increase the potential for mold growth or other microbial contamination. The studies also concluded that it is preferable to eliminate the typical sand layer beneath the slab and place the slab concrete in direct contact with a Class A vapor retarder, particularly during wet weather construction. However, placing the concrete directly on the vapor retarder requires special attention to using the proper vapor retarder, a very low water-cement ratio in the concrete mix, and special finishing and curing techniques.

6. Probably the next most effective option would be vapor-inhibiting admixtures and/or surface sealers. This would also require special concrete mixes and placement procedures, depending upon the recommendations of the admixture or sealer manufacturer.

7. Another option that may be a reasonable compromise between effectiveness and cost considerations is the use of a subslab vapor retarder protected by a sand layer. If a Class A vapor retarder is specified, the retarder can be placed directly on the free draining gravel layer. The retarder may be covered with a minimum 2 inches of *clean* sand. If a less durable vapor retarder is specified (Class B or C), a minimum of 4 inches of clean sand should be provided, and the retarder should be placed in the center of the clean sand layer. Clean sand is defined as a well or poorly graded sand (ASTM D 2487-11) of which less than 3 percent passes the No. 200 sieve. The grave and sand should be separated by the vapor barrier or a filter fabric as discussed in the "Retaining Wall" section of this report.

8. Regardless of the underslab vapor retarder selected, proper installation of the retarder per ASTM E 1643-18a is critical for optimum performance. Where utilized, the vapor retarder should be placed a minimum of 1 inch above the flow line of the drainage path surrounding the structures, 2 inches above retaining wall drains, or 1 inch above the area drain grates if area drains are used to collect runoff around the structures. As required by ASTM E 1643-18, all seams and utility penetrations should be properly sealed. At terminating edges of the vapor retarder, the vapor retarder should be effectively sealed with accessories specifically designed to seal the material to new or existing concrete; details for edge sealing of the vapor retarder should be provided by the architect/engineer.

9. If the sand is used between the vapor retarder and the slab, it should be moistened only as necessary to promote concrete curing; saturation of the sand should be avoided, as the excess moisture would be on top of the vapor retarder, potentially resulting in vapor transmission through the slab for months or years.

Exterior Pedestrian Flatwork

1. Exterior pedestrian flatwork should have a minimum thickness of 4 inches. Reinforcement size, placement, and slab dowels should be as directed by the architect/engineer; at a minimum, flatwork should be reinforced with No. 3 rebar at 24 inches on center each way. Where it is desired to maintain the elevation of flatwork at doorways and other areas, the flatwork should be doweled to the perimeter foundations or adjacent improvements. In

other areas, the flatwork may be doweled to the foundation or the flatwork may be allowed to "float free," at the discretion of the architect/engineer. Flatwork that is intended to float free should be separated from foundations by a felt joint or other means.

2. Flatwork surfaces should be sloped to freely drain toward appropriate drainage facilities. Water should not be allowed to stand or pond on or adjacent to pavement or other improvements as it could infiltrate into the aggregate base and/or subgrade, causing premature pavement deterioration.

3. In conventional construction, it is common to use 4 to 6 inches of sand beneath exterior pedestrian flatwork. Where bedrock is exposed, this typical practice is considered acceptable. However, where expansive soils are present, this typical practice is not recommended, as there would be a risk of movement and damage; heaving and cracking could occur. The potential for damage could be reduced by placing 8 to 21 inches nonexpansive material below flatwork. The thicker the nonexpansive layer, the better the protection. Prior to placement of the nonexpansive material, the underlying soil should be moisture conditioned and no desiccation cracks should be present. For an added level of protection, the flatwork can be provided with perimeter trenched edges up to 21 inches deep. The trenched edges if utilized, should be reinforced with No. 4 rebar top and bottom. The decision regarding the thickness of nonexpansive material to use below flatwork, as well as the use of trenched edges, is left to the architect/engineer or owner.

4. Flatwork should be constructed with frequent joints to allow articulation as the flatwork moves in response to seasonal soil moisture variations.

General

To reduce shrinkage cracks in concrete, the concrete aggregates should be of appropriate size and proportion, the water/cement ratio should be low, the concrete should be properly placed and finished, contraction joints should be installed, and the concrete should be properly cured. This is particularly applicable to slabs that will be cast directly upon a vapor retarder and those that will be protected from transmission of vapor by use of admixtures or surface sealers. Concrete materials, placement, and curing specifications should be at the direction of the architect/engineer; ACI 302.1R-15 (ACI 2015) is suggested as a resource for the architect/engineer in preparing such specifications.

**Retaining Walls**

1. Sitework retaining walls that are not rigidly attached to any structure may be founded either in soil or in bedrock. Retaining walls constructed as part of the building should be founded in bedrock similar to the structure. Where site retaining walls will bear in soil, the foundation area should be overexcavated and recompacted as described in the "Grading" section of this report. Foundation excavations should be observed by the geotechnical engineer prior to placing reinforcing steel in the excavations.

2. Retaining wall foundations bearing in bedrock should penetrate into the bedrock a minimum of 12 inches (not including any keyway). Site retaining wall foundations bearing in compacted soil should have a minimum depth of 21 inches (not including any keyway) below the lowest grade within 8 feet of the toe of the foundation.

3. If a site retaining wall foundation will span from bearing in compacted soil to bearing in bedrock or vice versa, a construction joint should be placed in the wall and thew wall's foundation at the transition point.

4. The following allowable bearing capacities may be used in retaining wall foundation design:

| | |
|---|---|
| Compacted soil | 2,800 psf |
| *In situ* bedrock | 3,500 psf |

5. Table 1610.1 of the CBC does not allow fat clay (CH) soils such as some of those found on this site to be used for retaining wall backfill; other site soils, crushed sandstone, sand, or gravel backfill should be used exclusively. If sand or gravel backfill is specified exclusively above a 1:1 plane from the bottom of the wall to 1 foot from the top of the backfill, the following parameters may be used in the design:

| | |
|---|---|
| Active equivalent fluid pressure | 35 pcf |
| At-rest equivalent fluid pressure | 55 pcf |

6. If site soils (other than fat clay soils) or crushed sandstone are to be used as backfill, or if there will be insufficient space behind the wall to ensure that all clay soils are removed from above a 1:1 plane, the design of the walls should be based upon the influence of the clay soils and the following parameters may be used:

| | |
|---|---|
| Active equivalent fluid pressure | 55 pcf |
| At-rest equivalent fluid pressure | 70 pcf |

7. The above pressures are applicable to a retained surface that is horizontal at the top of the wall. Walls having a retained surface that slopes upward from the top of the wall should be designed for an additional equivalent fluid pressure of 1 pcf for the active case and 1.5 pcf for the at-rest case, for every degree of slope inclination.

8. In calculating resistance to sliding, the following parameters may be used:

Passive equivalent fluid pressure, compacted soil.....300 pcf
Passive equivalent fluid pressure, bedrock.....500 pcf
Friction coefficient, compacted soil .....0.35
Friction coefficient, bedrock.....0.45

9. Where improvements will be constructed above retaining wall backfill, all soil backfill should be compacted to a minimum of 95 percent of maximum dry density. Where gravel backfill is utilized, it should be consolidated every lift by means of a vibratory compacter greater than 500 pounds.

10. Section 1803.5.12.1 of the CBC requires that dynamic seismic lateral earth pressures be provided by the geotechnical engineer for walls retaining more than 6 feet of backfill. The Earthquake Hazards Program website (USGS 2016) was used to determine the Mean Peak Ground Acceleration ($PGA_M$) for a Seismic Design Category "D" project and the Maximum Considered Earthquake on this site. The resulting PGA was 0.445g. Then, using the methods presented by Lew et al. Structural Engineers Association of California (SEAOC) Convention Proceedings (2010) and this PGA, the seismic incremental increases in lateral soil pressure, above the static active equivalent fluid pressure for cantilevered walls, were determined to be the following:

| Backfill Material | Incremental Increase |
|---|---|
| Imported Sand/Gravel | 12 pcf |
| Site Soils*, 8 feet tall | 6 pcf |
| Site Soils*, 10 feet tall | 12 pcf |
| Site Soils*, 12 feet tall | 15 pcf |
| Site Soils*, 14 feet tall | 18 pcf |
| Site Soils*, 16 feet tall | 23 pcf |
| Site Soils*, 18 feet tall | 30 pcf |
| Site Soils*, 20 feet tall | 36 pcf |

*See Paragraph 6 of this Section for limitations on use of site soils for retaining wall backfill. The incremental increases for wall heights not shown may be proportioned linearly between the noted values.

According to Lew et al. (2010), the seismic incremental increase for cantilever walls is due to the out-of-phase interaction between the wall and the backfill soil. For rigid walls, in-phase interaction between the wall and the accelerating soil occurs. Consequently, no incremental increase is considered necessary for walls that are designed using the at-rest equivalent fluid pressures recommended in Paragraphs 5 and 6 of this section.

11. In typical structural design methods for retaining walls such as those found in Section 1605 of the CBC, the soil pressure is multiplied by a load factor of 1.6. According to Lew, a load factor of 1.6 is too conservative for seismic loads; he suggests that the seismic increase in lateral pressure be separated from the static active pressure and that a load factor of 1.0 be used for the seismic increase. Further, Al Atik and Sitar (2010), found that pressure increases due to seismic earth loads were minimal for walls retaining less than 12 feet of backfill. While the Al Atik, and Sitar research appears to be well done and is gaining favor among geotechnical and structural engineers in California, it is not entirely acknowledged by the California Building Standards Commission (CBSC), as the CBC seems to set the height below which seismic loads may be ignored at 6 feet.

12. Footings should not bear in retaining wall backfill. Gradebeams may be utilized to span across the backfill zone between the retaining wall and bedrock.

13. No surcharges are taken into consideration in the values presented above. The maximum toe pressures are *allowable* values; no factors of safety, load factors or other factors have been applied to the remaining values. With the exception of the maximum toe pressures, these values will require application of appropriate factors of safety, load factors, and/or other factors as deemed appropriate by the architect/engineer.

14. The upper foot of backfill should consist of native soil, except in areas where slabs, pavement, or flatwork will abut the top of the wall. In such cases, the gravel should extend to the nonexpansive material, aggregate base, or other material, as appropriate.

15. Long-term settlement of properly compacted imported sand or gravel retaining wall backfill should be assumed to be about 0.25 to 0.5 percent of the depth of the backfill; long-term settlement of site soil retaining wall backfill should be assumed to be about 0.75 to 1.5 percent of the depth of the backfill. Improvements that are constructed near the tops of retaining walls should be designed to accommodate the potential for settlement.

16. All retaining walls should be drained with perforated pipe encased in a free-draining gravel blanket. The pipe should be placed atop the wall footing, perforations downward, and should discharge in a nonerosive manner away from foundations and other improvements. The gravel blanket should have a width of approximately 1 foot and should extend upward to approximately 1 foot from the top of the wall backfill. The upper foot should be backfilled with native soil, except in areas where slabs, pavement, or flatwork will abut the top of the wall. In such cases, the gravel should extend to the nonexpansive material, aggregate base, or other material, as appropriate. To reduce infiltration of the soil into the gravel, a permeable synthetic fabric, conforming to Caltrans Standard Specifications, Section 96-1.02B – Class C (Caltrans 2015), should be placed between the two. Manufactured synthetic drains, such as Miradrain or Enkadrain are acceptable alternatives to the use of gravel, provided that they are installed in accordance with the recommendations of the manufacturer.

17. Walls facing areas where moisture transmission through the wall would be undesirable should be *thoroughly* waterproofed in accordance with the specifications of the architect/engineer.

18. The architect/engineer should bear in mind that retaining walls by their nature are flexible structures, and that surface treatments on walls often crack. Where walls are to be plastered or otherwise have a finish applied, the flexibility should be considered in determining the suitability of the surfacing material, spacing of horizontal and vertical control joints, etc. The flexibility should also be considered where a retaining wall will abut or be connected to a rigid structure, and where the geometry of the wall is such that its flexibility will vary along its length.

**Drainage and Maintenance**

1. Unpaved ground surfaces should be graded during construction, and per Section 1804.4 of the CBC, should be finish graded to direct surface runoff away from foundations, slopes, and other improvements at a minimum 5 percent grade for a minimum distance of 10 feet. If this is not practicable due to terrain, surface improvements, proximity of property lines, etc., swales with improved surfaces, area drains, or other drainage features should be provided to divert drainage away from these areas.

2. Finished surfaces should be sloped to freely drain toward appropriate drainage facilities. Water should not be allowed to stand or pond on or adjacent to foundations.

3. Any raised planter boxes constructed adjacent to the proposed building should be installed with drains, and sealed sides and bottoms to reduce the potential for planter drainage gaining access to subslab areas. Drains should also be provided in all areas adjacent to foundations that would not otherwise drain freely.

4. All eaves of the proposed building should be provided with roof gutters. Runoff from roof gutters, downspouts, area drains, weep holes, etc., should discharge to an appropriate outlet in a nonerosive manner away from foundations and other improvements in accordance with the requirements of the governing agencies. Erosion protection should be placed at drainage outlets unless discharge is to a concrete surface.

5. The on-site soils are erodible. Stabilization of surface soils, particularly those disturbed during construction, by vegetation, or other means *during and following construction* is essential to protect the site from erosion damage. Care should be taken to establish and maintain vegetation. The landscaping should be installed to maintain the surface drainage recommended above.

6. All exterior drains, subdrains, retaining wall drains, etc., should be maintained to be free-flowing.

7. Erosion protection should be maintained or supplemented as needed. Irrigation systems should be maintained so that the soils are not over-watered or allowed to desiccate.

8. To reduce the potential for undermining of foundations, flatwork, and other improvements, all rodent activity should be aggressively controlled and kept to an absolute minimum.

**Observation and Testing**

1. It must be recognized that the recommendations contained in this report are based on a limited number of exploratory borings and rely on continuity of the subsurface conditions encountered. Therefore, the geotechnical engineer should be retained to provide consultation during the design phase, to review plans as they near completion, to interpret this report during construction, and to provide construction monitoring in the form of testing and observation.

2. At a minimum, the geotechnical engineer should be retained to provide:

   - Professional observation during grading
   - Oversight of compaction testing during grading and backfill
   - Oversight of soil special inspection during grading and foundation construction

3. Special inspection of grading should be provided as per Section 1705.6 and Table 1705.6 of the 2016 CBC; the special inspector should be under the direction of the geotechnical engineer. In our opinion, there are no operations that are sufficiently critical as to warrant *continuous* special inspection; periodic special inspection should suffice. Subject to the approval of the Building Official, the exception to continuous special inspection (Section 1705.2, Subparagraph 1) should be specified by the architect/engineer and *periodic* special inspection of the following should be provided by the special inspector:

   - Stripping and clearing of existing improvements, vegetation, and debris
   - Utility trench backfill
   - Fill quality, placement, moisture conditioning, and compaction
   - Foundation excavations
   - Retaining wall drains and backfill
   - Keyway, bench, and back drain installation, if necessary

4. A program of quality control should be developed prior to beginning grading. The contractor or project manager should determine any additional inspection items required by the architect/engineer or the governing jurisdiction.

5. Locations and frequency of compaction tests should be as per the recommendation of the geotechnical engineer at the time of construction. The recommended test location and frequency may be subject to modification by the geotechnical engineer, based upon soil and moisture conditions encountered, size and type of equipment used by the contractor, the general trend of the results of compaction tests, or other factors.

6. A preconstruction conference among the owner, the geotechnical engineer, the soil special inspector, the University, and contractors is recommended to discuss planned construction procedures and quality control requirements.

7. The geotechnical engineer should be notified at least 48 hours prior to beginning construction operations.

## 7.0 CLOSURE

Our intent was to perform the investigation in a manner consistent with the level of care and skill ordinarily exercised by members of the profession currently practicing in the locality of this project under similar conditions. No representation, warranty, or guarantee is either expressed or implied. This report is intended for the exclusive use by the client as discussed in the "Scope of Services" section. Application beyond the stated intent is strictly at the user's risk.

This report is valid for conditions as they exist at this time for the type of project described herein. The conclusions and recommendations contained in this report could be rendered invalid, either in whole or in part, due to changes in building codes, regulations, standards of geotechnical or construction practice, changes in physical conditions, or the broadening of knowledge. If Earth Systems Pacific is not retained to provide construction observation and testing services, it shall not be responsible for the interpretation of the information by others or any consequences arising there from.

If changes with respect to project type or location become necessary, if items not addressed in this report are incorporated into plans, or if any of the assumptions used in the preparation of

this report are not correct, the geotechnical engineer shall be notified for modifications to this report. Any items not specifically addressed in this report should comply with the CBC and the requirements of the governing jurisdiction.

The preliminary recommendations of this report are based upon geotechnical conditions encountered at the site, and may be augmented by additional requirements of the architect/engineer, or by additional recommendations provided by the geotechnical engineer based on peer or jurisdictional reviews, or conditions exposed at the time of construction.



Thank you for this opportunity to have been of service. If you have any questions, please feel free to contact this office at your convenience.

End of Text.

## TECHNICAL REFERENCE LIST

ACI (American Concrete Institute). 2015. "Guide for Concrete Floor and Slab Construction." Documents 302.1R15.

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Al Atik, L. A. and Sitar, N. 2010 October. "Seismic Earth Pressures on Cantilever Retaining Structures." *Journal of Geotechnical and Geoenvironmental Engineering* 136 (10). American Society of Civil Engineers.

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Caltrans (California Department of Transportation). 2015. "Standard Specifications."

ESP (Earth Systems Pacific). 2016. Geotechnical Engineering Report, Science and Agriculture teaching and Research Complex, North Poly View Drive, Cal Poly State University, San Luis Obispo, California, by Earth Systems Pacific, Doc. No. 1600-010.SER, dated May 6, 2016, Job No. PID-000357-001,002

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Lew, M., et al. 2010. "Seismic Earth Pressures on Deep Building Basements." *Structural Engineers Association of California (SEAOC) Convention Proceedings.*

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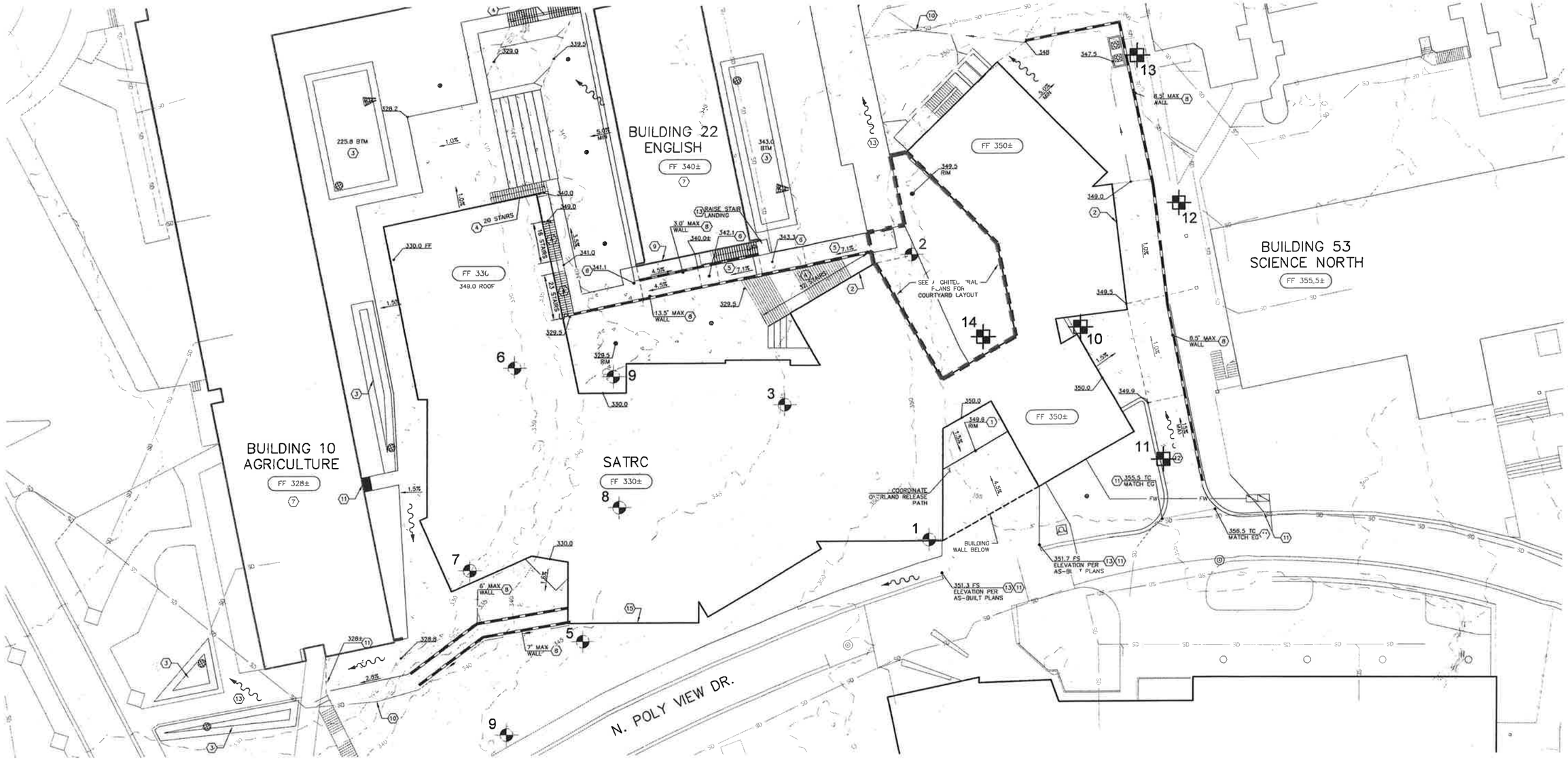
**APPENDIX A**

Boring Location Map
Boring Log Legend
Boring Logs – ESP 2016
Boring Logs – ESP 2018




## LEGEND

B1 Boring Location 1-9 (Approx.) -2016

B1 Boring Location 10-14 (Approx.) -2018

BASE MAP PROVIDED BY: ZGF ARCHITECTS

N

NOT TO SCALE

**Earth Systems Pacific**
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# EXPLORATION LOCATION MAP

Cal Poly Science and Agriculture Teaching and Research Complex
North Poly View Drive
San Luis Obispo, California

**Date**
April, 2018

**Project No.**
300986-017

Figure 1

CP SCIENCE AND AGRICULTURE TEACHING AND RESEARCH COMPLEX-040618maps

Earth Systems Pacific

# BORING LOG LEGEND

| SAMPLE / SUBSURFACE WATER SYMBOLS | GRAPH. SYMBOL |
|---|---|
| CALIFORNIA MODIFIED | ■ |
| STANDARD PENETRATION TEST (SPT) | ● |
| SHELBY TUBE | □ |
| BULK | ○ |
| SUBSURFACE WATER DURING DRILLING | ▼ |
| SUBSURFACE WATER AFTER DRILLING | ▽ |

## UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D 2487)

| MAJOR DIVISIONS | GROUP SYMBOL | TYPICAL DESCRIPTIONS | GRAPH. SYMBOL |
|---|---|---|---|
| COARSE GRAINED SOILS (MORE THAN HALF OF MATERIAL IS LARGER THAN #200 SIEVE SIZE) | GW | WELL GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES | |
| | GP | POORLY GRADED GRAVELS, OR GRAVEL-SAND MIXTURES, LITTLE OR NO FINES | |
| | GM | SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES, NON-PLASTIC FINES | |
| | GC | CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES, PLASTIC FINES | |
| | SW | WELL GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES | |
| | SP | POORLY GRADED SANDS OR GRAVELLY SANDS, LITTLE OR NO FINES | |
| | SM | SILTY SANDS, SAND-SILT MIXTURES, NON-PLASTIC FINES | |
| | SC | CLAYEY SANDS, SAND-CLAY MIXTURES, PLASTIC FINES | |
| FINE GRAINED SOILS (HALF OR MORE OF MATERIAL IS SMALLER THAN #200 SIEVE SIZE) | ML | INORGANIC SILTS AND VERY FINE SANDS, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY | |
| | CL | INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS | |
| | OL | ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY | |
| | MH | INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR SILTY SOILS, ELASTIC SILTS | |
| | CH | INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS | |
| | OH | ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS | |
| | PT | PEAT AND OTHER HIGHLY ORGANIC SOILS | |

## OBSERVED MOISTURE CONDITION

| DRY | SLIGHTLY MOIST | MOIST | VERY MOIST | WET (SATURATED) |
|---|---|---|---|---|

## CONSISTENCY

| COARSE GRAINED SOILS | | | FINE GRAINED SOILS | | |
|---|---|---|---|---|---|
| BLOWS/FOOT | | DESCRIPTIVE TERM | BLOWS/FOOT | | DESCRIPTIVE TERM |
| SPT | CA SAMPLER | | SPT | CA SAMPLER | |
| 0-10 | 0-16 | LOOSE | 0-2 | 0-3 | VERY SOFT |
| 11-30 | 17-50 | MEDIUM DENSE | 3-4 | 4-7 | SOFT |
| 31-50 | 51-83 | DENSE | 5-8 | 8-13 | MEDIUM STIFF |
| OVER 50 | OVER 83 | VERY DENSE | 9-15 | 14-25 | STIFF |
| | | | 16-30 | 26-50 | VERY STIFF |
| | | | OVER 30 | OVER 50 | HARD |

## GRAIN SIZES

| U.S. STANDARD SERIES SIEVE | | | | CLEAR SQUARE SIEVE OPENING | | |
|---|---|---|---|---|---|---|
| # 200 | # 40 | # 10 | # 4 | 3/4" | 3" | 12" |

| SILT & CLAY | SAND | | | GRAVEL | | COBBLES | BOULDERS |
|---|---|---|---|---|---|---|---|
| | FINE | MEDIUM | COARSE | FINE | COARSE | | |

## TYPICAL BEDROCK HARDNESS

| MAJOR DIVISIONS | TYPICAL DESCRIPTIONS |
|---|---|
| EXTREMELY HARD | CORE, FRAGMENT, OR EXPOSURE CANNOT BE SCRATCHED WITH KNIFE OR SHARP PICK; CAN ONLY BE CHIPPED WITH REPEATED HEAVY HAMMER BLOWS |
| VERY HARD | CANNOT BE SCRATCHED WITH KNIFE OR SHARP PICK; CORE OR FRAGMENT BREAKS WITH REPEATED HEAVY HAMMER BLOWS |
| HARD | CAN BE SCRATCHED WITH KNIFE OR SHARP PICK WITH DIFFICULTY (HEAVY PRESSURE); HEAVY HAMMER BLOW REQUIRED TO BREAK SPECIMEN |
| MODERATELY HARD | CAN BE GROOVED 1/16 INCH DEEP BY KNIFE OR SHARP PICK WITH MODERATE OR HEAVY PRESSURE; CORE OR FRAGMENT BREAKS WITH LIGHT HAMMER BLOW OR HEAVY MANUAL PRESSURE |
| SOFT | CAN BE GROOVED OR GOUGED EASILY BY KNIFE OR SHARP PICK WITH LIGHT PRESSURE, CAN BE SCRATCHED WITH FINGERNAIL; BREAKS WITH LIGHT TO MODERATE MANUAL PRESSURE |
| VERY SOFT | CAN BE READILY INDENTED, GROOVED OR GOUGED WITH FINGERNAIL, OR CARVED WITH KNIFE; BREAKS WITH LIGHT MANUAL PRESSURE |

## TYPICAL BEDROCK WEATHERING

| MAJOR DIVISIONS | TYPICAL DESCRIPTIONS |
|---|---|
| FRESH | NO DISCOLORATION, NOT OXIDIZED |
| SLIGHTLY WEATHERED | DISCOLORATION OR OXIDATION IS LIMITED TO SURFACE OF, OR SHORT DISTANCE FROM, FRACTURES; SOME FELDSPAR CRYSTALS ARE DULL |
| MODERATELY WEATHERED | DISCOLORATION OR OXIDATION EXTENDS FROM FRACTURES, USUALLY THROUGHOUT; Fe-Mg MINERALS ARE "RUSTY", FELDSPAR CRYSTALS ARE "CLOUDY" |
| INTENSELY WEATHERED | DISCOLORATION OR OXIDATION THROUGHOUT; FELDSPAR AND Fe-Mg MINERALS ARE ALTERED TO CLAY TO SOME EXTENT, OR CHEMICAL ALTERATION PRODUCES IN SITU DISAGGREGATION |
| DECOMPOSED | DISCOLORATION OR OXIDATION THROUGHOUT, BUT RESISTANT MINERALS SUCH AS QUARTZ MAY BE UNALTERED; FELDSPAR AND Fe-Mg MINERALS ARE COMPLETELY ALTERED TO CLAY |

drafting/masters/Boring Log Legend121714.dwg

# Earth Systems Pacific

Boring No. 1
PAGE 1 OF 1

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem Auger

JOB NO.: SL-17635-SC
DATE: 03/22/16

**CAL POLY SCIENCE AND AGRICULTURE TEACHING AND RESEARCH COMPLEX**
**California Polytechnic State University**
**San Luis Obispo, California**

| DEPTH (feet) | USCS CLASS | SYMBOL | SOIL DESCRIPTION | SAMPLE DATA: INTERVAL (feet) | SAMPLE TYPE | DRY DENSITY (pcf) | MOISTURE (%) | BLOWS PER 6 IN. |
|---|---|---|---|---|---|---|---|---|
| 0 | SC | | CLAYEY SAND: red brown, medium dense, moist (Fill) | | | | | |
| 1 | | | yellow brown | 0.0 - 3.0 | ○ | | | |
| 4 | | | brown, loose, trace gravel | | | | | 2 5 10 |
| 5 | CL | | SANDY LEAN CLAY: brown, stiff, moist (Alluvium) | 5.0 - 6.5 | ■ | 106.4 | 20.3 | |
| 6 | | | | 5.0 - 7.0 | ○ | | | |
| 10 | | | | 10.0 - 11.5 | ■ | 125.3 | 9.3 | 5 13 36 |
| 11 | | | SANDSTONE: yellow brown, very soft, moist, intensely weathered (Franciscan Melange) | | | | | |
| 13 | | | soft, slightly moist | | | | | |
| 15 | | | gray/ yellow brown mottled, very soft, moist, sheared | 15.0 - 16.5 | ● | | | 18 18 20 |
| 17 | | | End of Boring @ 16.5'<br>No subsurface water encountered | | | | | |

LEGEND: ■ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

# Earth Systems Pacific

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem Auger

**Boring No. 2**
PAGE 1 OF 1
JOB NO.: SL-17635-SC
DATE: 03/22/16

**CAL POLY SCIENCE AND AGRICULTURE TEACHING AND RESEARCH COMPLEX**
**California Polytechnic State University**
**San Luis Obispo, California**

| DEPTH (feet) | USCS CLASS | SYMBOL | SOIL DESCRIPTION | SAMPLE DATA: INTERVAL (feet) | SAMPLE TYPE | DRY DENSITY (pcf) | MOISTURE (%) | BLOWS PER 6 IN. |
|---|---|---|---|---|---|---|---|---|
| 0 | CL | | SANDY LEAN CLAY: brown to yellow brown, stiff, moist (Topsoil) | | | | | |
| 2 | | | SANDSTONE: yellow brown, soft, moist, intensely weathered (Franciscan Melange) | | | | | |
| 3 | | | soft, slightly moist | | | | | |
| 5 | | | very fractured, very moist along fractures | 5.0 - 6.5 | ● | | | 21, 24, 25 |
| 7 | | | End of Boring @ 6.5'<br>No subsurface water encountered | | | | | |

LEGEND: ■ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

# Earth Systems Pacific

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem Auger

**Boring No. 3**
PAGE 1 OF 1
JOB NO.: SL-17635-SC
DATE: 03/22/16

**CAL POLY SCIENCE AND AGRICULTURE TEACHING AND RESEARCH COMPLEX**
**California Polytechnic State University**
**San Luis Obispo, California**

| DEPTH (feet) | USCS CLASS | SYMBOL | SOIL DESCRIPTION | SAMPLE DATA: INTERVAL (feet) | SAMPLE TYPE | DRY DENSITY (pcf) | MOISTURE (%) | BLOWS PER 6 IN. |
|---|---|---|---|---|---|---|---|---|
| 0 | CH | | SANDY FAT CLAY: brown to yellow brown, stiff, moist (Fill) | 0.0 - 3.0 | ○ | | | |
| 4 | | | SANDSTONE: yellow brown, soft, slightly moist, intensely weathered (Franciscan Melange) | | | | | |
| 5 | | | moderately hard | 5.0 - 6.5 | ● | | | 50'/6" |
| 7 | | | hard, moderately weathered | | | | | |
| 9 | | | moderately hard | | | | | |
| 10 | | | | 10.0 - 11.0 | ● | | | 24<br>50/3" |
| 11 | | | End of Boring @ 11.0'<br>No subsurface water encountered | | | | | |

LEGEND: ■ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

# Earth Systems Pacific

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem Auger

**Boring No. 4**
PAGE 1 OF 1
JOB NO.: SL-17635-SC
DATE: 03/22/16

**CAL POLY SCIENCE AND AGRICULTURE TEACHING AND RESEARCH COMPLEX**
**California Polytechnic State University**
**San Luis Obispo, California**

## SOIL DESCRIPTION

| DEPTH (feet) | USCS CLASS | SYMBOL | SOIL DESCRIPTION | SAMPLE DATA: INTERVAL (feet) | SAMPLE TYPE | DRY DENSITY (pcf) | MOISTURE (%) | BLOWS PER 6 IN. |
|---|---|---|---|---|---|---|---|---|
| 0 | SC | | CLAYEY SAND: brown, medium dense, moist (Fill) | | | | | |
| 3 | CL | | SANDY LEAN CLAY: orange brown, stiff, moist | | | | | |
| 5 | | | SANDSTONE: yellow brown, soft, moist, intensely weathered, fractured (Franciscan Melange) | 5.0 - 6.5 | ■ | 132.5 | 8.6 | 8<br>23<br>39 |
| 8 | | | slightly moist, moderately hard, moderately weathered | | | | | |
| 10 | | | hard | 10.0 - 10.5 | ● | No Return | | 50/3" |
| 11 | | | End of Boring @ 11.0'<br>No subsurface water encountered | | | | | |

LEGEND: ■ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

# Earth Systems Pacific

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem Auger

**Boring No. 5**
PAGE 1 OF 1
JOB NO.: SL-17635-SC
DATE: 03/22/16

**CAL POLY SCIENCE AND AGRICULTURE TEACHING AND RESEARCH COMPLEX**
**California Polytechnic State University**
**San Luis Obispo, California**

| DEPTH (feet) | USCS CLASS | SYMBOL | SOIL DESCRIPTION | SAMPLE DATA: INTERVAL (feet) | SAMPLE TYPE | DRY DENSITY (pcf) | MOISTURE (%) | BLOWS PER 6 IN. |
|---|---|---|---|---|---|---|---|---|
| 0 | SC | | CLAYEY SAND: brown, loose to medium dense, moist (Fill) | | | | | |
| 4 | | | light brown, slightly moist, trace, sandstone gravels | 5.0 - 6.5 | ● | | | 4 5 7 |
| 7 | CL | | SANDY LEAN CLAY: brown, stiff, moist (Residual Soil) | | | | | |
| 10 | | | SANDSTONE: light brown, very soft, moist, intensely weathered (Franciscan Melange) | 10.0 - 10.5 | ● | | | 3 7 12 |
| 13 | | | moderately hard, moderately weathered | 14.0 - 14.5 | ● | | | 50/5" |
| 15 | | | End of Boring @ 14.5' due to refusal<br>No subsurface water encountered | | | | | |

LEGEND: ■ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

# Earth Systems Pacific

**Boring No. 6**
PAGE 1 OF 1
JOB NO.: SL-17635-SC
DATE: 03/22/16

LOGGED BY: R. Wagner
DRILL RIG: Simco with Automatic Hammer
AUGER TYPE: 6" Solid Stem Auger

**CAL POLY SCIENCE AND AGRICULTURE TEACHING AND RESEARCH COMPLEX**
**California Polytechnic State University**
**San Luis Obispo, California**

| DEPTH (feet) | USCS CLASS | SYMBOL | SOIL DESCRIPTION | SAMPLE DATA: INTERVAL (feet) | SAMPLE TYPE | DRY DENSITY (pcf) | MOISTURE (%) | BLOWS PER 6 IN. |
|---|---|---|---|---|---|---|---|---|
| 0 - 1 | SC | | CLAYEY SAND: brown, loose, moist (Top Soil) | | | | | |
| 1 - 2 | | | SANDSTONE: light gray to yellow brown, moderately hard, slightly moist, moderately weathered (Franciscan Melange) | | | | | |
| 2 - 3 | | | | | | | | |
| 3 - 4 | | | | | | | | |
| 4 - 5 | | | End of Boring @ 4.0' | 4.0 - 4.5 | ● | No Return | | 50/2" |
| 5 - 6 | | | No subsurface water encountered | | | | | |
| 6 - 7 | | | | | | | | |
| 7 - 8 | | | | | | | | |
| 8 - 9 | | | | | | | | |
| 9 - 10 | | | | | | | | |
| 10 - 11 | | | | | | | | |
| 11 - 12 | | | | | | | | |
| 12 - 13 | | | | | | | | |
| 13 - 14 | | | | | | | | |
| 14 - 15 | | | | | | | | |
| 15 - 16 | | | | | | | | |
| 16 - 17 | | | | | | | | |
| 17 - 18 | | | | | | | | |
| 18 - 19 | | | | | | | | |
| 19 - 20 | | | | | | | | |
| 20 - 21 | | | | | | | | |
| 21 - 22 | | | | | | | | |
| 22 - 23 | | | | | | | | |
| 23 - 24 | | | | | | | | |
| 24 - 25 | | | | | | | | |
| 25 - 26 | | | | | | | | |

LEGEND: ■ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

# Earth Systems Pacific

Boring No. 7
PAGE 1 OF 1

LOGGED BY: R. Wagner
DRILL RIG: Simco with Automatic Hammer
AUGER TYPE: 6" Solid Stem Auger

JOB NO.: SL-17635-SC
DATE: 03/22/16

**CAL POLY SCIENCE AND AGRICULTURE TEACHING AND RESEARCH COMPLEX**
**California Polytechnic State University**
**San Luis Obispo, California**

| DEPTH (feet) | USCS CLASS | SYMBOL | SOIL DESCRIPTION | SAMPLE DATA: INTERVAL (feet) | SAMPLE TYPE | DRY DENSITY (pcf) | MOISTURE (%) | BLOWS PER 6 IN. |
|---|---|---|---|---|---|---|---|---|
| 0 | SC | | CLAYEY SAND: brown, medium dense, moist (Top Soil) | | | | | |
| 3 | | | SANDSTONE: yellow brown, very soft, slightly moist, intensely weathered (Franciscan Melange) | | | | | |
| 8 | | | soft, moderately weathered | | | | | |
| 9 | | | moderately hard | | | | | |
| 10 | | | End of Boring @ 9.5'<br>No subsurface water encountered | | | | | |

LEGEND: ■ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

# Earth Systems Pacific

LOGGED BY: R. Wagner
DRILL RIG: Simco with Automatic Hammer
AUGER TYPE: 6" Solid Stem Auger

**Boring No. 8**
PAGE 1 OF 1
JOB NO.: SL-17635-SC
DATE: 03/22/16

**CAL POLY SCIENCE AND AGRICULTURE TEACHING AND RESEARCH COMPLEX**
**California Polytechnic State University**
**San Luis Obispo, California**

| DEPTH (feet) | USCS CLASS | SYMBOL | SOIL DESCRIPTION | SAMPLE DATA: INTERVAL (feet) | SAMPLE TYPE | DRY DENSITY (pcf) | MOISTURE (%) | BLOWS PER 6 IN. |
|---|---|---|---|---|---|---|---|---|
| 0 | CL | | SANDY LEAN CLAY: brown, stiff, moist (Fill) | | | | | |
| 6 | | | light brown | | | | | |
| 8 | | | SANDSTONE: yellow brown, very soft, moist, intensely weathered (Franciscan Melange) | | | | | |
| 10 | | | End of Boring @ 10.0'<br>No subsurface water encountered | | | | | |

LEGEND: ■ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

# Earth Systems Pacific

LOGGED BY: R. Wagner
DRILL RIG: Simco with Automatic Hammer
AUGER TYPE: 6" Solid Stem Auger

**Boring No. 9**
PAGE 1 OF 1
JOB NO.: SL-17635-SC
DATE: 03/22/16

**CAL POLY SCIENCE AND AGRICULTURE TEACHING AND RESEARCH COMPLEX**
**California Polytechnic State University**
**San Luis Obispo, California**

| DEPTH (feet) | USCS CLASS | SYMBOL | SOIL DESCRIPTION | SAMPLE DATA: INTERVAL (feet) | SAMPLE TYPE | DRY DENSITY (pcf) | MOISTURE (%) | BLOWS PER 6 IN. |
|---|---|---|---|---|---|---|---|---|
| 0 | SC | | CLAYEY SAND: red brown, medium dense, moist (Fill) | | | | | |
| 2 | | | orange brown | | | | | |
| 5 | | | | 5.0 - 6.5 | ■ | 100.3 | 9.6 | 5<br>11<br>12 |
| 6 | CL | | SANDY LEAN CLAY: brown, very stiff, moist (Residual Soil) | | | | | |
| 8 | | | SANDSTONE: yellow brown, very soft, moist, intensely weathered (Franciscan Melange) | | | | | |
| 10 | | | | 10.0 - 11.5 | ● | | | 20<br>29<br>40 |
| 11 | | | moderately hard, moderately weathered | | | | | |
| 12 | | | End of Boring @ 11.5'<br>No subsurface water encountered | | | | | |

LEGEND: ■ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

# Earth Systems Pacific

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6"Hollow Stem Auger

**Boring No. 10**
PAGE 1 OF 1
JOB NO.: 300986-017
DATE: 3/29/18

**CAL POLY SCIENCE AND AGRICULTURE TEACHING AND RESEARCH COMPLEX**
**North of Poly View Drive**
**San Luis Obispo, California**

| DEPTH (feet) | USCS CLASS | SYMBOL | SOIL DESCRIPTION | SAMPLE DATA: INTERVAL (feet) | SAMPLE TYPE | DRY DENSITY (pcf) | MOISTURE (%) | BLOWS PER 6 IN. |
|---|---|---|---|---|---|---|---|---|
| 0 | | | 8" PCC | | | | | |
| 1 | SC | | CLAYEY SAND: olive brown to red brown, medium dense, moist (Residual Soil) | | | | | |
| 2 | | | | | | | | |
| 3 | | | | | | | | |
| 4 | | | SANDSTONE: olive brown, soft, moderately weathered, friable (Franciscan Melange) | | | | | |
| 5 | | | | 5.0 - 6.5 | ■ | 120.6 | 8.6 | 10<br>50/6" |
| 6 | | | | | | | | |
| 7 | | | | 7.0 - 7.5 | ● | | | 50/3" |
| 8 | | | End of Boring @ 7.5'<br>No subsurface water encountered | | | | | |
| 9 | | | | | | | | |
| 10 | | | | | | | | |
| 11 | | | | | | | | |
| 12 | | | | | | | | |
| 13 | | | | | | | | |
| 14 | | | | | | | | |
| 15 | | | | | | | | |
| 16 | | | | | | | | |
| 17 | | | | | | | | |
| 18 | | | | | | | | |
| 19 | | | | | | | | |
| 20 | | | | | | | | |
| 21 | | | | | | | | |
| 22 | | | | | | | | |
| 23 | | | | | | | | |
| 24 | | | | | | | | |
| 25 | | | | | | | | |
| 26 | | | | | | | | |

LEGEND: ■ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

# Earth Systems Pacific

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6"Hollow Stem Auger

**Boring No. 11**
PAGE 1 OF 1
JOB NO.: 300986-017
DATE: 3/29/18

**CAL POLY SCIENCE AND AGRICULTURE TEACHING AND RESEARCH COMPLEX**
**North of Poly View Drive**
**San Luis Obispo, California**

| DEPTH (feet) | USCS CLASS | SYMBOL | SOIL DESCRIPTION | SAMPLE DATA: INTERVAL (feet) | SAMPLE TYPE | DRY DENSITY (pcf) | MOISTURE (%) | BLOWS PER 6 IN. |
|---|---|---|---|---|---|---|---|---|
| 0 | | | 4.0" AC over 4.0" AB | | | | | |
| 1 | GC | | CLAYEY GRAVEL W/ SAND: dark gray, medium dense, moist (Residual Soil) | | | | | |
| 2 | SC | | CLAYEY SAND: dark brown, medium dense, moist | 2.0 - 4.0 | ○ | | | |
| 3 | | | increasing clay content | | | | | |
| 4 | | | | | | | | |
| 5 | | | SANDSTONE: olive brown, soft, intensely weathered, friable, massive (Franciscan Melange) | 5.0 - 6.5 | ■ | | | 12<br>35<br>50/2" |
| 6 | | | | | | | | |
| 7 | | | | | | | | |
| 8 | | | | | | | | |
| 9 | | | | | | | | |
| 10 | | | End of Boring @ 9.5' due to refusal<br>No subsurface water encountered | 9.0 - 9.5 | ● | | | 50/1" |
| 11 | | | | | | | | |
| 12 | | | | | | | | |
| 13 | | | | | | | | |
| 14 | | | | | | | | |
| 15 | | | | | | | | |
| 16 | | | | | | | | |
| 17 | | | | | | | | |
| 18 | | | | | | | | |
| 19 | | | | | | | | |
| 20 | | | | | | | | |
| 21 | | | | | | | | |
| 22 | | | | | | | | |
| 23 | | | | | | | | |
| 24 | | | | | | | | |
| 25 | | | | | | | | |
| 26 | | | | | | | | |

LEGEND: ■ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

# Earth Systems Pacific

LOGGED BY: R. Wagner
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6"Hollow Stem Auger

**Boring No. 12**
PAGE 1 OF 1
JOB NO.: 300986-017
DATE: 3/29/18

**CAL POLY SCIENCE AND AGRICULTURE TEACHING AND RESEARCH COMPLEX**
**North of Poly View Drive**
**San Luis Obispo, California**

| DEPTH (feet) | USCS CLASS | SYMBOL | SOIL DESCRIPTION | SAMPLE DATA: INTERVAL (feet) | SAMPLE TYPE | DRY DENSITY (pcf) | MOISTURE (%) | BLOWS PER 6 IN. |
|---|---|---|---|---|---|---|---|---|
| 0 | | | 4.5" PCC over 2-3" SP | | | | | |
| 1 | SC | | CLAYEY SAND: olive brown, medium dense, moist, trace gravel (Residual Soil) | 0.5 - 2.5 | ○ | | | |
| 2 | | | | | | | | |
| 3 | | | SANDSTONE: olive brown, soft, massive, intensely weathered, friable | | | | | |
| 4 | | | | | | | | |
| 5 | | | medium hard | 5.0 - 5.5 | ● | | | 50/4" |
| 6 | | | | | | | | |
| 7 | | | | | | | | |
| 8 | | | | | | | | |
| 9 | | | fractured, inter bedded with thin beds of clay stone, sheared | | | | | 16 |
| 10 | | | | 10.0 - 11.5 | ● | | | 22 |
| 11 | | | | | | | | 50/2" |
| 12 | | | End of Boring @ 11.5'<br>No subsurface water encountered | | | | | |
| 13 | | | | | | | | |
| 14 | | | | | | | | |
| 15 | | | | | | | | |
| 16 | | | | | | | | |
| 17 | | | | | | | | |
| 18 | | | | | | | | |
| 19 | | | | | | | | |
| 20 | | | | | | | | |
| 21 | | | | | | | | |
| 22 | | | | | | | | |
| 23 | | | | | | | | |
| 24 | | | | | | | | |
| 25 | | | | | | | | |
| 26 | | | | | | | | |

LEGEND: ■ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

# Earth Systems Pacific

**Boring No. 13**
PAGE 1 OF 1
JOB NO.: 300986-017
DATE: 3/29/18

LOGGED BY: R. Wagner
DRILL RIG: Simcp EP 200 with Automatic Hammer
AUGER TYPE: 6" Solid Stem Auger

**CAL POLY SCIENCE AND AGRICULTURE TEACHING AND RESEARCH COMPLEX**
**North of Poly View Drive**
**San Luis Obispo, California**

| DEPTH (feet) | USCS CLASS | SYMBOL | SOIL DESCRIPTION | SAMPLE DATA: INTERVAL (feet) | SAMPLE TYPE | DRY DENSITY (pcf) | MOISTURE (%) | BLOWS PER 6 IN. |
|---|---|---|---|---|---|---|---|---|
| 0 | SC | | CLAYEY SAND: brown, loose, moist, roots, trace gravel (Fill) | | | | | |
| 2 | CL | | SANDY LEAN CLAY: dark olive brown, stiff, moist, (Residual Soil) | | | | | |
| 3 | | | SANDSTONE: olive brown, soft, weathered, massive, friable (Franscian Melange) | | | | | |
| 5 | | | | 5.0 - 6.5 | ■ | 115.8 | 11.2 | 25<br>50/5" |
| 7 | | | moderately hard | | | | | |
| 8 | | | End of Boring @ 8.0'<br>No subsurface water encountered | | | | | |

LEGEND: ■ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

# Earth Systems Pacific

LOGGED BY: R. Wagner
DRILL RIG: Hand Auger
AUGER TYPE: 3" Solid Stem Auger

**Boring No. 14**
PAGE 1 OF 1
JOB NO.: 300986-017
DATE: 3/29/18

**CAL POLY SCIENCE AND AGRICULTURE TEACHING AND RESEARCH COMPLEX**
**North of Poly View Drive**
**San Luis Obispo, California**

| DEPTH (feet) | USCS CLASS | SYMBOL | SOIL DESCRIPTION | SAMPLE DATA: INTERVAL (feet) | SAMPLE TYPE | DRY DENSITY (pcf) | MOISTURE (%) | BLOWS PER 6 IN. |
|---|---|---|---|---|---|---|---|---|
| 0 | SC | | CLAYEY SAND: brown, loose, moist (Top Soil) | | | | | |
| 1 | | | increasing clay content | | | | | |
| 2 | | | CLAYEY SAND: olive brown/ brown mottled, medium dense, trace gravel (Fill) | | | | | |
| 3 | | | | | | | | |
| 4 | | | increasing coarse gravel | | | | | |
| 5 | | | End of Boring @ 4.5' due to refusal<br>No subsurface water encountered | | | | | |

LEGEND: ■ Ring Sample ○ Grab Sample ▭ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

**APPENDIX B**

Laboratory Test Results – ESP 2016
Laboratory Test Results – ESP 2018

Cal Poly Science and Agriculture Teaching and Research Complex PID-000357-001, 002

## BULK DENSITY TEST RESULTS

ASTM D 2937-10 (modified for ring liners)

March 30, 2016

| BORING NO. | DEPTH feet | MOISTURE CONTENT, % | WET DENSITY, pcf | DRY DENSITY, pcf |
|---|---|---|---|---|
| 1 | 6.0 - 6.5 | 20.3 | 128.0 | 106.4 |
| 1 | 11.0 - 11.5 | 9.3 | 136.9 | 125.3 |
| 4 | 6.0 - 6.5 | 8.6 | 143.8 | 132.5 |
| 9 | 6.0 - 6.5 | 9.6 | 109.9 | 100.3 |

## EXPANSION INDEX TEST RESULTS

ASTM D 4829-11

| BORING NO. | DEPTH feet | EXPANSION INDEX |
|---|---|---|
| 1 | 0.0 - 3.0 | 56 |
| 1 | 5.0 - 7.0 | 35 |
| 3 | 0.0 - 3.0 | 94 |

Cal Poly Science and Agriculture Teaching and Research Complex PID-000357-001, 002

## MOISTURE-DENSITY COMPACTION TEST

**ASTM D 1557-12 (Modified)**

PROCEDURE USED: A

PREPARATION METHOD: Moist

RAMMER TYPE: Mechanical

SPECIFIC GRAVITY: 2.70 (assumed)

March 30, 2016

Boring #1 @ 0.0 - 3.0'

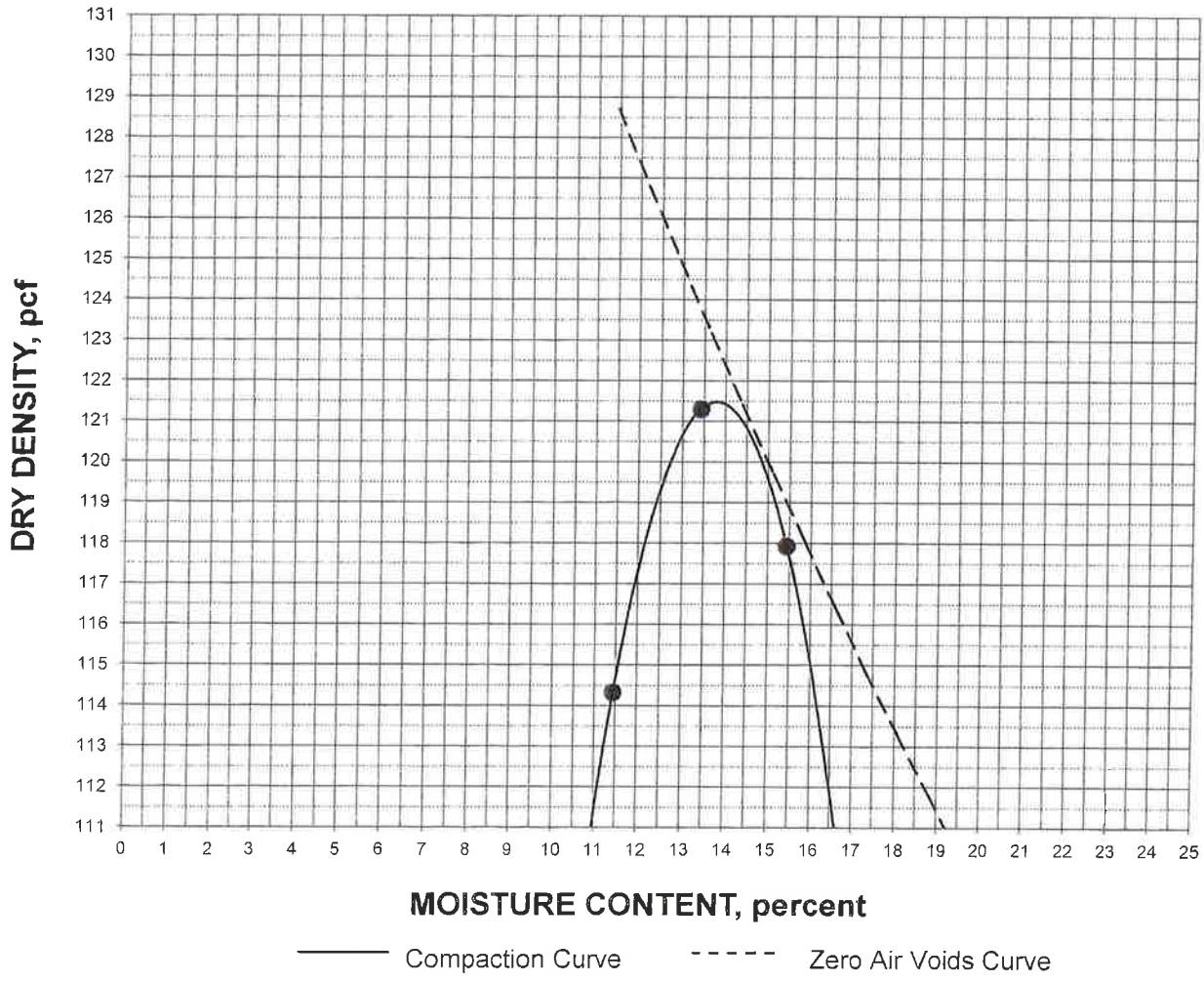
Red Brown Clayey Sand (SC)

SIEVE DATA:

| Sieve Size | % Retained (Cumulative) |
|---|---|
| 3/4" | 0 |
| 3/8" | 0 |
| #4 | 0 |

**MAXIMUM DRY DENSITY: 121.5 pcf**

**OPTIMUM MOISTURE: 13.8%**



Cal Poly Science and Agriculture Teaching and Research Complex PID-000357-001, 002

## MOISTURE-DENSITY COMPACTION TEST

ASTM D 1557-12 (Modified)

PROCEDURE USED: A

PREPARATION METHOD: Moist

RAMMER TYPE: Mechanical

SPECIFIC GRAVITY: 2.70 (assumed)

March 30, 2016

Boring #1 @ 5.0 - 7.0'

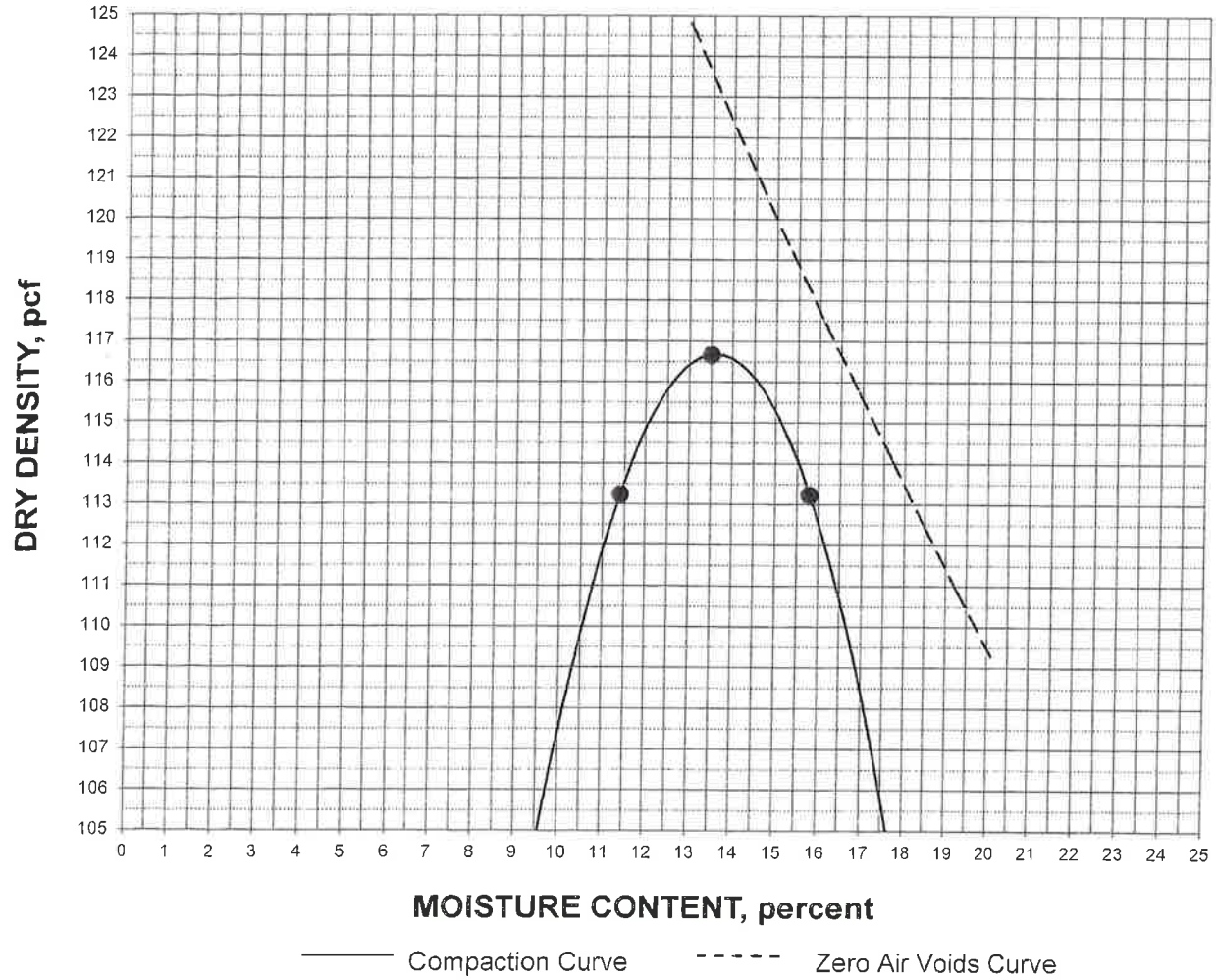
Brown Sandy Lean Clay (CL)

SIEVE DATA:

| Sieve Size | % Retained (Cumulative) |
|---|---|
| 3/4" | 0 |
| 3/8" | 0 |
| #4 | 0 |

**MAXIMUM DRY DENSITY: 116.7 pcf**

**OPTIMUM MOISTURE: 13.6%**



Cal Poly Science and Agriculture Teaching and Research Complex

PID-000357-001, 002

## MOISTURE-DENSITY COMPACTION TEST

**ASTM D 1557-12 (Modified)**

PROCEDURE USED: A

PREPARATION METHOD: Moist

RAMMER TYPE: Mechanical

SPECIFIC GRAVITY: 2.70 (assumed)

March 30, 2016

Boring #3 @ 0.0 - 3.0'

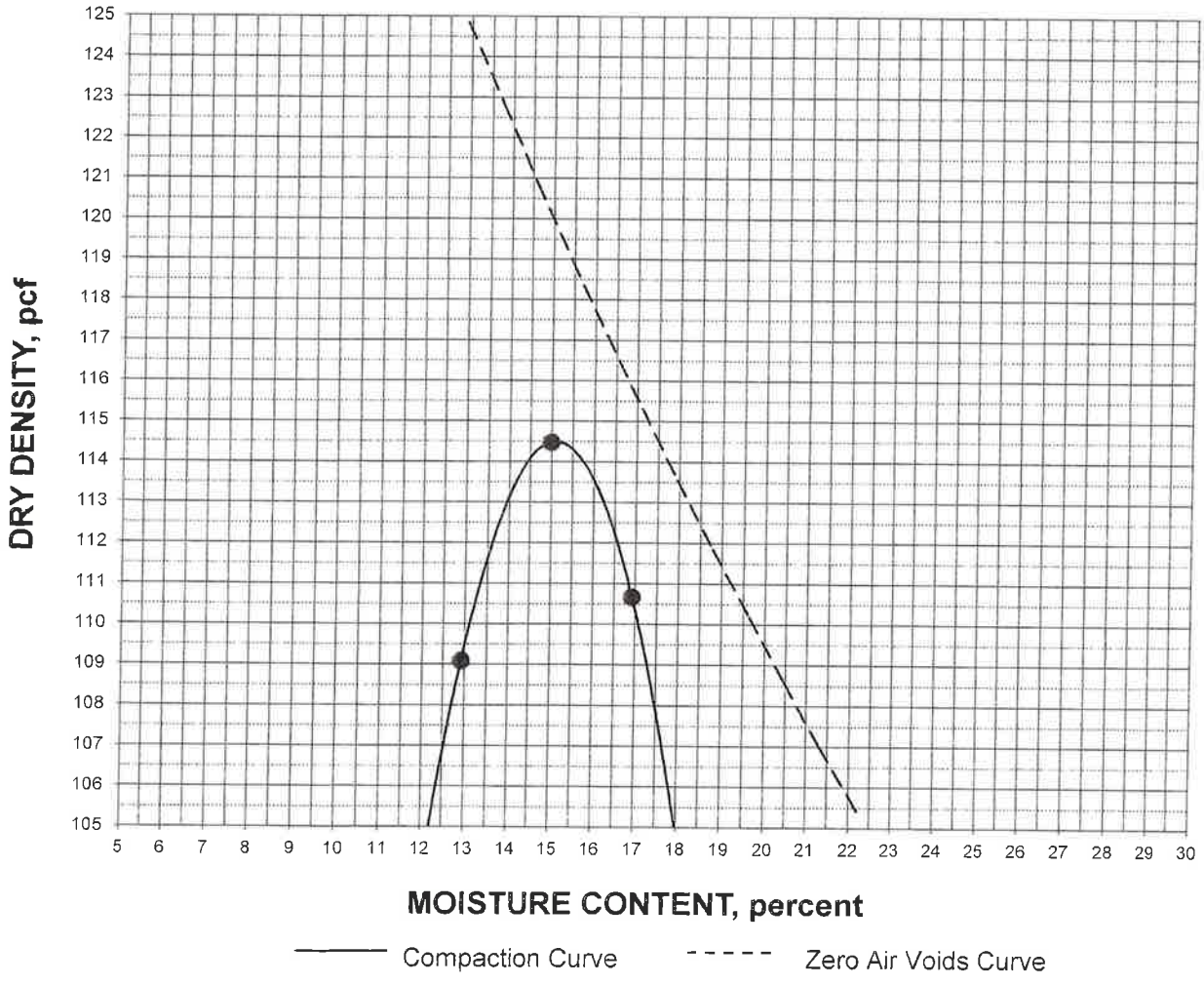
Brown Sandy Fat Clay (CH)

SIEVE DATA:

| Sieve Size | % Retained (Cumulative) |
|---|---|
| 3/4" | 0 |
| 3/8" | 0 |
| #4 | 0 |

**MAXIMUM DRY DENSITY: 114.5 pcf**

**OPTIMUM MOISTURE: 15.1%**



Cal Poly Science and Agriculture Teaching and Research Complex

PID-000357-001, 002

## DIRECT SHEAR

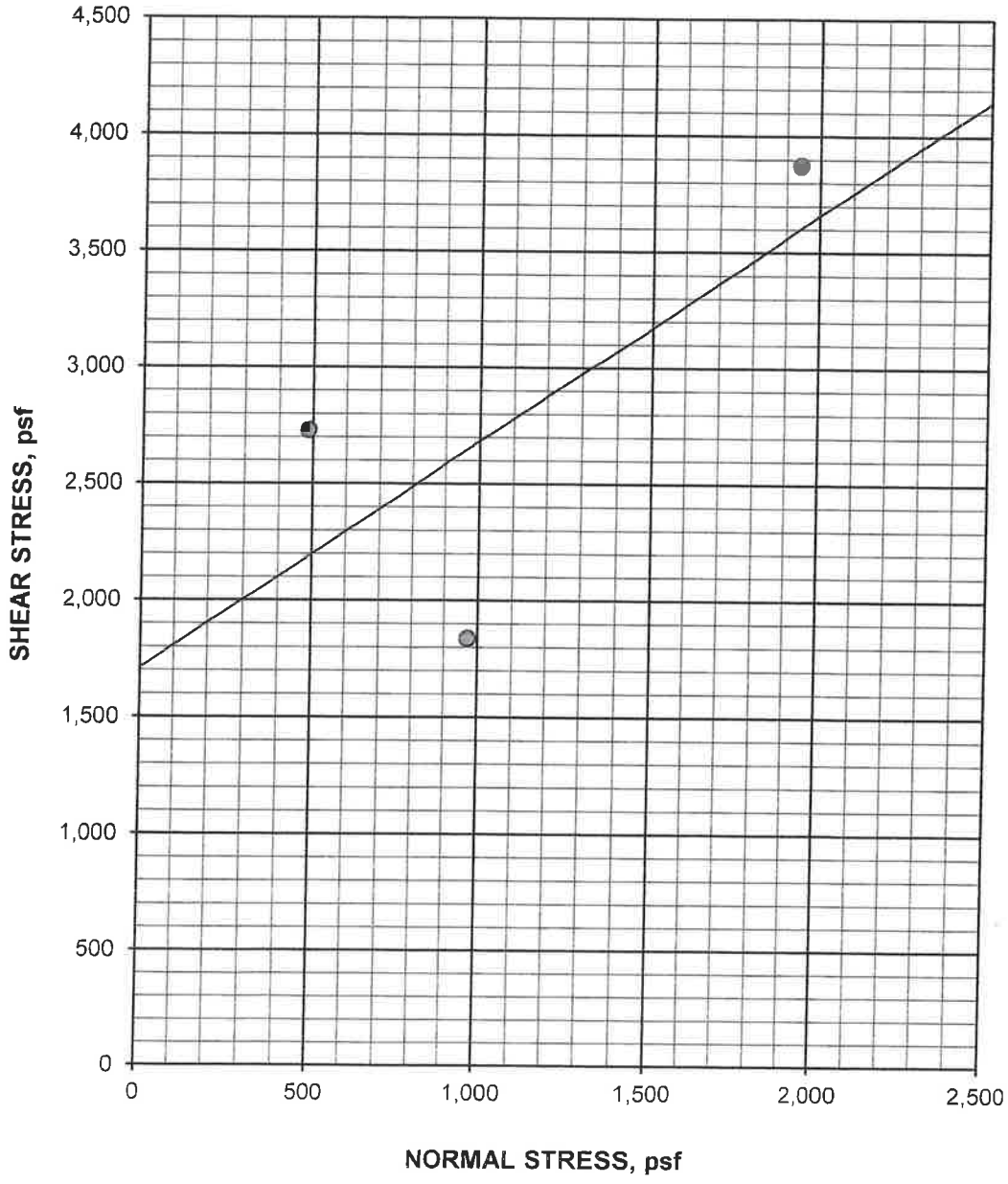
**ASTM D 3080/D3080M-11 (modified for consolidated, undrained conditions)**

March 30, 2016

Boring #4 @ 6.0 -6.5'
Intensely Weathered Sandstone
Ring sample, saturated

INITIAL DRY DENSITY: 130.0 pcf
INITIAL MOISTURE CONTENT: 8.6 %
PEAK SHEAR ANGLE (Ø): 44°
COHESION (C): 1,712 psf

### SHEAR vs. NORMAL STRESS



## DIRECT SHEAR continued

**ASTM D 3080/D3080M-11 (modified for consolidated, undrained conditions)**

Boring #4 @ 6.0 -6.5'

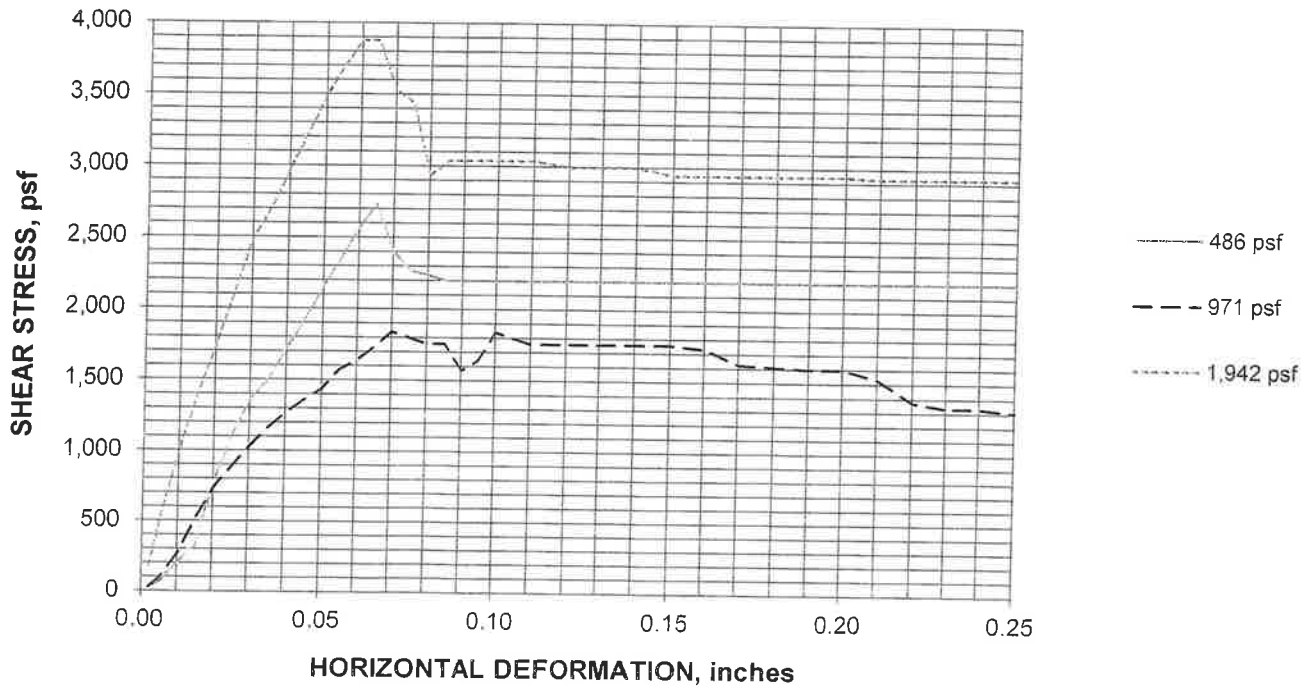
March 30, 2016

Intensely Weathered Sandstone

Ring sample, saturated

SPECIFIC GRAVITY: 2.70 (assumed)

| SAMPLE NO.: | 1 | 2 | 3 | AVERAGE |
|---|---|---|---|---|
| **INITIAL** | | | | |
| WATER CONTENT, % | 8.6 | 8.6 | 8.6 | 8.6 |
| DRY DENSITY, pcf | 131.0 | 127.7 | 131.3 | 130.0 |
| SATURATION, % | 81.3 | 72.6 | 82.1 | 78.7 |
| VOID RATIO | 0.286 | 0.320 | 0.283 | 0.296 |
| DIAMETER, inches | 2.410 | 2.410 | 2.410 | |
| HEIGHT, inches | 1.00 | 1.00 | 1.00 | |
| **AT TEST** | | | | |
| WATER CONTENT, % | 11.3 | 11.6 | 11.0 | |
| DRY DENSITY, pcf | 131.0 | 127.7 | 131.7 | |
| SATURATION, % | 100.0 | 98.0 | 100.0 | |
| VOID RATIO | 0.286 | 0.320 | 0.279 | |
| HEIGHT, inches | 1.00 | 1.00 | 1.00 | |



Cal Poly Science, Agricultlure Teaching
and Research Complex

300986-017

## BULK DENSITY TEST RESULTS

**ASTM D 2937-17 (modified for ring liners)**

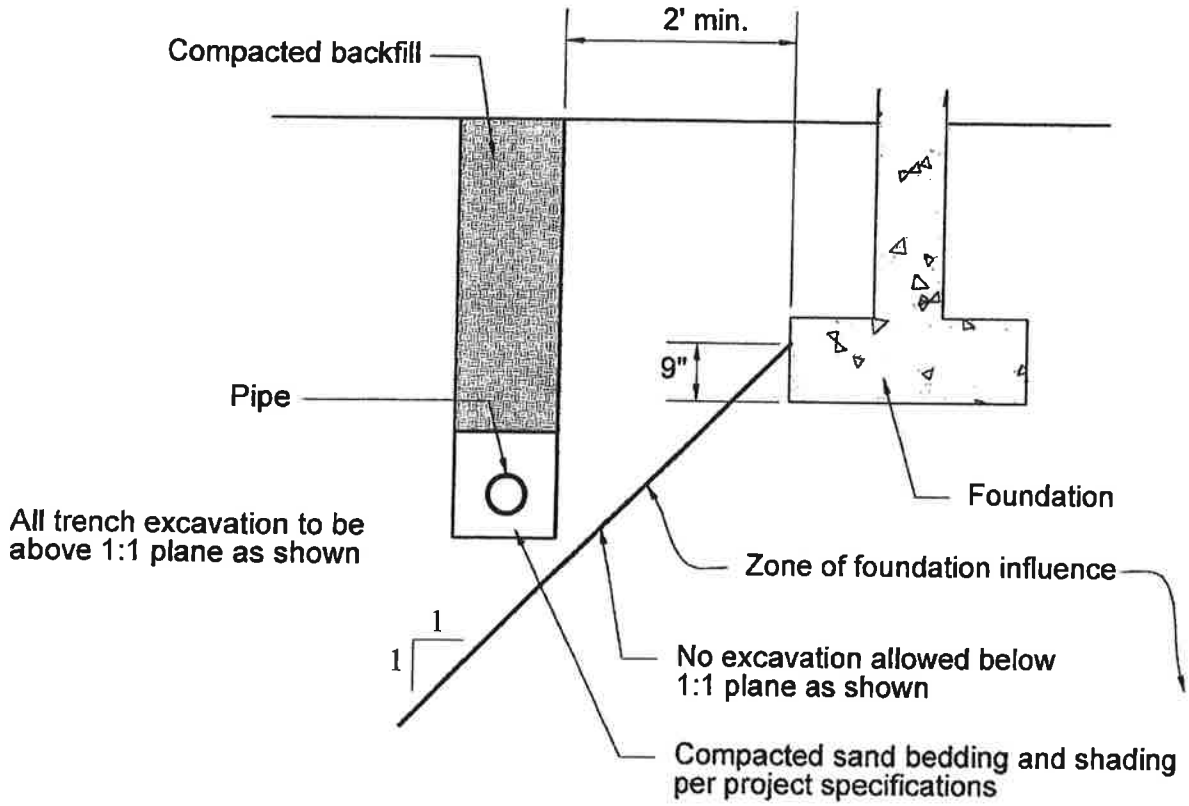
April 3, 2018

| BORING NO. | DEPTH feet | MOISTURE CONTENT, % | WET DENSITY, pcf | DRY DENSITY, pcf |
|---|---|---|---|---|
| 10 | 5.5 - 6.0 | 8.6 | 131.0 | 120.6 |
| 13 | 5.5 - 6.0 | 11.2 | 128.8 | 115.8 |

## APPENDIX C

Typical Detail A: Pipe Placed Parallel to Foundations
Typical Bench and Keyway Detail
Typical Back Drain Detail

# TYPICAL DETAIL A
# PIPE PLACED PARALLEL TO FOUNDATIONS




**SCHEMATIC ONLY**
NOT TO SCALE

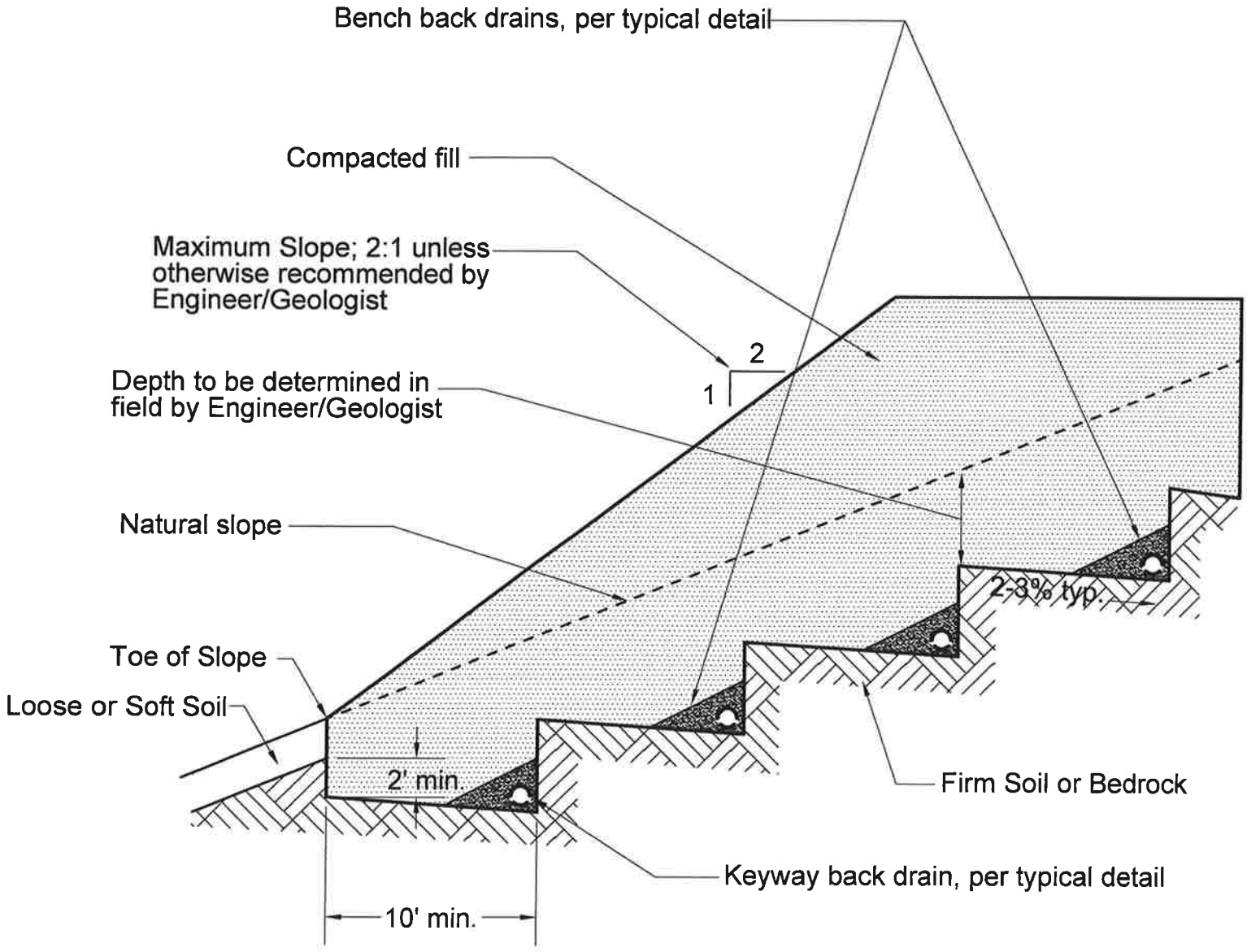
**Earth Systems Pacific**

4378 Old Santa Fe Road
San Luis Obispo, CA 93401-8116
(805) 544-3276 • FAX (805) 544-1786
E-mail: esp@earthsystems.com

# TYPICAL BENCH AND KEYWAY DETAIL

## CAL POLY SCIENCE AND AGRICULTURE TEACHING AND RESEARCH COMPLEX

California Polytechnic State University
San Luis Obispo, California

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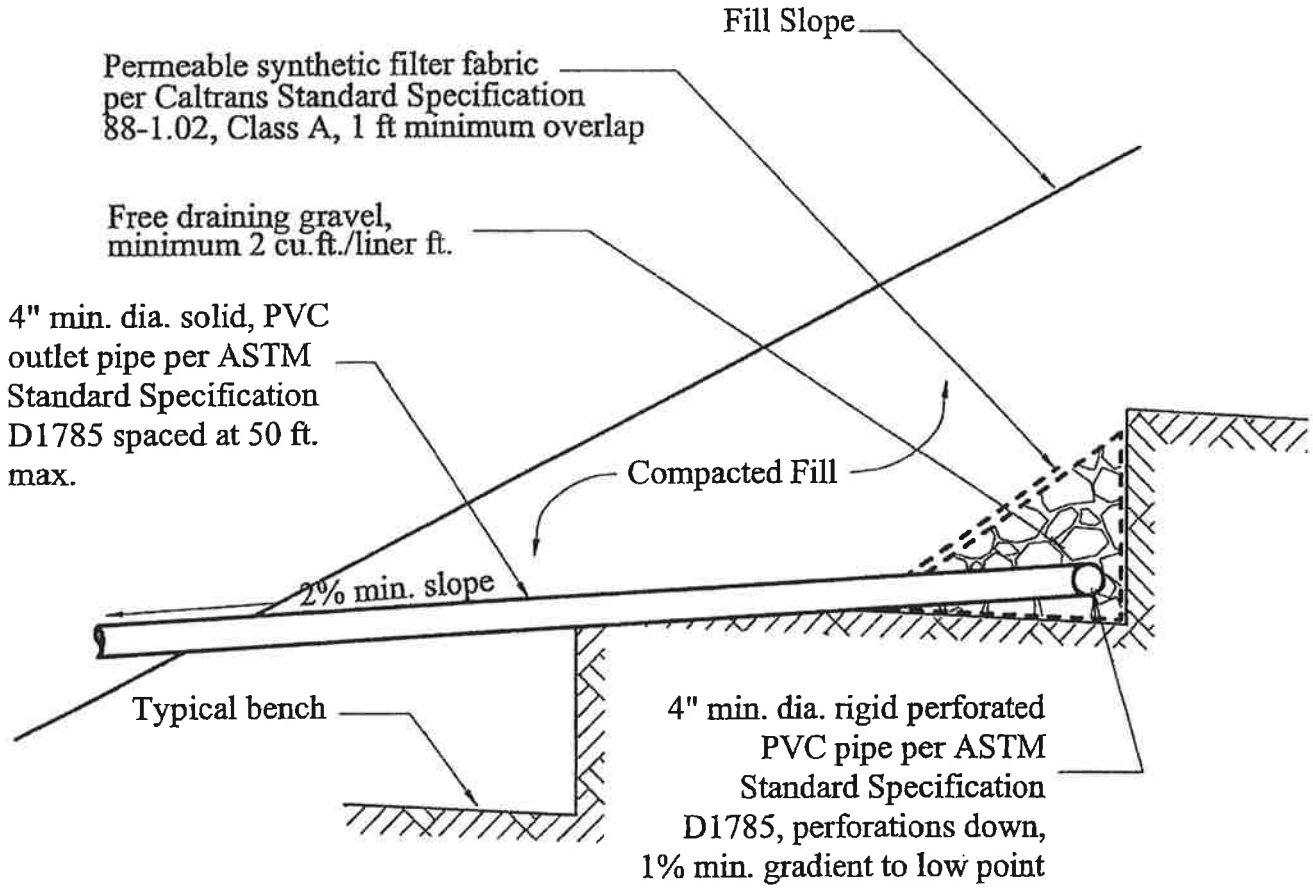
4378 Old Santa Fe Road
San Luis Obispo, CA 93401-8116
(805) 544-3276 • FAX (805) 544-1786
E-mail: esp@earthsys.com

May 5, 2016 SB PID-000357-001,002

CAL POLY SCIENCE AND AGG-050516drain

# TYPICAL BACK DRAIN DETAIL




Note: A prefabricated panel drainage system (Advanedge, Miradrain, etc.) may be substituted for the gravel / pipe system, provided it is installed in accordance with the manufacturer's recommendations

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NOT TO SCALE

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4378 Old Santa Fe Road
San Luis Obispo, CA 93401-8116
(805) 544-3276 • FAX (805) 544-1786
E-mail: esp@earthsys.com

# Appendix C

Noise Modeling Worksheets

Roadway Construction Noise Model (RCNM),Version 1.1

Report dat ########
Case Descr SATRC- Dmeolition

---- Receptor #1 ----

| Description | Land Use | Baselines (dBA) Daytime | Evening | Night |
|---|---|---|---|---|
| Campus bu | Commercia | 50 | 40 | 40 |

| Description | Impact Device | Usage(%) | Equipment Spec Lmax (dBA) | Actual Lmax (dBA) | Receptor Distance (feet) | Estimated Shielding (dBA) |
|---|---|---|---|---|---|---|
| Tractor | No | 40 | 84 | | 25 | 0 |
| Concrete Saw | No | 20 | | 89.6 | 25 | 0 |
| Generator | No | 50 | | 80.6 | 25 | 0 |
| Crane | No | 16 | | 80.6 | 25 | 0 |
| Dozer | No | 40 | | 81.7 | 25 | 0 |
| Tractor | No | 40 | 84 | | 25 | 0 |
| Backhoe | No | 40 | | 77.6 | 25 | 0 |
| Backhoe | No | 40 | | 77.6 | 25 | 0 |
| Welder / Torch | No | 40 | | 74 | 25 | 0 |
| Welder / Torch | No | 40 | | 74 | 25 | 0 |
| Welder / Torch | No | 40 | | 74 | 25 | 0 |
| Man Lift | No | 20 | | 74.7 | 25 | 0 |
| Welder / Torch | No | 40 | | 74 | 25 | 0 |
| Man Lift | No | 20 | | 74.7 | 25 | 0 |

Results

| Equipment | Calculated (dBA) *Lmax | Leq | Noise Limits (dBA) Day Lmax | Leq | Evening Lmax | Leq | Night Lmax | Leq |
|---|---|---|---|---|---|---|---|---|
| Tractor | 90 | 86 | N/A | N/A | N/A | N/A | N/A | N/A |
| Concrete Saw | 95.6 | 88.6 | N/A | N/A | N/A | N/A | N/A | N/A |
| Generator | 86.7 | 83.6 | N/A | N/A | N/A | N/A | N/A | N/A |
| Crane | 86.6 | 78.6 | N/A | N/A | N/A | N/A | N/A | N/A |
| Dozer | 87.7 | 83.7 | N/A | N/A | N/A | N/A | N/A | N/A |
| Tractor | 90 | 86 | N/A | N/A | N/A | N/A | N/A | N/A |
| Backhoe | 83.6 | 79.6 | N/A | N/A | N/A | N/A | N/A | N/A |
| Backhoe | 83.6 | 79.6 | N/A | N/A | N/A | N/A | N/A | N/A |
| Welder / Torch | 80 | 76 | N/A | N/A | N/A | N/A | N/A | N/A |
| Welder / Torch | 80 | 76 | N/A | N/A | N/A | N/A | N/A | N/A |
| Welder / Torch | 80 | 76 | N/A | N/A | N/A | N/A | N/A | N/A |
| Man Lift | 80.7 | 73.7 | N/A | N/A | N/A | N/A | N/A | N/A |
| Welder / Torch | 80 | 76 | N/A | N/A | N/A | N/A | N/A | N/A |
| Man Lift | 80.7 | 73.7 | N/A | N/A | N/A | N/A | N/A | N/A |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Total | 95.6 | 93.9 | N/A | N/A | N/A | N/A | N/A | N/A |

*Calculated Lmax is the Loudest value.

| Noise Limit Exceedance (dBA) | | | | | |
|---|---|---|---|---|---|
| Day | | Evening | | Night | |
| Lmax | Leq | Lmax | Leq | Lmax | Leq |
| N/A | N/A | N/A | N/A | N/A | N/A |
| N/A | N/A | N/A | N/A | N/A | N/A |
| N/A | N/A | N/A | N/A | N/A | N/A |
| N/A | N/A | N/A | N/A | N/A | N/A |
| N/A | N/A | N/A | N/A | N/A | N/A |
| N/A | N/A | N/A | N/A | N/A | N/A |
| N/A | N/A | N/A | N/A | N/A | N/A |
| N/A | N/A | N/A | N/A | N/A | N/A |
| N/A | N/A | N/A | N/A | N/A | N/A |
| N/A | N/A | N/A | N/A | N/A | N/A |
| N/A | N/A | N/A | N/A | N/A | N/A |
| N/A | N/A | N/A | N/A | N/A | N/A |
| N/A | N/A | N/A | N/A | N/A | N/A |
| N/A | N/A | N/A | N/A | N/A | N/A |

| | | | | | |
|---|---|---|---|---|---|
| N/A | N/A | N/A | N/A | N/A | N/A |

Roadway Construction Noise Model (RCNM),Version 1.1

Report dat ########
Case Descr SATRC- Site Prep

---- Receptor #1 ----

| | Baselines (dBA) | | |
|---|---|---|---|
| Description | Land Use | Daytime | Evening | Night |
| Campus bu | Commercia | 50 | 40 | 40 |

| Description | Impact Device | Usage(%) | Equipment Spec Lmax (dBA) | Actual Lmax (dBA) | Receptor Distance (feet) | Estimated Shielding (dBA) |
|---|---|---|---|---|---|---|
| Tractor | No | 40 | 84 | | 25 | 0 |
| Dozer | No | 40 | | 81.7 | 25 | 0 |
| Tractor | No | 40 | 84 | | 25 | 0 |
| Grader | No | 40 | 85 | | 25 | 0 |
| Scraper | No | 40 | | 83.6 | 25 | 0 |
| Backhoe | No | 40 | | 77.6 | 25 | 0 |
| Grader | No | 40 | 85 | | 25 | 0 |

| | Calculated (dBA) | | Results | | Noise Limits (dBA) | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Day | | Evening | | Night | |
| Equipment | *Lmax | Leq | Lmax | Leq | Lmax | Leq | Lmax | Leq |
| Tractor | 90 | 86 | N/A | N/A | N/A | N/A | N/A | N/A |
| Dozer | 87.7 | 83.7 | N/A | N/A | N/A | N/A | N/A | N/A |
| Tractor | 90 | 86 | N/A | N/A | N/A | N/A | N/A | N/A |
| Grader | 91 | 87 | N/A | N/A | N/A | N/A | N/A | N/A |
| Scraper | 89.6 | 85.6 | N/A | N/A | N/A | N/A | N/A | N/A |
| Backhoe | 83.6 | 79.6 | N/A | N/A | N/A | N/A | N/A | N/A |
| Grader | 91 | 87 | N/A | N/A | N/A | N/A | N/A | N/A |
| Total | 91 | 94 | N/A | N/A | N/A | N/A | N/A | N/A |

*Calculated Lmax is the Loudest value.

| Noise Limit Exceedance (dBA) | | | | | |
|---|---|---|---|---|---|
| Day | | Evening | | Night | |
| Lmax | Leq | Lmax | Leq | Lmax | Leq |
| N/A | N/A | N/A | N/A | N/A | N/A |
| N/A | N/A | N/A | N/A | N/A | N/A |
| N/A | N/A | N/A | N/A | N/A | N/A |
| N/A | N/A | N/A | N/A | N/A | N/A |
| N/A | N/A | N/A | N/A | N/A | N/A |
| N/A | N/A | N/A | N/A | N/A | N/A |
| N/A | N/A | N/A | N/A | N/A | N/A |
| N/A | N/A | N/A | N/A | N/A | N/A |

Roadway Construction Noise Model (RCNM),Version 1.1

Report dat ########
Case Descr SATRC- Grading

| | | ---- Receptor #1 ---- | | |
|---|---|---|---|---|
| | | Baselines (dBA) | | |
| Description | Land Use | Daytime | Evening | Night |
| Campus bu | Commercia | 50 | 40 | 40 |

| | | | Equipment | | | |
|---|---|---|---|---|---|---|
| | | | Spec | Actual | Receptor | Estimated |
| | Impact | | Lmax | Lmax | Distance | Shielding |
| Description | Device | Usage(%) | (dBA) | (dBA) | (feet) | (dBA) |
| Tractor | No | 40 | 84 | | 25 | 0 |
| Dozer | No | 40 | | 81.7 | 25 | 0 |
| Backhoe | No | 40 | | 77.6 | 25 | 0 |
| Grader | No | 40 | 85 | | 25 | 0 |

| | | | Results | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Calculated (dBA) | | Noise Limits (dBA) | | | | | |
| | | | Day | | Evening | | Night | |
| Equipment | *Lmax | Leq | Lmax | Leq | Lmax | Leq | Lmax | Leq |
| Tractor | 90 | 86 | N/A | N/A | N/A | N/A | N/A | N/A |
| Dozer | 87.7 | 83.7 | N/A | N/A | N/A | N/A | N/A | N/A |
| Backhoe | 83.6 | 79.6 | N/A | N/A | N/A | N/A | N/A | N/A |
| Grader | 91 | 87 | N/A | N/A | N/A | N/A | N/A | N/A |
| Total | 91 | 90.9 | N/A | N/A | N/A | N/A | N/A | N/A |

*Calculated Lmax is the Loudest value.

| | Noise Limit Exceedance (dBA) | | | | |
|---|---|---|---|---|---|
| Day | | Evening | | Night | |
| Lmax | Leq | Lmax | Leq | Lmax | Leq |
| N/A | N/A | N/A | N/A | N/A | N/A |
| N/A | N/A | N/A | N/A | N/A | N/A |
| N/A | N/A | N/A | N/A | N/A | N/A |
| N/A | N/A | N/A | N/A | N/A | N/A |
| N/A | N/A | N/A | N/A | N/A | N/A |

Roadway Construction Noise Model (RCNM),Version 1.1

Report dat ########
Case Descr SATRC- building construction

---- Receptor #1 ----

| Description | Land Use | Baselines (dBA) Daytime | Evening | Night |
|---|---|---|---|---|
| Campus bu | Commercia | 50 | 40 | 40 |

| Description | Impact Device | Usage(%) | Equipment Spec Lmax (dBA) | Actual Lmax (dBA) | Receptor Distance (feet) | Estimated Shielding (dBA) |
|---|---|---|---|---|---|---|
| Crane | No | 16 | | 80.6 | 25 | 0 |
| Backhoe | No | 40 | | 77.6 | 25 | 0 |
| Welder / Torch | No | 40 | | 74 | 25 | 0 |
| Welder / Torch | No | 40 | | 74 | 25 | 0 |
| Welder / Torch | No | 40 | | 74 | 25 | 0 |
| Man Lift | No | 20 | | 74.7 | 25 | 0 |
| Generator | No | 50 | | 80.6 | 25 | 0 |
| Man Lift | No | 20 | | 74.7 | 25 | 0 |

Results

| | Calculated (dBA) | | Noise Limits (dBA) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Day | | Evening | | Night | |
| Equipment | *Lmax | Leq | Lmax | Leq | Lmax | Leq | Lmax | Leq |
| Crane | 86.6 | 78.6 | N/A | N/A | N/A | N/A | N/A | N/A |
| Backhoe | 83.6 | 79.6 | N/A | N/A | N/A | N/A | N/A | N/A |
| Welder / Torch | 80 | 76 | N/A | N/A | N/A | N/A | N/A | N/A |
| Welder / Torch | 80 | 76 | N/A | N/A | N/A | N/A | N/A | N/A |
| Welder / Torch | 80 | 76 | N/A | N/A | N/A | N/A | N/A | N/A |
| Man Lift | 80.7 | 73.7 | N/A | N/A | N/A | N/A | N/A | N/A |
| Generator | 86.7 | 83.6 | N/A | N/A | N/A | N/A | N/A | N/A |
| Man Lift | 80.7 | 73.7 | N/A | N/A | N/A | N/A | N/A | N/A |
| Total | 86.7 | 87.5 | N/A | N/A | N/A | N/A | N/A | N/A |

*Calculated Lmax is the Loudest value.

| | Noise Limit Exceedance (dBA) | | | | |
|---|---|---|---|---|---|
| Day | | Evening | | Night | |
| Lmax | Leq | Lmax | Leq | Lmax | Leq |
| N/A | N/A | N/A | N/A | N/A | N/A |
| N/A | N/A | N/A | N/A | N/A | N/A |
| N/A | N/A | N/A | N/A | N/A | N/A |
| N/A | N/A | N/A | N/A | N/A | N/A |
| N/A | N/A | N/A | N/A | N/A | N/A |
| N/A | N/A | N/A | N/A | N/A | N/A |
| N/A | N/A | N/A | N/A | N/A | N/A |
| N/A | N/A | N/A | N/A | N/A | N/A |
| N/A | N/A | N/A | N/A | N/A | N/A |

Roadway Construction Noise Model (RCNM),Version 1.1

Report date ########
Case Descri SATRC- Architectural Coating

| | | Baselines (dBA) | | ---- Receptor #1 ---- |
|---|---|---|---|---|
| Description | Land Use | Daytime | Evening | Night |
| Campus bu | Commercia | 50 | 40 | 40 |

| | | | Equipment | | | |
|---|---|---|---|---|---|---|
| | | | Spec | Actual | Receptor | Estimated |
| | Impact | | Lmax | Lmax | Distance | Shielding |
| Description | Device | Usage(%) | (dBA) | (dBA) | (feet) | (dBA) |
| Compressor (air) | No | 40 | | 77.7 | 25 | 0 |

| | | | Results | | | | |
|---|---|---|---|---|---|---|---|
| | Calculated (dBA) | | Noise Limits (dBA) | | | | |
| | | | Day | | Evening | | Night |
| Equipment | *Lmax | Leq | Lmax | Leq | Lmax | Leq | Lmax |
| Compressor (air) | 83.7 | 79.7 | N/A | N/A | N/A | N/A | N/A |
| Total | 83.7 | 79.7 | N/A | N/A | N/A | N/A | N/A |

*Calculated Lmax is the Loudest value.

| | | Noise Limit Exceedance (dBA) | | | | |
|---|---|---|---|---|---|---|
| | Day | | Evening | | Night | |
| Leq | Lmax | Leq | Lmax | Leq | Lmax | Leq |
| N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| N/A | N/A | N/A | N/A | N/A | N/A | N/A |

Roadway Construction Noise Model (RCNM),Version 1.1

Report dat ########
Case Descr SATRC- Paving

---- Receptor #1 ----

| Description | Land Use | Baselines (dBA) Daytime | Evening | Night |
|---|---|---|---|---|
| Campus bu | Commercia | 50 | 40 | 40 |

| Description | Impact Device | Usage(%) | Equipment Spec Lmax (dBA) | Actual Lmax (dBA) | Receptor Distance (feet) | Estimated Shielding (dBA) |
|---|---|---|---|---|---|---|
| Roller | No | 20 | | 80 | 25 | 0 |
| Paver | No | 50 | | 77.2 | 25 | 0 |
| Concrete Mixer Truck | No | 40 | | 78.8 | 25 | 0 |
| Backhoe | No | 40 | | 77.6 | 25 | 0 |
| Pavement Scarafier | No | 20 | | 89.5 | 25 | 0 |
| Roller | No | 20 | | 80 | 25 | 0 |
| Compressor (air) | No | 40 | | 77.7 | 25 | 0 |

Results

| Equipment | Calculated (dBA) *Lmax | Leq | Noise Limits (dBA) Day Lmax | Leq | Evening Lmax | Leq | Night Lmax | Leq |
|---|---|---|---|---|---|---|---|---|
| Roller | 86 | 79 | N/A | N/A | N/A | N/A | N/A | N/A |
| Paver | 83.2 | 80.2 | N/A | N/A | N/A | N/A | N/A | N/A |
| Concrete Mixer Truck | 84.8 | 80.8 | N/A | N/A | N/A | N/A | N/A | N/A |
| Backhoe | 83.6 | 79.6 | N/A | N/A | N/A | N/A | N/A | N/A |
| Pavement Scarafier | 95.5 | 88.5 | N/A | N/A | N/A | N/A | N/A | N/A |
| Roller | 86 | 79 | N/A | N/A | N/A | N/A | N/A | N/A |
| Compressor (air) | 83.7 | 79.7 | N/A | N/A | N/A | N/A | N/A | N/A |
| Total | 95.5 | 91.1 | N/A | N/A | N/A | N/A | N/A | N/A |

*Calculated Lmax is the Loudest value.

| Noise Limit Exceedance (dBA) | | | | | |
|---|---|---|---|---|---|
| Day | | Evening | | Night | |
| Lmax | Leq | Lmax | Leq | Lmax | Leq |
| N/A | N/A | N/A | N/A | N/A | N/A |
| N/A | N/A | N/A | N/A | N/A | N/A |
| N/A | N/A | N/A | N/A | N/A | N/A |
| N/A | N/A | N/A | N/A | N/A | N/A |
| N/A | N/A | N/A | N/A | N/A | N/A |
| N/A | N/A | N/A | N/A | N/A | N/A |
| N/A | N/A | N/A | N/A | N/A | N/A |
| N/A | N/A | N/A | N/A | N/A | N/A |

# Appendix D

Notice of Intent to Adopt a Mitigated Negative Declaration

THE TRIBUNE
Newspaper of the Central Coast

3825 South Higuera • Post Office Box 112 • San Luis Obispo, California 93406-0112 • (805) 781-7800

In The Superior Court of The State of California
In and for the County of San Luis Obispo

AD #3912727
RINCON

STATE OF CALIFORNIA
ss.
County of San Luis Obispo

I am a citizen of the United States and a resident of the County aforesaid; I am over the age of eighteen and not interested in the above entitled matter; I am now, and at all times embraced in the publication herein mentioned was, the principal clerk of the printers and publishers of THE TRIBUNE, a newspaper of general Circulation, printed and published daily at the City of San Luis Obispo in the above named county and state; that notice at which the annexed clippings is a true copy, was published in the above-named newspaper and not in any supplement thereof – on the following dates to wit; OCTOBER 23, 2018 that said newspaper was duly and regularly ascertained and established a newspaper of general circulation by Decree entered in the Superior Court of San Luis Obispo County, State of California, on June 9, 1952, Case #19139 under the Government Code of the State of California.

I certify (or declare) under the penalty of perjury that the foregoing is true and correct.

Jane E. Durand

(Signature of Principal Clerk)
DATE: OCTOBER 23, 2018
AD COST: $317.02

**Board of Trustees of the California State University**
**NOTICE OF INTENT TO ADOPT MITIGATED NEGATIVE DECLARATION**

Notice is hereby given that an Initial Study-Mitigated Negative Declaration (IS-MND) has been prepared for the project described below in accordance with the provisions of the California Environmental Quality Act of 1970, as set forth in the Public Resources Code, Sections 21000 to 21174, as amended.

**Project Title:** Cal Poly San Luis Obispo Science and Agriculture Teaching and Research Complex Project (SATRC)

**Lead Agency:** The Trustees of California State University

**Project Description:** The project would include construction of a four story, 72,000 assignable square-foot (ASF)/102,900 gross square-foot (GSF) Science and Agriculture Teaching and Research Complex (SATRC) to foster interdisciplinary teaching and research between science and agricultural colleges. The SATRC would house a lecture hall, research and teaching laboratories, interdisciplinary spaces, and faculty offices. The project would include demolition of Building #53A (Science North Annex), which is approximately 8,300 square feet. The new building would accommodate all of the existing Building #53A uses except for two (plant conservatory and vivarium), which would be relocated to other nearby sites. The plant conservatory would consist of 3,000 square-feet of covered space and 3,000 square-feet of uncovered/outdoor space. The vivarium use would consist of a 1,500 square-foot pre-fabricated building. The project will require a Campus Master Plan Amendment, but would not affect overall enrollment. The project square footage does not exceed the development potential identified in the 2001 Cal Poly Master Plan.

**Project Location:** California Polytechnic State University, San Luis Obispo campus, located at 1 Grand Avenue in San Luis Obispo County, California. The project site is located in the campus instructional core to the south of Buildings #10 (Erhart Agriculture) and #22 (English) and to the north of Building #180 (Baker Science) and Poly View Drive. The site is approximately 3.5 acres and currently contains Building #53A (Science North Annex), trees, and landscaping.

**Finding:** Based on findings of the Initial Study, the CSU Board of Trustees has determined that, with mitigation, this project would not result in significant environmental impacts. Mitigation measures for aesthetics, air quality, biological resources, cultural resources, geology and soils, and noise will be required to reduce impacts to less than significant. Accordingly, the CSU Board of Trustees intends to adopt a Mitigated Negative Declaration, pursuant to Section 21080(c) of the Public Resources Code.

The project site is not included on a list of hazardous materials sites enumerated under Section 65962.5 of the California Government Code (Cortese List).

**Public Review/Public Comment Period:** The IS-MND is available for a **30-day public review period, which begins on October 23, 2018 and ends on November 21, 2018.** All written comments on the IS-MND must be received by **5:00 PM on November 21, 2018.** If you wish to comment on the IS-MND, please send written comments to:

Anthony R. Palazzo, Campus Planner
Facilities Planning and Capital Projects
California Polytechnic State University
1 Grand Avenue
San Luis Obispo, CA 93407-0690
Phone: (805) 756-6538
Email: arpalazz@calpoly.edu

**Document Availability:** A copy of the IS-MND is available for public review at: Kennedy Library on the Cal Poly campus, the City/County Library at 995 Palm Street in San Luis Obispo, and online at https://afd.calpoly.edu/facilities/docs/cal-poly-satrc-mnd.pdf

October 23, 2018 3912727

# Appendix E

Mitigation Monitoring and Reporting Program

# Mitigation Monitoring and Reporting Program

## Statutory Requirement

When a Lead Agency makes findings on significant environmental effects, the agency must also adopt a "reporting or monitoring program for the changes to the project which it has adopted or made a condition of approval in order to mitigate or avoid significant effects on the environment" (Public Resources Code §21081.6(a) and CEQA Guidelines §15091(d) and §15097). The Mitigation Monitoring and Reporting Program (MMRP) is implemented to ensure that the mitigation measures and project revisions are implemented. Therefore, the MMRP must include all changes in the proposed project either adopted by the project proponent or made conditions of approval by the Lead or Responsible Agency.

## Administration of the Mitigation Monitoring and Reporting Program

The Board of Trustees of the California State University (CSU) is the Lead Agency responsible for the adoption of the MMRP. The project applicant, California Polytechnic State University, San Luis Obispo (Cal Poly) Facilities Planning and Capital Projects Department is responsible for implementation of the MMRP, in coordination with other identified entities. According to CEQA Guidelines §15097(a), a public agency may delegate reporting or monitoring responsibilities to another public agency or to a private entity that accepts the delegation. The Board of Trustees delegate responsibility for verifying and documenting compliance with the MMRP to the local campus, in this case, California Polytechnic State University, San Luis Obispo. Specifically, the Cal Poly Facilities Planning and Capital Projects Department, as coordinator of the project and its construction, will be responsible for compliance. However, until mitigation measures have been completed, the Lead Agency remains responsible for ensuring that the implementation of the measure occurs in accordance with the program.

## Mitigation Measures and Reporting Program

The MMRP table is structured to enable quick reference to mitigation measures and the associated monitoring program based on the environmental resource. The numbering of mitigation measures correlates with numbering of measures found in the Initial Study/Mitigated Negative Declaration for the Science and Agriculture Teaching and Research Complex Project (SATRC).

| Mitigation Measure/ Condition of Approval | Action Required | Monitoring Timing | Monitoring Frequency | Responsible Party | Compliance Verification | | |
|---|---|---|---|---|---|---|---|
| | | | | | Initial | Date | Comments |
| **Aesthetics** | | | | | | | |
| **AES-1: Lighting and Glare Minimization** | | | | | | | |
| To minimize impacts associated with operational lighting and reflective building components, all exterior lighting shall be hooded. No unobstructed beam of light shall be directed toward sensitive uses. The use of reflective materials in all structures shall be minimized (e.g., metal roofing, expanses of reflective glass on west-facing walls). | Review final building plan to verify compliance with measure requirements | Prior to the approval of construction documents by CSU | Once | Cal Poly | | | |
| **Air Quality** | | | | | | | |
| **AQ-1: Fugitive Dust Control Measures** | | | | | | | |
| Construction projects shall implement the following dust control measures so as to reduce $PM_{10}$ emissions in accordance with San Luis Obispo Air Pollution Control District (SLOAPCD) requirements.<br>▪ Reduce the amount of the disturbed area where possible<br>▪ Water trucks or sprinkler systems shall be used during construction in sufficient quantities to prevent airborne dust from leaving the site. Increased watering frequency shall be required whenever wind speeds exceed 15 mph. Reclaimed (non-potable) water shall be used whenever possible<br>▪ All dirt stock pile areas shall be sprayed daily as needed<br>▪ Permanent dust control measures identified in the approved project revegetation and landscape plans shall be implemented as soon as possible following completion of any soil disturbing activities | Review final grading plans to verify measure requirements have been listed<br><br>Field verify compliance with measure requirements | Prior to the approval of construction documents by CSU<br><br>During construction | Once during plan review<br><br>Periodically during construction | Cal Poly | | | |

| Mitigation Measure/ Condition of Approval | Action Required | Monitoring Timing | Monitoring Frequency | Responsible Party | Compliance Verification | | |
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| | | | | | Initial | Date | Comments |
| ▪ Exposed ground areas that are planned to be reworked at dates greater than one month after initial grading shall be sown with a fast germinating, non-invasive grass seed and watered until vegetation is established<br>▪ All disturbed soil areas not subject to revegetation shall be stabilized using approved chemical soil binders, jute netting, or other methods approved in advance by the SLOAPCD<br>▪ All roadways, driveways, sidewalks, etc. to be paved shall be completed as soon as possible after grading unless seeding or soil binders are used<br>▪ Vehicle speed for all construction vehicles shall not exceed 15 mph on any unpaved surface at the construction site<br>▪ All trucks hauling dirt, sand, soil, or other loose materials are to be covered or shall maintain at least two feet of freeboard (minimum vertical distance between top of load and top of trailer) in accordance with California Vehicle Code Section 23114<br>▪ Install wheel washers where vehicles enter and exit unpaved roads onto streets, or wash off trucks and equipment leaving the site<br>▪ Sweep streets at the end of each day if visible soil material is carried onto adjacent paved roads. Water sweepers with reclaimed water shall be used where feasible<br>▪ All of these fugitive dust mitigation measures shall be shown on grading and building plans<br>▪ The contractor or builder shall designate a person or persons to monitor the fugitive dust emissions and enhance the implementation of the measures as necessary to minimize dust complaints, reduce visible emissions below 20 | | | | | | | |

| Mitigation Measure/ Condition of Approval | Action Required | Monitoring Timing | Monitoring Frequency | Responsible Party | Compliance Verification | | |
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| | | | | | Initial | Date | Comments |
| percent opacity, and to prevent transport of dust offsite. Their duties shall include holidays and weekend periods when work may not be in progress. The name and telephone number of such persons shall be provided to the SLOAPCD Compliance Division prior to the start of any grading, earthwork, or demolition. | | | | | | | |
| **AQ-2(a): Standard Control Measures for Construction Equipment** | | | | | | | |
| The following standard air quality mitigation measures shall be implemented during construction activities at the project site:<br>▪ Maintain all construction equipment in proper tune according to manufacturer's specifications<br>▪ Fuel all off-road and portable diesel powered equipment with ARB certified motor vehicle diesel fuel (non-taxed version suitable for sue off-road)<br>▪ Use diesel construction equipment meeting ARB's Tier 2 certified engines or cleaner off-road heavy-duty diesel engines, and comply with the State Off-Road Regulation<br>▪ Use on-road heavy-duty trucks that meet the ARB's 2007 or cleaner certification standard for on-road heavy-duty diesel engines, and comply with the State On-Road Regulation<br>▪ Construction or trucking companies with fleets that do not have engines in their fleet that meet the engine standards identified in the above two measures (e.g., captive or $NO_X$ exempt area fleets) may be eligible by proving alternative compliance<br>▪ All on- and off-road diesel equipment shall not idle for more than 5 minutes. Signs shall be posted in the designated queuing areas and or job sites to remind drivers and operators of | Review final grading plans to verify measures have been listed<br><br>Field verify compliance with measure requirements | Prior to the approval of construction documents by CSU<br><br>During construction | Once<br><br>Periodically during constriction | Cal Poly | | | |

| Mitigation Measure/ Condition of Approval | Action Required | Monitoring Timing | Monitoring Frequency | Responsible Party | Compliance Verification | | |
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| | | | | | Initial | Date | Comments |
| the 5 minute idling limit<br>▪ Diesel idling within 1,000 feet of sensitive receptors is not permitted<br>▪ Staging and queuing areas shall not be located within 1,000 feet of sensitive receptors<br>▪ Electrify equipment when feasible<br>▪ Substitute gasoline-powered in place of diesel-powered equipment, where feasible<br>▪ Use alternatively fueled construction equipment onsite where feasible, such as compressed natural gas, liquefied natural gas, propane or biodiesel | | | | | | | |
| **AQ-2(b): Best Available Control Technology (BACT) for Construction Equipment** | | | | | | | |
| The following BACT for diesel-fueled construction equipment shall be implemented during construction activities at the project site, where feasible: | Review final grading plans to verify measures have been listed | Prior to the approval of construction documents by CSU | Once | Cal Poly | | | |
| ▪ Further reduce emissions by expanding use of Tier 3 and Tier 4 off-road and 2010 on-road compliant engines where feasible<br>▪ Repower equipment with the cleanest engines available<br>▪ Install California Verified Diesel Emission Control Strategies, such as level 2 diesel particulate filters (these strategies are listed at: www.arb.ca.gov/diesel/verdev/vt/cvt.htm) | Field verify compliance with measure requirements | During construction | Periodically during constriction | | | | |
| **AQ-2(c): Architectural Coating** | | | | | | | |
| To reduce ROG and $NO_X$ levels during the architectural coating phase, low or no VOC-emission paint shall be used with levels of 50 g/L or less. | Review final building plans to verify requirement has been listed | Prior to the approval of construction documents by CSU | Once | Cal Poly | | | |
| | Field verify compliance with measure requirement | During construction | Once | | | | |

| Mitigation Measure/ Condition of Approval | Action Required | Monitoring Timing | Monitoring Frequency | Responsible Party | Compliance Verification | | |
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| | | | | | Initial | Date | Comments |
| **Biological Resources** | | | | | | | |
| **BIO-1: Native/Breeding Native Bird Protection** | | | | | | | |
| To avoid impacts to nesting birds, including birds protected under the Migratory Bird Treaty Act, all initial ground-disturbing activities including tree removal should be limited to the time period between August 16 and January 31 (i.e., outside the nesting season) if feasible. If initial site disturbance, grading, and vegetation removal cannot be conducted during this time period, a pre-construction survey for active nests within the project site shall be conducted by a qualified biologist at the site no more than two weeks prior to any construction activities. If an active bird nest is located, the nest site shall be fenced at a distance commensurate with the particular species and in consultation with the California Department of Fish and Wildlife (CDFW) until juveniles have fledged and when there is no evidence of a second attempt at nesting. Limits of construction to avoid a nest should be established in the field with flagging and stakes or construction fencing. Construction personnel shall be instructed on the sensitivity of the area. The project proponent shall record the results of the recommended protective measures described above to document compliance with applicable state and federal laws pertaining to protection of native birds. | Review project specifications and grading plans to verify requirements have been listed | Prior to the approval of construction documents by CSU | Once | Cal Poly | | | |
| | If grading or construction is to occur between February and August, verify that a pre-construction/grading bird nest survey has been completed | Prior to construction | Once | | | | |
| | If an active bird nest is identified, verify that a buffer zone has been established by a qualified biologist and field verify compliance | Following identification of active nest | Once | | | | |

| Mitigation Measure/ Condition of Approval | Action Required | Monitoring Timing | Monitoring Frequency | Responsible Party | Compliance Verification | | |
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| | | | | | Initial | Date | Comments |
| **Cultural Resources** | | | | | | | |
| **CUL-1: Treatment of Unknown Archaeological Resources** | | | | | | | |
| In the event unknown archaeological resources are exposed or unearthed during project construction, all earth disturbing work within the vicinity of the find must be temporarily suspended or redirected until an archaeologist has evaluated the nature and significance of the find. If the archaeologist determines that the resource is an "historic resource" or "unique archaeological resource" as defined by California Environmental Quality Act Guidelines Section 15064.5 and avoidance is not feasible, further evaluation by the archaeologist shall occur. The archaeologist's recommendations for further evaluation may include a Phase II testing and evaluation program to assess the significance of the site. Resources found not to be significant will not require mitigation. Impacts to sites found to be significant shall be mitigated through implementation of a Phase III data recovery program. After the find has been mitigated appropriately, work in the area may resume. A local Native American representative shall monitor any mitigation work associated with prehistoric cultural material. | Review construction plans to verify measure requirements have been listed | Prior to the approval of construction documents by CSU | Once | Cal Poly | | | |
| | If potential archaeological resources are found, verify work has been halted until the discovery has been evaluated and mitigated, as necessary | Upon finding of cultural resources | Once | | | | |
| **CUL-2: Treatment of Paleontological Resources** | | | | | | | |
| If soil excavation associated with grading activities requires disturbance of bedrock formations and should any vertebrate fossils or potentially significant finds (e.g., numerous well-preserved invertebrate or plant fossils) be encountered during work on the site, all activities in the immediate vicinity of the find shall cease until a qualified paleontologist evaluates the find | Review construction plans to verify measure requirements have been listed | Prior to the approval of construction documents by CSU | Once | Cal Poly | | | |
| | If any vertebrate fossils or potentially significant finds are encountered, verify work has been halted until the finds have been evaluated by a | Upon finding of fossils | Once | | | | |

| Mitigation Measure/ Condition of Approval | Action Required | Monitoring Timing | Monitoring Frequency | Responsible Party | Compliance Verification | | |
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| | | | | | Initial | Date | Comments |
| for its scientific value. If deemed significant, the paleontological resource(s) shall be salvaged and deposited in an accredited and permanent scientific institution where they will be curated and preserved properly. If monitoring is required, the qualified paleontologist shall submit a monitoring report to the University following completion of all required monitoring activities. | qualified paleontologist<br><br>If monitoring is required, verify report has been prepared | Following completion of monitoring activities | Once | | | | |
| **Geology and Soils** | | | | | | | |
| **GEO-1: Geotechnical Hazard Reduction Measures** | | | | | | | |
| Grading, foundation design, and construction of the proposed project shall comply with recommendations in the 2018 site specific Geotechnical Engineering Report by Earth Systems Pacific (Appendix B), including the following:<br>▪ Within the building area, all soils used as fill in the final 18 inches below bottom of slab elevation shall be non-expansive soils. All imported fill shall be approved by the geotechnical engineer before being transported to the site. The upper 6 inches below the vapor retarder, shall consist of free-draining granular gravel with a maximum size of 1 inch. If a sand cushion is needed below the vapor retarder, a filter fabric shall be placed between the sand and gravel.<br>▪ Following site preparation, exterior pedestrian flatwork areas shall be over-excavated to allow for placement of non-expansive material beneath the flatwork. The soil surface exposed by over-excavation shall be scarified, moisture conditioned, and recompacted prior to placement of the non-expansive material. If fill is required to reach the elevation of the bottom of the non-expansive layer, the | Review project specifications and plans to verify measure requirements have been listed<br><br>Field verify compliance with measure requirements | Prior to the approval of construction documents by CSU<br><br>During grading and construction activities | Once<br><br>Once | Cal Poly | | | |

| Mitigation Measure/ Condition of Approval | Action Required | Monitoring Timing | Monitoring Frequency | Responsible Party | Compliance Verification | | |
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| | | | | | Initial | Date | Comments |
| prepared soil surface shall be scarified, moisture conditioned, and recompacted prior to placement of fill.<br>▪ If the soils are overly moist so that they become unstable, or if the recommended compaction cannot be achieved readily, drying the soil to optimum moisture content, or just above, may be necessary. Placement of gravel layers or geotextiles may also be necessary to help stabilize unstable soils. Soils disturbed in any manner shall be removed, moisture conditioned, and recompacted.<br>▪ A select, noncorrosive, easily compacted sand shall be used as bedding and shading immediately around utilities. Trench backfill, above the select material, within the building area shall also be non-expansive sand up to the drainage layer; beyond the building area the site soils may be used.<br>▪ Place 8 to 21 inches non-expansive material below flatwork. Prior to placement of the non-expansive material, the underlying soil shall be moisture conditioned and no desiccation cracks shall be present. For an added level of protection, the flatwork can be provided with perimeter trenched edges up to 21 inches deep. The trenched edges, if utilized, shall be reinforced with No. 4 rebar top and bottom. The decision regarding the thickness of non-expansive material to use below flatwork, as well as the use of trenched edges, is left to the architect/engineer or owner. | | | | | | | |

| Mitigation Measure/ Condition of Approval | Action Required | Monitoring Timing | Monitoring Frequency | Responsible Party | Compliance Verification | | |
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| | | | | | Initial | Date | Comments |
| **Noise** | | | | | | | |
| **NOI-1: Construction Vibration Mitigation** | | | | | | | |
| The following vibration measures shall be applied during project construction activity.<br>▪ Operations: keep vibration-intensive equipment as far as possible from vibration-sensitive site boundaries. Machines and equipment should not be left idling.<br>▪ Schedule vibration-intensive operations to minimize their duration at any given location. Notify the Trustees and the Architect in advance of performing work creating unusual noise and schedule such work at times mutually agreeable.<br>▪ Whenever practical, the most vibration-intensive construction operations shall be scheduled to occur together in the construction program to avoid continuous periods of vibration. Scheduling of vibration-intensive construction activities shall also take advantage of summer sessions and other times when classes are not in session. | Review construction plans to verify measure requirements have been listed<br><br>Field verify compliance with measure requirements | Prior to the approval of construction documents by CSU<br><br>During construction | Once<br><br>Periodically during construction | Cal Poly | | | |
| **NOI-2: Construction Noise** | | | | | | | |
| The following Cal Poly Standard Requirements shall be implemented during project construction.<br>▪ Maximum noise levels within 1,000 feet of any classroom, laboratory, residence, business, adjacent buildings, or other populated area; noise levels for trenchers, pavers, graders and trucks shall not exceed 90 dBA at 50 feet as measured under the noisiest operating conditions. For all other equipment, noise levels shall not exceed 85 dBA at 50 feet. | Review construction plans to verify measure requirements have been listed; verify preparation of haul route plan<br><br>Field verify compliance with measure requirements | Prior to the approval of construction documents by CSU<br><br>During construction | Once<br><br>Periodically during construction | Cal Poly | | | |

| Mitigation Measure/ Condition of Approval | Action Required | Monitoring Timing | Monitoring Frequency | Responsible Party | Compliance Verification | | |
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| | | | | | Initial | Date | Comments |
| ▪ Equipment: equip jackhammers with exhaust mufflers and steel muffling sleeves. Air compressors should be of a quiet type such as a "whisperized" compressor. Compressor hoods shall be closed while equipment is in operation. Use electrically powered rather than gasoline or diesel powered forklifts. Provide portable noise barriers around jack hammering, and barriers constructed of 3/4-inch plywood lined with 1-inch thick fiberglass on the work side.<br>▪ Operations: keep noisy equipment as far as possible from noise-sensitive site boundaries. Machines should not be left idling. Use electric power in lieu of internal combustion engine power wherever possible. Maintain equipment properly to reduce noise from excessive vibration, faulty mufflers, or other sources. All engines shall have properly functioning mufflers.<br>▪ Scheduling: schedule noisy operations to minimize their duration at any given location, and to minimize disruption to the adjoining users. Notify the Trustees and the Architect in advance of performing work creating unusual noise and schedule such work at times mutually agreeable.<br>▪ Do not play radios, tape recorders, televisions, and other similar items at construction site.<br>▪ When work occurs in or near occupied buildings, the Contractor is cautioned to keep noise associated with any activities to a minimum. If excessively noisy operations that disrupt academic activities are anticipated, they must be scheduled after normal work hours, as needed.<br>▪ A haul route plan shall be prepared for review and approval by the University that designates | | | | | | | |

| Mitigation Measure/ Condition of Approval | Action Required | Monitoring Timing | Monitoring Frequency | Responsible Party | Compliance Verification | | |
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| | | | | | Initial | Date | Comments |
| haul routes as far as possible from sensitive receptors.<br>▪ Stockpiling and vehicle staging areas shall be located as far as practical from occupied structures.<br>▪ Whenever practical, the noisiest construction operations shall be scheduled to occur together in the construction program to avoid continuous periods of noise generation. | | | | | | | |