

A P P E N D I X C

AIR QUALITY, ENERGY, AND GREENHOUSE GASES

Prepared for
Stanford University Real Estate Development
City of Belmont, California

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STANFORD UNIVERSITY BELMONT CAMPUS CONCEPTUAL DEVELOPMENT PLAN AND DEVELOPMENT AGREEMENT: AIR QUALITY, HEALTH RISK ASSESSMENT, GREENHOUSE GAS AND ENERGY TECHNICAL REPORT

**1500 RALSTON AVENUE
BELMONT, CALIFORNIA**

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1. INTRODUCTION

Ramboll US Consulting, Inc. (Ramboll) conducted California Environmental Quality Act (CEQA) air quality, health risk, greenhouse gas (GHG) and energy analyses for the Stanford Belmont Campus Conceptual Development Plan and Development Agreement in the City of Belmont, California (referred to as the “Project” hereafter) proposed by Stanford University (the “Project Sponsor”). The analyses will be used to support the Project’s application and the California Environmental Quality Act (CEQA) environmental review, with the City of Belmont (the “City”) as the lead agency.

The Project site is at the former Notre Dame de Namur University (NDNU) campus, located at 1500 Ralston Avenue in Belmont, California. The Project site is shown in **Figure 1**. Currently, the site contains approximately 318,000 square feet of academic and academic support facilities, and student housing. As reported to the Project Sponsor by NDNU, student housing as of 2013 (considered a representative, full enrollment year) encompassed a total area of 122,000 square feet. There are 624 existing parking spaces among several surface paved parking lots. The Project site is located in the Ralston Avenue corridor of the City, with Notre Dame High School and Notre Dame Elementary School to the southwest, single-family homes and childcare facilities to the northwest, single-family and multi-family homes to the northeast, and open space, single-family homes and a senior care facility to the south and southeast. The nearest school is less than 90 feet away from the project boundary and the nearest residence is about 15 feet away from the northern project boundary. The Project site is located approximately 0.64 mile from the Caltrain station and the El Camino Real corridor, 6 miles from Stanford’s Redwood City campus, and 11 miles from the main Stanford campus.

The existing Conceptual Development Plan (CDP) issued to NDNU in 2000 by the City of Belmont allows for additional campus buildings for a total of 444,336 square feet of building space on the campus. The Project Sponsor submitted a conceptual development plan (CDP) to the City in October 2022 which requests campus redevelopment and growth to a total of 700,000 square feet of campus building space, inclusive of academic and academic support facilities and housing.¹ The Project would preserve three existing buildings: Ralston Hall, Taube Center, and Madison Art Center. All other existing buildings could be demolished and replaced over time. The Project will also increase the number of parking spaces to a range between 950-1350 spaces and 50 to 200 units of dormitory-style group housing and/or apartment-style housing occupied by faculty, staff, postdoctoral scholars, medical residents, visiting scholars, graduate students, undergraduate students, and academic program attendees.

The CalEEMod Land Use Categories for existing conditions and proposed development at the Project site are listed in **Table 1**. The precise locations and sizes of individual new buildings are not known at this time and would be shown on subsequent Detailed Development Plans submitted to the City for review and approval consistent with the 2022 CDP.

¹ Stanford University. 2022. Conceptual Development Plan Application. October.

The methodology and results for the Project's air quality, health risk, GHG and energy analysis are summarized in this technical report. This section provides an overview of the Project and the purpose of the technical report. **Section 2** presents the applicable CEQA thresholds of significance on the topics of air quality, GHG emissions, and energy, and provides an overview of the approach. The applicable City of Belmont's conditions of approval (COAs) for the impacts analyzed in this Technical Report are also presented here for ease of reference. **Section 3** presents the detailed methodology and results for the relevant air quality impact areas, including construction and operational criteria air pollutants (CAP) emissions (**Section 3.1**), Project-level and cumulative health risk impacts (**Section 3.2**), localized impacts of carbon monoxide concentrations (**Section 3.3**), generation of and exposure to odors (**Section 3.4**), and consistency with the applicable air quality plan (**Section 3.5**). **Section 4** presents the detailed methodology and results for the Project's impacts related to GHG emissions and climate change, including the Project's construction and operational GHG emissions (**Section 4.1 and 4.2**) and the Project's consistency with the applicable CEQA thresholds of significance (**Section 4.3**) and the applicable GHG reduction plans (**Section 4.4**). **Section 5** presents the additional methodology, assumptions, and results on the Project's impacts related to energy, including the Project's energy consumption during construction (**Section 5.1**) and operations (**Section 5.2**), a detailed discussion of the Project's energy consumption and energy-saving features with respect to the local, regional and State's energy conservation landscape (**Section 5.3**), and a consistency analysis with the applicable renewable energy and energy efficiency plans (**Section 5.4**). **Section 6** provides a summary of the results and impact conclusions.

2. METHODOLOGY OVERVIEW

The purpose of the air quality, GHG and energy analysis is to evaluate the Project's impacts in accordance with guidelines and methodologies from the Office of Planning and Research (OPR). For air quality impacts, the technical report assesses potential criteria air pollutant emissions, as well as health risks and hazards that would result from the construction and operation of the Proposed Project, consistent with guidelines and methodologies from air quality regulatory agencies, specifically, the Bay Area Air Quality Management District's (BAAQMD's) 2022 CEQA Guidelines.^{2,3} Where applicable, recommended methods and assumptions were also used from guidelines from these agencies: the California Air Resources Board (ARB), the California Office of Environmental Health Hazard Assessment (OEHHA), and the US Environmental Protection Agency (USEPA). The applicable thresholds for evaluation are detailed in **Section 2**.

In March 2023, the City adopted COAs which apply to all complex, commercial, and multifamily developments.⁴ This technical report incorporates the applicable COAs in the evaluation of CAP emissions and the health risk assessment (HRA), as appropriate. The applicable COAs to the Project's air quality, greenhouse gas, and/or energy impacts are listed in **Section 2.7**.

The Project would replace existing buildings on the Project site, retrofit some of the existing buildings on site, and construct new buildings over a 30-year period. Therefore, total operational emissions and energy consumption associated with the Project are the difference between impacts from the new land uses and impacts from the existing land uses that would no longer be present. To calculate emissions and energy consumption from the existing land uses, emission factors consistent with Project evaluation years were applied to site activity levels that are representative of the time when NDNU was in full operations. This time was determined to be 2013, which was recommended by the Project Sponsor and is consistent with the Project Sponsor's right to fully occupy the NDNU without extra approvals, covering transportation, water, and sewage aspects. Determination of the baseline year of 2013 ensures accurate reporting of the Project's impacts.⁵

Although the Project site would likely be built out over a 30-year period, it could be built out in as fast as a 10-year period. Because the exact buildout sequence and phasing is not known at the time for preparation of this technical report, the analysis assumes the earliest and most intense buildout schedule for the purpose of providing the most conservative estimates for emissions, health risk impacts and energy consumption. Construction of the entire Project site was assumed to be compressed to two years, which represents the most intense buildout schedule that would be possible for the Project and is a conservative

² BAAQMD. 2023. 2022 CEQA Air Quality Guidelines. Available at: <https://www.baaqmd.gov/plans-and-climate/california-environmental-quality-act-ceqa/updated-ceqa-guidelines>. April.

³ Despite being released in 2023, the BAAQMD has titled these the 2022 Guidelines as that was their intended release date.

⁴ City of Belmont. 2023. Attachment A – Standard Conditions of Approval, Complex, Commercial and Multifamily Projects. Adopted on March 28.

⁵ Stanford. 2023. Letter titled "Summary of Baseline Conditions at Notre Dame at Namur University", from John Donahoe at Stanford University to Stephanie Davis at Good City Company. April 7.

assumption for the purpose of estimating CAP emissions and health risks, discussed further below. 50-percent and 100-percent operations of the Project were assumed to occur as early as 2030 and 2035, respectively. The 50-percent and 100-percent operations of the Project are referred to hereafter as partial operations and full operations, respectively. For partial operations, this technical report applied the 2030 emission factors (if applicable) to 50 percent of the site activities at full operations to estimate emissions.

The Project would be constructed in phases; however, the timing and extent of each phase is unknown. To evaluate the maximum possible impacts of the Project on the existing environment, this technical report assumes that the Project would be constructed in a single phase under the most intense schedule. Under a less intense buildout schedule, the Project's impacts from phased construction on the existing environment would be less or equally intense compared to the Project's single-phase construction assumed throughout this technical report. This is a conservative manner of performing the analysis in that it would tend to overstate, rather than understate, adverse environmental impacts. In this manner, the analysis creates an outer envelope of air quality, GHG and energy impacts associated with the Project.

2.1 Air Quality Thresholds for Evaluation

2.1.1 Criteria Pollutants and Precursors

Project construction and operational emissions of CAPs and precursors were evaluated and compared with the BAAQMD's 2022 CEQA Guidelines thresholds of significance. Project operational emissions were compared to the annual and daily operational thresholds of 54 pounds (lbs) per day and 10 tons per year (tpy) of Reactive Organic Gases (ROG), oxides of nitrogen (NO_x) and particulate matter less than 2.5 micrometers in diameter (PM_{2.5}), and 82 lbs per day and 15 tpy for particulate matter less than 10 micrometers in diameter (PM₁₀). Project construction emissions were compared to the average daily construction thresholds of 54 lbs per day of ROG, NO_x, and PM_{2.5} and 82 lbs per day of PM₁₀. BAAQMD thresholds of significance for construction-related PM₁₀ and PM_{2.5} mass emissions apply to exhaust emissions only and do not include fugitive dust emissions. However, fugitive dust emissions were quantified and included in the HRA to be compared with the BAAQMD's annual average PM_{2.5} concentration threshold. BAAQMD thresholds for fugitive dust during construction are based upon compliance with the listed Best Management Practices (BMPs).

In developing thresholds of significance for CAP emissions, the BAAQMD considered the emission levels for which a project's individual emissions would be cumulatively considerable within the air basin. If a project does not exceed the significance thresholds for CAP emissions, its CAP emissions would not be considered cumulatively considerable, resulting in less-than-significant cumulative air quality impact.

2.1.2 Health Risks and Hazards

The HRA in this technical report evaluates the estimated cancer risk, non-cancer chronic and acute hazard indices (HIs), and fine particulate matter (PM_{2.5}) concentration associated with construction of the Project. As discussed in more details in **Section 3.2**, Project operations are unlikely to introduce any new stationary sources, and the specifics of any academic land use that may be associated with toxic air contaminants (TACs) emissions cannot be determined at the time of preparation of this technical report. Therefore, a quantitative

evaluation of the Project's operational health risk impacts is not warranted at this time. Instead, this report focuses on Project-specific and cumulative health risks associated with project construction.

The BAAQMD's 2022 CEQA Guidelines define receptors as people—children, adults, and seniors—occupying or residing in:

- Residential dwellings, including apartments, houses, condominiums, single-room occupancy units, and residential hotels;
- Places of business;
- Schools, colleges and universities;
- Daycare centers;
- Hospitals;
- Temporary housing, shelters, or encampments;
- Detention centers or correctional facilities and
- Senior-care facilities.⁶

The construction health risk analyses were compared with the BAAQMD 2022 CEQA significance thresholds. The maximum exposure impacts were combined with the impacts of off-site sources of TACs and compared against the BAAQMD 2022 CEQA cumulative thresholds. The thresholds are:

Project-specific impacts are considered significant if they achieve or exceed:

- An excess lifetime cancer risk level of more than 10 in one million;
- Non-cancer chronic and acute HIs greater than 1.0; and
- An incremental increase in the annual average PM_{2.5} of greater than 0.3 micrograms per cubic meter (µg/m³).⁷

A project's contributions towards cumulative impacts are considered substantial if they meet or exceed:

- An excess lifetime cancer risk level of more than 100 in one million;
- A chronic non-cancer HI greater than 10.0; and
- An incremental increase in the annual average PM_{2.5} concentration of greater than 0.8 µg/m³.

⁶ BAAQMD. 2023. 2022 CEQA Air Quality Guidelines, Appendix E, Recommended Methods for Screening and Modeling Local Risks and Hazards. Available at: <https://www.baaqmd.gov/plans-and-climate/california-environmental-quality-act-ceqa/updated-ceqa-guidelines>. April.

⁷ Quantification of construction-related fugitive dust in addition to exhaust emissions to evaluate the project's local risks and hazards impact is at the discretion of the lead agency. The Air District will be developing further guidance and recommendations to support lead agencies in this decision.

As discussed in detail in **Section 3.2**, health impacts from the Project are based on emissions of diesel particulate matter (DPM). DPM does not have an acute non-cancer toxicity value, so an acute HI from diesel exhaust is not estimated.

2.1.3 Local Carbon Monoxide (CO) Impacts

The BAAQMD's 2022 thresholds of significance for local CO impacts are consistent with the 1-hour and 8-hour California Ambient Air Quality Standards, which are 20.0 parts per million (ppm) and 9.0 ppm, respectively. BAAQMD's 2022 CEQA Guidelines provide the following screening criteria to evaluating significance related to localized CO concentrations:

- Project is consistent with an applicable congestion management program established by the county congestion management agency for designated roads or highways, regional transportation plan, and local congestion management agency plans.
- The project traffic would not increase traffic volumes to more than 44,000 vehicles per hour at affected intersections without airflow restrictions, or more than 24,000 vehicles per hour where vertical and/or horizontal mixing is substantially limited (e.g., tunnel, parking garage, bridge underpass, natural or urban street canyon, below-grade roadway).

2.1.4 Odor

The BAAQMD's threshold of significance for odor is based on the number of odor complaints for projects that propose new odor sources near existing receptors. The BAAQMD considers a project's odor impacts to be significant if the project would site a new odor source resulting in more than five confirmed odor complaints per year, averaged over three years. The BAAQMD's 2022 CEQA Guidelines also recommend screening distances for siting new odor sources away from existing receptors.

2.2 Greenhouse Gas Emissions and Climate Change Thresholds for Evaluation

The effects of GHG emissions are cumulative impacts by nature. GHG emissions contribute, on a cumulative basis, to the significant adverse environmental impacts of global climate change. Climate change impacts may include an increase in extreme heat days, higher concentrations of air pollutants, sea level rise, impacts to water supply and water quality, public health impacts, impacts to ecosystems, impacts to agriculture, and other environmental impacts.

No single project could generate enough GHG emissions to noticeably change the global average temperature. However, the combination of GHG emissions from past, present, and future projects contributes substantially to the global climate change, resulting in substantial environmental impacts as described above. The significance criteria used for analyzing and determining the Project's impacts related to GHG emissions are described in this section.

2.2.1 CEQA Statute and Guidelines

CEQA Guidelines Section 15064 and relevant portions of Appendix G of the CEQA Guidelines recommend that a lead agency consider a project's consistency with relevant adopted plans and discuss any inconsistencies with applicable regional plans, including plans to reduce GHG emissions. In Appendix G of the CEQA Guidelines published by the Office of Planning and

Research, two checklist questions are provided to evaluate whether a project would result in a potentially significant impact related to climate change. A project's impacts related to GHG emissions and climate change would be potentially significant if the project would:

- Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment.
- Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of GHG.

2.2.2 BAAQMD 2022 Operational Thresholds of Significance for Climate Impacts of Land Use Projects

The BAAQMD recommends methods for analyzing project-related GHGs in CEQA analyses as well as implementation of GHG reduction measures for land use development projects.

In April 2022, the BAAQMD adopted CEQA Thresholds of Evaluating the Significance of Climate Impacts from Land Use Projects and Plans. The updated CEQA thresholds considered state reduction targets (e.g., Senate Bill 32) and the carbon neutrality goal by 2045. The updated CEQA thresholds also emphasized (1) avoiding development of fossil fuel infrastructure in new buildings that will be in place for decades and therefore potentially conflicting with carbon neutrality by 2045 and (2) ensuring consistency with a qualified GHG reduction strategy (also known as a Climate Action Plan). A project would have a less-than-significant impact related to GHG emissions and climate change if it would comply with either of the following options:

- A. Projects must include, at a minimum, the following project design elements:
 1. Buildings
 - a. The project will not include natural gas appliances or natural gas plumbing (in both residential and nonresidential development).
 - b. The project will not result in any wasteful, inefficient, or unnecessary energy usage as determined by the analysis required under CEQA Section 21100(b)(3) and Section 15126.2(b) of the State CEQA Guidelines.
 2. Transportation
 - a. Achieve a reduction in project-generated vehicle miles traveled (VMT) below the regional average consistent with the current California Climate Change Scoping Plan (currently 15 percent) or meet a locally adopted SB 743 VMT target:
 - i. Residential projects: 15 percent below the existing VMT per capita
 - ii. Office projects: 15 percent below the existing VMT per employee
 - iii. Retail projects: no net increase in existing VMT
 - b. Achieve compliance with electric vehicle charging requirements in the most recently adopted version of CALGreen Tier 2.
- B. Be consistent with a local GHG Reduction Strategy that meets the criteria under the CEQA Guidelines section 15183.5(b).

This technical report analyzes the Project’s impacts related to GHG emissions and climate change through **Option A** of the BAAQMD’s thresholds of significance for evaluating climate impacts from land use projects and plans.

2.3 BAAQMD’s Guidance on Construction GHG Impacts

BAAQMD has not developed quantitative thresholds for construction-related GHG emissions; however the 2022 Guidelines recommend that the GHG emissions should be quantified and disclosed. Additionally, the Guidelines recommend BMPs for reducing GHG emissions from construction activities. This technical report quantifies construction GHG emissions and provides a consistency analysis with recommended construction GHG BMPs, summarized in **Section 4.3.2**.

2.3.1 Thresholds of Significance for Climate Impacts of Stationary Sources

The BAAQMD’s 2022 CEQA Guidelines require a quantitative evaluation of GHG emissions from new stationary sources and comparison with the bright-line threshold of 10,000 metric tons of carbon dioxide equivalent (CO_{2e}) per year. This threshold of significance is not applicable to the Project as no new stationary sources are anticipated.

2.4 Summary of Air Quality and GHG Emissions Thresholds of Significance

With respect to the Project, the BAAQMD thresholds for evaluation in this technical report are summarized as follows:

BAAQMD CEQA Thresholds of Significance¹			
Pollutant	Construction-Related	Operational	
Criteria Air Pollutants (and Precursors)	Average Daily Emissions (lbs/day)	Average Daily Emissions (lbs/day)	Maximum Annual Emissions (tpy)
ROG	54	54	10
NO _x	54	54	10
PM ₁₀	82 (exhaust only)	82	15
PM _{2.5}	54 (exhaust only)	54	10
PM ₁₀ /PM _{2.5} (fugitive dust)	Best Management Practices	None	None
CO (local concentration)	None	9.0 ppm (8-hour average), 20.0 ppm (1-hour average)	

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BAAQMD CEQA Thresholds of Significance¹			
Pollutant	Construction-Related	Operational	
Criteria Air Pollutants (and Precursors)	Average Daily Emissions (lbs/day)	Average Daily Emissions (lbs/day)	Maximum Annual Emissions (tpy)
Risk and Hazards for new sources and receptors (Individual Project)	Compliance with Qualified Community Risk Reduction Plan OR Increased cancer risk of >10.0 in a million Increased non-cancer risk of > 1.0 HI (chronic or acute) Ambient PM_{2.5} increase: > 0.3 µg/m³ annual average <u>Zone of Influence</u>: 1,000-foot radius from fence line of source or receptor		
Risk and Hazards for new sources and receptors (Cumulative Threshold)	Compliance with Qualified Community Risk Reduction Plan OR Increased cancer risk of >100 in a million (from all local sources) Increased non-cancer risk of >10 HI (from all local sources) (chronic) Ambient PM_{2.5} increase: > 0.8 µg/m³ annual average (from all local sources) <u>Zone of Influence</u>: 1,000-foot radius from fence line of source or receptor		
Odors	None	5 confirmed complaints per year averaged over three years	

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BAAQMD CEQA Thresholds of Significance ¹			
Pollutant	Construction-Related	Operational	
Criteria Air Pollutants (and Precursors)	Average Daily Emissions (lbs/day)	Average Daily Emissions (lbs/day)	Maximum Annual Emissions (tpy)
GHG – Land Use Developments	Must include A or B A. Project must include, at a minimum, the following project design elements: 1. Buildings a. The project will not include natural gas appliances or natural gas plumbing. b. The project will not result in any wasteful, inefficient, or unnecessary energy usage as determined by the analysis required under CEQA Section 21100(b)(3) and Section 15126.2(b) of the State CEQA Guidelines. 2. Transportation a. Achieve a reduction in project-generated vehicle miles traveled (VMT) below the regional average consistent with the current version of the California Climate Change Scoping Plan (currently 15 percent) or meet a locally adopted Senate Bill 743 VMT target, reflecting the recommendations provided in the Governor’s Office of Planning and Research’s Technical Advisory on Evaluating Transportation Impacts in CEQA: 15 percent below the existing VMT per employee for office projects. b. Achieve compliance with off-street electric vehicle requirements in the most recently adopted version of CALGreen Tier 2. B. Project must be consistent with a local GHG reduction strategy that meets the criteria under State CEQA Guidelines Section 15183.5(b).		
GHG – Stationary Sources	10,000 metric tons CO ₂ e/year		
Notes: ¹ Unless otherwise stated, the thresholds of significance provided in this table are considered both project-level and cumulative thresholds of significance. If the project-level impact is less than significant when compared with a threshold of significance presented above, the cumulative impact of the project is also considered less than significant. Abbreviations: CO = Carbon Monoxide Lbs = pounds MT of CO ₂ e/yr = metric tons of carbon dioxide equivalent per year MT CO ₂ e/SP/yr = metric tons carbon dioxide equivalent per service population per year NOx = oxides of nitrogen PM _{2.5} = Particulate Matter less than 2.5 microns PM ₁₀ = Particulate Matter less than 2.5 microns ROG = Reactive Organic Gas µg/m ³ = micrograms per cubic meter. GHG = Greenhouse Gas CO ₂ e = Carbon dioxide equivalent VMT = Vehicle Miles Traveled			

2.5 Energy Thresholds for Evaluation

Section 15126.2(b) of the State CEQA Guidelines requires a CEQA document to analyze energy impacts to the extent relevant and applicable to the project.⁸ In accordance with the environmental checklist in the State CEQA Guidelines, a project would result in potentially significant impacts if it would:

- Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation
- Conflict with or obstruct a state or local plan for renewable energy or energy efficiency.⁹

Appendix F of the State CEQA Guidelines requires a discussion of the Project's environmental impacts related to energy conservation in six categories:

1. The project's energy requirements and its energy use efficiencies by amount and fuel type for each stage of the project including construction, operation, maintenance and/or removal. If appropriate the energy intensiveness of materials may be discussed.
2. The effects of the project on local and regional energy supplies and on requirements for additional capacity.
3. The effects of the project on peak and base period demands for electricity and other forms of energy.
4. The degree to which the project complies with existing energy standards.
5. The effects of the project on energy resources.
6. The project's projected transportation energy use requirements and its overall use of efficient transportation alternatives.

The analysis of energy-related impacts in **Section 5** of this technical report discloses fossil fuel, renewable energy, and water consumption of the Project, provides an overview of the applicable state and local regulations related to energy and water conservation, and demonstrates that the Project would have less-than-significant energy impacts using the applicable CEQA guidelines.

2.6 Thresholds of Significance in the State's CEQA Guidelines

Appendix G of the CEQA Guidelines, the Environmental Checklist Form, is often used as the basis for lead agencies' selection of significance thresholds. The Environmental Checklist questions do not prescribe specific thresholds, which are selected at a lead agency's discretion, taking into consideration the BAAQMD's recommended thresholds, presented in **Section 2.4**, above. The Environmental Checklist questions for air quality, GHG emissions, and energy impacts are addressed throughout this technical report. Significance

⁸ CCR, Title 14, § 15126.2.

⁹ Association of Environmental Professionals. 2023. 2023 CEQA Statute and Guidelines.

determinations regarding each Environmental Checklist question are summarized in **Section 6, Impact Conclusions.**

2.7 Applicable City's Conditions of Approval (COAs)

In March 2023, the City of Belmont adopted a list of standard development requirements and COAs that may be required for all complex projects and for commercial, multi-family, and mixed-use project applications.¹⁰ The COAs are listed under applicable resource areas identified in Appendix G of the CEQA Guidelines published by the Office of Planning and Research. Below are the COAs relevant to the Project's air quality, GHG, and energy impacts, listed as represented in the adopted COAs¹¹, without edit. Other COAs that may indirectly affect such impacts of the Project, such as the requirements of compliance with the City's Transportation Demand Management programs and tree protection, are excluded.

Air Quality

Construction & Operations

The General Plan EIR (GP EIR) indicates that individual development projects have the potential for construction and operational emissions in excess of BAAQMD's project level thresholds; however, Mitigation Measures AQ-1 through AQ-4 would reduce construction related emissions, and Mitigation Measure AQ-5 would address operational-related emissions. Thus, all large projects are required to implement the following mitigation measures as standard conditions of project approval:

- 1. Pursuant to GP EIR Mitigation Measure AQ-1, the applicant shall require their contractors, as a condition of contract, to further reduce construction-related exhaust emissions by ensuring that all off-road equipment greater than 50 horsepower (hp) and operating for more than 20 total hours over the entire duration of construction activities shall operate on an EPA-approved Tier 4 or newer engine. Exemptions can be made for specialized equipment where Tier 4 engines are not commercially available within 200 miles of the project site. The construction contract must identify these pieces of equipment, document their unavailability, and ensure that they operate on no less than an EPA- approved Tier 3 engine. ARB regulations will result in the percentage of Tier 4 engines increasing over the next several years.*
- 2. Pursuant to GP EIR Mitigation Measure AQ-2, the applicant shall require their contractors, as a condition of contract, to reduce construction-related exhaust emissions by ensuring that all off-road equipment greater than 50 horsepower (hp) and operating for more than 20 total hours over the entire duration of construction activities shall operate on renewable diesel (such as Diesel high performance renewable). Renewable diesel is currently commercially available in San Francisco Bay Area.*
- 3. Pursuant to GP EIR Mitigation Measure AQ-3, the applicant shall require their contractors, as a condition of contract, to reduce construction-related fugitive ROG emissions by ensuring that low-VOC coatings that have a VOC content of 10 grams/liter (g/L) or less are used during construction. The project applicant will submit evidence of the use of low-VOC coatings to BAAQMD prior to the start of construction.*

¹⁰ Complex Projects generally include General Plan Amendments, Rezoning, new buildings greater than 10,000 gross square feet, major subdivisions of land into five or more lots or condominium units, tentative maps, all vesting tentative maps, roadway improvement plans, and projects that include multiple, interrelated project entitlements.

¹¹ City of Belmont. 2023. Attachment A – Standard Conditions of Approval Complex, Commercial & Multifamily Projects.

4. Pursuant to GP EIR Mitigation Measure AQ-4, the applicant shall require their contractors, as a condition of contract, to reduce construction-related fugitive dust by implementing BAAQMD's basic control measures at all construction and staging areas. The following measures are based on BAAQMD's current CEQA guidelines.

- a) All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) will be watered two times per day.
- b) All haul trucks transporting soil, sand, or other loose material offsite will be covered.
- c) All visible mud or dirt track-out onto adjacent public roads or sidewalks will be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.
- d) Entry and exit from the site will use rock or rumble strips to prevent tracking.
- e) All vehicle speeds on unpaved roads, driveways, or driving surfaces shall be limited to 15 mph.
- f) All roadways, driveways, and sidewalks to be paved will be completed as soon as possible. Building pads will be laid as soon as possible after grading unless seeding or soil binders are used.
- g) Post a publicly visible sign with the telephone number and the name of the person to contact at the lead agency regarding dust complaints. This person will respond and take corrective action within 48 hours. The phone number of the District will also be visible to ensure compliance.

5. Pursuant to GP EIR Mitigation Measure AQ-5, the developer(s) shall provide education for residential and commercial tenants concerning green consumer products. Prior to receipt of any certificate of final occupancy, the project sponsors shall work with the City of Belmont to develop electronic correspondence to be distributed by email to new residential and commercial tenants that encourages the purchase of consumer products that generate lower than typical VOC emissions. Examples of green products may include low-VOC architectural coatings, cleaning supplies, and consumer products, as well as alternatively fueled landscaping equipment.

6. The applicant must require their contractors, as a condition of contract, to reduce construction-related exhaust emissions by implementing following measures during construction related activities:

- a. Idling times must be minimized either by shutting equipment off when not in use or reducing the maximum idling time to five minutes (as required by the California airborne toxics control measure Title 13, Section 2485 of California Code of Regulations). Clear signage must be provided for construction workers at all access points.
- b. All construction equipment must be maintained and properly tuned in accordance with manufacturer's specifications. All equipment must be checked by a certified mechanic and determined to be running in proper condition prior to operation.

7. The applicant must require their contractors, as a condition of contract, to reduce construction-related fugitive ROG emissions by ensuring that paints and solvents have a VOC content of 100 grams per liter or less for interior surfaces and 150 grams per liter or less for exterior surfaces.

Sensitive Receptors

The General Plan EIR indicates that the construction of individual development projects has the potential to expose sensitive receptors (residential uses, hospitals, schools, daycare centers, etc.) to toxic air contaminants (TACs). Thus, General Plan EIR Mitigation Measure AQ-6, requires that all projects proposing development within 1,000 feet of existing sensitive

receptors prepare a site-specific health risk assessment (HRA). If the HRA demonstrates, to the satisfaction of the City, that the health risk exposures for adjacent receptors will be less than BAAQMD project-level thresholds, then additional mitigation would be unnecessary. The preparation of a project-specific HRA is a standard development requirement (SDR) for all large projects that are proposed within 1,000 feet of existing sensitive receptors.

COA - Dust Control

In addition to the above COAs, the Public Works Department requires the following standard dust control COA for all large projects:

1. The owner/applicant must submit a dust control plan for approval by the Department of Public Works. To reduce dust levels, exposed earth surfaces shall be watered as necessary. The application of water must be monitored to prevent runoff into the storm drain system. Spillage resulting from hauling operations along or across any public or private property shall be removed immediately. Dust nuisances originating from the contractor's operations, either inside or outside of the right-of-way must be controlled. The measures must also include:

- a) Water all active construction sites at least twice daily.
- b) Cover all trucks hauling soil, sand, and other loose materials or require all trucks to maintain at least two feet of freeboard.
- c) Pave, apply water three times daily, or apply (non-toxic) soil stabilizers on all unpaved access roads, parking areas, and staging areas at construction sites.
- d) Sweep daily (with water sweepers) all paved access roads, parking areas and staging areas at construction sites. All sidewalks shall be kept clear of dust and debris unless the sidewalk is closed as part of a City approved traffic control plan.
- e) Sweep streets daily along the haul route (with water sweepers) if visible soil material is carried onto adjacent public streets.
- f) Entry and exit from the site will use rock or rumble strips to prevent tracking.
- g) Hydroseed or apply (non-toxic) soil stabilizers to inactive construction areas (previously graded areas inactive for ten days or more).
- h) Enclose, cover, water twice daily, or apply non-toxic soil binders to exposed stockpiled materials.
- i) Install sandbags or other erosion-control measures to prevent silt runoff to public roadways.
- j) Replant vegetation in disturbed areas as quickly as possible.
- k) Watering should be used to control dust generation during the break-up of pavement.
- l) Cover all trucks hauling demolition debris from the site.
- m) Use dust-proof chutes to load debris into trucks whenever feasible.
- n) Water or cover stockpiles of debris, soil, sand or other materials that can be blown by the wind.
- o) All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications. All equipment shall be checked by a certified mechanic and determined to be in proper running order prior to operation.
- p) Diesel powered equipment shall not be left inactive and idling for more than five minutes, and shall comply with applicable BAAQMD rules.
- q) Use alternative fueled construction equipment, if possible.
- r) All vehicle speeds on unpaved roads shall be limited to 15 mph.

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s) Post a visible sign with the telephone number and person to contact at the Lead Agency regarding dust complaints. This person shall respond and take corrective action within 24 hours. The Air District phone number shall also be visible to ensure compliance with applicable regulations.

Green House Gas

The following standard conditions of approval are required for all projects:

COAs – Green House Gas

- 1. A minimum of 10% of the construction materials must be acquired (sourced) within 100 miles of the planning area. Documentation must be provided before the final building permit inspection.*
- 2. A minimum of 50% of the construction waste generated by this project must be recycled or salvaged for use. Documentation must be provided before the final building permit inspection. Sample forms located at www.hcd.ca.gov/CALGreen.html may be used to assist in documenting compliance.*
- 3. Prior to issuance of a building permit, the applicant must provide documentation (i.e., construction contracts or signed agreements) demonstrating that all contractors and subcontractors agree to operate all off-road equipment greater than 50 horsepower (hp) and operating for more than 20 total hours over the entire duration of work on renewable diesel (such as Diesel high performance renewable).*

COAs – Hydrology & Water Quality

Operational – COAs & BMPs

- 10. Efficient irrigation systems shall be used throughout all landscaped areas in accordance with the Model Water Efficient Landscape Ordinance.*

3. IMPACT EVALUATIONS

3.1 Emissions of Criteria Air Pollutants

The following sections describe the input data and methodologies used in the construction and operational emissions analysis. A summary of emission quantification methodologies is presented in **Table 2**. Results are summarized for construction and operational emissions. As demonstrated below, the Project's impacts related to criteria pollutant emissions would be less than significant, because neither Project construction nor operations would result in exceedance of the applicable BAAQMD thresholds of significance.

Project-specific input data were provided by the Project Sponsor. Where Project-specific information was not available, Ramboll utilized California Emission Estimator Model version 2022.1.0 (CalEEMod)¹² equivalent methodologies in a proprietary program to quantify construction and operational CAP emissions. CalEEMod is a statewide program designed to calculate both CAP and GHG emissions for development projects in California. CalEEMod provides a simple platform to calculate both construction emissions and operational emissions from a land use project. It calculates both the daily maximum and annual average for CAPs as well as total or annual GHG emissions.

CalEEMod utilizes widely accepted models for emission estimates combined with appropriate default data that can be used if site-specific information is not available. CalEEMod uses sources such as the US Environmental Protection Agency (USEPA) AP-42 emission factors,¹³ ARB's on-road and off-road equipment emission models such as the Emission FACtor model (EMFAC) and the Offroad Inventory (OFFROAD), ARB's Carl Moyer Program Guidelines¹⁴ and studies commissioned by California agencies such as the California Energy Commission (CEC) and CalRecycle.

3.1.1 Construction Emissions

Construction emissions from the Project include on-site, off-road heavy equipment, off-site, on-road vehicle travel, architectural coating, paving, and fugitive dust. As described below, Ramboll updated several default assumptions to Project-specific information to generate emission estimates with CalEEMod equivalent methodologies. Where project-specific data were not available, Ramboll used CalEEMod defaults for the land use categories shown in **Table 1**.

The Project's construction CAP emissions are summarized in **Table 3**. The Project's daily average CAP emissions during the construction period would be below the BAAQMD's thresholds of significance.

¹² California Air Pollution Control Officers Association (CAPCOA). 2022. California Emissions Estimator Model (CalEEMod®), Version 2022.1.0. Available online at: <http://www.CalEEMod.com/>

¹³ The USEPA maintains a compilation of Air pollutant Emission Factors and process information for several air pollution source categories. The data is based on source test data, material balance studies, and engineering estimates. Available at: <http://epa.gov/ttnchie1/ap42/>

¹⁴ CARB. 2017. The Carl Moyer Program Guidelines. Available at: https://ww2.arb.ca.gov/sites/default/files/2020-06/2017_cmpgl.pdf

In calculating Project construction emissions, several updates were made to the CalEEMod default construction activities and emission factors. Details are provided below:

- Total construction activity for Project buildout was based on CalEEMod default construction schedule and activities for land use categories presented in **Table 1**. CalEEMod default construction duration based on the land uses sizes was approximately four years. However, to account for a conservatively compressed potential buildout schedule, CalEEMod default construction phase durations were halved, while total equipment and on-road activity was conserved. The result of this was an effective doubling of equipment population counts, vehicle activity, and emissions on a given construction day. (**Tables 4, 5, and 6**).
- The Project Sponsor has committed to using renewable diesel and Tier 4 engines for all off-road equipment, including those rated less than 50 horsepower. The emission factors for Tier 4 engines were obtained from CalEEMod, which are based on ARB's Carl Moyer Guidelines.¹⁵ (**Table 5**).
- All worker vehicles are assumed to be fueled by gasoline, and all vendor vehicles and haul trucks are assumed to be fueled by diesel. On-road emissions were calculated using emission factors from EMFAC2021. (**Table 6**).
- One-way haul truck trip rates and VMT were calculated based on the amount of material to be moved and the truck capacity of 10 tons (or 16 cubic yards) per truck, as provided by the Project sponsor.¹⁶ (**Table 6**).
- 50% of the parking spaces are assumed to be in a parking lot, while the other 50% are assumed to be in enclosed parking garages with an elevator. The parking lot is assumed to be paved with asphalt. (**Table 7**)
- As shown in **Section 2.7**, the City's COA #3 for Air Quality - Construction and Operations requires that low volatile organic compounds (VOC) coatings that have a VOC content of 10 grams/liter (g/L) or less are used during construction. Emission estimates from the architectural coating phase assumed interiors of the buildings would be painted with low VOC coatings. (**Table 8**)

As discussed in **Section 2.1**, the BAAQMD thresholds of significance for construction-related PM₁₀ and PM_{2.5} CAP emissions do not include a quantified fugitive dust emission threshold. For a project to have a less-than-significant criteria air pollutant impact related to construction-related fugitive dust emissions, the project must implement the BAAQMD's basic BMPs, including but not limited to, watering exposed surfaces two times a day, covering of haul trucks, and limiting vehicle speeds on unpaved road. As shown in **Section 2.7** and **Appendix A**, the City's applicable COAs on Dust Control generally satisfy the performance requirements of the fugitive dust BMPs recommended by the BAAQMD. The Project would be required to implement the City's COAs related to fugitive dust emissions

¹⁵ CARB. 2017. The Carl Moyer Program Guidelines. Available at: https://ww2.arb.ca.gov/sites/default/files/2020-06/2017_cmpgl.pdf

¹⁶ BKF Engineers. 2023. Stanford Belmont – Preliminary Earthwork Summary. February 22.

and therefore would have a less-than-significant impact related to construction CAP emissions of particulate matter.

Fugitive dust emissions from Project construction were calculated in **Section 3.2**, below, for the purposes of estimating the Project's contribution to local increases in annual average PM_{2.5} concentrations (as part of the HRA).

3.1.2 Operational Emissions

Operational CAP emissions from the Project would include on-road mobile sources, and area sources such as consumer product use, landscaping, and architectural coating. Additional sources that would only contribute to the Project's operational GHG emissions are electricity use, water use, solid waste generation, and refrigerant leakage. GHG emissions from these sources are further described in **Section 4**.

As discussed in **Section 2.1**, the Project's net new operational emissions were estimated by calculating the difference between baseline emissions at full occupancy of the NDNU campus and Project emissions at partial and full-buildout of the proposed CDP. Land use categories used in the analysis are summarized in **Table 1** and emission quantification methodologies for operational sources are summarized in **Table 2**. The Project's operational CAP emissions are summarized by emission source and presented in **Table 9**. Overall, CAP emissions from Project operation would be below the applicable thresholds of significance.

Details of emission estimates for each operational source of CAP emissions are provided below.

3.1.2.1 On-Road Mobile Sources

Daily trips and vehicle miles traveled (VMT) generated by the existing conditions and the Project were provided by the Project Sponsor's transportation consultant.¹⁷ The Project will implement a transportation demand management (TDM) program that would result in a 19.2 percent reduction in trips and VMT compared to campus operations without such a program. The TDM program is a project feature reflected in **Table 10**.

Mobile emission factors from running, idling, and starting vehicle exhaust, as well as evaporative running loss, tire wear, and brake wear emissions were calculated using EMFAC2021 for San Mateo County. Running exhaust, running loss evaporative, tire wear, and brake wear emissions were determined using factors with units of grams/mile while idling and starting exhaust and other evaporative emissions were determined using factors with units of grams/trip. Mobile emission factors based on default EMFAC fleet mix are summarized in **Table 11**. These mobile emission factors are based on default vehicle population projections in EMFAC2021 and do not account for California Air Resources Board's Advanced Clean Cars II rule, which requires 100 percent of new cars and light trucks to be zero-emission vehicles by 2035.

Vehicles driving on roadways would also emit PM_{2.5} and PM₁₀ in the form of re-suspended road dust. The weighted average silt loading factor specific to San Mateo County was

¹⁷ Fehr & Peers. 2023. Stanford Belmont Campus Transportation Impact Analysis. July 24.

calculated based on travel fraction by roadway category and silt loading parameters obtained from ARB's Entrained Road Travel Emission Inventory Source Methodology document, as shown in **Table 12**. The average silt loading factor was then used in conjunction with parameters from the ARB Miscellaneous Process Methodology 7.9 for Entrained Road Travel, Paved Road Dust to calculate fugitive PM₁₀ and PM_{2.5} emission factors, summarized in **Table 13a**. Road dust PM_{2.5} and PM₁₀ emissions were added to exhaust PM_{2.5} and PM₁₀ emissions in **Table 14** for comparison against BAAQMD's total operational CAP emissions significance thresholds. As discussed above, mobile emissions for the Project's partial and full operations do not account for the Advanced Clean Cars II rule and are therefore conservative. Mobile emissions from the Project are expected to be less than what is presented in **Table 14** due to the higher fleet projections of zero-emission vehicles by 2035.

3.1.2.2 Area Sources

Area sources that would generate CAP emissions from Project operations would include landscaping equipment, consumer products, and architectural coatings.

For emissions from landscaping equipment, annual usage hours for typical landscaping equipment were estimated based on CalEEMod default usage hours per residential and non-residential square foot, derived from ARB's Small Off-Road Engines Model. Existing and Project landscaping area were obtained from the Preliminary Engineering Report.¹⁸ To be conservative, all CalEEMod default landscaping equipment were assumed to be used except for snowblowers, which are not expected for this Project's climate. All landscaping equipment were assumed to use gasoline. Usage and emissions for gasoline landscaping equipment are summarized in **Table 15**. ARB's Assembly Bill No. 1346 requires engines of landscaping equipment produced on or after January 1, 2024, to be zero-emissions (e.g., electric). This is expected to increase the amount of zero-emission landscaping equipment in the Statewide fleet. Consistent with the Statewide trend, the percentage of zero-emission landscaping equipment used for Project operations is expected to be non-zero and to grow during the Project's buildout period. Thus, the estimates for Project operations in **Table 15** are conservative.

Operational architectural coatings include the reapplication of paint and coatings on interior and exterior surfaces, which result in emissions of ROG. CalEEMod default assumptions were used to calculate the building surface area that would be coated, as well as the application rate and outdoor ROG emission factors based on BAAQMD Regulation 8 Rule 3 paint VOC regulations. All VOC content parameters used CalEEMod default assumptions for BAAQMD expect for the indoor paint VOC content, which was required to be low-VOC paint by the City's COA #3 for Construction and Operations. In addition, ROG emissions for parking garages were calculated using CalEEMod default assumptions for additional painting of stripes, handicap symbols, directional arrows, and car space descriptions for parking land uses. ROG emissions from operational architectural coatings are summarized in **Table 16**.

Consumer product emissions come from various non-industrial solvents, including cleaning supplies, kitchen aerosols, cosmetics, and toiletries, which emit ROG during their use. CalEEMod provides a statewide consumer products emission factor based on the ARB 2008

¹⁸ BKF Engineers (BKF). 2023. Stanford Belmont Campus - Preliminary Engineering Report. January 12.

emissions inventory. For this analysis, a San Mateo County specific emission factor was developed based on the emissions from consumer products from the ARB 2020 emissions inventory for San Mateo County and the building square footage in the county using the same methodologies utilized in CalEEMod. The consumer product emission factor for commercial and residential land uses is shown in **Table 17**. The emission factor for the parking area and parks are the default values for these land use categories from the CalEEMod User's Guide. ROG emissions from consumer product uses are summarized in **Table 18**.

As shown in **Section 2.7**, through COA #5 for Air Quality - Construction and Operations, the City requires that project developers provide education for residential and commercial tenants concerning green consumer products. Implementation of this COA may result in higher likelihood for the Project tenants to use green products compared to the regional average. Potential ROG emissions would be reduced by the use of green products, such as low-VOC coatings, cleaning supplies, and consumer products, as well as alternatively fueled landscaping equipment. However, because the use of green products is a voluntary action, emissions estimated for area sources in the technical report did not quantify the additional reductions that may result from this COA.

3.1.2.3 Energy Sources

Typical commercial and residential buildings consume natural gas and electricity. Both energy sources would generate GHG emissions; however, only on-site consumption of natural gas in heaters, boilers, and stoves would generate Project-specific CAP emissions. The Project will be all electric and will not include any natural gas hookups. Therefore, no CAP emissions from the Project's energy use would be considered Project-specific CAP emissions and therefore none are included in the estimates in this technical report. Electricity usage under Project conditions was calculated based on energy intensity from CalEEMod 2022 default parameters for the Project land uses. Because the proposed new buildings on the Project site would be all-electric, natural gas usage based on CalEEMod default parameters was replaced with electricity usage by multiplying the electric energy use rates from Table A-9 of the Sacramento Metropolitan Air Quality Management District Greenhouse Gas Threshold Report by the Project's number of dwelling units or non-residential square footage.¹⁹

Existing conditions includes both natural gas and electricity consumption for building operations. Electricity use and natural gas consumption for existing (2013) conditions was estimated from the campus's January 2018 – November 2020 utility bills. The total electricity and natural gas use was summed annually then divided by the campus population for each year to estimate a per-person use. This per person energy use was averaged and adjusted to the 2013 campus population.

Energy usage for the existing and Project conditions are summarized in **Table 19**. CAP emissions from natural gas use under existing conditions are summarized in **Table 20**.

¹⁹ Ramboll. 2020. Greenhouse Gas Thresholds for Sacramento County. Available at: <https://www.airquality.org/LandUseTransportation/Documents/SMAQMDGHGThresholds2020-03-04v2.pdf>.

3.2 Health Risk Assessment

A site-specific HRA assesses the project-level and cumulative risks and hazards at a local scale from air pollutants emitted from a project's sources and other sources located in the vicinity of the receptors. The HRA evaluates the estimated cancer risk, non-cancer chronic and acute hazard indices (HIs), and fine particulate matter (PM_{2.5}) concentration associated with construction of the Project. As discussed in **Section 2**, the HRA conservatively assumes that the Project would be constructed in one phase. The HRA also conservatively excludes any health risk reduction benefits of the Project for removing the existing operations on the Project site. Since the Project does not anticipate adding any new stationary sources to the site, health risks from the Project's operations were not quantified and are discussed in **Section 3.2.6**.

3.2.1 Modeled Toxic Air Contaminant (TAC) Emissions

Project construction would generate TAC emissions, specifically diesel particulate matter (DPM), through off-road diesel construction equipment and on-road diesel haul and vendor trucks. Diesel exhaust, a complex mixture that includes hundreds of individual constituents, is identified by the State of California as a known carcinogen.²⁰ Under California regulatory guidelines, DPM is used as a surrogate measure of exposure for the mixture of chemicals that make up diesel exhaust as a whole. The Cal/EPA-approved toxicity values for DPM were used to evaluate health impacts from construction and operational diesel fueled sources.²¹ There is currently no acute non-cancer toxicity value available for DPM.

All diesel-fueled off-road equipment and on-road vehicle emissions of exhaust PM₁₀ were assumed to be DPM. Modeled DPM emissions during construction are summarized in **Table 21**.

Operational traffic can also contribute vehicular TAC emissions, predominantly from gasoline-fueled engines, if the Project would increase traffic volumes on nearby roadways substantially. The BAAQMD defines major roadways as those with at least 10,000 annual average daily traffic (AADT) and requires major roadways to be considered as a mobile source of TAC emissions.²² Based on the trip generation provided by the Project Sponsor, the Project would generate less than 10,000 daily trips, distributed to nearby roadways. In addition, taking into consideration baseline conditions, the Project would generate a net negative number of daily trips, as shown in **Table 10**. Therefore, the Project is not anticipated to increase AADT on any roadway segment by more than 10,000 AADT.²³ Therefore, operational on-road vehicles were not modeled as a TAC source.

²⁰ California Environmental Protection Agency (Cal/EPA), Office of Environmental Health Hazard Assessment (OEHHA). 1998. Findings of the Scientific Review Panel on The Report on Diesel Exhaust, as adopted at the Panel's April 22, 1998, meeting.

²¹ Cal/EPA. 2022. OEHHA/ARB Consolidated Table of Approved Risk Assessment Health Values. December. <http://www.arb.ca.gov/toxics/healthval/contable.pdf>

²² BAAQMD. 2022. Risk and Hazard Screening Analysis Process Flow Chart. Available at: https://www.baaqmd.gov/~media/files/planning-and-research/ceqa/tools/2020_02_20-screening-approach-flow-chart-pdf.pdf?la=en. Revised on: August 29, 2022.

²³ Fehr & Peers. 2023. Stanford Belmont Campus Transportation Impact Analysis. July 24.

3.2.2 Modeled PM_{2.5} Emissions

PM_{2.5} originates from a variety of sources, including fossil fuel combustion, residential wood burning, cooking, wildfires, and dust. For assessment of local risks and hazards, quantification of construction-related fugitive dust in addition to exhaust is at the discretion of the lead agency.²⁴ The modeled PM_{2.5} emissions in this HRA include both exhaust and fugitive dust sources, to be conservative. Exhaust PM_{2.5} emission rates were quantified using the same methodologies described in **Section 3.1**. The following construction activities would generate fugitive dust emissions: dismemberment and debris loading during demolition; and material movements including grading equipment passes, bulldozing, truck loading, and road dust. Quantification of these fugitive dust sources are described below. Fugitive PM_{2.5} emission rates summarized in **Table 21** were based on the total emissions for a given construction phase, averaged by phase duration and daily construction hours.

Operational traffic would also generate road dust emissions that are negligibly small compared to the existing traffic on nearby roadway segments; therefore, fugitive dust emissions from operational traffic, similar to the Project's operational mobile TAC emissions, were not quantified in this HRA.

3.2.2.1 Fugitive Dust from Demolition

Fugitive dust emissions from mechanical dismemberment and debris loading during demolition were estimated using CalEEMod methodology and assumptions. The emission factor is calculated on a per-ton of building waste weight, assuming a 36 percent reduction due to watering two times a day, as required by the City's COA on Dust Control. Further details are shown in **Section 2.7**. Building waste weight was estimated based on the square footage of the buildings that would be demolished and the CalEEMod default assumption on the weight of building debris per building size. Fugitive PM_{2.5} emissions from demolition are summarized in **Table 22**.

3.2.2.2 Fugitive Dust from Grading

Fugitive dust emissions from grading equipment (i.e., graders and scrapers) occur during the grading and utility phases. Grading emissions were estimated using CalEEMod methodology and assumptions. The emission factor for grading is calculated on a per-VMT basis, assuming a 61 percent reduction due to the watering requirement in the City's COAs. Further details are shown in **Section 2.7**. Equipment VMT was calculated using the maximum area disturbed per day, based on Project-specific data and CalEEMod default assumptions. Fugitive PM_{2.5} emissions from grading activities are summarized in **Table 23**.

3.2.2.3 Fugitive Dust from Material Loading

Fugitive dust from material loading activities includes the unloading of construction materials and loading of soil onto the haul trucks throughout Project construction. Material loading fugitive dust emissions were estimated using CalEEMod methodology and assumptions. The emission factor for material loading is calculated on a per-ton basis. Material loaded in cubic yards is based on Project-specific data provided by the Project Sponsor, as shown in **Table**

²⁴ BAAQMD. 2023. 2022 CEQA Air Quality Guidelines. Available at: <https://www.baaqmd.gov/plans-and-climate/california-environmental-quality-act-ceqa/updated-ceqa-guidelines>. April.

24. The fugitive PM_{2.5} emissions in **Table 24** assumed a 61 percent reduction due to the watering requirement in the City's COAs. Further details are shown in **Section 2.7**.

3.2.2.4 Fugitive Dust from Bulldozing

Similar to grading equipment, bulldozing would generate fugitive PM_{2.5} emissions. The bulldozing emission factors were derived in CalEEMod based on material moisture content and silt content, consistent with the AP-42 methodologies. Emissions from bulldozing operations were calculated using CalEEMod default emission factors and hours of active operations for the dozers provided in **Table 25**, assuming a 61 percent reduction due to watering requirements in the City's COAs. Further details are shown in **Section 2.7**.

3.2.2.5 Fugitive Dust from On-Road Construction Traffic

Construction worker, vendor and hauling vehicles driving on roadways, similar to operational vehicles, would also emit PM_{2.5} in the form of re-suspended road dust, as described in **Section 3.1.2.1**. Road dust PM_{2.5} emissions are calculated based on emission factors in **Table 13b** and summarized in **Table 26**.

3.2.3 Dispersion Modeling

Ramboll analyzed Project construction risks by estimating ambient air concentrations of DPM and PM_{2.5}. The modeled construction sources are shown in **Figure 1**. As discussed previously, although the Project site would have different areas of construction throughout the buildout period, the entire Project site was modeled as one emission source because the exact buildout sequence and phasing are not known at the time of preparation of this technical report.

To estimate air concentrations of DPM and PM_{2.5}, Ramboll used AERMOD v22112, a steady-state Gaussian plume model developed by USEPA for regulatory applications, along with AERMET v18081. AERMOD requires emission source locations and release parameters, receptor locations, and processed meteorological data. An overview of AERMOD input parameters, selected in accordance with the BAAQMD's 2022 CEQA Guidelines, is provided in **Table 27**. Construction emissions were modeled as occurring between 8 AM and 5 PM, consistent with the City of Belmont's noise ordinance. AERMOD's variable emission factor (EMISFACT) option was used to limit emissions to this time period. AERMOD input and output files are included in **Appendix B**.

Ramboll used three years (2013-2015) of meteorological data from the BAAQMD San Carlos Airport meteorological station with upper air data collected at the Oakland Airport (OAK) for the same time period. A 3-year wind rose diagram from the surface meteorological station at San Carlos is presented in **Figure 2**. The predominant wind direction at the site is from northwest to southeast, which occurs approximately 45% of the time. Elevation and land use data were imported from the National Elevation Dataset (NED) maintained by the United States Geological Survey at a resolution of 1/3 arc-second (10m). Another important consideration in an air dispersion modeling analysis is the selection of whether to model an urban area. Here the model assumes an urban land use with representative population as has been done for similar projects in the area.

Emissions from each source group were modeled using the x/Q (“chi over q”) method, such that each source has unit emission rates (i.e., 1 gram per second [g/s]), and the model estimates dispersion factors with units of [µg/m³]/[g/s]. For annual average ambient air concentrations, the estimated annual average dispersion factors were multiplied by the annual average emission rates. The emission rates will vary day to day, with some days having no emissions. For simplicity, the model assumed a constant emission rate during the entire year.

For the health risk assessment, a receptor grid with 20-meter spacing was used for areas within the 1000-foot of the facility. All sensitive receptors (Resident, Worker, High School, Elementary School, Daycare and Preschool) were identified within the receptor grid. All the receptors were modeled at a breathing height of 1.5 meters as recommended in BAAQMD guidance.²⁵ For each receptor location, the model generated air concentrations (or air dispersion factors as unit emissions that were modeled) that result from emissions from multiple sources. The receptor grid used in this HRA and the modeled source locations are shown in **Figure 1**. The MEI location with the maximum health risk impacts from Project construction is a residence about 80 feet from the Project boundary.

3.2.4 Exposure Parameters and Project-Level Risk Results

The health risk assessment was conducted consistent with OEHHA’s 2015 Guidance Manual for Preparation of Health Risk Assessment²⁶ and BAAQMD’s 2022 CEQA Guidelines.²⁷ Ramboll conservatively evaluated Project impacts due to construction emissions using default exposure assumptions for residents from OEHHA (2015) unless the receptor locations were identified otherwise. The exposure parameters consistent with the BAAQMD’s 2022 CEQA Guidelines are presented in **Table 28**.

The dose estimated for each exposure pathway is a function of the concentration of a chemical and the intake of that chemical. The intake factor for inhalation, IF_{inh} , can be calculated as follows:

$$IF_{inh} = \frac{DBR * FAH * EF * ED * CF * ASF * FY}{AT}$$

Where:

IF_{inh} = Intake Factor for Inhalation (m³/kg-day)
DBR = Daily Breathing Rate (L/kg-day)

²⁵ BAAQMD. 2023. California Environmental Quality Act Air Quality Guidelines, Appendix E: Recommended Methods for Screening and Modeling Local Risks and Hazards. April. Available at: https://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa-guidelines-2022/appendix-e-recommended-methods-for-screening-and-modeling-local-risks-and-hazards_final-pdf.pdf?la=en

²⁶ OEHHA. 2015. Air Toxics Hot Spot Program. Risk Assessment Guidelines. Guidance Manual for Preparation of Health Risk Assessments. February. Available online at: <https://oehha.ca.gov/media/downloads/crn/2015guidancemanual.pdf>

²⁷ BAAQMD. 2023. California Environmental Quality Act Air Quality Guidelines, Appendix E: Recommended Methods for Screening and Modeling Local Risks and Hazards. April. Available at: https://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa-guidelines-2022/appendix-e-recommended-methods-for-screening-and-modeling-local-risks-and-hazards_final-pdf.pdf?la=en

FAH =	Fraction of Time at Home (unitless)
EF =	Exposure Frequency (days/year)
ED =	Exposure Duration (years)
AT =	Averaging Time (days)the
CF =	Conversion Factor, 0.001 (m ³ /L)
ASF =	Age Sensitivity Factor (unitless)
FY =	Fraction of Year, to correct annualization of partial year emissions

The chemical intake or dose is estimated by multiplying the inhalation intake factor, IF_{inh} , by the chemical concentration in air, C_i . When coupled with the chemical concentration, this calculation is mathematically equivalent to the dose algorithm given in the OEHHA 2015 guidance.

The toxicity assessment characterizes the relationship between the magnitude of exposure and the nature and magnitude of adverse health effects that may result from such exposure. This HRA evaluated theoretical exposures to TACs for two categories of potential adverse health effects: cancer and non-cancer chronic endpoints. Toxicity values for DPM (OEHHA 2023 Consolidated Table) are presented in **Table 29**.

BAAQMD recommends applying an adjustment factor to the annual average concentration modeled assuming continuous emissions (i.e., 24 hours per day, seven days per week), when the actual emissions are less than 24 hours per day and exposures are concurrent with activities occurring as part of the Project. For construction activities, emissions only impact receptors during certain hours of the day when activities are occurring. However, the TAC concentrations modeled during those hours are annualized assuming 24 hour per day in the modeling outputs. Thus, a model adjustment factor (MAF) is recommended to be applied to the annual average concentration used in the evaluation to account for an emissions schedule that is not occurring 24 hours per day, seven days per week if the exposure takes place preferentially during hours during which work, school or recreational activities are occurring. Thus, a MAF of 4.2 was applied to all receptor types except for residents to adjust from 24 hours per day to 8 hours per day and from 7 days a week to 5 days week ($[24 \text{ hours} / 8 \text{ hours}] * [7 \text{ days} / 5 \text{ days}] = 4.2$). The MAF values are presented in **Table 28**.

The potential for exposure to result in adverse chronic noncancer effects is evaluated by comparing the estimated annual average air concentration (which is equivalent to the average daily air concentration) to the noncancer chronic reference exposure level (cREL) for each chemical. When calculated for a single chemical, the comparison yields a ratio termed a hazard quotient (HQ). To evaluate the potential for adverse chronic noncancer health effects from simultaneous exposure to multiple chemicals, the chronic HQs for all chemicals are summed, yielding a chronic HI.

$$HQ_i = C_i / cREL$$

Where:

HQ_i = Chronic hazard quotient for chemical i

HI	=	Hazard index
C _i	=	Annual average concentration of chemical i (µg/m ³)
cREL _i	=	Chronic noncancer reference exposure level for chemical i (µg/m ³)

As shown in **Table 30**, all health risk impacts would be below the BAAQMD's thresholds of significance; thus, health risk impacts associated with the Project would be less than significant.

3.2.5 Cumulative Health Risk Results

According to BAAQMD's CEQA Guidelines, cumulative health risks should be evaluated from all sources of TACs within a 1,000-foot radius from a project site, and the combined impact compared to BAAQMD's cumulative health risk thresholds.

Nearby sources of TAC, as well as Project-related activities including construction and operation, could contribute to a cumulative health risk for sensitive receptors near the Project site. BAAQMD's inventory of stationary sources health risks and the distance multiplier approach were used to estimate excess impacts from existing stationary sources at the maximum impacted sensitive receptor. Geographic information system (GIS) roadway and rail screening data layers provided by BAAQMD were used to estimate impacts due to nearby railway and roadways. The results of the cumulative impact assessment are summarized in **Table 31**, which shows the estimated Project impact at the most affected sensitive receptor and contributions of the existing sources at the same location. The sum of the health risk impacts including cancer risk, non-cancer chronic hazard index, and annual average PM_{2.5} concentration were compared to their respective BAAQMD cumulative thresholds. The cumulative cancer risk, chronic HI and annual average PM_{2.5} concentrations would all be below the BAAQMD's thresholds of significance for the exposure scenarios analyzed. Thus, cumulative health risk impacts associated with the Project would be less than significant.

3.2.6 Operational Health Risk Impacts

The Project is committed to all-electric buildings and would not have any diesel emergency generators, an operational TAC source, during Project operations. It is possible for the Project to include wet laboratories as part of the proposed educational land use, however, at the time of preparation of this technical report, such details of the proposed educational land use are not determined and would be provided through submission of a detailed development plan (DDP) at a later date.

The HRA does not quantify health risks associated with laboratory TAC's. Wet laboratory operations could potentially generate TAC emissions from manipulations of evaporative liquids and pulverized metal-containing materials. Without knowing the scale of future laboratory operations, the types of operations, and the chemicals that would be used, any quantitative analysis on health risk impacts from possible wet laboratory is speculative at this time. Furthermore, as shown in **Section 2.7**, the City's COA on Sensitive Receptors requires that all projects proposing development within 1,000 feet of existing sensitive receptors prepare a site-specific HRA as a standard development requirement. Wet laboratories proposed through a future DDP application would be subject to this COA, in

addition to BAAQMD permitting requirements as applicable and other relevant safety and building code standards. The BAAQMD's Rule 2-1 exempts laboratory space below certain sizes from the requirement to obtain permits for authority to construct and permits to operate, detailed in BAAQMD's Rule 2-1-113.2.12, provided that Responsible Laboratory Management Practices (RLMP) are followed. RLMP include the incorporation of information about the emissions of volatile TACs into training for laboratory personnel, avoidance of open container storage of volatile TACs and hazardous chemical waste, the periodic monitoring of fume hoods, and proper disposal of hazardous chemical waste containing TACs. If RLMPs are followed, then the laboratory sources that meet the following criteria are exempt from permitting requirements in Rule 2-1:

- Laboratories located in a building where the total laboratory floor space is less than 25,000 square feet or the total number of fume hoods is less than 50. In addition, teaching laboratories used exclusively for classroom experimentation and/or demonstration and laboratory units for which the owner or operator can demonstrate that there will not be any TAC emissions (except under accidental conditions) are not included in the floor space or fume hood calculations.

The proposed mitigation measure, below, is consistent with the intent of the COA on Sensitive Receptors listed in **Section 2.7** and BAAQMD's Rule 2-1, and requires an HRA to be performed should wet laboratory operations above a certain size be proposed in the subsequent DDPs:

Mitigation Measure AIR-1: The Project Sponsor shall perform a health risk assessment and obtain a permit from the Bay Area Air Quality Management District (BAAQMD) if the total applicable laboratory floor space is more than 25,000 square feet and the applicable total number of fume hoods exceeds 50, as included in the subsequent detailed development plans (DDP) of this Project. Permit issuance by the BAAQMD may be required either prior to or as a condition of approval of the proposed laboratory space. The health risk assessment for wet laboratory operations, if required, shall be based on site-specific data in accordance with current guidance from the California Air Resources Board (ARB) and BAAQMD. The HRA shall be submitted to the City for review and approval. If an HRA is required, the HRA shall demonstrate that any wet laboratory operations in the proposed DDPs would be below the identified health risk thresholds, to the satisfaction of the City. The BAAQMD's project-level health risk thresholds are: an excess lifetime cancer risk level of 10 in one million, non-cancer chronic and acute Hazard Indexes (His) of 1.0, and an annual average PM_{2.5} concentration of 0.3 micrograms per cubic meter (µg/m³).

With the implementation of Mitigation Measure AIR-1, above, the health risk impact of TAC emissions from wet laboratory operations, if any, would be less than significant.

3.3 Local Carbon Monoxide (CO) Impacts

According to the 2022 BAAQMD CEQA Guidelines, the Project would result in less-than-significant localized CO concentrations if the following criteria are met:

1. Project is consistent with an applicable congestion management program established by the county congestion management agency for designated roads or highways, regional transportation plan, and local congestion management agency plans.
2. The project traffic would not increase traffic volumes at affected intersections to more than 44,000 vehicles per hour.
3. The project traffic would not increase traffic volumes at affected intersections to more than 24,000 vehicles per hour where vertical and/or horizontal mixing is substantially limited (e.g., tunnel, parking garage, bridge underpass, natural or urban street canyon, below-grade roadway).

Peak-hour traffic volumes from the project were analyzed to determine whether the Project would meet BAAQMD screening criteria. Maximum traffic volumes at the intersections under all scenarios would be well below the 44,000-vehicle-per-hour screening threshold.²⁸ Also, intersection traffic volumes under all scenarios would be below the 24,000-vehicle-per-hour screening threshold for areas where vertical and/or horizontal mixing is substantially limited; therefore, there would be no exceedance of either the non-limited mixing threshold (44,000 vehicles per hour) or the limited vertical/horizontal mixing threshold (24,000 vehicles per hour). Furthermore, the Project's TDM program would meet the metrics in the City of Belmont and the City/County Association of Governments of San Mateo County (C/CAG) plans. Specifically, the Project's TDM program would exceed the 18-point reduction required by the City's TDM program and would exceed the 35% reduction in the C/CAG TDM checklist. Therefore, the Project would be consistent with the C/CAG's congestion management program.²⁹ The project would not result in an exceedance of the BAAQMD screening criteria and would have a less-than-significant impact related to CO emissions.

3.4 Odor Assessment

For odor impacts, BAAQMD recommends that potential impacts be evaluated if a potential source of objectionable odors is proposed at a location near existing sensitive receptors. The occurrence and severity of odor impacts depend on the nature, frequency, and intensity of the source, the wind speed and direction, and the sensitivity of receptors. According to BAAQMD's 2022 CEQA guidelines, examples of land use that have the potential to generate considerable odors include, but are not limited to, wastewater treatment plants, landfills, confined animal facilities, composting stations, food manufacturing plants, refineries and chemical plants. The Project is an academic campus that would not include any of the odor-generating facilities identified by BAAQMD. Therefore, Project operation is not anticipated to generate persistent and objectional odors affecting a substantial number of people.

During construction, odors could be emitted from various diesel-powered vehicles and equipment in use onsite as well as architectural coatings. These could create localized odors; however, these odors would be temporary, depend on specific construction activities occurring at certain times, and are not likely to be noticeable for extended periods of time

²⁸ Fehr & Peers. 2023. Stanford Belmont Campus Traffic Study. July 24.

²⁹ Fehr & Peers. 2023. Conceptual Transportation Demand Management Plan. July 24.

beyond the boundaries of the Project site. Therefore, the Project's construction odor impacts on existing sensitive receptors are considered less than significant.

In addition, BAAQMD Regulation 7 contains requirements on the discharge of odorous substances after the Air Pollution Control Officer (APCO) receives odor complaints from ten or more complainants within a 90-day period, alleging that a person has caused odors perceived at or beyond the property line of such person and deemed to be objectionable by the complainants in the normal course of their work, travel or residence (BAAQMD 7-102). The operations within the Project will be subject to this regulation and will comply with the requirements if the regulation becomes applicable via BAAQMD 7-102, which is not expected.

Overall, the impact of the Project would be considered less than significant with respect to odors.

3.5 Consistency with Applicable Air Quality Plans

Appendix G of the CEQA Guidelines requires a Project to analyze whether it would conflict with or obstruct implementation of the applicable air quality plan. The most recently adopted regional air quality plan is the Bay Area Air Quality Management District (BAAQMD) 2017 Clean Air Plan³⁰, which includes all feasible measures to reduce emissions of NOx and ROG, which are ozone precursors, reduce transport of ozone and its precursors, and reduce emissions of fine particulate matter and toxic air contaminants. The Clean Air Plan focuses on protecting public health and the climate, and includes measures designed to reduce GHG emissions in addition to air quality-related measures. The Clean Air Plan is established pursuant to air quality planning requirements defined in the California Health and Safety Code.

In determining consistency with the Clean Air Plan, this analysis considers whether the Project would (1) support the primary goals of the Clean Air Plan, (2) include applicable control measures from the Clean Air Plan, and (3) avoid disrupting or hindering implementation of control measures identified in the Clean Air Plan.

The 2017 Clean Air Plan defines a control strategy based on reducing emissions from all key sources, reducing "super-GHGs"³¹, decreasing demand for fossil fuels, and decarbonizing the energy system. The control strategy contains 85 control measures that are specific actions to reduce air pollutants and GHGs in the San Francisco Bay Area Air Basin. These control strategies are grouped into the following economic sectors:

- Stationary source (SS);
- Transportation (TR);
- Energy (EN);
- Building (BL);

³⁰ Bay Area Air Quality Management District, 2017. Spare the Air Cool the Climate: Final 2017 Clean Air Plan. Available at: https://www.baaqmd.gov/~media/files/planning-and-research/plans/2017-clean-air-plan/attachment-a_-proposed-final-cap-vol-1-pdf.pdf

³¹ Super-GHGs are defined in the Clean Air Plan as methane, black carbon, and fluorinated gases.

- Agriculture (AG);
- Natural and working lands (NW);
- Waste management (WA);
- Water (WR);
- Super-GHGs (SL).

The following economic sectors are not applicable to the Project: Stationary source, Agriculture, and Super-GHGs. In addition, many of the control measures are beyond the scope and control of the Project. For instance, some control measures will be implemented by BAAQMD, publicly owned treatment works, and other public agencies, and therefore are not suited to implementation through approval actions for individual projects. The Clean Air Plan measures potentially applicable to the Project are listed below along with how the Project would be consistent with the measures. For measures that are largely directed at BAAQMD action, the summary below describes how Project features would support the BAAQMD's implementation of the measures.

Table 3.5-1. Consistency of Project with Clean Air Plan Control Measures

Measure	Measure Description	Project Consistency
TR1–Clean Air Teleworking Initiative	Develop teleworking best practices for employers and develop additional strategies to promote telecommuting. Promote teleworking on Spare the Air Days.	Consistent. Many of the Project's employees would have the ability to telecommute and the Project promotes commuting by non-single-occupancy vehicles through its TDM program. ³²

³² Fehr & Peers. 2023. Conceptual Transportation Demand Management Plan. July 24.

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Measure	Measure Description	Project Consistency
TR2 - Trip Reduction Programs	Implement the regional Commuter Benefits Program (Rule 14-1) that requires employers with 50 or more Bay Area employees to provide commuter benefits. Encourage trip reduction policies and programs in local plans, e.g., general and specific plans while providing grants to support trip reduction efforts. Encourage local governments to require mitigation of vehicle travel as part of new development approval, to adopt transit benefits ordinances in order to reduce transit costs to employees, and to develop innovative ways to encourage rideshare, transit, cycling, and walking for work trips. Fund various employer-based trip reduction programs.	Consistent. The Project will implement a TDM program to support trip reduction.³³ The Project's TDM program may include, but are not limited to, the following measures: • On-street bicycle racks/lockers • Indoor bicycle racks and/or lockers • Long-term bicycle parking for residents/workers • Shower and locker facilities • Provide curbside carpool/vanpool/rideshare loading zones • Provide preferential parking for carpool/vanpool vehicles • Provide employees with carpool/vanpool matching services • Provide/participate in shuttle program • Provide guaranteed emergency rides • Participate in Transportation Management Association • Designate a TDM Liaison • Pre-tax transportation benefits • Provide free transit passes • Allow telecommuting and flexible work schedule
TR5 - Transit Efficiency and Use	Improve transit efficiency and make transit more convenient for riders through continued operation of 511 Transit, full implementation of Clipper® fare payment system and the Transit Hub Signage Program.	Consistent. The Project will provide a first/last mile shuttle service and subsidized transit fares to encourage use of Caltrain, SamTrans, and other transit services. The Project will implement a new shuttle service connecting the campus and Belmont Caltrain Station during peak periods, provide free transit passes, and provide pre-tax transportation benefits.

³³ Fehr & Peers. 2023. Conceptual Transportation Demand Management Plan. July 24.

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Measure	Measure Description	Project Consistency
TR8 - Ridesharing	Promote carpooling and vanpooling by providing funding to continue regional and local ridesharing programs, and support the expansion of carsharing programs. Provide incentive funding for pilot projects to evaluate the feasibility and cost-effectiveness of innovative ridesharing and other last-mile solution trip reduction strategies. Encourage employers to promote ridesharing and carsharing to their employees.	Consistent. The Project will promote carpooling and vanpooling through a combination of a ride-matching program and preferential parking. The Project will incorporate all the carpool and vanpool measures identified in the City's TDM program, including providing curbside loading zones, preferential parking, and matching services.
TR9 - Bicycle and Pedestrian Access and Facilities	Encourage planning for bicycle and pedestrian facilities in local plans, e.g., general and specific plans, fund bike lanes, routes, paths and bicycle parking facilities.	Consistent. The Project will incorporate all the pedestrian and bicycle measures identified in the City's TDM program. Pedestrian measures will include sidewalk-facing pedestrian-oriented building entrances, multiple pedestrian entrances for large buildings, pedestrian breezeways/paseos, extra-wide sidewalks and amenities. Bicycle measures will include on-street bicycle racks/lockers, indoor bicycle racks/lockers, long-term bicycle parking for residents/workers, and shower/locker facilities.
TR10 - Land Use Strategies	Support implementation of Plan Bay Area, maintain and disseminate information on current climate action plans and other local best practices, and collaborate with regional partners to identify innovative funding mechanisms to help local governments address air quality and climate change in their general plans.	Consistent. The project will implement features that reduce air pollutants and greenhouse gas emissions, such as an extensive TDM program, ³⁴ green buildings that comply with CalGreen Tier 2 requirements, and the utilization of renewable fuel in construction equipment, among others.

³⁴ Fehr & Peers. 2023. Conceptual Transportation Demand Management Plan. July 24.

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Measure	Measure Description	Project Consistency
TR13 - Parking Policies	Encourage parking policies and programs in local plans, e.g., reduce minimum parking requirements; limit the supply of off-street parking in transit-oriented areas; unbundle the price of parking spaces; support implementation of demand-based pricing (such as "SF Park") in high-traffic areas.	Consistent. The Project will provide preferential parking for carpool/vanpool vehicles as stated in TDM program. The Project is not in a transit-oriented area, therefore, the off-street parking policies are not applicable.
TR14 – Cars and Light Trucks	Commit regional clean air funds toward qualifying vehicle purchases and infrastructure development. Partner with private, local, state and federal programs to promote the purchase and lease of battery-electric and plug-in hybrid electric vehicles.	Consistent. The Project will offer EV charging stations in a manner proportional to the amount of parking provided in each phase of development. Additionally, the Project will comply with CalGreen Tier 2 EV charging requirements.
TR22 – Construction, Freight and Farming Equipment	Provide incentives for the early deployment of electric, Tier 3 and 4 off-road engines used in construction, freight and farming equipment. Support field demonstrations of advanced technology for off-road engines and hybrid drive trains.	Consistent. The construction equipment used during the construction of the Project will have Tier 4 engines powered by renewable diesel.
EN1 - Decarbonize Electricity Production	Engage with PG&E, municipal electric utilities and CCEs to maximize the amount of renewable energy contributing to the production of electricity within the Bay Area as well as electricity imported into the region. Work with local governments to implement local renewable energy programs. Engage with stakeholders including dairy farms, forest managers, water treatment facilities, food processors, public works agencies and waste management to increase use of biomass in electricity production.	Consistent. All electricity used on the Project site will be generated from renewable sources, either through purchase through Peninsula Clean Energy (PCE) or through other means. As applicable, the Project will include solar energy generation for residential land use as required by the applicable California Energy Code.

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Measure	Measure Description	Project Consistency
EN2 – Decrease Electricity Demand	Work with local governments to adopt additional energy efficiency policies and programs. Support local government energy efficiency program via best practices, model ordinances, and technical support. Work with partners to develop messaging to decrease electricity demand during peak times.	Consistent. The Project will comply with existing energy standards and will not conflict with or obstruct the State and local plans for renewable energy or energy efficiency. Based on the estimated average hourly electricity demand, the Proposed Project will not have a substantial impact on the peak period demands for electricity or other forms of energy.
BL1 - Green Buildings	Collaborate with partners such as KyotoUSA to identify energy-related improvements and opportunities for onsite renewable energy systems in school districts; investigate funding strategies to implement upgrades. Identify barriers to effective local implementation of the CALGreen (Title 24) statewide building energy code; develop solutions to improve implementation/enforcement. Work with ABAG's BayREN program to make additional funding available for energy-related projects in the buildings sector. Engage with additional partners to target reducing emissions from specific types of buildings.	Consistent. This action is directed at the Air District. However, the Project will construct new buildings and retrofit existing buildings with energy efficiency requirements consistent with the applicable CALGreen code.
BL2 - Decarbonize Buildings	Explore potential Air District rulemaking options regarding the sale of fossil fuel-based space and water heating systems for both residential and commercial use. Explore incentives for property owners to replace their furnace, water heater or natural-gas powered appliances with zero-carbon alternatives. Update Air District guidance documents to recommend that commercial and multi-family developments install ground source heat pumps and solar hot water heaters.	Consistent. This action is directed at the Air District. However, the Project will be consistent with the goal of building decarbonization by excluding any natural gas hook-ups and committing to using electricity generated by 100% renewable sources.

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Measure	Measure Description	Project Consistency
NW2 - Urban Tree Planting	Develop or identify an existing model municipal tree planting ordinance and encourage local governments to adopt such an ordinance. Include tree planting recommendations the Air District's technical guidance, best practices for local plans and CEQA review.	Consistent. The Project will comply with City's existing tree ordinance. In the undeveloped portions of the site, Stanford expects less than 10 percent of existing trees would be removed. In each of the development areas, efforts would be made to preserve trees, to the extent feasible, to maintain the established campus feel.
WA3 - Green Waste Diversion	Develop model policies to facilitate local adoption of ordinances and programs to reduce the amount of green waste going to landfills.	Consistent. The Project will include sustainability features that target a minimum of 65% of non-hazardous construction and demolition waste to be recycled and/or salvaged for reuse and 100 percent of trees, stumps, rocks and associated vegetation and soils resulting primarily from land clearing to be reused or recycled.
WA4 - Recycle and Waste Reduction	Develop or identify and promote model ordinances on community-wide zero waste goals and recycling of construction and demolition materials in commercial and public construction projects.	
WR2 - Support Water Conservation	Develop a list of best practices that reduce water consumption and increase on-site water recycling in new and existing buildings; incorporate into local planning guidance.	Consistent. The Project will install water-efficient interior plumbing fixtures, appliances, and equipment in all new buildings.

4. GREENHOUSE GAS EMISSIONS AND CLIMATE CHANGE

This section provides the estimated GHG emissions from construction and operations of the Project and analyzes the Project's consistency with the BAAQMD's performance standards, the City's Climate Action Plan, the State's 2022 Scoping Plan for Achieving Carbon Neutrality, and other applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs. The Project's GHG-reducing features that would be implemented during construction are compared against the BAAQMD-recommended BMPs for construction-related GHG emissions.

4.1 Construction Emissions

GHG emissions from Project construction would be generated from on-road construction vehicles and off-road construction equipment. The same methodologies and construction activities described in **Section 3.1.1** for estimating CAP emissions were used to estimate GHG emissions, which are presented in **Table 32**.

All off-road construction equipment would use renewable diesel. Carbon dioxide (CO₂) emissions from the combustion of renewable diesel are considered biogenic, because the fuel is considered biomass and the CO₂ emitted from biomass burning is a part of the biogenic carbon cycle. Other GHGs emitted from the combustion of renewable diesel are conservatively estimated as non-biogenic CO₂e. In contrast, all on-road construction vehicles are not under any fuel requirements, and all CO₂e emissions from this source are considered non-biogenic.

4.2 Operational Emissions

Operational sources (area sources and mobile sources) described in **Section 3.1.2** for CAP emissions would also generate GHG emissions. In addition to these sources, Project operations would also generate GHG emissions from electricity use, water supply and wastewater treatment, and solid waste. Operational emissions of GHGs, namely biogenic CO₂ and non-biogenic CO₂e, are summarized in **Table 33**.

Additional sources that would only generate GHG emissions are described in detail, below.

4.2.1 Building Electricity Use

Indirect GHG emissions are typically due to electricity generation from off-site power plant locations. In an effort to reduce GHG emissions, the Project would be entirely electrically powered, and would purchase 100-percent carbon free electricity and/or generate renewable energy onsite through solar panels and other means. Electricity use for the Project was based on CalEEMod energy intensity for the proposed land uses. Because the Project would not include any natural gas infrastructure, the default energy consumption from CalEEMod was adjusted to reflect an increase in electricity consumption consistent with the methodology presented in the Sacramento Air Quality Management District (SMAQMD) GHG Thresholds development.³⁵ Because electricity used by the Project would be 100-percent

³⁵ Ramboll. 2020. GHG Thresholds for Sacramento County, Section 5.2. Available at: <http://www.airquality.org/LandUseTransportation/Documents/SMAQMDGHGThresholds2020-03-04v2.pdf>

carbon free, the Project would not generate any indirect GHG emissions from its use of electricity.

Under existing conditions, the NDNU campus consumed both natural gas and electricity. As described in **Section 3.1.2**, GHG emissions from natural gas consumption were calculated using the same CalEEMod emission factors as the CAP emissions. Electricity use from campus operations under existing conditions is assumed to be from the grid and to have been associated with non-zero carbon intensity factors. Projected carbon intensity factors from Pacific Gas and Electric (PG&E) for the partial buildout year and full buildout year were applied to the estimated electricity use under existing conditions. GHG emissions from building energy use for the Project and the existing conditions are summarized in **Table 19**.

4.2.2 Water and Wastewater

Indirect GHG emissions would result from the electricity used to convey, treat, and distribute water and wastewater. The amount of electricity required to convey, treat, and distribute water depends on the volume of water as well as the sources of the water. Indirect emissions from electricity to supply, treat, and distribute water decrease over time as the carbon intensity of electricity decreases. Additional emissions from wastewater treatment include CO₂, methane (CH₄) and nitrous oxide (N₂O), which are emitted directly from the wastewater.

Indoor and outdoor water use under both existing conditions and Project conditions were provided in the Project's Preliminary Engineering Report and summarized in **Table 34**.³⁶ GHG emissions were estimated using CalEEMod equivalent methodologies with default data assumptions, summarized in **Table 35**. Electricity consumption for wastewater treatment is considered indirect, non-biogenic emissions, while CO₂ emissions from aerobic water treatment, anaerobic water treatment and other processes are considered biogenic. The electricity used to pump the water to the site is not under the control of the Project and therefore cannot be guaranteed to be generated with 100% renewable energy. GHG emissions from the existing conditions and the Project are summarized in **Table 36**.

4.2.3 Solid Waste

Indirect GHG emissions associated with waste disposal include CH₄ generation from the decomposition of waste and CO₂ emissions associated with the combustion of CH₄, if applicable. GHG emissions associated with non-landfill diverted waste streams were not considered because it is generally assumed that these diversions do not result in any appreciable amounts of GHG emissions.

CalEEMod default solid waste generation rates were used to estimate solid waste volume generated by the existing conditions. Solid waste generation for the Project was estimated using the 2021 solid waste generation volume on Stanford's main campus and the ratio between the Project user population and main campus' population.³⁷ This is a conservative estimate for the Project's solid waste generation in 2030 and 2035. With Stanford's goal of

³⁶ BKF Engineers (BKF). 2023. Stanford Belmont Campus - Preliminary Engineering Report. January 12.

³⁷ Stanford. 2023. Email Titled "RE Belmont campus question re solid waste" from Julie Muir at Stanford to Ivy Tao at Ramboll. March 7.

90% waste reduction goal by 2030 and the requirement by Senate Bill 1383 to divert 75% of organics by 2025, the Project's solid waste generation in 2030 and 2035 are expected to be lower than this estimate. Solid waste generation volumes are summarized in **Table 37**.

Solid waste CO₂ emissions are considered biogenic, consistent with CalEEMod's methodologies. GHG emissions from solid waste generation and CalEEMod default parameters used for this calculation are summarized in **Table 38**.

4.2.4 Refrigerant Emissions

Refrigerants are substances used in equipment for air conditioning (A/C) and refrigeration. Most of the refrigerants used today are hydrofluorocarbons (HFCs) or blends thereof, which would contribute to global warming. Two main sources of refrigerant emissions are present for the existing conditions and the Project: refrigerant leakage from the existing and proposed land uses and from vehicular A/C systems.

Average annual GHG emissions from refrigerants for both existing conditions and the Project are presented in **Table 39**. GHG emissions were determined using CalEEMod equivalent methodologies which includes using the equipment charge size, annual operational leak rate, service Leak Rate, number of times serviced, equipment lifetime, and refrigerant specific GWP to quantify the refrigerant emissions from leaks during regular operation and routine servicing over the equipment lifetime. The types of refrigeration equipment used for both existing and Project conditions would be for education and residential land use types and include refrigerators, freezers, air conditioners, and heat pumps – all of which emit either R-134a or R-410a refrigerants.

HFC emissions (assumed to be HFC-134a) from on-road mobile sources are primarily from refrigerant leakage, which increases when A/C units are in operation. HFC emission factors are based on information provided by ARB and are calculated using a top-down approach (i.e., the factors are derived from total emission inventory estimates and activity data).³⁸ HFC emission factors, presented in **Table 11**, are calculated as a running loss rate (g/hr) and can be converted to a g/mile rate by assuming a fleet-average vehicle speed. Using the HFC emission factors, annual VMT, and HFC-134a GWP, the GHG emissions from on-road mobile sources emitting HFC were calculated for both existing and Project conditions and summarized in **Table 14**.

4.3 Evaluation Against the BAAQMD'S Thresholds of Significance for Climate Impacts for Project Operations

4.3.1 BAAQMD's Performance Standards for Climate Impacts

The Project would be compliant with **Option A** of the BAAQMD's thresholds of significance for climate impacts of land use projects as follows:

For performance standards related to buildings, the Project must comply with the City's Reach Code (adopted January 10, 2023, per Resolution 2023-004 and Ordinance 2023-1170), which requires all-electric buildings in most circumstances. The Project will not

³⁸ California Air Resources Board (ARB) 2021. EMFAC2021. Available at: <https://ww2.arb.ca.gov/our-work/programs/mobile-source-emissions-inventory/msei-modeling-tools>

include natural gas appliances or natural gas hook-ups. Also, as discussed in **Section 5.3**, below, the Project will not result in wasteful, inefficient, or unnecessary energy usage.

For performance standards related to transportation, the Project will implement a TDM program as a Project feature and will result in VMT that is more than 15 percent below the regional average for both employee-based VMT and resident-based VMT.³⁹ Furthermore, the Project will meet the voluntary Tier 2 electric vehicle charging standards of the CALGreen Code.⁴⁰ Therefore, the Project would have a less-than-significant contribution to climate impacts.

Beyond compliance with the BAAQMD's performance thresholds, the Project Sponsor has committed to the following key sustainability features that are not required by regulations or ordinances:

- All electricity used on the Belmont Campus would be generated from renewable sources, either through purchase from the City of Belmont's green energy provider or through other means.
- To the extent feasible, all diesel-powered equipment used for Project construction would satisfy Tier 4 standards and use renewable diesel.

Project operation is subject to additional COAs related to GHG emissions reductions:

- Air Quality-Construction & Operations-COA #5: the developer(s) shall provide education for residential and commercial tenants concerning green consumer products.
- Hydrology & Water Quality - Operational COAs & BMPs #10: Efficient irrigation systems shall be used throughout all landscaped areas in accordance with the Model Water Efficient Landscape Ordinance.

The Project will meet the voluntary Tier 2 electric vehicle charging standards of the CALGreen Code. Details of above COAs and BMPs are listed in **Section 2.7**.

4.3.2 Construction GHG Best Management Practices

Since construction emissions are temporary and variable, BAAQMD has not developed a quantitative threshold of significance for construction related GHG emissions. However, to minimize GHG emissions and emissions of other air quality pollutants, BAAQMD developed a list of best management practices (BMP) that are recommended for incorporation into projects. The description of each BMP, the applicability to the Project, and the consistency of the Project's design features are presented in Table B, below.

³⁹ Fehr & Peers. 2023. Stanford Belmont Campus Transportation Impact Analysis. July 24.

⁴⁰ Stanford University. Teleconference on Project details between Kathleen Kavanaugh and John D. Donahoe at Stanford University and Taylor Vencill and Ivy Tao at Ramboll. February 7, 2023.

Table 4.3-1. Best Management Practices for Construction-Related GHG Emissions and Project's Consistency

BMP Measure Summary	Applicability/Project Consistency
Use zero-emission and hybrid-powered equipment to the greatest extent possible, particularly if emissions are occurring near sensitive receptors or located within a BAAQMD-designated Community Air Risk Evaluation (CARE) area or Assembly Bill 617 community.	To be determined. The Project is not located in a CARE area nor is it considered an Assembly Bill 617 community. Zero-emission and hybrid-powered equipment availability and feasibility will be assessed at the time of construction.
Require all diesel-fueled off-road construction equipment be equipped with EPA Tier 4 Final compliant engines or better as a condition of contract.	Consistent. The Project will use diesel off-road construction equipment with Tier 4 Final engines.
Require all on-road heavy-duty trucks to be zero emissions or meet the most stringent emissions standard, such as model year (MY) 2024 to 2026, as a condition of contract.	To be determined. Availability of zero emission on-road heavy-duty trucks will be assessed at the time of construction.
Minimize idling time either by shutting equipment off when not in use or reducing the time of idling to no more than 2 minutes (A 5-minute limit is required by the state airborne toxics control measure [Title 13, Sections 2449(d)(3) and 2485 of the California Code of Regulations]). Provide clear signage that posts this requirement for workers at the entrances to the site and develop an enforceable mechanism to monitor idling time to ensure compliance with this measure.	Consistent. The Project will minimize idling time by shutting off when not in use or reducing the time of idling to no more than 2 minutes.
Prohibit off-road diesel-powered equipment from being in the "on" position for more than 10 hours per day.	Consistent. The Project will prohibit off-road diesel equipment from being in the "on" position for more than 10 hours per day.
Use California Air Resources Board-approved renewable diesel fuel in off-road construction equipment and onroad trucks.	To be determined. The Project will use ARB-approved renewable diesel fuel in off-road construction equipment in compliance with the COA-Air Quality -Construction & Operations#2 listed in Section 2.7 . Feasibility of using renewable diesel in onroad trucks will be assessed at the time of construction.
Use U.S. Environmental Protection Agency SmartWay certified trucks for deliveries and equipment transport.	To be determined. Availability of SmartWay certified trucks will be assessed at the time of construction.

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BMP Measure Summary	Applicability/Project Consistency
Require all construction equipment is maintained and properly tuned in accordance with manufacturer's specifications. Equipment should be checked by a certified mechanic and determined to be running in proper condition prior to operation.	Consistent. All construction equipment will be maintained and properly tuned in accordance with manufacturer's specifications and all equipment will be checked by a certified mechanic and determined to be in proper running order prior to operation.
Where grid power is available, prohibit portable diesel engines and provide electrical hook ups for electric construction tools, such as saws, drills and compressors, and using electric tools whenever feasible.	To be determined. Details of construction will be developed later at the DDP stage. If feasible, the Project will use electrical hook ups for electric construction tools.
Where grid power is not available, use alternative fuels, such as propane or solar electrical power, for generators at construction sites.	Not applicable. Grid power is available at the Project site.
Encourage and provide carpools, shuttle vans, transit passes, and/or secure bicycle parking to construction workers and offer meal options onsite or shuttles to nearby meal destinations for construction employees.	To be determined. Details of construction and the construction management plan will be developed later at the DDP stage. If feasible, the Project will provide shuttles and bicycle parking to construction workers.
Reduce electricity use in the construction office by using LED bulbs, powering off computers every day, and replacing heating and cooling units with more efficient ones.	To be determined. Details of construction and the construction management plan will be developed later at the DDP stage. As feasible, the Project will reduce electricity use in the construction office following these measures.
Minimize energy used during site preparation by deconstructing existing structures to the greatest extent feasible.	Consistent. Details of construction will be developed later at the DDP stage. As feasible, the Project will minimize energy used during site preparation.
Recycle or salvage nonhazardous construction and demolition debris, with a goal of recycling at least 15% more by weight than the diversion requirement in Title 24.	Consistent. As stated in the CDP Application, a minimum of 65% of non-hazardous construction and demolition waste would be recycled and/or salvaged for reuse.
Use locally sourced or recycled materials for construction materials (goal of at least 20% based on costs for building materials and based on volume for roadway, parking lot, sidewalk and curb materials). Wood products used should be certified through a sustainable forestry program.	Consistent. As stated in the CDP Application, 100 percent of trees, stumps, rocks and associated vegetation and soils resulting primarily from land clearing will be reused or recycled.
Use low-carbon concrete, minimize the amount of concrete used and produce concrete on-site if it is more efficient and lower emitting than transporting ready-mix.	To be determined. Details of construction will be developed later at the DDP stage. As feasible, the Project will use low-carbon concrete, minimize the amount of concrete used and produce concrete on-site if it is more efficient and lower emitting than transporting ready-mix.

BMP Measure Summary	Applicability/Project Consistency
Develop a plan to efficiently use water for adequate dust control since substantial amounts of energy can be consumed during the pumping of water.	Consistent. The Project will control fugitive dust by watering the site two times a day.
Include all requirements in applicable bid documents, purchase orders, and contracts, with successful contractors demonstrating the ability to supply the compliant on- or off-road construction equipment for use prior to any ground-disturbing and construction activities.	Consistent. The Project will include all requirements in applicable documents with successful contractors prior to any construction activities.

4.4 Consistency with Applicable GHG Reduction Plans, Policy and Regulations

Appendix G of CEQA Guidelines requires a Project to analyze whether it would conflict with an applicable plan, policy or regulation adopted for the purpose of reducing GHG emissions. The Project is evaluated for consistency with the following plans, policies, and regulations:

- 2022 CARB Scoping Plan adopted under AB 1279
- Plan Bay Area 2050
- BAAQMD's 2017 Clean Air Plan
- City of Belmont's Climate Action Plan

Descriptions of each plan, policy, and regulation in addition to a discussion of Project consistency with each plan, policy, and regulation is presented below.

2022 CARB Scoping Plan

In November 2022, CARB approved California's 2022 Scoping Plan for Achieving Carbon Neutrality (Third Update). This update extends the previous Scoping Plans and lays out a path to achieve carbon neutrality no later than 2045, as directed by AB 1279. The previous 2017 Scoping Plan identified a technologically feasible and cost-effective path to achieve the 2030 GHG reduction target by leveraging existing programs such as the Renewables Portfolio Standard, Advanced Clean Cars, Low Carbon Fuel Standard, Short-Lived Climate Pollutant (SLCP) Reduction Strategy, Cap-and-Trade Program, and a Mobile Source Strategy that included strategies targeted to increase zero emission vehicle fleet penetration. The 2022 Scoping Plan looks toward the 2045 climate goals and the deeper GHG reductions needed to meet the state's statutory carbon neutrality target specified in AB 1279 and EO B-55-18. The 2022 Scoping Plan provides a sector-by-sector roadmap for achieving these goals, focusing on technological feasibility, cost-effectiveness and equity. The Plan's Appendix D makes non-binding suggestions that local agencies, such as the City of Belmont, may consider as they identify significance thresholds and mitigation measures for GHG impacts. The 2022 Scoping Plan suggests, but does not mandate, measures related to renewable energy, the low carbon fuel standard, cleaner vehicles and fuels, short-lived climate pollutants, and natural and working lands that could be relevant to the proposed project.

As discussed in Section 3.2.3, Appendix D of the 2022 Scoping Plan states that a development project can determine consistency with the Scoping Plan by using significance criteria from an air district or other lead agency if the criteria align with the State's current GHG emission reduction goals. Because the BAAQMD's current GHG significance criteria were created to determine a project's "fair share" of what is necessary to meet California's 2045 climate goals, the criteria are sufficient to determine consistency with the 2022 Scoping Plan. Because the Project's impacts would be less than significant when compared against the BAAQMD's CEQA significance criteria for building and transportation design features, the Proposed Project would also be consistent with the 2022 Scoping Plan.

The Project would be consistent with key State plans and regulatory requirements referenced in the 2022 Scoping Plan Update designed to reduce statewide emissions. According to the 2022 Scoping Plan Update, reductions needed to achieve the 2045 target are expected to be achieved by decarbonizing the electricity sector, greatly increasing the fuel economy of vehicles and the number of zero-emission or hybrid vehicles, reducing the rate of growth in VMT, supporting high speed rail and other alternative transportation options, and increasing the use of high efficiency appliances, water heaters, and HVAC systems. The Project would support and would not impede implementation of these potential reduction strategies identified by CARB, and it would benefit from statewide and utility-provider efforts towards increasing the portion of electricity provided from renewable resources. The Project would also benefit from statewide efforts towards increasing the fuel economy standards of vehicles and reducing the carbon content of fuels. The Project would utilize energy efficient appliances and equipment, as required by Title 24, and it would provide EV charging stations to support the current and future use of electric and hybrid-electric vehicles by employees and visitors traveling to and from the site. The Project would install EV charging capabilities consistent with the City of Belmont Code and CalGreen Tier 2 standards. The electricity for EV charging at the Project would be supplied with 100% renewable and/or carbon free energy. For these reasons, the Project would be consistent with the objectives of the 2022 Scoping Plan Update.

Plan Bay Area 2050

Plan Bay Area 2050 is a 30-year plan that outlines thirty-five integrated strategies across four key issues – housing, the economy, transportation, and the environment – to make the Bay Area more equitable for all residents and more resilient in the face of unexpected challenges. The proposed Plan's strategies chart a course to make the Bay Area more affordable, connected, diverse, healthy, and vibrant for all residents, while also achieving regional GHG reduction targets established by the California Air Resources Board pursuant to the Sustainable Communities and Climate Protection Act of 2008 (Senate Bill (SB) 375, Statutes of 2008). The proposed Plan serves as the Regional Transportation Plan and Sustainable Communities Strategy (RTP/SCS) for the Bay Area. MTC and ABAG are required under State and Federal law to prepare an RTP/SCS every four years. The Plan covers the Bay Area's nine counties – including San Mateo County. Environmental Strategies EN7, EN8 and EN9 are strategies recommended to reduce climate emissions. Table C shows how the Project features are consistent with these strategies.

Table 4.4-1. Consistency of Project with Plan Bay Area 2050

Environmental Strategies	Applicability/Project Consistency
EN3. Fund energy upgrades to enable carbon neutrality in all existing commercial and public buildings. Support electrification and resilient power system upgrades in all public and commercial buildings.	Consistent. The Project site will source its electricity from 100% renewable energy, including for the existing buildings on the Project site to be preserved.
EN4. Maintain Urban Growth Boundaries. Using urban growth boundaries and other existing environmental protections, focus new development within the existing urban footprint or areas otherwise suitable for growth, as established by local jurisdictions.	Consistent. The Project boundaries stay within an existing urban footprint.
EN7. Expand commute trip reduction programs at major employers. Set a sustainable commute target for major employers as part of an expanded Bay Area Commuter Benefits Program, with employers responsible for funding incentives and disincentives to shift auto commuters to any combination of telecommuting, transit, walking and/or bicycling.	Consistent. The Project's TDM program includes measures including bike paths, ridesharing programs, shuttle services, subsidized transit benefits, and telecommuting. ⁴¹
EN8. Expand clean vehicle initiatives. Expand investments in clean vehicles, including more fuel-efficient vehicles and electric vehicle subsidies and chargers.	Consistent. The Project will offer EV charging stations in a manner proportional to the amount of parking provided in each phase of development and the Project will meet CALGreen Tier 2 requirements and City of Belmont building code for electric vehicle charging infrastructure, which would support the use of efficient vehicles.
EN9. Expand transportation demand management initiatives. Expand investments in programs like vanpools, bikeshare, carshare, and parking fees to discourage solo driving.	Consistent. The Project's TDM program includes measures such as end-of-trip bicycle facilities, bike paths, ridesharing program, first/last mile shuttle program, and subsidized transit benefits. ⁴²

BAAQMD's 2017 Clean Air Plan

The BAAQMD's *2017 Clean Air Plan: Spare the Air, Cool the Climate*, which was discussed in **Section 3.5**, lays the groundwork for long-term effort to reduce Bay Area GHG emissions 40 percent below 1990 levels by 2030 and 80 percent below 1990 levels by 2050. The consistency of the Project with control measures on CAPs and TAC emissions are discussed in **Table 3.5-1**, some of which are also applicable to GHG emission reduction. The Project would be consistent with the GHG reduction goals and measures in the 2017 Clean Air Plan.

⁴¹ Fehr & Peers. 2023. Conceptual Transportation Demand Management Plan. July 24.

⁴² Fehr & Peers. 2023. Conceptual Transportation Demand Management Plan. July 24.

The City's Climate Action Plan

The City's Climate Action Plan is a blueprint for the community's response to the challenges posed by climate change.⁴³ The Climate Action Plan is designed to reduce GHG emissions and create new City programs and services that support the community in doing the same. The Climate Action Plan offers ways to make homes more energy-efficient, increase locally produced renewable energy, promote smart development patterns that emphasize complete neighborhoods and alternate modes of transportation, reduce waste heading to landfills, and make the municipal government an efficient and resource-conservation-minded organization. The CAP was developed in collaboration with the City/County Association of Governments of San Mateo. An Environmental Impact Report that covers the Climate Action Plan and the City's 2035 General Plan and Belmont Village Specific Plan was adopted in November 2017.

The Climate Action Plan has several goals. One goal is to demonstrate environmental leadership by taking reasonable steps to reduce greenhouse gas emissions. Another goal is to save money and promote green jobs by reducing utility costs through increased energy and water efficiency. The Climate Action Plan also aims to comply with the letter and spirit of state environmental initiatives and promote sustainable development. By developing this Climate Action Plan according to BAAQMD's Guidelines, a streamlined environmental review process is enabled for sustainable development projects.

The Climate Action Plan included 23 measures to address the reduction of GHG emissions and climate change. The description of each measure, the measure's applicability to the Project, and the consistency of the Project's design features with each measure are presented in **Table 4.4-2**, below. The Project would be consistent with the City's Climate Action Plan, as demonstrated below.

Table 4.4-2. City of Belmont's Climate Action Plan and Project's Consistency

Measure Category	Measure	Description	Applicability/Project Consistency
Energy	EC1	Adopt CALGreen for non-residential buildings triennially. Work to mandate achievement of CALGreen Tier 1 energy performance.	Partially applicable/Consistent. This action is directed toward the City and only applies to individual projects through the City's implementation by adopting ordinances and standard conditions. However, the Project is committed to meeting CALGreen Tier 2 EV charging requirements.
	EC2	Update CALGreen for residential buildings triennially. Work to mandate achievement of CALGreen Tier 1 energy performance.	Partially applicable/Consistent. This action is directed toward the City and only applies to individual projects through the City's implementation by adopting ordinances and standard conditions. However, the Project is committed to meeting CALGreen Tier 2 EV charging requirements.

⁴³ City of Belmont. 2017. Climate Action Plan.

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Energy	EC3	Provide financial incentives for solar photovoltaics (PV) and hot water system installation.	Not applicable. This action is directed toward the City.
	EC4	Provide or encourage residential energy audits and retrofits. Leverage existing rebates/add additional rebates for energy efficient retrofits.	Not applicable. This action is directed toward the City.
	EC5	Promote and assist with marketing and outreach for PG&E energy efficiency and demand response programs for the nonresidential sector. Leverage existing rebates/add additional rebates for energy efficient retrofits.	Not applicable. This action is directed toward the City and is not applicable to individual developments.
	EC6	Continue to be part of the Peninsula Clean Energy Community Choice Aggregation (CCA) Program and continue to opt for the ECO100 option (100% renewable energy) for all City facilities.	Not applicable. This action is directed toward the City. The Project is a private development and will not include any City facilities. However, all electricity used on the Project site will be generated from renewable sources, either through the purchase from PCE or through other means.
	EM1	Replace street, signal lights, parks and parking lot lighting with efficient lighting (LEDs, induction, etc.).	Not applicable. This action is directed toward the City.
	EM2	Implement a sustainable purchasing policy that emphasizes recycled materials and Energy Star equipment.	Partially applicable/Consistent. This action is directed toward the City and only applies to individual projects through the City's implementation by adopting ordinances and standard conditions. However, large appliances installed in the proposed buildings will be Energy Star-rated products or equivalent.
	EM3	Mandate all new municipal buildings achievement of CALGreen Tier 1 energy performance.	Not applicable. This action is directed toward the City and the Project will not include any municipal buildings.

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Measure Category	Measure	Description	Applicability/Project Consistency
	EM4	Complete feasibility study on the installation of solar or other renewable energy projects at City facilities and install where feasible. Set a goal for renewable energy purchase if installation is not feasible.	Not applicable. This action is directed toward the City. The Project will not include any City facilities.
	EM5	Participate in San Mateo County Energy Watch and leveraged benchmarking to identify energy efficiency (EE) audit and retrofit projects and track energy performance.	Not applicable. This action is directed toward the City.
	EW1	Promote existing and/or new rebates for water efficient appliances and fixtures.	Partially applicable/Consistent. This action is directed toward the City and only applies to individual projects through the City's implementation by adopting ordinances and standard conditions. However, the Project will install high efficiency plumbing fixtures such as toilets, urinals, showerheads, etc.
	EW2	Adopt Bay Area Water Supply and Conservation Agency (BAWSCA) Ordinances or triennial CALGreen codes that apply to water.	Not applicable. This action is directed toward the City.
Transportation and Land Use	TL1	Establish a Smart Growth Policy that prioritizes infill, higher density, transportation oriented and mixed-use development	Partially applicable/Consistent. This action is directed toward the City and only applies to individual projects through the City's implementation by adopting ordinances and standard conditions. The Project will increase density of an existing educational site and is therefore consistent with the Smart Growth Policy.
	TL2	Remake urban landscape to ensure Complete Streets, with bike lanes, bike parking, traffic calming, beautification, etc. Continue to support Paper Trails and Safe Routes to School to encourage walking.	Not applicable. This action is directed toward the City. However, the Project will promote connectivity to bicycle network system and pedestrian sidewalk facilities.

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Measure Category	Measure	Description	Applicability/Project Consistency
Transportation and Land Use	TL3	Incentivize City Car Sharing Companies to open pods in town. Explore Bike Share program.	Not applicable. This action is directed toward the City. However, the Project's TDM program will provide employees with carpool/vanpool matching service. Additionally, carpool/vanpool/rideshare loading zones will be provided. ⁴⁴
	TM1	Prioritize purchase of efficient vehicles and alternative fuel vehicles (including off-road equipment). Maintain existing vehicles for optimum mileage. Encourage staff to drive minimally and efficiently. Establish government operations idling policy.	Not applicable. This action is directed toward the City and City-owned equipment. However, the Project will meet CALGreen Tier 2 requirements for electric vehicle charging infrastructure, which would support the use of efficient vehicles.
	TM2	Establish alternative work schedules to reduce employee commute.	Not applicable. This action is directed toward the City. However, the Project will allow telecommuting and flexible work schedules to reduce employee commute.
	TM4	Target purchase or lease of new or conversion of existing government vehicles to more efficient vehicles.	Not applicable. This action is directed toward the City.
Solid Waste	WC1	Increase participation in recycling programs and ensure weekly collection of recyclables and organic waste.	Consistent. The Project will implement recycle programs and educate the campus on waste reduction, reuse, recycling and composting.
	WC2	Mandate businesses recycle and provide staff or contractor to verify compliance.	Consistent. The Project is required by the City to provide plans and materials that include details for collecting trash and recycling.

⁴⁴ Fehr & Peers. 2023. Conceptual Transportation Demand Management Plan. July 24.

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Measure Category	Measure	Description	Applicability/Project Consistency
	WC4	Increase diversion/recycling of yard waste by landscapers and landscape maintenance businesses and food scraps by residents and businesses. Explore a ban on these organics from landfill.	Consistent. The City of Belmont is responsible for implementing this measure as well as ensuring compliance with SB 1383 which requires 75% of organic waste to be diverted by 2025. The Project Sponsor's Department of Sustainability, Utilities & Infrastructure will work with the City of Belmont to ensure compliance here and with any of the campus's internal goals.
All Sectors	A1	Establish voluntary program that allows businesses to brand themselves as green by following sustainable practices.	Partially applicable/Consistent. This action is directed toward the City and only applies to individual projects through the City's implementation by adopting ordinances and standard conditions. However, as stated in the CDP Application, the Project is committed on a variety of sustainability features and lead by example in sustainability and reducing environmental footprint.

5. ENERGY

5.1 Energy Used During Project Construction

During the Project's construction period, there would be a temporary increase in energy consumption due to the transportation of construction materials, site preparation, demolition, and building foundation, as well as the construction of the proposed buildings. This increase in energy consumption would be small compared to the energy used by the operations of the Project during its useful life. To assess the potential energy-related impacts of the Project, the estimated fuel use during the construction phase is summarized in **Table 40**.

Detailed fuel consumption by construction vehicle fuel use during Project construction is summarized in **Table 41**. This analysis conservatively assumes all worker vehicles would consume gasoline and all vendor and haul trucks would consume diesel, whereas, in reality, some of the construction vehicles are likely powered by electricity or use a hybrid of fossil fuels and electricity.

Detailed fuel consumption by on-site construction equipment during Project construction is summarized in **Table 42**. This Project will use renewable diesel in all on-site construction equipment. Implementation of this commitment by the Project reduces non-biogenic CO₂e emissions, as discussed previously.

It is important to note that the energy consumption during construction will vary depending on factors such as the duration of the construction period, specific construction operations, equipment types, and number of workers. However, it is anticipated that fuel conservation would be prioritized during construction, as higher-tier engines (and thus newer models) will be used during Project construction. In addition, construction contractors have a financial disincentive to waste fuel used by the construction equipment (*i.e.*, excess fuel usage reduces profits).

As discussed in **Section 2.1.1**, The City's COA on Dust Control and COA #4 for Construction and Operations require projects to implement fugitive dust BMPs, which includes the limit on equipment idling time to 5 minutes, consistent with the Airborne Toxic Control Measure (ATCM) to Limit Diesel-Fueled Commercial Motor Vehicle Idling by ARB. This was done to save fuel because ARB estimated that heavy-duty vehicles (off-road equipment) can consume up to one gallon of diesel fuel per hour of idling, which can total to 1,500 gallons of diesel fuel per year per vehicle. This ATCM has led to fuel savings of approximately 121 million gallons per year statewide since full implementation. Although potential fuel reductions resulting from the implementation of the idling limit were not quantified in **Table 42**, idling time during Project construction will be greatly reduced by complying with these COAs, and the use of diesel fuel will be reduced.

The demand for diesel and gasoline during Project construction is expected to be minimal. The demand for gasoline during the entire construction period is estimated to be 100.8 thousand gallons. The demand for conventional diesel and renewable diesel is estimated to be 147.5 thousand gallons and 118.1 thousand gallons, respectively. These amounts represent about 0.02% and less than 0.002% of the Northern California region's 2022

annual average diesel and gasoline production throughput,⁴⁵ respectively. Therefore, the impact of the Project construction on local and regional fuel supplies would be temporary and minimal and would not require an increase in fuel production capacity. Additionally, the Project is not expected to cause any significant disruptions in local fuel supplies, nor will it require additional capacity to be constructed. Overall, the Project's energy impact during its construction would be less than significant.

5.2 Energy Used During Project Operation

Project operations would require long-term consumption of energy in the form of electricity, gasoline, and diesel fuel. Project operations would also increase water demand of the Project site. **Table 43** and **Table 34** summarize annual energy and water consumption by the Project's operational activities, respectively. The Project's increased electricity consumption by building and mobile sources is in line with the State and local electrification trends.

The proposed Project buildings would be all-electric, with no natural gas hook-ups. The default energy consumption from CalEEMod was adjusted to reflect an increase in electricity consumption consistent with the methodology presented in the Sacramento Air Quality Management District (SMAQMD) GHG Thresholds development.⁴⁶ Total electricity consumption of the Project operations are summarized in **Table 19**.

In **Table 46**, mobile source fuel use associated with operation of the Proposed Project was estimated based on the Project's unmitigated VMT and the fleet-average fuel efficiency (in gallons per mile or kilowatts per mile) from EMFAC2021 for San Mateo County. Because the Project would provide electric vehicle (EV) charging stations for Project users, actual EV penetration in the Project's fleet is likely to be higher than EMFAC defaults, which would increase electricity consumption and decrease fossil fuel consumption relative to what is presented.

Other forms of energy consumption of the Project operation would include gasoline consumed by landscaping equipment (**Table 44**), and electricity used to treat, supply, and distribute water (**Table 45**).

5.3 Analysis of Factors Identified in CEQA Guidelines Appendix F

Appendix F of the CEQA Guidelines identifies factors relating to whether a project would result in the wasteful, inefficient, or unnecessary consumption of fuel or energy, and conversely whether the project would fail to incorporate renewable energy or energy efficiency measures into building design, equipment uses, transportation or other project features. The Appendix F factors are addressed below and used as guidance to evaluate the energy impact of the Proposed Project relative to the identified significance criteria.

⁴⁵ California Energy Commission (CEC). 2023. Refinery Inputs and Production. Available: <https://www.energy.ca.gov/media/6522>. Accessed March 20, 2023.

⁴⁶ Ramboll. 2020. GHG Thresholds for Sacramento County, Section 5.2. Available at: <http://www.airquality.org/LandUseTransportation/Documents/SMAQMDGHGThresholds2020-03-04v2.pdf>

5.3.1 Appendix F.II.C.1: Energy Requirements and Energy Use Efficiencies

CEQA Guidelines Appendix F, Section II.C.1, includes the following impact guidance factor:

The project's energy requirements and its energy use efficiencies by amount and fuel type for each stage of the project including construction, operation, maintenance and/or removal. If appropriate the energy intensiveness of materials may be discussed.

The energy estimates in this evaluation include electricity and fossil fuels used for construction and operation of the Proposed Project. These energy use requirements are summarized in **Table 40** for the construction activities and in **Table 43** for Proposed Project operations.

5.3.2 Appendix F.II.C.2: Local and Regional Energy Supplies

CEQA Guidelines Appendix F, Section II.C.2, includes the following impact guidance factor:

The effects of the project on local and regional energy supplies and on requirements for additional capacity.

As discussed above, the Proposed Project would result in the consumption of electricity, natural gas, gasoline, and diesel associated with mobile vehicle sources, building and landscaping energy uses, and construction activities. The Project's electricity would be sourced by Peninsula Clean Energy (PCE) and delivered to the site through the distribution system of Pacific Gas & Electricity (PG&E). PCE is a Community Choice Aggregation program to provide the San Mateo County with electricity from clean energy sources. PCE has established contracts and commitments to ensure there is adequate electricity generation to meet its current and future energy loads. Total energy use requirements are shown in **Table 43** for Project operations.

The Project would not include any natural gas associated with the Project operations. Other types of fossil fuels consumed during Project operations would be diesel fuel used by on-road vehicles and gasoline fuel used by on-road vehicles and landscaping equipment. Based on annual consumption of diesel and gasoline summarized in **Table 43**, during the first year of full-buildout operations, the Project would consume less than 0.2% of the County's gasoline consumption volume and less than 0.2% of the County's diesel consumption.⁴⁷ Presently, California's fossil fuel refining industry has the capacity to produce gasoline and diesel fuel in sufficient quantities to meet consumer demand that's anticipated to have seasonal variations and elasticity due to economic conditions. For example, Northern California was a net exporter of gasoline and diesel product from 2007 to 2016, demonstrating that refineries in this region have the capacity to meet increases in demand.⁴⁸ In addition, the distribution and delivery infrastructure of transportation fuel has improved in the past and is not expected to be a hindrance to small increases in fuel demand, temporary or permanent. For example, the estimated number of retail fuel stations in San Mateo County remained

⁴⁷ County of San Mateo. 2016. San Mateo County Vehicles Miles Traveled (VMT) and Fuel Consumption 2005-2010. Available at: <https://datahub.smcgov.org/Environment/San-Mateo-County-Vehicle-Miles-Traveled-VMT-and-Fu/sfpq-cg3g>. Updated March 2, 2016. Accessed on: May 19, 2023.

⁴⁸ California Energy Commission. 2017. Transportation Fuel Supply Outlook, 2017. Publication Number: CEC-200-2017-008-SF. September.

relatively stable from 2010 to 2015.⁴⁹ In future years, as the on-road fleet becomes more electrified and as a larger fraction of the fleet uses alternative fuels, this demand for fossil fuel is anticipated to decrease,⁵⁰ and electricity consumption is anticipated to increase.

As shown in **Table 43**, the majority of the electricity consumption during Project operations would be from building electricity use and mobile sources. The region's building and transportation sectors are expected to have increases in demand for electricity as a result of the building decarbonization and transportation electrification trends. At a State level, the CEC reviews the integrated resources plans required by SB 350 that guide load-serving entities, such as community choice aggregators, to meet demand reliably and cost-effectively while meeting state policy goals and mandates.⁵¹ The PCE's existing and planned supply commitment will enable PCE to fulfill its clean electricity procurement goals. Possible programs that would be implemented by PCE include energy storage, electric vehicle programs, and demand response.⁵² In addition, San Mateo County prepared an Alternative Fuel Readiness Plan in 2022 that serves as guidance to public agencies, private companies, and individuals for incorporation of alternative fuel vehicles and the associated infrastructure. Cities are expected to implement measures recommended in this Plan in anticipation of increase infrastructure demand on different levels of electric vehicle chargers, vehicular natural gas consumption, and renewable diesel by 2030.⁵³

5.3.3 Appendix F.II.C.3: Peak and Base Period Demands

CEQA Guidelines Appendix F, Section II.C.3, includes the following impact guidance factor:

The effects of the project on peak and base period demands for electricity and other forms of energy.

Peak period electrical demand is the short period of time during which electrical power is needed when electricity is in highest demand. Base period electrical load is the minimum amount of electrical demand needed over a 24-hour time period. Wasteful, inefficient, or unnecessary consumption or use of energy during the peak period of electrical demand has greater potential to cause adverse environmental effects compared to during the base period because of the higher demand during the peak period. The Proposed Project would not have a substantial impact on the peak and base period demands for electricity or other forms of energy. The Proposed Project's base energy consumption compared to regional and statewide energy consumption is discussed above. Further details and reasoning on the peak demand are described below.

⁴⁹ California Energy Commission. 2017. Transportation Fuel Supply Outlook, 2017. Publication Number: CEC-200-2017-008-SF. Table 8. Summary Of California Annual Retail Fuel Survey Responses (2010-2015). September.

⁵⁰ City/County Association of Governments of San Mateo County (C/CAG) & Life Cycle Associates, LLC. 2022. Alternative Fuel Readiness Plan for San Mateo County. Publication Number: CEC-600-2022-009. January.

⁵¹ California Energy Commission. 2023. Drafted 2023 Integrated Energy Policy Report. November.

⁵² Peninsula Clean Energy. 2017. 2018 Integrated Resource Plan. December.

⁵³ City/County Association of Governments of San Mateo County (C/CAG) & Life Cycle Associates, LLC. 2022. Alternative Fuel Readiness Plan for San Mateo County. Publication Number: CEC-600-2022-009. January.

In 2021, California's peak grid demand was 43,982 MW. On that same peak day, PG&E reached a maximum demand of 20,118 MW.⁵⁴ In comparison, the Project's annual electricity usage rate of approximately 8,851 MWh corresponds to average hourly electricity demand of approximately 1 MW (assuming the Project would operate everyday throughout the year). The maximum peak demand is anticipated to be no more than twice the hourly average usage, corresponding to 2 MW.⁵⁵ The Project's peak demand would represent less than 0.01% of PG&E's peak demand. As mentioned above, PCE is the local Community Choice Aggregate program. PCE is required to comply with the California Public Utility Commission's Resource Adequacy (RA) program. Implementation of the RA program ensures that there is enough generation on the grid to ensure sufficient generating capacity and additional "reserve" capacity, as well as the availability of fast response generation sources to address resource intermittency.⁵⁶ With proper planning of the power generation inventory, including what's required of the RA program, the Project would have a negligible effect on the grid-wide peak demand. This also conservatively excludes improvements in demand response due to future updates to the Title 24 energy standards. These future updates would further reduce peak demand through performance standards that are based on the time dependent valuation of energy, which uses the value of the electricity or natural gas used during every hour of the year to incentivize load shifting from peak use periods. The Project would not result in energy demand substantially affecting local and regional energy supplies and capacity.

5.3.4 Appendix F.II.C.4: Existing Energy Standards

CEQA Guidelines Appendix, Section II.C.4, includes the following impact guidance factor:

The degree to which the project complies with existing energy standards.

The Project would comply with existing energy standards and would not conflict with or obstruct the State and local plans for renewable energy or energy efficiency. During construction, the Project would adhere to the State's standards and provisions in the City's COAs designed to minimize use of fuel in construction equipment and vehicles, such as the limit on equipment idling. In the long run, operations of the Project would comply with existing building energy efficiency standards and maintain flexible and reliable water supply for deliveries to treatment plants, managed groundwater recharge, and maintenance of a local source of emergency water supply. Operation and maintenance activities would also comply with the State's RPS and other energy and natural resources measures in the City's COAs. Therefore, construction and operation of the Project would be consistent with the State and local plans for renewable energy and energy efficiency.

⁵⁴ California Independent System Operator (Cal ISO). 2022. 2021-2022 Transmission Plan, March 17, 2022. <http://www.aiso.com/Documents/ISOBoardApproved-2021-2022TransmissionPlan.pdf>, accessed May 2023.

⁵⁵ Since the peak energy demand for the Proposed Project was not available, Ramboll used a factor of 2 to estimate the peak demand based on historic CAISO peak-to-average demand ratio. Peak-to-average electricity demand ratio rising in California. https://www.eia.gov/todayinenergy/detail.php?id=15051#tabs_SpotPriceSlider-7, accessed May 2023.

⁵⁶ Peninsula Clean Energy. 2017. 2018 Integrated Resource Plan. December.

5.3.5 Appendix F.II.C.5: Energy Resources

CEQA Guidelines Appendix F, Section II.C.5, includes the following impact guidance factor:

The effects of the project on energy resources.

As discussed above, the Project's energy use would be primarily associated with construction activities, vehicle travel, and building operations. The Project would rely on existing infrastructure for generation and distribution of electricity and fossil fuels. Despite an increase in total VMT due to Project operations, total gasoline and diesel fuel consumption are expected to decrease over time due to the use of vehicles that meet increasingly stringent fuel efficiency standards. The construction of new buildings that comply with the stringent current Title 24 Energy Efficiency Standards, CALGreen, and appliance efficiency standards, would result in high energy efficiency relative to existing buildings in the region. The Project's use of energy would not have a substantial adverse effect on statewide or regional energy resources relative to wasteful, inefficient, or unnecessary use of energy.

5.3.6 Appendix F.II.C.6: Transportation Energy Use

CEQA Guidelines Appendix F, Section II.C.6, includes the following impact guidance factor:

The project's projected transportation energy use requirements and its overall use of efficient transportation alternatives.

The Project's transportation energy use requirements in terms of gasoline, diesel, natural gas, and electricity quantities for construction and operations are presented in **Table 41** and **Table 46**, respectively. The Project's operational mobile sources would consume some natural gas, because EMFAC's default fleet mix for San Mateo County assumes a portion of buses and heavy trucks in the county are powered by natural gas combustion. SB 743 requires OPR to identify new metrics for identifying and mitigating transportation impacts within CEQA. OPR has identified net VMT as well as VMT per capita and per employee as metrics for land use project transportation analyses. The quantification of VMT associated with Proposed Project operations, which is used to quantify the total operational transportation-related energy use requirements, was provided by the Project Sponsor's transportation consultant.⁵⁷

5.3.7 Summary of Energy Impact Analysis Based on Appendix F Guidelines

In conclusion, construction and operations of the Project would not result in wasteful, inefficient, and unnecessary consumption of energy resources. The Project would be consistent with relevant state and local plans for renewable energy and energy efficiency. The Project's impacts related to energy conservation would be less than significant.

5.4 Consistency with Energy Plans

Appendix G of CEQA Guidelines requires a Project to analyze whether it would conflict with an applicable plan, policy or regulation adopted for the purpose of reducing environmental impacts related to energy. As discussed in **Section 4.4**, several State plans as well as the City's adopted General Plan include energy conservation and energy efficiency strategies

⁵⁷ Fehr & Peers. 2023. Stanford Belmont Campus Transportation Impact Analysis. July 24.

intended to enable the State and the City to achieve GHG reduction and energy conservation goals. The Project is evaluated for consistency with the following plans, policies, and regulations specific to energy:

- 2023 Integrated Energy Policy Report,
- AB 2076 Reducing Dependence on Petroleum,
- AB 1007 State Alternative Fuels Plans,
- Bioenergy Action Plan EO S-06-06,
- Peninsula Clean Energy's Strategic Integrated Resource Plan
- San Mateo County's Alternative Fuel Readiness Plan

Descriptions of each plan, policy, and regulation are presented below. **Table 5.4-1** summarizes the Project consistency with each plan, policy, and regulation.

2023 Integrated Energy Policy Report

The CEC published the 2023 Integrated Energy Policy Report to identify pathways to deeply decarbonize the state's electricity system in response to meeting the SB 100 goal of zero-carbon by 2045. The report provides an analysis of electricity sector trends, building decarbonization and energy efficient, zero-emission vehicles, energy equity, climate change adaptation, electricity reliability, natural gas assessment, and electricity, natural gas, and transportation energy demand forecasts. The aim is to leverage California's clean electricity system to decarbonize, or remove carbon from, other portions of the state's energy system. SB 1389 (Chapter 568, Statutes of 2002) requires the CEC to conduct assessments and forecasts of all aspects of energy industry supply, production, transportation, delivery, distribution, electricity demand, and price to develop energy policies that conserve resources, protect the environment, ensure energy reliability, enhance the State's economy, and protect public health and safety.

AB 2076 Reducing Dependence on Petroleum

Pursuant to Assembly Bill (AB) 2076, the CEC and CARB prepared and adopted in 2003 a joint agency report, Reducing California's Petroleum Dependence. AB 2076 emphasizes the importance to adopt measures to improve transportation energy efficiency and expand the use of non-petroleum fuels to allow for a smooth transition away from petroleum dependence in the transportation sector. The areas of influence include legislative direction, fuel efficiency and fuel substitution.

AB 1007 State Alternative Fuels Plans

AB 1007 (Chapter 371, Statutes 2005) required the CEC to prepare a State plan to increase the use of alternative fuels in California. The CEC prepared the State Alternative Fuels Plan (SAF Plan) in partnership with CARB and in consultation with other State, federal, and local agencies. The SAF Plan presents strategies and actions California must take to increase the use of alternative, nonpetroleum fuels in a manner that minimizes costs to California and maximizes the economic benefits of in-State production. The SAF Plan assessed various alternative fuels and developed fuel portfolios to meet California's goals to reduce petroleum

consumption, increase alternative fuel use, reduce GHG emissions, and increase in-State production of biofuels without causing a significant degradation of public health and environmental quality.

Executive Order S-06-06, Bioenergy Action Plan,

Executive Order (EO) S-06-06, adopted April 25, 2006, establishes targets for the use and production of biofuels and biopower, and directs State agencies to work together to advance biomass programs in California while providing environmental protection and mitigation. The EO establishes the following target to increase the production and use of bioenergy, including ethanol and biodiesel fuels made from renewable resources: produce a minimum of 20 percent of its biofuels in California by 2010, 40 percent by 2020 and 75 percent by 2050. EO S-06-06 also calls for the State to meet a target for use of biomass electricity.

The 2011 Bioenergy Action Plan identifies those barriers and recommends actions to address them so that the State can meet its clean energy, waste reduction, and climate protection goals. The 2012 Bioenergy Action Plan updates the 2011 Plan and provides a more detailed action plan to achieve the following goals.

- Increase environmentally and economically sustainable energy production from organic waste.
- Encourage development of diverse bioenergy technologies that increase local electricity generation, combined heat and power facilities, renewable natural gas, and renewable fuels for transportation and fuel cell applications.
- Create jobs and stimulate economic development, especially in rural regions of the State.
- Reduce fire danger, improve air and water quality, and reduce waste.

Peninsula Clean Energy Strategic Integrated Resource Plan

The Peninsula Clean Energy (PCE) Strategic Integrated Resource Plan (IRP) provides guidance for serving the electric needs of the residents and businesses in San Mateo County while meeting PCE's policy objectives and regulatory requirements over a 10-year planning period from 2018-2027. This Strategic IRP addresses how PCE will meet the following targets by managing a portfolio of energy and capacity resources to:

- Meet California's RPS requirements of 50% of retail electricity sales to come from renewable energy sources by 2030.
- Provide the necessary capacity reserves to meet California's Resource Adequacy (RA) regulatory requirements for load-serving entities.
- Maintain a minimum renewable energy content of 50% for its ECOplus product, and 100% for its ECO100 product, while working towards a goal of increasing PCE's renewable content to 100% renewable energy for all PCE customers by 2025.

- Meet its GHG-free target of 85% for 2018, and increase its GHG-free energy by 5% per year to 100% GHG-free in 2021. (This target was met in 2021 based on PCE's most recent two-year report to California Public Utilities Commission).⁵⁸

San Mateo County's Alternative Fuel Readiness Plan

The Alternative Fuel Readiness Plan for San Mateo County (AFRP) provides a resource regarding the increased use and incorporation of alternative fuel vehicles and alternative fuel infrastructure in communities within San Mateo County. This Plan provides an overview of each alternative fuel in the marketplace and presents the motivations for having an alternative fuel readiness plan, including existing legislation and incentives, environmental benefits, and economic factors.

Table 5.4-1. Project's Consistency with the State's and the City's Energy Plans

Renewable Energy or Energy Efficiency Plan	Applicability/Project Consistency
2023 Integrated Energy Policy Report: The 2023 report highlights the implementation of California's innovative policies and the role they have played in establishing a clean energy economy, as well as provides more detail on several key energy policies, including decarbonizing buildings, increasing energy efficiency savings, and integrating more renewable energy into the electricity system.	Consistent. The project will facilitate decarbonization of buildings (removing GHG emissions from the building's energy use) by retrofitting and constructing buildings with no natural gas, increase energy efficiency through installation of high efficiency appliances, water heaters, and HVAC systems. Therefore, the Project will not conflict with or obstruct implementation of the 2023 Integrated Energy Policy.
Assembly Bill 2076: Reducing Dependence on Petroleum: Pursuant to AB 2076, the CEC and CARB prepared and adopted a joint-agency report, Reducing California's Petroleum Dependence, in 2003. Included in this report are recommendations to increase the use of alternative fuels to 20 percent of on-road transportation fuel use by 2020 and 30 percent by 2030, significantly increase the efficiency of motor vehicles, and reduce per capita VMT. One of the performance-based goals of AB 2076 is to reduce petroleum demand to 15 percent below 2003 demand.	Consistent. The Project features include a TDM program to reduce VMT by campus employees and students ⁵⁹ and the Project is committed to meeting CALGreen Tier 2 EV charging requirements which will promote EV use and reduce petroleum consumption for vehicles. Additionally, the Project is committed to non-petroleum fuel sources (renewable diesel) for all construction equipment. Therefore, the Project will not conflict with or obstruct implementation of the Assembly Bill 2076.

⁵⁸ Peninsula Clean Energy, 2022. Standard Load Serving Entity (LSE) Plan. Available at: https://www.peninsulacleanenergy.com/wp-content/uploads/2022/10/Attachment-A-pcea_public_v1.pdf. November.

⁵⁹ Fehr & Peers. 2023. Conceptual Transportation Demand Management Plan. July 24.

Renewable Energy or Energy Efficiency Plan	Applicability/Project Consistency
AB 1007: State Alternative Fuels Plans: The State Alternative Fuels Plan assessed various alternative fuels and developed fuel portfolios to meet California’s goals to reduce petroleum consumption, increase alternative fuels use, reduce GHG emissions, and increase in-State production of biofuels without causing a significant degradation of public health and environmental quality. Bioenergy Action Plan, EO S-06-06. The EO establishes the following targets to increase the production and use of bioenergy, including ethanol and biodiesel fuels made from renewable resources: produce a minimum of 20 percent of its biofuels in California by 2010, 40 percent by 2020, and 75 percent by 2050.	Consistent. The project will not interfere with or obstruct the production of biofuels in California. Vehicles used by future students and employees will be EVs or will be fueled by gasoline and diesel fuels blended with ethanol and biodiesel fuels as required by CARB regulations. Additionally, all construction equipment will be fueled by renewable diesel. Therefore, the Project will not conflict with or obstruct implementation of the Bioenergy Action Plan or the State Alternative Fuels Plan.
Peninsula Clean Energy Integrated Resource Plan: PCE Strategic goals include designing a diverse power portfolio that is GHG free, strive to offer ECOplus at rates that meet or are lower than PG&E rates, stimulate development of new renewable energy projects and clean-tech innovation in San Mateo and California, demonstrate economic benefits to the County/region while prioritizing local hiring and workforce development, implement and invest in programs to further reduce GHG emissions, and maximize customer participation.	Consistent. The Project, located in San Mateo County, will either generate onsite electricity through solar or purchase electricity from PCE at ECOplus rates. Therefore, the Project will not conflict with or obstruct implementation of the PCE Integrated Resource Plan.
San Mateo County’s Alternative Fuel Readiness Plan: The goal of AFRP is to stimulate and prepare San Mateo county for the transition from fossil fuels to alternative fuels.	Consistent. A portion of vehicles used by future students and employees will be EVs or will be fueled by gasoline and diesel fuels blended with ethanol and biodiesel fuels as required by CARB regulations. Additionally, all construction equipment will be fueled by renewable diesel. Therefore, the project will not conflict with or obstruct implementation of the San Mateo AFRP.

6. IMPACT CONCLUSIONS

The analysis presented above represents CAP emissions, health risk impacts, GHG emissions and climate change impacts, and energy consumption from construction and operation of the Project with respect to the existing conditions. This technical report also provides consistency analysis with regards to plans and policies related to air quality, GHG emissions and energy. With the implementation of Project design features, the applicable COAs, and mitigation measures, the Project would not exceed any applicable CEQA significance thresholds for its air quality, GHG, and energy impacts. CEQA impact conclusions are summarized below:

6.1 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) 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?	☐	☐	☒	☐
c) Expose sensitive receptors to substantial pollutant concentrations?	☐	☒	☐	☐
d) Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?	☐	☐	☒	☐

As discussed in **Section 3.5**, the Project would be consistent with the goals and control measures of the BAAQMD's 2017 Clean Air Plan. Therefore, the Project's impact related to consistency with the applicable air quality plan would be less than significant.

As discussed in **Section 3.1** and **Section 3.3**, the Project's construction and net operational CAP emissions are below the applicable BAAQMD recommended thresholds. The Project will also implement the City's COA on reducing construction-related fugitive dust emissions. Therefore, the Project would not result in any cumulatively considerable net increase of any criteria pollutant for which the region is non-attainment. This impact would be less than significant.

The Project's health risk impacts are analysed in **Section 3.2**. The Project's health risk impacts on existing nearby receptors from its construction activities are below the BAAQMD recommended health risk thresholds. Due to the low level of Project-generated daily vehicle trips (<10,000 trips per day)⁶⁰ and lack of diesel generators, operational health risk impacts are similarly below BAAQMD recommended health risk thresholds. Should the Project include wet laboratory operations, incorporation of Mitigation Measure AIR-1 in **Section 3.2.6** will ensure any potential health risks will be below applicable thresholds. The Project's operational health risk impacts would be less than significant with incorporation of Mitigation Measure AIR-1.

In addition to impacts summarized above, the Project would not result in other emissions (such as those leading to odors) adverse affecting a substantial number of people. As discussed in **Section 3.4**, neither the Project's construction nor its operations would generate persistent and objectional odors. Furthermore, the proposed land uses and operations at the Project site are consistent with the existing higher education site use. Therefore, this impact would be less than significant.

6.2 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 an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs?	☐	☐	☒	☐

The Project's construction and operational GHG emissions are disclosed in **Sections 4.1** and **4.2**. As discussed in **Section 4.3**, the Project anticipates implementing feasible construction GHG reduction BMPs in subsequent DDP applications. The Project will implement the BAAQMD's design elements and is considered to contribute its fair share of the cumulative GHG reduction required to achieve the State's climate goals. Therefore, the Project's impact related to the generation of GHG emissions would be less than significant.

As discussed in **Section 4.4**, the Project would be consistent with the 2022 CARB Scoping Plan, Plan Bay Area 2050, the BAAQMD's 2017 Clean Air Plan, and the City's Climate Action Plan. The Project will also comply with the applicable State building codes and the City's

⁶⁰ Fehr & Peers. 2023. Stanford Belmont Campus Traffic Study. July 24.

zoning ordinance. Therefore, the Project would not conflict with any GHG plans, policy or regulation; This impact would be less than significant.

6.3 Energy

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
Would the Project:				
a) Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?	☐	☐	☒	☐
b) Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?	☐	☐	☒	☐

As discussed in **Sections 5.1** through **5.3**, using Appendix F of the CEQA Guidelines, the Project's energy requirement and energy use efficiencies would not substantially affect energy resources, supplies and capacity, nor would they affect peak and base period demand of energy, including energy in the forms of electricity and transportation fuel use. The Project will also be consistent with applicable energy standards such as Title 24 and the City's Municipal Code and General Plan. Therefore, the Project would not result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources. This impact is less than significant.

As discussed in **Section 5.4**, the Project would be consistent and would not conflict with or obstruct the implementation of applicable energy plans, in addition to complying with Title 24 and local requirements. This impact would be less than significant.

TABLES

Table 1
Existing Conditions and Proposed Project's Land Uses - CalEEMod Mapping
Stanford Belmont Project
Belmont, CA

Existing Conditions and Full Buildout Land Use Summary¹

Site	Land Use Type	Description	CalEEMod Land Use Category ²	Land Use Quantity	Percent in Use by 2030	Units
Existing Conditions	Educational	Academic/Support Buildings	University/College (4yr)	177	--	ksf
	Residential	Housing	Apartments Mid Rise	122	--	ksf
	Parking	Parking	Parking Lot	624	--	Spaces
Full Buildout Conditions	Educational	Historic Buildings	University/College (4yr)	75	50%	ksf
		Teaching/Research	University/College (4yr)	425	50%	ksf
	Residential	Housing	Apartments Mid Rise	200	50%	DU
	Parking	Parking	Parking Lot	675	50%	Spaces
			Enclosed Parking with Elevator	675	50%	Spaces

Notes:

- ^{1.} Land uses presented here are for purposes of mapping to CalEEMod categories and may be more refined than other land use descriptions.
- ^{2.} CalEEMod Land Use Category represents the land uses from CalEEMod used for default assumptions.

Abbreviations:

DU - Dwelling Unit

ksf - 1000 square feet

CalEEMod - California Emissions Estimator Model

References:

California Air Pollution Control Officers Association (CAPCOA). California Emissions Estimator Model (CalEEMod), Version 2022.1. Available online at <http://www.caleemod.com/>

Table 2
Emission Calculation Methodology
Stanford Belmont Project
Belmont, CA

Type	Source	Methodology and Formula	Reference
Construction Equipment	Off-Road Equipment ¹	$E_c = \Sigma(EF_c * HP * LF * Hr * C)$	CalEEMod, OFFROAD2017 and ARB/USEPA Engine Standards
Construction and Operational On-Road Mobile Sources ²	Exhaust – Running	$E_R = \Sigma(EF_R * VMT * C)$, where VMT = Trip Length * Trip Number	EMFAC2021
	Brake Wear and Tire Wear	$E_{BW,TW} = \Sigma(EF_{BW,TW} * VMT * C)$, where VMT = Trip Length * Trip Number	EMFAC2021
	Exhaust - Idling	$E_I = \Sigma(EF_I * Trip\ Number * T_I * C)$	EMFAC2021
	Entrained Road Dust	$E_{RD} = \Sigma(EF_{RD} * VMT * C)$, where VMT = Trip Length * Trip Number	CalEEMod
Construction Fugitive Dust	Mechanical Dismemberment, Grading, Bulldozing, Truck Loading	CalEEMod	CalEEMod
Other Operational Sources	Area, Energy, Water and Wastewater, Solid Waste	CalEEMod	CalEEMod

Notes:

- ¹ E_c : off-road equipment exhaust emissions (lb)
 EF_c : emission factor (g/hp-hr). CalEEMod default emission factors used
HP: equipment horsepower. From CalEEMod defaults
LF: equipment load factor. From OFFROAD2017
Hr: equipment hours
C: unit conversion factor
- ² On-road mobile sources include truck and passenger vehicle trips. Emissions associated with mobile sources were calculated using the following formulas.
- E_R : running exhaust and running losses emissions (lb)
 EF_R : running emission factor (g/mile). From EMFAC2021
VMT: vehicle miles traveled
C: unit conversion factor
The calculation involves the following assumptions:
a. All material transporting and soil hauling trucks are heavy-heavy duty trucks.
b. Trip Length: The one-way trip length as calculated based on CalEEMod Appendix G defaults for San Francisco County.
c. Trip Number: Worker trip rates are calculated based on CalEEMod Appendix C. Vender and hauling trip rates were provided by the Project Sponsor.
- E_I : vehicle idling emissions (lb).
 EF_I : vehicle idling emission factor (g/hr-trip). From EMFAC2021
 T_I : idling time
C: unit conversion factor
- E_{RD} : entrained road dust emissions (lb)
 EF_{RD} : annual average emission factor (lb/VMT) = $k * (sL)^{0.91} * (W)^{1.02} * (1-P/4N)$
k: particle size multiplier for particle size range
sL: roadway silt loading [grams per square meter - g/m²]
W: average weight of vehicles traveling the road [tons]
P = number of "wet" days in county with at least 0.01 in of precipitation during the annual averaging period
N = number of days in the averaging period
VMT: vehicle miles traveled
C: unit conversion factor

Abbreviations:

ARB: California Air Resources Board	lb - pound
I - Idling	CalEEMod - California Emissions Estimator Model
BW: Brake Wear	RL - Running Losses
EF - Emission Factor	mi: mile
EMFAC - Emission FACTor Model	USEPA: United States Environmental Protection Agency
g - gram	VMT: vehicle miles traveled
HP - horsepower	

References:

California Air Pollution Control Officers Association (CAPCOA). California Emissions Estimator Model (CalEEMod), Version 2022.1. Available online at <http://www.caleemod.com/>

California Air Resources Board (ARB) 2021. EMFAC2021. Available at: <https://ww2.arb.ca.gov/our-work/programs/mobile-source-emissions-inventory/msei-modeling-tools>

Table 3
Construction Emissions of Criteria Air Pollutants
Stanford Belmont Project
Belmont, CA

Summary of Construction Emissions by Source

Phase	Construction Sources	CAP Emissions (lb/phase/construction source) ¹			
		ROG	NO _x	PM ₁₀ (Exhaust)	PM _{2.5} (Exhaust)
Demolition	Off-Road Equipment	19	234	3.3	3.3
	On-Road Vehicles	4.7	154	1.3	1.3
Site Preparation	Off-Road Equipment	16	83	3.2	3.2
	On-Road Vehicles	17	1114	9.4	9.0
Grading	Off-Road Equipment	49	336	9.4	9.4
	On-Road Vehicles	20	1117	9.5	9.0
Building Construction	Off-Road Equipment	183	1,880	33	30
	On-Road Vehicles	838	3,775	37	35
Paving	Off-Road Equipment	9.0	108	1.6	1.6
	On-Road Vehicles	2.6	1.9	0.034	0.031
Architectural Coating	Paving Off-Gassing	16	0	0	0
	Off-Road Equipment	1.2	36	0.13	0.13
	On-Road Vehicles	11	8.2	0.15	0.14
	Architecture Coating	3,378	0	0	0

Summary of Construction Emissions by Source

Year	Daily Average CAP Emissions (lb/day) ²			
	ROG	NO _x	PM ₁₀ (Exhaust)	PM _{2.5} (Exhaust)
1	2.6	23	0.3	0.3
2	15.7	11.6	0.1	0.14
BAAQMD Thresholds³	54	54	82	54
Exceed Thresholds?	No	No	No	No

Notes:

1. The emissions above include emissions from diesel off-road equipment, gasoline and diesel on-road equipment, and off-gassing emissions from architectural coating. Tier 4 Final emission factors are applied to all off-road equipment.
2. Emissions were calculated using the annual emissions for each year divided by the working days in each year.
3. Thresholds are from BAAQMD's 2022 CEQA Guidelines. For PM, this excludes construction fugitive emissions.

Abbreviations:

CalEEMod - California Emissions Estimator Model	PM _{2.5} - particulate matter < 2.5 µm
DPM - diesel particulate matter	PM ₁₀ - particulate matter < 10 µm
EMFAC2021 - California Air Resources Board Emission FACTor model	lb - pound
California Air Pollution Control Officers Association (CAPCOA). California Emissions	CAP - criteria air pollutant
NO _x - nitrogen dioxide	

References:

California Air Pollution Control Officers Association (CAPCOA). California Emissions Estimator Model (CalEEMod), Version 2022.1. Available online at <http://www.caleemod.com/>

Bay Area Air Quality Management District (BAAQMD). 2023. California Environmental Quality Act (CEQA) Air Quality Guidelines. Available at: <https://www.baaqmd.gov/plans-and-climate/california-environmental-quality-act-ceqa/updated-ceqa-guidelines>

Table 4
Construction Phasing Schedule
Stanford Belmont Project
Belmont, CA

Construction Phase ¹	Construction Subphase ²	Start Date ³	End Date ³	Year ³	Number of Work Days	Days per Week
Single-Phase	Demolition	1	37	1	26	5
	Site Preparation	38	60	1	16	5
	Grading	61	115	1	38	5
	Building Construction	116	635	1-2	371	5
	Paving	636	675	2	28	5
	Architectural Coating	676	716	2	28	5

Notes:

- ^{1.} For the purpose of generating construction activities for the health risk assessment, the entire Project site is treated as if it would be built out in one phase.
- ^{2.} All construction phasing information was based on CalEEMod default construction assumptions. To be conservative, construction duration was reduced from four years (CalEEMod default duration) to two years, while maintaining total equipment activities. Construction is generally expected to occur between 8am-5pm Monday-Friday per the City of Belmont's noise ordinance.
- ^{3.} Start dates and end dates are counted from the first day of construction (Day 1). Construction is conservatively assumed to start in 2024.

Table 5
Construction Equipment
Stanford Belmont Project
Belmont, CA

Construction Subphases	Equipment Name ¹	Fuel ²	Number ¹	Horsepower ¹	Days Per Phase ³	Daily Usage (hours/day) ¹	Load Factor ¹	Utilization ⁴	Engine Tier ⁵
Demolition	Rubber Tired Dozers	Diesel	4	367	26	8	0.4	100%	Tier 4 Final
	Excavators	Diesel	6	36	26	8	0.38	100%	Tier 4 Final
	Concrete/Industrial Saws	Diesel	2	33	26	8	0.73	100%	Tier 4 Final
Site Preparation	Rubber Tired Dozers	Diesel	6	367	16	8	0.4	100%	Tier 4 Final
	Tractors/Loaders/Backhoes	Diesel	8	84	16	8	0.37	100%	Tier 4 Final
Grading	Excavators	Diesel	4	36	38	8	0.38	100%	Tier 4 Final
	Graders	Diesel	2	148	38	8	0.41	100%	Tier 4 Final
	Rubber Tired Dozers	Diesel	2	367	38	8	0.4	100%	Tier 4 Final
	Scrapers	Diesel	4	423	38	8	0.48	100%	Tier 4 Final
	Tractors/Loaders/Backhoes	Diesel	4	84	38	8	0.37	100%	Tier 4 Final
Building Construction	Cranes	Diesel	2	367	371	7	0.29	100%	Tier 4 Final
	Forklifts	Diesel	6	82	371	8	0.2	100%	Tier 4 Final
	Generator Sets	Diesel	2	14	371	8	0.74	100%	Tier 4 Final
	Tractors/Loaders/Backhoes	Diesel	6	84	371	7	0.37	100%	Tier 4 Final
	Welders	Diesel	2	46	371	8	0.45	100%	Tier 4 Final
Paving	Pavers	Diesel	4	81	28	8	0.42	100%	Tier 4 Final
	Paving Equipment	Diesel	4	89	28	8	0.36	100%	Tier 4 Final
	Rollers	Diesel	4	36	28	8	0.38	100%	Tier 4 Final
Architectural Coating	Air Compressors	Diesel	2	37	28	6	0.48	100%	Tier 4 Final

Notes:

- ¹. This equipment list is based on CalEEMod default values for the project size and has been scaled to match the total number of hp-hrs for each equipment. Load factor is the ratio of the average of an engine's rated power and is based on CalEEMod default values.
- ². The Project has committed to using renewable diesel in all off-road construction equipment, including those <50 horsepower.
- ³. Days per subphase is two times the default subphase duration from CalEEMod, because the CalEEMod-default construction schedule is halved to assume the most intense construction scenario.
- ⁴. Utilization rate refers to the percent of daily construction duration when an equipment has its engine on. 100% utilization rate is assumed because of the lack of Project-specific data.
- ⁵. The Project has committed to using Tier 4 engines for all off-road construction equipment, including those <50 horsepower.

Abbreviations:

CalEEMod - California Emissions Estimator Model

hrs - hours

hp - horsepower

References:

California Air Pollution Control Officers Association (CAPCOA). California Emissions Estimator Model (CalEEMod), Version 2022.1. Available online at <http://www.caleemod.com/>

**Table 6
Construction Trips
Stanford Belmont Project
Belmont, CA**

Trip Data

Construction Phase	Construction Subphase	Year	Construction Days	Trip Rates ¹ (One-way trips/day)		Trip Rates ² (one-way trips/subphase)	Trip Lengths ³ (miles/one-way trip)		
				Worker Trips	Vendor Trips	Hauling Trips	Worker Trips	Vendor Trips	Hauling Trips
Single Phase Buildout	Demolition	1	26	30	0	1,103	11.7	8.4	20
	Site Preparation	1	16	36	0	8,094	11.7	8.4	20
	Grading	1	38	40	0	8,094	11.7	8.4	20
	Building Construction	1-2	371	646	182	0	11.7	8.4	20
	Paving	2	28	30	0	0	11.7	8.4	20
	Architectural Coating	2	28	130	0	0	11.7	8.4	20

EMFAC Data⁴

Trip Type	EMFAC Settings	Fleet Mix	Fuel Type
Worker	San Mateo County Calendar Years 2024-2027 Annual Season Aggregated Model Year EMFAC2007 Vehicle Categories	25% LDA, 50% LDT1, 25% LDT2	Gasoline
Vendor		50% MHDT, 50% HHDT	Diesel
Hauling		100% HHDT	Diesel

Notes:

1. Worker and vendor default trip rates were based on values from CalEEMod default schedule and multiplied by two to account the compressed construction schedule.
2. To obtain the demolition trip rate, we first determined the amount of debris. This was calculated as 11,153 tons by converting the square footage of the demolished area provided by the client. The debris amount was then divided by 16 cubic yards per trip, which is the capacity that CalEEMod assumes a truck can transport in a single trip. The Project Sponsor also provided the amounts for exported and imported materials, with 118,800 cubic yards to be exported and 10,700 cubic yards to be imported. These numbers were allocated to the site preparation and grading subphase. The combined total of exported and imported materials, as specified by the Project Sponsor, was then divided by 16 cubic yards to determine the haul trips during the site preparation, and grading subphases.
3. Worker, vendor, and hauling trip lengths are based on CalEEMod defaults.
4. Emissions were calculated using emission factors from EMFAC2021 with the specified settings and fleet and fuel assumptions.

Abbreviations:

CalEEMod - California Emissions Estimator Model

EMFAC2021 - California Air Resources Board Emission FACtor model

LDA - light-duty automobiles

LDT - light-duty trucks

HHDT - heavy-heavy duty trucks

sqft - square feet

References:

California Air Pollution Control Officers Association (CAPCOA). California Emissions Estimator Model (CalEEMod), Version 2022.1. Available online at <http://www.caleemod.com/>

California Air Resources Board (ARB) 2021. EMFAC2021. Available at: <https://ww2.arb.ca.gov/our-work/programs/mobile-source-emissions-inventory/msei-modeling-tools>

Table 7
Estimated Emissions from Construction Paving Off-Gassing
Stanford Belmont Project
Belmont, CA

Proposed Project

Construction Area	Construction Activity	Land Use Type	Asphalt-Paved Area (acre) ¹	Asphalt Paving Off-Gassing ROG Emission Factor (lb/acre) ²	Asphalt Paving Off-Gassing ROG Emissions (lb/activity)
Project site	Paving	Parking	6.2	2.62	16

Notes:

- ¹. All surface parking areas were assumed to be asphalt paving areas according to CalEEMod Appendix C.
- ². Emission factor is from CalEEMod User's Guide, Appendix C.

Abbreviations:

lb - pound
 ROG - reactive organic gas

sqft - square feet

References:

California Air Pollution Control Officers Association (CAPCOA). California Emissions Estimator Model (CalEEMod), Version 2022.1.
 Available online at <http://www.caleemod.com/>

Table 8
Estimated Emissions from Construction Architectural Coating
Stanford Belmont Project
Belmont, CA

Inputs^{1,2}

Parameter		Input	Units
Residential Surface Area to Floor Area Ratio		2.7	--
Non-Residential Surface Area to Floor Area Ratio		2.0	--
Painted Stripes Area in Parking Structures		6%	--
Painted Building Area in Parking Structures		5%	--
Application Rate		100%	--
Fraction of Surface Area	Non-Parking Interior Surfaces	75%	--
	Non-Parking Exterior Shell	25%	--
	Parking Interior Surfaces	90%	--
	Parking Exterior Shell	10%	--
Indoor Paint VOC Content ³		10	g/L
Parking Stripes VOC Content		100	g/L
Outdoor Paint VOC Content		150	g/L

Proposed Project Emissions by Phase

Proposed Project Emissions by Phase							
Phase	Land Use Type	Description	CalEEMod Land Use	Square Footage ² (square feet)	Building Surface Area ² (square feet)	Painted Parking Stripes Area ² (square feet)	Architectural Coatings VOC emissions ⁴ (lbs)
Construction	Educational	Historic Buildings (meeting, office, conference, residential) Total: 75,000 sqft	University/College (4yr)	75,000	150,000	--	313
	Residential	Housing (200 x 2BR Units) Total: 200,000 sqft	Apartments Mid Rise	200,000	540,000	--	1127
	Educational	Teaching/Research (classrooms, convening, café, recreation) Total: 425,000 sqft	University/College (4yr)	425,000	850,000	--	1773
	Parking	Parking	Parking Lot	270,000	13,500	16,200	75
	Parking		Enclosed Parking with Elevator	270,000	13,500	16,200	90
Total VOC Emissions by Phase (lbs)							3,378

Proposed Project Emissions by Year

Phase	Year	Work Days per Year	VOC Emissions by Phase (lbs)	VOC Emissions by Year (lbs)
Construction	2	28	3,378	3,378

Notes:

- ¹ Input parameters are consistent with CalEEMod Appendix G except Indoor paint VOC content was based on the City's Conditions of Approval.
- ² Building square footage was based on information provided by the Project Sponsor. Residential building surface area assumed to be 2.7 times the square footage and non-residential square footage is assumed to be 2.0 times the square footage, consistent with CalEEMod Appendix C. Parking surface area is representative of the surface area of the lot that is painted, in accordance with the CalEEMod default of 6% for stripes and 5% for the building.
- ³ All VOC content parameters were obtained from CalEEMod Appendix G Table G-17 for BAAQMD except for the indoor paint VOC content of 10 g/L, which was obtained from the City's conditions of approval.
- ⁴ Calculated based on CalEEMod assumption that 1 gallon of paint covers 180 square feet and that building area is assumed to be 75% interior surfaces and 25% exterior shell except for parking land uses which are 90% interior surfaces and 10% exterior shell.

Abbreviations:

CalEEMod - California Emissions Estimator Model	L - liter
EF - Emission Factor	lb - pound
g - gram(s)	VOC - Volatile Organic Compound

References:

California Air Pollution Control Officers Association (CAPCOA). California Emissions Estimator Model (CalEEMod), Version 2022.1. Available online at <http://www.caleemod.com/>

Table 9
Summary of Criteria Air Pollutants Emissions from Existing Conditions and Project Operations
Stanford Belmont Project
Belmont, CA

Emissions Source	CAP Emissions ¹							
	(ton/year)				(lb/day) ²			
	ROG	NO _x	PM ₁₀	PM _{2.5}	ROG	NO _x	PM ₁₀	PM _{2.5}
Existing Conditions^{3,4}								
Architectural Coating	0.072	--	--	--	0.40	--	--	--
Consumer Products	1.0	--	--	--	5.4	--	--	--
Landscaping (2030 Emission Factors)	0.5	0.024	0.007	0.005	2.7	0.13	0.039	0.029
Landscaping (2035 Emission Factors)	0.5	0.024	0.007	0.005	2.7	0.13	0.039	0.029
Natural Gas Use	0.044	0.804	0.061	0.061	0.24	4.4	0.33	0.33
Mobile (2030 Emission Factors)	1.12	0.7	1.1	0.20	6.2	4.1	6	1.1
Mobile (2035 Emission Factors)	1.04	0.63	1.1	0.20	5.7	3.5	6	1.1
Total Emissions (2030 Emission Factors)	2.7	1.6	1.2	0.27	15	9	6	1.5
Total Emissions (2035 Emission Factors)	2.6	1.5	1.2	0.26	14	8.0	6	1.4
Full Buildout Conditions⁴								
Architectural Coating	0.16	--	--	--	0.89	--	--	--
Consumer Products	2.3	--	--	--	13	--	--	--
Landscaping	2.16	0.103	0.0308	0.023	11.8	0.56	0.169	0.128
Mobile	0.88	0.79	1.7	0.31	4.8	4.3	10	1.7
Total Emissions	5.5	0.89	1.8	0.34	30	4.9	10	1.8
Partial Buildout Conditions^{4,5}								
Architectural Coating	0.081	--	--	--	0.44	--	--	--
Consumer Products	1.1	--	--	--	6.3	--	--	--
Landscaping	1.08	0.051	0.0154	0.0116	5.9	0.28	0.084	0.064
Mobile	0.47	0.47	0.9	0.16	2.6	2.6	4.8	0.9
2030 Partial Buildout Emissions⁵	2.8	0.52	0.9	0.17	15	2.9	4.9	0.9
Net Emissions⁶								
Net Emissions (2030 Partial to Existing)	0.06	-1.1	-0.3	-0.10	0.3	-5.8	-1.5	-0.5
Net Emissions (2035 Buildout to Existing)	2.9	-0.57	0.613	0.073	15.7	-3.1	3.36	0.40
BAAQMD Thresholds⁷	10	10	15	10	54	54	82	54
Exceed Thresholds?	No	No	No	No	No	No	No	No

Notes:

- ¹ Emissions estimated using methods consistent with CalEEMod® version 2022.1.
- ² Operational emissions shown represent activity and emissions across 365 days per year.
- ³ Operational emissions from existing conditions were calculated using CalEEMod® default data and emission factors based on the existing land use types provided by the Project Sponsor and CalEEMod defaults.
- ⁴ Detailed emissions calculations are presented in Table 10 - Table 20.
- ⁵ Operational emissions were estimated for partial buildout by applying scaling factors on emission activities, and using 2030 emission factors where applicable.
- ⁶ Net emissions were calculated as the difference between buildout emissions and existing condition emissions.
- ⁷ Net emissions were compared to the BAAQMD Thresholds of Significance.

Abbreviations:

CalEEMod® - California Emissions Estimator Model
CAP - Criteria Air Pollutant
lb - pounds
NO_x - nitrogen oxides

PM_{2.5} - PM less than 2.5 microns in diameter
PM₁₀ - PM less than 10 microns in diameter
ROG - reactive organic gases
yr - year

References:

California Air Pollution Control Officers Association (CAPCOA). 2022. California Emissions Estimator Model (CalEEMod), Version 2022.1. Available online at <http://www.caleemod.com/>
Bay Area Air Quality Management District (BAAQMD). 2023. California Environmental Quality Act (CEQA) Air Quality Guidelines. Available at: <https://www.baaqmd.gov/plans-and-climate/california-environmental-quality-act-ceqa/updated-ceqa-guidelines>

Table 10
Trips and Vehicle Miles Traveled for Existing Conditions and Project Operations
Stanford Belmont Project
Belmont, CA

Land Use TypeLand Use		VMT		Trips	
		Daily ¹	Annual ²	Daily ¹	Annual ²
		Miles/day	Miles/year	Trips/day	Trips/year
Existing Conditions					
Educational	University/College (4yr)	20,662	7,541,604	2,859	1,043,535
Residential	Apartments Mid Rise				
Parking	Parking Lot				
Full Buildout Conditions ^{3,4}					
Educational	University/College (4yr)	32,977	12,036,733	1,891	690,215
Educational	University/College (4yr)				
Residential	Apartments Mid Rise				
Parking	Parking Lot				

Notes:

- ¹. The daily VMT and daily trips were provided by the Traffic Consultant.
- ². Annual VMT and annual trips were calculated by multiplying the daily rates by 365 days/year. This results in conservative estimates because the Project is likely to have less weekend travel activities than weekday's.
- ³. Project's trip generation assumes a 19.2% reduction from the implementation of Stanford's transportation demand management (TDM) plan. The implementation of the TDM is considered a Project feature.
- ⁴. The increase in Project-generated VMT compared to baseline conditions is due to the assumed change in the composition of the population, with proportionately more faculty and staff assumed under Project conditions compared to baseline conditions. Faculty and staff are assumed to travel longer distances than students.

Table 11
Mobile Emission Factors
Stanford Belmont Project
Belmont, CA

Year	Fleet Mix ¹												
	LDA	LDT1	LDT2	LHDT1	LHDT2	MHDT	HHDT	MCY	MDV	MH	OBUS	SBUS	UBUS
2030	39.3%	4.1%	30.9%	3.2%	0.7%	0.8%	0.2%	2.5%	17.8%	0.2%	0.2%	0.0%	0.1%
2035	35.9%	4.0%	32.7%	3.4%	0.8%	0.8%	0.2%	2.6%	19.0%	0.2%	0.2%	0.0%	0.1%

Year	CAP Emission Factors ²											
	ROG		NO _x		CO		SO _x		PM ₁₀		PM _{2.5}	
	g/mile	g/trip	g/mile	g/trip	g/mile	g/trip	g/mile	g/trip	g/mile	g/trip	g/mile	g/trip
2030	0.026	0.79	0.058	0.23	0.72	2.5	0.0029	6.6E-04	0.020	0.0016	0.0070	0.0015
2035	0.025	0.72	0.047	0.21	0.69	2.2	0.0027	6.2E-04	0.020	0.0012	0.0068	0.0011

Year	GHG Emission Factors ²									
	CO ₂		CH ₄		N ₂ O		HFC		CO ₂ e	
	g/mile	g/trip	g/mile	g/trip	g/mile	g/trip	g/mile	g/trip	g/mile	g/trip
2030	291	67	0.0055	0.050	0.0078	0.026	1.8E-04	--	294	76
2035	273	63	0.0051	0.042	0.0070	0.025	8.4E-05	--	276	71

Notes:

- ¹ Emission factors for each fleet type were developed by creating weighted emission factors based on the vehicle classes in each fleet type. EMFAC2021 emissions were summed across each year for each vehicle class within a fleet type, then a vehicle class emission factor based on VMT and trip counts for the vehicle class was calculated. Emission factors for each vehicle class within a fleet type were weighted based on total EMFAC VMT and trips to create a fleet-wide emission factor for each year.

Abbreviations:

CAP - Criteria Air Pollutants	EMFAC - California Air Resources Board EMISSION FACTOR model
ROG - Reactive organic gases	VMT - Vehicle miles traveled
NO _x - Nitrogen oxides	LDA - light-duty automobiles
CO - carbon monoxide	LDT - light-duty trucks
SO _x - sulfur oxides	LHDT - light-heavy duty trucks
PM ₁₀ - Particulate matter less than 10 microns in diameter	MHDT - medium-heavy duty trucks
PM _{2.5} - Particulate matter less than 2.5 microns in diameter	HHDT - heavy-heavy duty trucks
CO ₂ e - Carbon dioxide equivalent	UBUS - urban buses

References:

California Air Resources Board (ARB) 2021. EMFAC2021. Available at: <https://ww2.arb.ca.gov/our-work/programs/mobile-source-emissions-inventory/msei-modeling-tools>

Table 12
Operational Silt Loading Emission Factors
Stanford Belmont Project
Belmont, CA

Entrained Roadway Dust Constants for San Mateo County		
Roadway Category	Silt Loading¹ (g/m²)	Travel Fraction¹
Freeway	0.015	63%
Major	0.032	27%
Collector	0.032	5%
Local - Urban	0.32	5%
Weighted Silt Loading Factor	0.036	100%

Notes:

- ¹. Travel fraction by roadway category and silt loading are based on ARB's Entrained Road Travel Emission Inventory Source Methodology Tables 2 and 4, respectively.

Abbreviations:

ARB - Air Resources Board
g - gram(s)
m - meter

References:

California Air Resources Board (ARB) 2021. Miscellaneous Process Methodology 7.9. Available here:
https://ww3.arb.ca.gov/ei/areasrc/fullpdf/2021_paved_roads_7_9.pdf

Table 13a
Operational Fugitive Road Dust Emission Factors
Stanford Belmont Project
Belmont, CA

Road Dust Equation¹

$$E \text{ [lb/VMT]} = [k \cdot (sL)^{0.91} \cdot (W)^{1.02}] \cdot (1 - P/4N)$$

Parameters ^{2,3}	Value
E = annual average emission factor in the same units as k	[calculated]
k = particle size multiplier for particle size range	
PM ₁₀ (lb/VMT)	0.0022
PM _{2.5} (lb/VMT)	3.3E-04
sL = roadway silt loading [grams per square meter - g/m ²]	0.036
W = average weight of vehicles traveling the road [tons]	2.4
P = number of "wet" days in county with at least 0.01 in of precipitation during the annual averaging period ³	74
N = number of days in the averaging period	365

Entrained Road Dust Emission Factors	
PM ₁₀ Emission Factor [lb/VMT]	2.46E-04
PM _{2.5} Emission Factor [lb/VMT]	3.69E-05

Notes:

- ¹ Road dust equation and parameters are from the California Air Resources Board's (ARB) 2021 Miscellaneous Process Methodology 7.9 for Entrained Road Travel, Paved Road Dust.
- ² The silt loading emission factor assumes San Mateo County default roadway fractions and silt loading levels from ARB 2021. Other parameters (average weight of vehicles, size multipliers) are from ARB 2021. PM_{2.5} is assumed to be 15% of PM₁₀ based on paved road dust sampling in California (ARB Speciation Profile #471), which is a more representative fraction than provided in the older AP-42 fugitive dust methodology as discussed in ARB 2021 (page 17).
- ³ The number of "wet" days for San Mateo is from the California Air Resources Board's (ARB) 2021 Miscellaneous Process Methodology 7.9 Table 5.

Abbreviations:

ARB - California Air Resources Board	lb - pound
CalEEMod - California Emissions Estimator Model	PM _{2.5} - particulate matter less than 2.5 microns
EMFAC - Emission FACTor Model	VMT - vehicle miles traveled
g - gram	

References:

- California Air Resources Board (ARB). 2021. Miscellaneous Process Methodology 7.9, Entrained Road Travel, Paved Road Dust. March. Available online at: https://ww3.arb.ca.gov/ei/areasrc/fullpdf/2021_paved_roads_7_9.pdf
- California Air Pollution Control Officers Association (CAPCOA). California Emissions Estimator Model (CalEEMod), Version 2022.1. Available online at <http://www.caleemod.com/>

Table 13b
Construction Fugitive Road Dust Emission Factors
Stanford Belmont Project
Belmont, CA

Road Dust Equation¹

$$E \text{ [lb/VMT]} = [k * (sL)^{0.91} * (W)^{1.02}] * (1 - P/4N)$$

Parameters ^{2,3}	Value
E = annual average emission factor in the same units as k	[calculated]
k = particle size multiplier for particle size range PM _{2.5} (lb/VMT)	3.3E-04
sL = roadway silt loading [grams per square meter - g/m ²]	0.5
W = average weight of vehicles traveling the road [tons]	2.4
P = number of "wet" days in county with at least 0.01 in of precipitation during the annual averaging period ³	74
N = number of days in the averaging period	365

Entrained Road Dust Emission Factors	
PM _{2.5} Emission Factor [lb/VMT]	4.07E-04

Notes:

- ¹ Road dust equation and parameters are from the California Air Resources Board's (ARB) 2021 Miscellaneous Process Methodology 7.9 for Entrained Road Travel, Paved Road Dust.
- ² The silt loading emission factor is obtained from Appendix D of BAAQMD's 2022 CEQA Air Quality Guidelines, assuming vehicle travel on roads with at least 5,000 vehicles per day under worst-case conditions.
- ³ The number of "wet" days for San Mateo is from the California Air Resources Board's (ARB) 2021 Miscellaneous Process Methodology 7.9 Table 5.

Abbreviations:

ARB - California Air Resources Board	lb - pound
CalEEMod - California Emissions Estimator Model	PM _{2.5} - particulate matter less than 2.5 microns
EMFAC - Emission FACTor Model	VMT - vehicle miles traveled
g - gram	

References:

Bay Area Air Quality Management District (BAAQMD). 2023. California Environmental Quality Act (CEQA) Air Quality Guidelines. Appendix D Available at: <https://www.baaqmd.gov/plans-and-climate/california-environmental-quality-act-ceqa/updated-ceqa-guidelines>

California Air Resources Board (ARB). 2021. Miscellaneous Process Methodology 7.9, Entrained Road Travel, Paved Road Dust. March. Available online at: https://ww3.arb.ca.gov/ei/areasrc/fullpdf/2021_paved_roads_7_9.pdf

California Air Pollution Control Officers Association (CAPCOA). California Emissions Estimator Model (CalEEMod), Version 2022.1. Available online at <http://www.caleemod.com/>

Table 14
Operational Mobile Emissions of Criteria Air Pollutants and Greenhouse Gases
Stanford Belmont Project
Belmont, CA

Fleet Type	Year	CAP Emissions ³										GHG Emissions				
		ROG	NO _x	CO	SO _x	PM ₁₀	PM _{2.5}	ROG	NO _x	PM ₁₀	PM _{2.5}	CO ₂	CH ₄	N ₂ O	HFC	CO ₂ e
		tons/year						lbs/day				MT/year				
Existing Conditions ^{1,2}	2030	1.1	0.7	9	0.025	1.1	0.20	6.2	4.1	6	1.1	2,268	0.09	0.09	0.0014	2,298
	2035	1.0	0.63	8	0.023	1.1	0.20	5.7	3.5	6	1.1	2,127	0.08	0.08	0.0006	2,154
2030 Partial Buildout ^{1,2}	2030	0.47	0.47	5.7	0.019	0.9	0.16	2.6	2.6	4.8	0.9	1,777	0.051	0.056	0.0011	1,797
Full Buildout Conditions ^{1,2}	2035	0.9	0.8	11	0.036	1.7	0.31	4.8	4.3	10	1.7	3,334	0.09	0.10	0.0010	3,368

Notes:

^{1.} Daily trip rates and VMT were provided by the Transportation Consultant, for more detail see Table 10.

^{2.} Annual trips and VMT are calculated assuming 365 days of operation per year for all fleets.

^{3.} Criteria air pollutants are calculated by year using emission factors for the associated year and fleet from EMFAC2021. Project emission factors are shown in Table 11 and Table 13a.

Abbreviations:

CAP - Criteria Air Pollutants
 ROG - Reactive organic gases
 NO_x - Nitrogen oxides
 CO - carbon monoxide

SO_x - sulfur oxides
 PM₁₀ - Particulate matter less than 10 microns in diameter
 PM_{2.5} - Particulate matter less than 2.5 microns in diameter
 GHG - Greenhouse gas

CO₂ - Carbon dioxide
 CH₄ - Methane
 N₂O - Nitric oxide
 HFC - Hydrofluorocarbons
 CO₂e - Carbon dioxide equivalent
 lb - pound
 VMT- vehicle miles traveled

References:

California Air Resources Board (ARB) 2021. EMFAC2021. Available at: <https://ww2.arb.ca.gov/our-work/programs/mobile-source-emissions-inventory/msei-modeling-tools>

Table 15
Landscaping Emissions from Existing Conditions and Project Operations
Stanford Belmont Project
Belmont, CA

Land Use Type	Year	Landscape Equipment	Horsepower ²	Load Factor	Usage	Emissions from Landscaping Equipment ¹						
						ROG	TOG	NOx	PM ₁₀	PM _{2.5}	Non-Biogenic CO ₂ e	
					(hr/yr)	(tons/yr)					(MT/yr)	
Existing Conditions (2030 Emission Factors)												
Non-Residential	2013	Chainsaws	1.9	0.70	410	0.028	0.030	8.5E-04	3.2E-04	2.4E-04	0.37	
		Chainsaws Preempt	1.9	0.70	221	0.022	0.024	7.6E-04	1.7E-04	1.3E-04	0.20	
		Lawn Mowers	3.9	0.36	592	0.023	0.024	0.0058	8.5E-04	6.5E-04	0.57	
		Leaf Blowers/Vacuums	1.8	0.94	848	0.063	0.068	0.0010	9.0E-04	6.8E-04	1.3	
		Leaf Blowers/Vacuums	4.5	0.94	87	0.063	0.068	0.0010	9.0E-04	6.8E-04	1.3	
		Other Lawn & Garden Equipment	6.1	0.58	6.0	2.5E-04	2.6E-04	5.5E-05	2.1E-07	1.6E-07	0.014	
		Riding Mowers	21	0.38	50	0.0044	0.0047	0.0011	4.5E-06	3.6E-06	0.26	
		Tillers	1.4	0.40	0.52	2.1E-05	2.2E-05	8.4E-08	3.2E-08	2.4E-08	2.7E-04	
		Tillers	4.4	0.40	0.86	2.1E-05	2.2E-05	8.4E-08	3.2E-08	2.4E-08	2.7E-04	
		Trimmers/Edgers/Brush Cutters	1.1	0.91	662	0.029	0.031	7.2E-04	2.5E-04	1.9E-04	0.65	
Residential		Chainsaws	1.9	0.70	105	0.028	0.030	8.5E-04	3.2E-04	2.4E-04	0.37	
		Chainsaws Preempt	1.9	0.70	57	0.022	0.024	7.6E-04	1.7E-04	1.3E-04	0.20	
		Chippers/Stump Grinders/Shredder Preempt	4.9	0.78	0.8	1.7E-04	1.7E-04	7.3E-06	3.2E-08	2.6E-08	0.0019	
		Lawn Mowers	3.9	0.36	317	0.023	0.024	0.0058	8.5E-04	6.5E-04	0.57	
		Leaf Blowers/Vacuums	1.8	0.94	76	0.063	0.068	0.0010	9.0E-04	6.8E-04	1.3	
		Leaf Blowers/Vacuums	4.5	0.94	8	0.063	0.068	0.0010	9.0E-04	6.8E-04	1.3	
		Other Lawn & Garden Equipment	6.1	0.58	2.2	2.5E-04	2.6E-04	5.5E-05	2.1E-07	1.6E-07	0.014	
		Riding Mowers	21	0.38	141	0.0044	0.0047	0.0011	4.5E-06	3.6E-06	0.26	
		Tillers	1.4	0.40	3.3	2.1E-05	2.2E-05	8.4E-08	3.2E-08	2.4E-08	2.7E-04	
		Tillers	4.4	0.40	5.5	2.1E-05	2.2E-05	8.4E-08	3.2E-08	2.4E-08	2.7E-04	
		Trimmers/Edgers/Brush Cutters	1.1	0.91	138	0.029	0.031	7.2E-04	2.5E-04	1.9E-04	0.65	
		Trimmers/Edgers/Brush Cutters	1.7	0.91	34	0.029	0.031	7.2E-04	2.5E-04	1.9E-04	0.65	
		Wood Splitters	6.9	0.69	25	0.0031	0.0033	0.0008	1.7E-06	1.3E-06	0.08	
		Total Existing Landscaping Emissions (2030 Emission Factors)					0.50	0.54	0.024	0.0071	0.0053	10
		Existing Conditions (2035 Emission Factors)										
Non-Residential		Chainsaws	1.9	0.70	410	0.028	0.030	8.5E-04	3.2E-04	2.4E-04	0.37	
		Chainsaws Preempt	1.9	0.70	221	0.022	0.024	7.6E-04	1.7E-04	1.3E-04	0.20	
		Lawn Mowers	3.9	0.36	592	0.023	0.024	0.0058	8.6E-04	6.5E-04	0.57	
		Leaf Blowers/Vacuums	1.8	0.94	848	0.063	0.068	0.0010	9.0E-04	6.8E-04	1.3	
		Leaf Blowers/Vacuums	4.5	0.94	87	0.063	0.068	0.0010	9.0E-04	6.8E-04	1.3	
		Other Lawn & Garden Equipment	6.1	0.58	6.0	2.5E-04	2.6E-04	5.5E-05	2.1E-07	1.6E-07	0.014	
		Riding Mowers	21	0.38	50	0.0044	0.0047	0.0011	4.5E-06	3.6E-06	0.26	
		Tillers	1.4	0.40	0.52	2.1E-05	2.2E-05	8.4E-08	3.2E-08	2.4E-08	2.7E-04	
		Tillers	4.4	0.40	0.86	2.1E-05	2.2E-05	8.4E-08	3.2E-08	2.4E-08	2.7E-04	
		Trimmers/Edgers/Brush Cutters	1.1	0.91	662	0.029	0.031	7.2E-04	2.5E-04	1.9E-04	0.65	

Table 15
Landscaping Emissions from Existing Conditions and Project Operations
Stanford Belmont Project
Belmont, CA

Land Use Type	Year	Landscape Equipment	Horsepower ²	Load Factor	Usage	Emissions from Landscaping Equipment ¹					
						ROG	TOG	NOx	PM ₁₀	PM _{2.5}	Non-Biogenic CO _{2e}
					(hr/yr)	(tons/yr)					(MT/yr)
Residential	2013	Chainsaws	1.9	0.70	105	0.028	0.030	8.5E-04	3.2E-04	2.4E-04	0.37
		Chainsaws Preempt	1.9	0.70	57	0.022	0.024	7.6E-04	1.7E-04	1.3E-04	0.20
		Chippers/Stump Grinders/Shredder Preempt	4.9	0.78	0.8	1.7E-04	1.7E-04	7.3E-06	3.2E-08	2.6E-08	0.0019
		Lawn Mowers	3.9	0.36	317	0.023	0.024	0.0058	8.6E-04	6.5E-04	0.57
		Leaf Blowers/Vacuums	1.8	0.94	76	0.063	0.068	0.0010	9.0E-04	6.8E-04	1.3
		Leaf Blowers/Vacuums	4.5	0.94	8	0.063	0.068	0.0010	9.0E-04	6.8E-04	1.3
		Other Lawn & Garden Equipment	6.1	0.58	2.2	2.5E-04	2.6E-04	5.5E-05	2.1E-07	1.6E-07	0.014
		Riding Mowers	21	0.38	141	0.0044	0.0047	0.0011	4.5E-06	3.6E-06	0.26
		Tillers	1.4	0.40	3.3	2.1E-05	2.2E-05	8.4E-08	3.2E-08	2.4E-08	2.7E-04
		Tillers	4.4	0.40	5.5	2.1E-05	2.2E-05	8.4E-08	3.2E-08	2.4E-08	2.7E-04
		Trimmers/Edgers/Brush Cutters	1.1	0.91	138	0.029	0.031	7.2E-04	2.5E-04	1.9E-04	0.65
		Trimmers/Edgers/Brush Cutters	1.7	0.91	34	0.029	0.031	7.2E-04	2.5E-04	1.9E-04	0.65
Wood Splitters	6.9	0.69	25	0.0031	0.0032	0.0008	1.3E-06	1.1E-06	0.08		
Total Existing Landscaping Emissions (2035 Emission Factors)						0.50	0.54	0.024	0.0071	0.0053	10
2030 Partial Buildout Conditions											
Non-Residential	2030	Chainsaws	1.9	0.70	893	0.061	0.066	0.0019	7.0E-04	5.3E-04	0.81
		Chainsaws Preempt	1.9	0.70	481	0.048	0.052	0.0017	3.8E-04	2.9E-04	0.43
		Lawn Mowers	3.9	0.36	1,290	0.049	0.052	0.013	0.0019	0.0014	1.2
		Leaf Blowers/Vacuums	1.8	0.94	1,848	0.14	0.15	0.0022	0.0020	0.0015	2.8
		Leaf Blowers/Vacuums	4.5	0.94	191	0.14	0.15	0.0022	0.0020	0.0015	2.8
		Other Lawn & Garden Equipment	6.1	0.58	13	5.5E-04	5.7E-04	1.2E-04	4.6E-07	3.6E-07	0.030
		Riding Mowers	21	0.38	109	0.010	0.010	0.0024	9.7E-06	7.8E-06	0.57
		Tillers	1.4	0.40	1.1	4.5E-05	4.7E-05	1.8E-07	7.0E-08	5.2E-08	5.9E-04
		Tillers	4.4	0.40	1.9	4.5E-05	4.7E-05	1.8E-07	7.0E-08	5.2E-08	5.9E-04
		Trimmers/Edgers/Brush Cutters	1.1	0.91	1,444	0.063	0.069	0.0016	5.4E-04	4.0E-04	1.4
Residential		Chainsaws	1.9	0.70	83	0.061	0.066	0.0019	7.0E-04	5.3E-04	0.81
		Chainsaws Preempt	1.9	0.70	45	0.048	0.052	0.0017	3.8E-04	2.9E-04	0.43
		Chippers/Stump Grinders/Shredder Preempt	4.9	0.78	0.61	1.3E-04	1.3E-04	5.8E-06	2.5E-08	2.0E-08	0.0015
		Lawn Mowers	3.9	0.36	250	0.049	0.052	0.013	0.0019	0.0014	1.2
		Leaf Blowers/Vacuums	1.8	0.94	60	0.14	0.15	0.0022	0.0020	0.0015	2.8
		Leaf Blowers/Vacuums	4.5	0.94	6.2	0.14	0.15	0.0022	0.0020	0.0015	2.8
		Other Lawn & Garden Equipment	6.1	0.58	1.7	5.5E-04	5.7E-04	1.2E-04	4.6E-07	3.6E-07	0.030
		Riding Mowers	21	0.38	111	0.010	0.010	0.0024	9.7E-06	7.8E-06	0.57
		Tillers	1.4	0.40	2.6	4.5E-05	4.7E-05	1.8E-07	7.0E-08	5.2E-08	5.9E-04
		Tillers	4.4	0.40	4.4	4.5E-05	4.7E-05	1.8E-07	7.0E-08	5.2E-08	5.9E-04
		Trimmers/Edgers/Brush Cutters	1.1	0.91	108	0.063	0.069	0.0016	5.4E-04	4.0E-04	1.4
		Trimmers/Edgers/Brush Cutters	1.7	0.91	27	0.063	0.069	0.0016	5.4E-04	4.0E-04	1.4
		Wood Splitters	6.9	0.69	20	0.0025	0.0026	5.9E-04	1.4E-06	1.0E-06	0.060
		2030 Partial Buildout Emissions						1.1	1.2	0.051	0.015

Table 15
Landscaping Emissions from Existing Conditions and Project Operations
Stanford Belmont Project
Belmont, CA

Land Use Type	Year	Landscape Equipment	Horsepower ²	Load Factor	Usage	Emissions from Landscaping Equipment ¹					
						ROG	TOG	NOx	PM ₁₀	PM _{2.5}	Non-Biogenic CO _{2e}
					(hr/yr)	(tons/yr)					(MT/yr)
Full Buildout Conditions											
Non-Residential	2035	Chainsaws	1.9	0.70	1,786	0.12	0.13	0.0037	0.0014	0.0011	1.6
		Chainsaws Preempt	1.9	0.70	963	0.10	0.10	0.0033	7.6E-04	5.7E-04	0.87
		Lawn Mowers	3.9	0.36	2,580	0.10	0.10	0.025	0.0037	0.0028	2.5
		Leaf Blowers/Vacuums	1.8	0.94	3,696	0.27	0.30	0.0044	0.0039	0.0030	5.6
		Leaf Blowers/Vacuums	4.5	0.94	381	0.27	0.30	0.0044	0.0039	0.0030	5.6
		Other Lawn & Garden Equipment	6.1	0.58	26	0.0011	0.0011	2.4E-04	9.2E-07	7.2E-07	0.059
		Riding Mowers	21	0.38	218	0.019	0.020	0.0049	1.9E-05	1.6E-05	1.1
		Tillers	1.4	0.40	2.3	9.0E-05	9.4E-05	3.7E-07	1.4E-07	1.0E-07	0.0012
		Tillers	4.4	0.40	3.7	9.0E-05	9.4E-05	3.7E-07	1.4E-07	1.0E-07	0.0012
Trimmers/Edgers/Brush Cutters		1.1	0.91	2,888	0.13	0.14	0.0031	0.0011	8.1E-04	2.9	
Residential		Chainsaws	1.9	0.70	165	0.12	0.13	0.0037	0.0014	0.0011	1.6
		Chainsaws Preempt	1.9	0.70	89	0.10	0.10	0.0033	7.6E-04	5.7E-04	0.87
		Chippers/Stump Grinders/Shredder Preempt	4.9	0.78	1.2	2.6E-04	2.7E-04	1.2E-05	5.1E-08	4.1E-08	0.0030
		Lawn Mowers	3.9	0.36	499	0.10	0.10	0.025	0.0037	0.0028	2.5
		Leaf Blowers/Vacuums	1.8	0.94	120	0.27	0.30	0.0044	0.0039	0.0030	5.6
		Leaf Blowers/Vacuums	4.5	0.94	12	0.27	0.30	0.0044	0.0039	0.0030	5.6
		Other Lawn & Garden Equipment	6.1	0.58	3.5	0.0011	0.0011	2.4E-04	9.2E-07	7.2E-07	0.059
		Riding Mowers	21	0.38	222	0.019	0.020	0.0049	1.9E-05	1.6E-05	1.1
		Tillers	1.4	0.40	5.3	9.0E-05	9.4E-05	3.7E-07	1.4E-07	1.0E-07	0.0012
		Tillers	4.4	0.40	8.7	9.0E-05	9.4E-05	3.7E-07	1.4E-07	1.0E-07	0.0012
		Trimmers/Edgers/Brush Cutters	1.1	0.91	217	0.13	0.14	0.0031	0.0011	8.1E-04	2.9
		Trimmers/Edgers/Brush Cutters	1.7	0.91	53	0.13	0.14	0.0031	0.0011	8.1E-04	2.9
		Wood Splitters	6.9	0.69	40	0.0048	0.0050	0.0012	2.1E-06	1.7E-06	0.12
		Total 2035 Buildout Emissions					2.2	2.3	0.10	0.031	0.023

Notes:

¹. Landscape emissions are calculated using default values for landscaping equipment, equipment usage, and equipment HP rating from CalEEMod 2022.1.0 Appendix G (Tables G-24 and G-27), and the nonresidential land use square footage and number of dwelling units of residential land use for existing and full buildout conditions. All landscaping equipment is assumed to be powered by gasoline.

Abbreviations:

CalEEMod - California Emissions Estimator Model
hr - hour
PM_{2.5} - PM less than 2.5 microns in diameter
PM₁₀ - PM less than 10 microns in diameter

NO_x - nitrogen oxides
PM - particulate matter
ROG - reactive organic gases
yr - year

References:

California Air Pollution Control Officers Association (CAPCOA). California Emissions Estimator Model (CalEEMod), Version 2022.1. Available online at <http://www.caleemod.com/>

Table 16
Architectural Coating Emissions from Existing Conditions and Project Operations
Stanford Belmont Project
Belmont, CA

Land Use Type	Building Area	Building Surface Area ¹	Painted Parking Stripes Area ¹	Application Rate ²	Indoor or Parking Stripe Paint VOC EF	Outdoor Paint VOC EF	Architectural Coating VOC Emissions ⁴	Architectural Coating VOC Emissions
	sqft	sqft	sqft		g/L	g/L	lb/yr	tons/yr
Existing Conditions								
Educational	176,622	353,244	--	0.10	10	150	74	0.037
Residential	122,429	330,558	--	0.10	10	150	69	0.034
Parking	249,600	12,480	14,976	0.10	10	100	1.8	9.0E-04
Total Existing Conditions Emissions							144	0.07
Full Buildout Conditions								
Educational	75,000	150,000	--	0.10	10	150	31	0.016
Educational	425,000	850,000	--	0.10	10	150	177	0.089
Residential	200,000	540,000	--	0.10	10	150	113	0.056
Parking	270,000	--	16,200	0.10	10	100	0.75	3.8E-04
	270,000	13,500	16,200	0.10	10	100	1.9	0.0010
Total 2035 Buildout Emissions							324	0.16
2030 Partial Buildout Emissions ⁵							162	0.081

Notes:

- ¹. Consistent with CalEEMod Appendix C, residential building surface area was assumed to be 2.7 times the floor area, and non-residential 2 times the floor area. Also consistent with CalEEMod Appendix C, the parking painted stripes and building area was assumed to be 6% and 5% of the total surface area for surface lots respectively.
- ². Consistent with CalEEMod Appendix C, 10% of all surfaces were assumed to be coated each year.
- ³. All VOC content parameters were obtained from CalEEMod Appendix G Table G-17 for BAAQMD except for the indoor paint VOC content of 10 g/L, which was obtained from the City's conditions of approval.
- ⁴. Uses CalEEMod Appendix C assumption that 1 gallon of paint covers 180 square feet. Building surface area is assumed to be 75% indoors and 25% outdoors, consistent with CalEEMod Appendix C. Parking garages are assumed to have 90% indoor areas and 10% outdoor.
- ⁵. Partial buildout emissions were calculated from full buildout using scaling factors by land use type and phase.

Abbreviations:

BAAQMD - Bay Area Air Quality Management District
 CalEEMod - California Emissions Estimator Model
 EF - emission factor
 yr - year

g - grams
 L - liters
 lb - pound

References:

California Air Pollution Control Officers Association (CAPCOA). California Emissions Estimator Model (CalEEMod), Version 2022.1. Available online at <http://www.caleemod.com/>

Table 17
Consumer Product Emission Factor Refinement
Stanford Belmont Project
Belmont, CA

Year	Consumer Products ROG inventory (tons/day)¹	Total Building Square Footage²	Consumer Products VOC Emission Factor (lb/square foot/day)
2020	5.29	604,287,813	1.75E-05

Notes:

- ¹. ROG consumer products inventory obtained from California Emissions Projection Analysis Model for San Mateo County.
- ². Total building square footage in San Mateo County for 2020 was obtained from FEMA HAZUS-MH software (version 6.0).

Abbreviations:

lb - pound

ROG - Reactive Organic Compounds

References:

California Air Resources Board. California Emissions Projection Analysis Model, CEPAM2019v1.03. Available online at <https://ww2.arb.ca.gov/applications/cepam2019v103-standard-emission-tool>.

State of California Department of Finance. P-3: Complete State and County Projections Dataset. Available online at <https://dof.ca.gov/forecasting/demographics/projections/>.

US Federal Emergency Management Agency's Hazus software (HAZUS-MH), Version 6.0. Available online at <https://msc.fema.gov/portal/resources/hazus>.

Table 18
Consumer Product Emissions from Existing Conditions and Project Operations
Stanford Belmont Project
Belmont, CA

Land Use Type	Building Area	Consumer Products VOC EF ¹	Days per Year	Consumer Products VOC emissions ^{1,2}	Consumer Products VOC emissions
	sqft	lb/sqft/day		lb/yr	tons/yr
Existing Conditions					
Educational	176,622	1.8E-05	365	1130	0.6
Residential	122,429	1.8E-05	365	783	0.4
Parking	249,600	5.7E-07	365	52	0.0
Total Existing Conditions Emissions				1,964	1.0
Full Buildout Conditions					
Educational	75,000	1.8E-05	365	480	0.2
Educational	425,000	1.8E-05	365	2,718	1.4
Residential	200,000	1.8E-05	365	1,279	0.640
Parking	270,000	5.7E-07	365	56	0.028
Parking	270,000	5.7E-07	365	56	0.028
Total 2035 Buildout Emissions				4,589	2.3
2030 Partial Buildout Emissions ²				2,294	1.1

Notes:

- ¹. Consumer product VOC EFs for general land use was calculated in Table 17. Consumer product VOC EFs for parking land use was taken from CalEEMod 2022 Appendix C. These defaults take into account degreaser use in parking areas.
- ². Partial buildout emissions were calculated from full buildout using scaling factors by land use type and phase.

Abbreviations:

CalEEMod - California Emissions Estimator Model
VOC - volatile organic compounds
EF - emission factor

lb - pound
yr - year

References:

California Air Pollution Control Officers Association (CAPCOA). California Emissions Estimator Model (CalEEMod), Version 2022.1. Available online at <http://www.caleemod.com/>

Table 19
Energy Usage for Existing Conditions and Proposed Project
Stanford Belmont Project
Belmont, CA

Land Use Type	CalEEMod Land Use Subtype	Size	Size Units	Electricity Usage ^{1,2}	Natural Gas Usage ¹	Electricity to Replace Natural Gas ³	Total Building Energy Consumption ⁶
				MWhr/yr	MMBtu/yr	MWhr/yr	MWhr/yr
Existing Conditions ⁴							
Educational	University/College (4yr)	2030	Students	1,771	16,409	--	6,580
Full Buildout Conditions							
Educational	University/College (4yr)	75	ksf	428	--	153	582
Educational	University/College (4yr)	425	ksf	2,428	--	869	3,297
Residential	Apartments Mid Rise	200	DU	682	--	456	1,138
Parking	Parking Lot	675	ksf	591	--	--	591
Parking	Enclosed Parking with Elevator	675	ksf	2,363	--	--	2,363
Total 2035 Buildout Energy Usage				6,493	0	1,478	7,971
2030 Partial Buildout Energy Usage ⁵				3,247	0	739	3,986

Notes:

- ¹ Energy usage of the Project is based on energy intensity from CalEEMod 2022 defaults for the land uses specified in the "CalEEMod Land Use SubType" column.
- ² Electricity consumption in buildings exclude electricity supplied by electric vehicle charging stations, which are accounted for in mobile energy consumption.
- ³ Because the Project has committed to installing no natural gas infrastructure, electricity usage to replace natural gas usage is estimated based on the method developed in Table A-9 of the SMAQMD Greenhouse Gas Threshold Report.
- ⁴ Energy usage for Existing Conditions was calculated based on energy usage at the NDNu campus from 2018 to 2020.
- ⁵ Partial buildout energy use was calculated from full buildout using the scaling factors in Table 1.
- ⁶ For Existing Conditions, total building energy consumption includes electricity usage and natural gas usage, converted to MWhr/yr.

Abbreviations:

CalEEMod - California Emissions Estimator Model
 Cogen - Cogeneration Plant

MWh - Megawatt Hour
 MMBtu - Metric million British thermal unit

References:

Pacific Architects and Engineers (PAE). January 12, 2023. Parkline - Building Energy & Water Preliminary Estimates Memo.

Table 20
Energy Emissions from Existing Conditions and Proposed Project
Stanford Belmont Project
Belmont, CA

Land Use Type	Year	CalEEMod Land Use Subtype	Natural Gas Emissions ^{1,2,3}					Electricity GHG Emissions ^{3,4}
			ROG	NOx	PM ₁₀	PM _{2.5}	Non-Biogenic CO ₂ e	Non-Biogenic CO ₂ e
			ton/yr				MT/yr	MT/yr
Existing Conditions								
Educational	2030	University/College (4yr)	0.044	0.80	0.061	0.061	873	79
Educational	2035	University/College (4yr)	0.044	0.80	0.061	0.061	873	72
Full Buildout Conditions ⁵								
Educational	2035	University/College (4yr)	--	--	--	--	--	0
Educational		University/College (4yr)	--	--	--	--	--	0
Residential		Apartments Mid Rise	--	--	--	--	--	0
Parking		Parking Lot	--	--	--	--	--	0
Parking		Enclosed Parking with Elevator	--	--	--	--	--	0
Total 2035 Buildout Emissions			--	--	--	--	--	0
2030 Partial Buildout Emissions ⁴			--	--	--	--	--	0

Notes:

- ¹ The Project would not construct natural gas infrastructure or use natural gas for operations, therefore, there would be no emissions from natural gas use for project operations.
- ² CAP emissions result from the combustion of natural gas. As a result, CAP emissions were only calculated for natural gas use for existing conditions.
- ³ Energy Use values, shown in Table 19, were obtained using CalEEMod default values and the method developed in Table A-9 of the SMAQMD Greenhouse Gas Threshold Report to determine electricity to replace natural gas.
- ⁴ Partial buildout emissions were calculated using a 50% scaling factor for land use size and carbon intensity values from 2030.
- ⁵ Based on the Conceptual Development Plan application, all electricity used on campus would be generated from renewable sources, and therefore have a carbon intensity factor of zero.

Abbreviations:

CAP - Criteria Air Pollutants
 NOx - Nitrogen oxides
 MT - Metric tons
 CO₂e - Carbon dioxide equivalent

PM - Particulate matter
 yr - year
 GHG - Greenhouse gas

References:

California Air Pollution Control Officers Association (CAPCOA). California Emissions Estimator Model (CalEEMod), Version 2022.1. Available online at <http://www.caleemod.com/>

Table 21
Modeled Emission Rates
Stanford Belmont Project
Belmont, CA

Source Description ^{1,2}		Modeled Source Group Name	Emission Rate (g/s) ⁴	
			PM _{2.5}	DPM
Construction Area Exhaust Emission	Off-Road Equipment	CON	7.3E-04	7.3E-04
	Vendor Trips		1.8E-05	1.9E-05
	Worker Trips		5.0E-05	--
	Hauling Trips		5.3E-06	5.6E-06
Construction Area Fugitive Dust Emission	Fugitive Dust ³	CON_FD	5.8E-04	--
On-Road Vehicular Emissions on Haul Routes Within 1,000-foot Radius of Project Site	Vendor Trips	HAULR1	5.9E-05	2.5E-05
	Worker Trips		2.6E-05	--
	Hauling Trips		2.0E-05	8.0E-06
	Vendor Trips	HAULR2	5.9E-05	2.5E-05
	Worker Trips		2.6E-05	--
	Hauling Trips		2.0E-05	8.0E-06
	Vendor Trips	HAULR3	5.9E-05	2.5E-05
	Worker Trips		2.6E-05	--
	Hauling Trips		2.0E-05	8.0E-06

Notes:

- Emission factors for off-road equipment are based on CalEEMod defaults. Mobile emissions associated with vendor, worker, and hauling trips are described in Table 3 and calculated using EMFAC2021.
- Entrained roadway dust emissions are calculated in Table 26.
- On-site fugitive dust emissions are calculated in Table 22 through Table 25.
- Emission sources are modeled in an air dispersion model assuming construction would occur 8am-5pm Monday-Friday per the City of Belmont's noise ordinance. Outputs from the air dispersion model are annual average unit concentrations. Therefore, emission rates are calculated by dividing total emission of each source by the duration of the construction phase.

Abbreviations:

CalEEMod - California Emissions Estimator Model	lb - pound
DPM - diesel particulate matter	g - gram
PM _{2.5} - particulate matter < 2.5 µm	s - second
EMFAC2021 - California Air Resources Board Emission FACTor model	

References:

California Air Pollution Control Officers Association (CAPCOA). California Emissions Estimator Model (CalEEMod), Version 2022.1. Available online at <http://www.caleemod.com/>

California Air Resources Board (ARB) 2021. EMFAC2021. Available at: <https://ww2.arb.ca.gov/our-work/programs/mobile-source-emissions-inventory/msei-modeling-tools>

Table 22
Fugitive Dust Emissions from Building Demolition Waste
Stanford Belmont Project
Belmont, CA

Source Assignment	Year	Number of Days	Building Waste ¹	PM _{2.5} Emission Factor - Mechanical or Explosive Dismemberment ²	PM _{2.5} Emission Factor - Debris Loading ³	PM _{2.5} Emissions ⁴	
		days	ton	lb/ton	lb/ton	lb/day	ton/yr
Construction Area	1	26	11,153	4.5E-04	0.0031	0.966	1.3E-02

Notes:

1. Demolition building square footage was calculated by summing the square footages for all existing buildings on the site except for the three historic buildings that will remain (Taube Center, Madison Art Center and Ralston Hall Mansion). Building waste in ton was converted from square footage using the CalEEMod default conversion 0.046 ton/ft².
2. Emission factor calculated following guidance in the CalEEMod User's Guide, Appendix C Mechanical or Explosive Dismemberment, which is based of AP 42 Section 13.2.4.3 for batch drop operations. The equation is:

$$EF = k \cdot (0.0032) \cdot (U/5)^{1.3} / (M/2)^{1.4} \text{ (lb/ton of debris)}$$

0.35 = k, PM₁₀ Particle size multiplier (dimensionless)
0.053 = k, PM_{2.5} particle size multiplier (dimensionless)
10.51 = U, mean wind speed (mph)
2 = M, material moisture content (%)
3. Emission factor calculated following guidance in the CalEEMod User's Guide, Appendix C Debris Loading, which is based of AP 42 Section 13.2. The equation is:

$$EF = k \cdot EF_{L-TSP}$$

0.053 = k, PM_{2.5} particle size multiplier (dimensionless)
0.058 = EF_{L-TSP}, lb/ton
4. 36% Fugitive PM emissions reduction will be applied by watering the construction site two times per day per CalEEMod® recommendation.

Abbreviations:

CalEEMod - California Emissions Estimator Model	EF - emission factor
PM _{2.5} - particulate matter less than 2.5 microns in aerodynamic diameter.	lb - pound(s)
TSP - total suspended particulate(s)	

References:

California Air Pollution Control Officers Association (CAPCOA). California Emissions Estimator Model (CalEEMod), Version 2022.1. Available online at <http://www.caleemod.com/>

Table 23
Fugitive Dust Emissions from Off-Road Grading Activity
Stanford Belmont Project
Belmont, CA

Source Assignment	Construction Subphase ¹	Year	Total Work Days (per year)	Equipment	Quantity	Utilization %	CalEEMod Grading rate ²	Maximum Area Disturbed ¹	Grading VMT ²	PM _{2.5} Emission Factor ³	Emissions ⁴
							acre/8hr-day	acre/day	mile/day	lb/VMT	PM _{2.5} lb/yr
Construction Area	Site Preparation	1	16	Rubber Tired Dozers	6	100%	0.50	3.00	2.06	0.17	2.1
	Grading	1	38	Rubber Tired Dozers	2	100%	0.5	1.0	0.7	0.17	2
	Grading	1	38	Graders	2	100%	0.50	1.00	0.69	0.17	1.7
	Grading	1	38	Scrapers	4	100%	1.0	4.0	2.8	0.17	7

Notes:

- ¹ Maximum graded area calculated following guidance in the CalEEMod® User's Guide, Appendix C.
² Based on CalEEMod® default daily acres graded by equipment type, Table G-14, below.

Equipment	Acres Graded per 8 Hour Day
Crawler Tractors	0.5
Graders	0.5
Rubber Tired Dozers	0.5
Scrapers	1

- ³ VMT per day calculated following guidance in the CalEEMod® User's Guide, Appendix C, which is based on AP-42, Section 11.9 for grading equipment. The equation is:
 $A_S = A_S$, acres graded per day (varies by sub-activity); in this case using maximum estimated disturbed acres/day
 $12 = W_b$, blade width of grading equipment (CalEEMod® default) in ft
³ Emission factors calculated following guidance in the CalEEMod® User's Guide, Appendix C, which is based on AP-42, Section 11.9 for grading equipment. The equations are:
 $7.1 = S$, mean vehicle speed (mph) (AP-42 default)
 $0.6 = F_{PM_{10}}$, PM₁₀ scaling factor (AP-42 default)
 $0.031 = F_{PM_{2.5}}$, PM_{2.5} scaling factor (AP-42 default)
⁴ 61% Fugitive PM emissions reduction will be applied by watering the construction site two times per day per CalEEMod® recommendation.

Abbreviations:

CalEEMod® - California Emissions Estimator Model
 EF - emission factor
 ft - feet
 lb - pound(s)

mph - miles per hour
 PM_{2.5} - particulate matter less than 2.5 microns
 VMT - vehicle miles traveled
 yr - year

References:

California Air Pollution Control Officers Association (CAPCOA). California Emissions Estimator Model (CalEEMod), Version 2022.1. Available online at <http://www.caleemod.com/>

Table 24
Fugitive Dust Emissions from Truck Loading Activity
Stanford Belmont Project
Belmont, CA

Source Assignment	Construction Subphase	Year	Number of Days	Haul Trips	Total Material Loaded ¹	Material Loaded	Emission Factor ²	Emissions ³	
							PM _{2.5}	PM _{2.5}	
			days	# trips	ton	ton	lb/ton	lb/day	ton/yr
Construction Area	Demolition	1	26	1,103	11,153	11,153	3.6E-05	0.0061	7.9E-05
	Site Preparation	1	16	8,094	163,710	81,855		0.072	0.0006
	Grading	1	38	8,094		81,855		0.030	0.0006
	Building Construction	1-2	371	--		--		--	--
	Paving	2	28	--		--		--	--
	Architectural Coating	2	28	--		--		--	--

Notes:

- ¹. Total materials loaded for demolition phase was the building waste converted from square feet to tons using a CalEEMod default conversion factor 0.046 ton/ft². Total material loaded for other phases in tons were provided by Project Sponsor.
- ². Emission factor calculated following guidance in the CalEEMod User's Guide, Appendix C, which is based on AP-42, Section 13.2.4 for aggregate handling. The equation is:

$$EF * = k \times (U/5)^{1.3} / (M/2)^{1.4}$$
, where the following default values are used:
0.35 = k, PM₁₀ particle size multiplier
0.053 = k, PM_{2.5} particle size multiplier
4.7 = mean wind speed (U), meters per second
10.51 = mean wind speed (U), miles per hour
12 = material moisture content (M), %
- ³. 61% Fugitive PM emissions reduction will be applied by watering the construction site two times per day per CalEEMod® recommendation.

Abbreviations:

CalEEMod - California Emissions Estimator Model
EF - emission factor
ft² - square feet

PM_{2.5} - particulate matter less than 2.5 microns
lb - pound
yr - year

References:

California Air Pollution Control Officers Association (CAPCOA). California Emissions Estimator Model (CalEEMod), Version 2022.1. Available online at <http://www.caleemod.com/>

Table 25
Fugitive Dust Emissions from Off-Road Bulldozing Activity
Stanford Belmont Project
Belmont, CA

Source Assignment	Construction Subphase ¹	Equipment	Quantity	Utilization %	Avg. Usage Hours per Day	Emission Factor ²	Emissions ³	
						PM _{2.5}	PM _{2.5}	
				%		lb/hr	lb/day	ton/yr
Construction Area	Site Preparation	Rubber Tired Dozers	6	100%	8	4.14E-01	8	0.06
	Grading		2	100%	8	4.14E-01	3	0.05

Notes:

- ¹. Fugitive dust emission factors from site preparation, and grading. The fugitive dust loading/unloading emission factors for paving are assumed to be negligible due to high moisture content of the material.
- ². Emission factor for bulldozing calculated following guidance in the CalEEMod[®] User's Guide, Appendix C, which is based on AP-42, Section 11.9. The equation is:

$$EF_{PM10} = C_{PM15} * s^{(1.5)} / M^{(1.4)} * F_{PM10}$$

$$EF_{PM2.5} = C_{TSP} * s^{(1.2)} / M^{(1.3)} * F_{PM2.5}$$

1 = C_{PM15}
5.7 = C_{TSP}
7.90 = M % (Material moisture content)
6.90 = s%, material silt content
0.105 = F_{PM2.5}, scaling factor
0.75 = F_{PM10}, scaling factor
- ³. 61% Fugitive PM emissions reduction will be applied by watering the construction site two times per day per CalEEMod[®] recommendation.

Abbreviations:

CalEEMod[®] - California Emissions Estimator Model
EF - emission factor
lb - pound

PM_{2.5} - particulate matter less than 2.5 microns
yr - year
hr - hour

References:

California Air Pollution Control Officers Association (CAPCOA). California Emissions Estimator Model (CalEEMod), Version 2022.1. Available online at <http://www.caleemod.com/>

Table 26
Fugitive Dust Emissions for Modeled Entrained Roadway Dust
Stanford Belmont Project
Belmont, CA

Inputs	
Trip Length ¹	
Worker Trip length (miles/trip)	0.56
Vendor Trip Length (miles/trip)	0.56
Hauling Trip Length (miles/trip)	0.56
Entrained Road Dust Emission Factors ²	
PM _{2.5} Emission Factor [lb/VMT]	4.07E-04

Construction Area	Subphase	Year	Construction Days	Worker Trips (trips/day)	Vendor Trips (trips/day)	Hauling Trips (trips/subphase)	Worker VMT (miles)	Vendor VMT (miles)	Hauling VMT (miles)	Total VMT (miles)	Total Emissions (lb/yr)
											PM _{2.5}
Single-Phase	Demolition	1	26	30.0	--	1,103	434	--	614	1,048	0.427
	Site Preparation	1	16	36.0	--	8,094	321	--	4,506	4,826	1.97
	Grading	1	38	40.0	--	8,094	846	--	4,506	5,352	2.18
	Building Construction	1-2	179	646.0	182.0	0	64,370	18,135	--	82,505	33.6
	Building Construction	1-2	192	646.0	182.0	0	69,044	19,452	--	88,497	36.0
	Paving	2	28	30.0	--	--	468	--	--	468	0.190
	Architectural Coating	2	28	130.0	--	--	2,026	--	--	2,026	0.825

Notes:

1. Model trip length were obtained from dividing the total length of haul route segments divided by the number of haul route segments.
2. Entrained road dust emission factors were obtained from Table 13a.

Abbreviations:

PM_{2.5} - Particulate matter less than 2.5 microns
 yr - year

lb - pound
 VMT - Vehicle miles traveled

Table 27
AERMOD Source Parameters
Stanford Belmont Project
Belmont, CA

Construction Sources

Source	Number of Sources ^{1,2}	Source Type	Source Dimension	Release Height ^{3,4}	Initial Vertical Dimension ^{3,4}	Initial Lateral Dimension ³
			meter	meter	meter	meter
Construction Equipment Exhaust ⁴	1	Area	Approximate Equipment Area	5.0	1.16	--
On-Site Fugitive Dust	1	Area	Approximate Equipment Area	0	1.0	--
On-Road Haul Trucks ⁴	Variable	Volume	Road Width + 6m	3.4	3.16	Variable ⁵

Notes

- ¹ Construction off-road equipment and on-site fugitive dust will be modeled as an area source covering the parcel(s) under construction. The number of sources is based on the number of construction phase (single phase).
- ² The number of on-road sources is based on the geometry of the truck or traffic routes.
- ³ Release heights of construction equipment exhaust and on-site fugitive dust are 5 meters and 0 meters, respectively, consistent with guidance from South Coast Air Quality Management District guidance (SCAQMD 2008) for construction sources. Release height for on-site fugitive dust is 1 meter, also consistent with guidance from SCAQMD (SCAQMD 2008). Parameters for on-road haul truck volume sources are based on the BAAQMD's 2022 Guidelines.
- ⁴ Initial vertical dimension of construction equipment exhaust area source is based on the BAAQMD's 2022 Guidelines the vertical dimension of an elevated source divided by 4.3). Release height and initial vertical dimension of on-road haul trucks are also based on the BAAQMD's 2022 Guidelines for trucks' parameters.
- ⁵ Initial lateral dimension is based on source dimension divided 2.15 according to the BAAQMD's 2022 Guidelines.

References:

South Coast Air Quality Management District. 2008. Final Localized Significance Threshold Methodology. July. Available at: <http://www.aqmd.gov/home/rules-compliance/ceqa/air-quality-analysis-handbook/localized-significance-thresholds>

Bay Area Air Quality Management District (BAAQMD). 2023. California Environmental Quality Act (CEQA) Air Quality Guidelines. Available at: <https://www.baaqmd.gov/plans-and-climate/california-environmental-quality-act-ceqa/updated-ceqa-guidelines>

Abbreviations:

AT - averaging time
ASF - Age Sensitivity Factor
BAAQMD - Bay Area Air Quality Management District
DBR - daily breathing rate
ED - exposure duration
EF - exposure frequency
FAH - fraction of time at home
HS - number of hours of source operation per day
DS - number of days of source operation per week

DF - discount factor, set to 1 because offsite worker's schedule falls entirely within the source schedule
 IF_{inh} - intake factor
kg - kilogram
L - liter
 m^3 - cubic meter
OEHHA - Office of Environmental Health Hazard Assessment
MAF - model adjustment factor
HR - number of hours per day for which long-term concentration is calculated
DR - number of days per week for which annual average concentration is calculated

References:

OEHHA. 2015. Air Toxics Hot Spots Program Risk Assessment Guidelines. Guidance Manual for Preparation of Health Risk Assessments. Available at <https://oehha.ca.gov/media/downloads/cmr/2015guidancemanual.pdf>
Bay Area Air Quality Management District (BAAQMD). 2023. California Environmental Quality Act (CEQA) Air Quality Guidelines. Available at: <https://www.baaqmd.gov/plans-and-climate/california-environmental-quality-act-ceqa/updated-ceqa-guidelines>

Table 28
Exposure Parameters
Stanford Belmont Project
Belmont, CA

Receptor Type	Year	Receptor Age Group	Exposure Parameters							
			Daily Breathing Rate (DBR) ¹	Annual Exposure Duration (ED)	Fraction of Time at Home (FAH) ²	Exposure Frequency (EF) ³	Age Sensitivity Factor (ASF) ⁴	Averaging Time (AT)	ASF-Weighted Intake Factor, Inhalation (IF _{inh})	Worker Adjustment Factor ⁵
			[L/kg-day]	[years]	[unitless]	[days/year]		[days]	[m ³ /kg-day]	
Resident ⁶	1	3rd Trimester	361	0.25	1	350	10	25500	0.012	1
	1	Age 0-<2 Years	1090	0.75	1		10		0.112	1
	2	Age 0-<2 Years	1090	1	1		10		0.150	1
Worker	1	Age 16-70 Years	230	1	--	250	1		0.009	4.2
	2	Age 16-70 Years	230	1	--		1		0.009	4.2
High school ⁷	1	Age 2-<16 Years	520	1	--	180	3		0.046	4.2
	2	Age 2-<16 Years	520	1	--		3		0.046	4.2
Elementary School ⁸	1	Age 2-<16 Years	520	1	--	180	3		0.046	4.2
	2	Age 2-<16 Years	520	1	--		3		0.046	4.2
Daycare ⁹	1	Age 0-<2 Years	1090	1	--	350	10		0.628	4.2
	2	Age 0-<2 Years	1090	1	--		10		0.628	4.2
Preschool ¹⁰	1	Age 2-<16 Years	520	1	--	250	3		0.064	4.2
	2	Age 2-<16 Years	520	1	--		3		0.064	4.2

Notes:

- Daily breathing rates for residential receptors and non-residential receptors are consistent with the recommended breathing rates in the BAAQMD's 2022 CEQA Guidelines, Appendix E.
- Fraction of time spent at home is consistent with the recommended value in the BAAQMD's 2022 CEQA Guidelines, Appendix E for residential receptors.
- Exposure frequency was determined as follows:
 Resident, worker and daycare: reflects default residential exposure frequency from the BAAQMD's 2022 CEQA Guidelines.
 Preschool, elementary school: reflects the weekend closures of these facilities.
 High school and elementary school: reflects default number of school days per year (180 days/year).
- Age sensitivity factors (ASFs) account for an "anticipated special sensitivity to carcinogens" of infants and children as recommended in the OEHHA Technical Support Document (OEHHA 2015) and current OEHHA guidance (OEHHA 2015). This approach is consistent with the cancer risk adjustment factor calculations recommended by BAAQMD.
- BAAQMD recommends the use of a WAF where receptors such as workers may experience higher than estimated coincident exposures when the source emits only when the receptor is present. This recommendation applies even if the HROFDY function has already been incorporated in the AERMOD configuration. WAF are calculated based on the methodology from OEHHA's Guidance Manual for Preparation of Health Risk Assessments (2015). For construction, the WAF for the worker, high school, daycare and pre-school receptors is calculated to adjust from 24 hours/day to 8 hours/day and from 7 days/week to 5 days/week ([24 hours/8 hours] * [7 days/5 days] = 4.20). Resident types are expected to be exposed 24 hours/day and 7 days/week; as a result, the WAF is 1.
- A resident receptor is assumed to be exposed at the beginning of the infancy (third trimester)
- A high school receptor is assumed to be exposed starting at the age of 14 (grade 9).
- An elementary school receptor is assumed to be exposed starting at the age of 5.
- A daycare receptor is assumed to be exposed starting at the age of 0.
- A pre-school receptor is assumed to be exposed starting at the age of 2.

Calculation:

$IF_{inh} = DBR * FAH * EF * ED * CF / AT$
 $CF = 0.001 \text{ (m}^3\text{/L)}$
 $MAF = HR / HS * DR / DS * DF$

Abbreviations:

AT - averaging time
ASF - Age Sensitivity Factor
BAAQMD - Bay Area Air Quality Management District
DBR - daily breathing rate
ED - exposure duration
EF - exposure frequency
FAH - fraction of time at home
HS - number of hours of source operation per day
DS - number of days of source operation per week

DF - discount factor, set to 1 because offsite worker's schedule falls entirely within the source schedule
 IF_{inh} - intake factor
kg - kilogram
L - liter
 m^3 - cubic meter
OEHHA - Office of Environmental Health Hazard Assessment
MAF - model adjustment factor
HR - number of hours per day for which long-term concentration is calculated
DR - number of days per week for which annual average concentration is calculated

References:

OEHHA. 2015. Air Toxics Hot Spots Program Risk Assessment Guidelines. Guidance Manual for Preparation of Health Risk Assessments.
Available at <https://oehha.ca.gov/media/downloads/cnr/2015guidancemanual.pdf>
Bay Area Air Quality Management District (BAAQMD). 2023. California Environmental Quality Act (CEQA) Air Quality Guidelines. Available at: <https://www.baaqmd.gov/plans-and-climate/california-environmental-quality-act-ceqa/updated-ceqa-guidelines>

Table 29
Toxicity Value
Stanford Belmont Project
Belmont, CA

Source	Chemical ¹	CAS Number	Cancer Potency Factor	Chronic Noncancer Reference Exposure Level
			(mg/kg-day) ⁻¹	(µg/m ³)
PM ₁₀	DPM	9901	1.1	5.0

Notes:

- ¹. Toxicity values are taken from ARB's Consolidated Table of OEHHA/ARB Approved Risk Assessment Health Values.

Abbreviations:

ARB - California Air Resources Board
CAS - chemical abstract services
mg/kg-day - milligrams per kilogram per day
OEHHA - Office of Environmental Health Hazard Assessment
µg/m³ - micrograms per cubic meter
PM₁₀ - particulate matter < 10 microns
DPM - diesel particulate matter

References:

California Air Resources Board (ARB)/ California Office of Environmental Health Hazard Assessment (OEHHA). 2023. Consolidated Table of OEHHA/ARB Approved Risk Assessment Health Values. Updated on: May 1, 2023. Available at:
<https://ww2.arb.ca.gov/sites/default/files/classic/toxics/healthval/contable05012023.pdf>

Table 30
Project-Level Health Risk Impacts
Stanford Belmont Project
Belmont, CA

Offsite Worker Results

MEIR Risk and Location	Excess Lifetime Cancer Risk ¹	Chronic Hazard Index ^{2,4}	PM _{2.5} Concentration ^{3,4}
	in a million	unitless	µg/m ³
Total Project Contribution	0.11	0.0014	0.058
UTMx (m)	563456	563456	562976
UTMy (m)	4152389	4152389	4152429

Residential Results

MEIR Risk and Location	Excess Lifetime Cancer Risk ¹	Chronic Hazard Index ^{2,4}	PM _{2.5} Concentration ^{3,4}
	in a million	unitless	µg/m ³
Total Project Contribution	2.0	0.0018	0.053
UTMx (m)	563356	563356	563336
UTMy (m)	4152309	4152309	4152269

Daycare Results

MEIR Risk and Location	Excess Lifetime Cancer Risk ¹	Chronic Hazard Index ^{2,4}	PM _{2.5} Concentration ^{3,4}
	in a million	unitless	µg/m ³
Total Project Contribution	0.79	1.5E-04	0.0031
UTMx (m)	562956	562956	562956
UTMy (m)	4152769	4152769	4152769

Preschool Results

MEIR Risk and Location	Excess Lifetime Cancer Risk ¹	Chronic Hazard Index ^{2,4}	PM _{2.5} Concentration ^{3,4}
	in a million	unitless	µg/m ³
Total Project Contribution	0.54	0.0010	0.058
UTMx (m)	562996	562996	562976
UTMy (m)	4152409	4152409	4152429

Elementary School Results

MEIR Risk and Location	Excess Lifetime Cancer Risk ¹	Chronic Hazard Index ^{2,4}	PM _{2.5} Concentration ^{3,4}
	in a million	unitless	µg/m ³
Total Project Contribution	0.19	4.9E-04	0.0182
UTMx (m)	562896	562896	562896
UTMy (m)	4152569	4152569	4152569

High School Results

MEIR Risk and Location	Excess Lifetime Cancer Risk ¹	Chronic Hazard Index ^{2,4}	PM _{2.5} Concentration ^{3,4}
	in a million	unitless	µg/m ³
Total Project Contribution	0.43	0.0011	0.038
UTMx (m)	563096	563096	563056
UTMy (m)	4152309	4152309	4152349

Notes:

¹. The Project construction cancer risks were estimated using the following equation:

$$\text{Riskinh} = \text{Ci} \times \text{CF} \times \text{IFinh} \times \text{CPFi} \times \text{ASF}$$

Where:

Riskinh = Cancer Risk for the Inhalation Pathway (unitless)

Ci = Annual Average Air Concentration for Chemical "i" (µg/m³)

CF = Conversion Factor (mg/µg)

IFinh = Intake Factor for Inhalation (m³/kg-day)

CPFi = Cancer Potency Factor for Chemical "i" (mg/kg-day)⁻¹

ASF = Age Sensitivity Factor (unitless)

MAF = Modeling Adjustment Factor

2. The potential for exposure to result in adverse chronic non-cancer effects is evaluated by comparing the estimated annual average air concentration (which is equivalent to the average daily air concentration) from Project construction to the non-cancer chronic REL for each chemical. When calculated for a single chemical, the comparison yields a ratio termed a hazard quotient or HQ. To evaluate the potential for adverse chronic non-cancer health effects from simultaneous exposure to multiple chemicals, the hazard quotients for all chemicals are summed, yielding a hazard index or HI.

The chronic HI for each receptor was estimated using the following equation:

$$HI_{inh} = C_i / cREL$$

Where:

HI_{inh} = Chronic HI for the Inhalation Pathway (unitless)

C_i = Annual Average Air Concentration for Chemical "i" ($\mu\text{g}/\text{m}^3$)

cREL = Chronic Reference Exposure Level ($\mu\text{g}/\text{m}^3$)

3. The $\text{PM}_{2.5}$ concentration due to Project construction at each receptor was estimated using the following equation:

$$C_i = E \times D_i$$

Where:

C = Concentration of $\text{PM}_{2.5}$ at receptor "i" ($\mu\text{g}/\text{m}^3$)

D_i = Dispersion factor associated with unit emissions at receptor "i" ($\mu\text{g}/\text{m}^3$)/(g/s)

E = Emission Rate (g/s)

4. For all MEIRs, the year in which the highest chronic HI and annual average $\text{PM}_{2.5}$ concentration is Year 1.

Abbreviations:

g - gram

kg - kilogram

m^3 - cubic meter

m - meter

MEIR - maximally exposed individual receptor

mg - milligram

$\text{PM}_{2.5}$ - particulate matter <2.5 microns in diameter

s - second

μg - microgram

References:

Bay Area Air Quality Management District (BAAQMD). 2023. California Environmental Quality Act (CEQA) Air Quality Guidelines. Available at: <https://www.baaqmd.gov/plans-and-climate/california-environmental-quality-act-ceqa/updated-ceqa-guidelines>

OEHHA. 2015. Air Toxics Hot Spots Program. Risk Assessment Guidelines. Guidance Manual for Preparation of Health Risk Assessments. February. Available online at: <https://oehha.ca.gov/media/downloads/cmr/2015guidancemanual.pdf>

Table 31
Cumulative Health Risks Impacts
Stanford Belmont Project
Belmont, CA

Receptor Type	Source	Lifetime Excess Cancer Risk	Non-Cancer Chronic HI	PM _{2.5} Concentration
		(in a million)		(µg/m ³)
Off-Site Resident ¹	Stationary Sources ²	0.59	0	7.3E-04
	Roadways ³	10	0.049	0.15
	Railways ³	1.6	4.2E-04	0.0020
	Proposed Project	2.0	0.0018	0.053
	Total	14.3	0.051	0.20
BAAQMD's Thresholds		100	10	0.80
Exceeds Threshold?		No	No	No

Notes:

- ¹ The receptor with maximal exposure is located at UTMX 563356 m and UTM Y 4152309 m for cancer risk and non-cancer chronic HI impacts, and at UTMX 563336 m and UTM Y 4152269 m for PM_{2.5} concentrations.
- ² The risks associated with stationary sources located within a 1000-foot radius of the project site were acquired using the stationary source screening tool provided by BAAQMD and confirmed by BAAQMD that the information is up-to-date.
- ³ Health risks from roadways and railways were obtained from BAAQMD's screening tools.

Abbreviations:

ug/m³ - micrograms per cubic meter
HI - hazard index
PM_{2.5} - particulate matter less than 2.5 microns
CEQA - California Environmental Quality Act
BAAQMD - Bay Area Air Quality Management District

References:

BAAQMD. 2023. Email communication between Yu-Han (Amy) Chen at Ramboll and BAAQMD titled "RE: Public Records Number 2023-03-0008 - Stationary Source Request". April 3.

CEQA Roadway Screening Tool - Cancer Risk: <https://data.bayareametro.gov/Environment/CEQA-Roadway-Screening-Tool-Cancer-Risk/kz4a-ueki>

CEQA Roadway Screening Tool - Chronic Hazard: <https://data.bayareametro.gov/Environment/CEQA-Roadway-Screening-Tool-Chronic-Hazard/sfnx-xg6j>

CEQA Roadway Screening Tool - PM_{2.5}: <https://data.bayareametro.gov/Environment/CEQA-Roadway-Screening-Tool-PM2-5/r9gy-qwx>

CEQA Rail Screening Tool - Cancer Risk: <https://data.bayareametro.gov/Environment/CEQA-Rail-Screening-Tool-Cancer-Risk/6eut-z6mm>

CEQA Rail Screening Tool - Chronic-Hazard: <https://data.bayareametro.gov/Environment/CEQA-Rail-Screening-Tool-Chronic-Hazard/p57h-bkkt>

CEQA Rail Screening Tool - PM_{2.5}: <https://data.bayareametro.gov/Environment/CEQA-Rail-Screening-Tool-PM2-5/upac-tfkk>

Bay Area Air Quality Management District (BAAQMD). 2023. California Environmental Quality Act (CEQA) Air Quality Guidelines. Available at: <https://www.baaqmd.gov/plans-and-climate/california-environmental-quality-act-ceqa/updated-ceqa-guidelines>

Table 32
Construction Emissions of Greenhouse Gases
Stanford Belmont Project
Belmont, CA

Off-Road Emissions¹

Construction Phase	Construction Subphase	Year	Biogenic CO ₂	CH ₄	N ₂ O
			MT/year		
Single-Phase	Demolition	1	81	0.0033	6.6E-04
	Site Preparation	1	77	0.0031	6.2E-04
	Grading	1	227	0.0092	0.0018
	Building Construction	1	411	0.017	0.0033
		2	396	0.016	0.0032
	Paving	2	38	0.0016	3.1E-04
	Architectural Coating	2	3.4	1.4E-04	2.8E-05

Onroad Emissions¹

Construction Phase	Construction Subphase	Year	Non-Biogenic CO ₂	CH ₄	N ₂ O	HFC	Non-Biogenic CO ₂ e
			MT/year				
Single-Phase	Demolition	1	44	1.4E-04	0.0065	1.1E-04	46
	Site Preparation	1	302	3.9E-04	0.047	5.1E-04	317
	Grading	1	306	5.0E-04	0.047	5.7E-04	321
	Building Construction	1	895	0.015	0.083	8.8E-03	932
		2	846	0.014	0.078	2.9E-02	911
	Paving	2	3.0	9.2E-05	8.2E-05	1.5E-04	3.3
	Architectural Coating	2	13	4.0E-04	3.5E-04	6.7E-04	14

Summary of Project Construction Annual GHG Emissions by Year²

Year	Biogenic CO ₂	Non-Biogenic CO ₂ e
	MT/year	MT/year
1	796	1,618
2	438	929
Total	1,234	2,547

Notes:

¹ The methodology equivalent to CalEEMod 2022.1 was used to estimate construction emissions. The on-road emissions factors from EMFAC2021 and off-road construction equipment emission factors from CalEEMod were utilized to estimate the emissions. The default trip lengths in CalEEMod were used to calculate on-road emissions, while worker and vendor trip lengths were based on the default Nonresidential Home-to-Work and Work-to-Other trip lengths for Belmont City, respectively, as stated in Appendix G of the CalEEMod User Guide. The hauling trip length was based on the default reported in Appendix C. The on-road trips and construction off-road equipment were both CalEEMod defaults, but the Project design utilized Tier 4 final engines and renewable diesel for off-road equipment.

² The Global Warming Potential (GWP) for CH₄, N₂O and HFC were estimated to be 25, 298 and 1,430 respectively, consistent with CalEEMod 2022.1.

Abbreviations:

CalEEMod - California Emissions Estimator Model
 CH₄ - methane
 CO₂ - carbon dioxide
 CO₂e - carbon dioxide equivalent

GHG - greenhouse gas
 MT - metric ton
 N₂O - nitrous oxide

References:

California Air Pollution Control Officers Association (CAPCOA). California Emissions Estimator Model (CalEEMod), Version 2022.1. Available online at <http://www.caleemod.com/>

Table 33
Operational Emissions of Greenhouse Gases
Stanford Belmont Project
Belmont, CA

Emissions Source	GHG Emissions ¹							
	(MT/yr)							
	Existing Conditions (2030) ²		Existing Conditions (2035) ²		Partial Buildout ³		Full Buildout Conditions ⁴	
	Biogenic CO ₂	Non-Biogenic CO ₂ e	Biogenic CO ₂	Non-Biogenic CO ₂ e	Biogenic CO ₂	Non-Biogenic CO ₂ e	Biogenic CO ₂	Non-Biogenic CO ₂ e
Landscaping	--	10	--	10	--	21.8	--	44
Electricity Use	--	79	--	72	--	0	--	0
Natural Gas Use	--	873	--	873	--	--	--	--
Water Use	13	43	13	43	6	21	12	41
Waste Disposed	75	186	75	186	53	133	106	266
Refrigerants	--	0.11	--	0.11	--	0.28	--	0.56
Mobile	--	2,298	--	2,154	--	1,797	--	3,368
Total Emissions	88	3,489	88	3,338	59	1,972	119	3,719
Net Emissions⁵					-28	-1,517	31	381

Notes:

- ¹ Emissions estimated using methods consistent with CalEEMod® version 2022.1.0.
- ² Operational emissions from existing conditions were calculated using CalEEMod® default data and emission factors (2030 and 2035 to align with partial and full buildout years) based on the existing land use type and energy use rates provided by the Project Sponsor.
- ³ Operational emissions were estimated for partial buildout by using scaling factors by land use type and phase. For indirect electricity emissions from water usage and wastewater treatment, usage rates rather than emissions were scaled to account for year specific energy emission factors from PG&E.
- ⁴ Full buildout operational emissions are based on electricity, natural gas, and water usage rates operations provided by the Project Sponsor alongside CalEEMod® defaults for architectural coating, consumer product, landscaping, and waste emissions. Mobile emissions were calculated using traffic information provided from the traffic engineers.
- ⁵ Net emissions were calculated as the difference between buildout emissions and existing condition emissions.

Abbreviations:

CalEEMod® - California Emissions Estimator Model
CO₂e - carbon dioxide equivalent
yr - year

GHG - greenhouse gas
MT - metric ton

References:

California Air Pollution Control Officers Association (CAPCOA). California Emissions Estimator Model (CalEEMod). Version 2022.1. Available online at <http://www.caleemod.com/>

Table 34
Water Usage for Existing Conditions and Project Operations
Stanford Belmont Project
Belmont, CA

Land Use Type	Year	Indoor Water Use	Outdoor Water Use
		(million gal/year)	(million gal/year)
Existing Conditions ¹			
Educational	2013	31	4.2
Residential		10	
Full Buildout Conditions ¹			
Educational	2035	32	3.5
Residential		7	
Total 2035 Buildout Water Use		39	3.5

Water Electricity Intensity

Hydrologic Region	Electricity to Supply Water	Electricity to Treat Water	Electricity to Distribute Water
	(kWh/million gal)	(kWh/million gal)	(kWh/million gal)
San Francisco Bay	1,182	754	2,998

Notes:

¹. Indoor and outdoor water use for both existing and full buildout conditions are from the Preliminary Engineering Report from BKF Engineers provided to Ramboll on 2/8/23.

Abbreviations:

CalEEMod - California Emissions Estimator Model
kWh - kilowatt-hour

gal - gallon

References:

California Air Pollution Control Officers Association (CAPCOA). California Emissions Estimator Model (CalEEMod), Version 2022.1. Available online at <http://www.caleemod.com/>
BKF Engineers (BKF). 2023. Stanford Belmont Campus - Preliminary Engineering Report. January 12.

Table 35
Wastewater Emission Factors
Stanford Belmont Project
Belmont, CA

Wastewater Electricity Intensity¹

County	Hydrologic Region	Electricity to Treat Wastewater
		(kWh/million gal)
San Mateo	San Francisco Bay	1,542

Wastewater Treatment Types²

County	Septic Tank	Aerobic	Anaerobic, Facultative Lagoons	Anaerobic, Combustion of Gas	Anaerobic, Cogeneration of Gas
San Mateo	10%	87%	2%	100%	0%

Wastewater Treatment Direct Emission Factors³

Wastewater Treatment Type	Biogenic CO ₂	CH ₄	N ₂ O
	(ton/gal)	(ton/gal)	(ton/gal)
Aerobic	3.9E-07	1.3E-09	8.5E-10
Anaerobic, Facultative Lagoons	3.9E-07	4.0E-07	8.5E-10
Septic Tank	0	2.5E-07	8.5E-10

Notes:

- ¹. Water Electricity Intensity from Table G-32 from Appendix G of the CalEEMod® 2022 User Guide.
- ². Water Treatment Types from Table G-34 from Appendix G of the CalEEMod® 2022 User Guide.
- ³. Wastewater Treatment Direct Emission Factors from Table G-35 from Appendix G of the CalEEMod® 2022 User's Guide.

Abbreviations:

CalEEMod® - California Emissions Estimator Model
 CH₄ - methane
 CO₂ - carbon dioxide

gal - gallon
 kwh - kilowatt
 N₂O - nitrous oxide

References:

California Air Pollution Control Officers Association (CAPCOA). California Emissions Estimator Model (CalEEMod), Version 2022.1. Available online at <http://www.caleemod.com/>

Table 36
Water and Wastewater Emissions from Existing Conditions and Project Operations
Stanford Belmont Project
Belmont, CA

Land Use	Electricity Indirect Emissions ^{1,2}	Septic Tank Direct Emissions (biogenic) ^{1,2}	Septic Tank Direct Emissions (non-biogenic) ^{1,2}	Aerobic Direct Emissions (biogenic) ^{1,2}	Aerobic Direct Emissions (non-biogenic) ^{1,2}	Facultative Lagoon Direct Emissions (biogenic) ^{1,2}	Facultative Lagoon Direct Emissions (non-biogenic) ^{1,2}	Total Biogenic CO ₂ Emissions ³	Total Non-Biogenic CO ₂ e Emissions ³
	(MT CO ₂ e/yr)	(MT CO ₂ /yr)	(MT CO ₂ e/yr)	(MT CO ₂ /yr)	(MT CO ₂ e/yr)	(MT CO ₂ /yr)	(MT CO ₂ e/yr)	(MT/yr)	
Existing Conditions (2030)									
Existing Buildings	12	--	25	13	9	0.3	8.5	13	43
Existing Landscaping	1.2	--	--	--	--	--	--	--	--
Total Existing Emissions (2030)	13	--	25	13	9	0.3	8.5	13	43
Existing Conditions (2035)									
Existing Buildings	11	--	25	13	9	0.3	8.5	13	43
Existing Landscaping	1.1	--	--	--	--	--	--	--	--
Total Existing Emissions (2035)	12	--	25	13	9	0.3	8.5	13	43
Full Buildout Conditions									
Educational	8.4	--	19	10	7	0.25	6.6	10	33
Residential	2.0	--	5	2	2	0.058	1.5	2	8
Landscaping	0.9	--	--	--	--	--	--	--	--
Total 2035 Buildout Emissions	11	--	24	12	9.0	0.31	8.1	12	41
2030 Partial Buildout Emissions ⁴	5.6	--	12	6	4.5	0.15	4.0	6	21

Notes:

- ¹ Emissions shown in this table were calculated using default values and methods from CalEEMod Version 2022.1.0. The Water Electricity Intensity, Water Treatment Types, and Wastewater Treatment Direct Emission Factors used in the calculation can be found in tables G-32, G-34, G-35 from Appendix G of the CalEEMod user guide, respectively. These calculations were performed using water use rates, shown in Table 38, and energy emission factors for San Mateo.
- ² Consistent with CalEEMod, indoor water use was assumed to be processed as wastewater and outdoor water use was assumed to not be processed as wastewater.
- ³ Septic tank direct emission does not include CO₂, and its electricity indirect emissions are non-biogenic CO₂e. Aerobic direct emissions, and facultative lagoon direct emissions have both biogenic CO₂e and non-biogenic CO₂e.
- ⁴ Partial buildout direct emissions from Septic Tank, Aerobic, and Facultative Lagoon wastewater treatment were calculated from full buildout using scaling factors by land use type and phase. For partial buildout indirect electricity emissions from water usage and wastewater treatment, usage rates rather than emission were scaled to account for year specific energy emission factors from PG&E.

Abbreviations:

CalEEMod - California Emissions Estimator Model
CO₂e - carbon dioxide equivalents
MT - metric ton

yr - year
PG&E - Pacific Gas and Electric

References:

California Air Pollution Control Officers Association (CAPCOA). California Emissions Estimator Model (CalEEMod), Version 2022.1. Available online at <http://www.caleemod.com/>

Table 37
Solid Waste Generation for Existing Conditions and Project Operations
Stanford Belmont Project
Belmont, CA

Solid Waste Generation

Land Use	Year	Size	Units	Solid Waste Generation Rate
				(ton/year)
Existing Conditions ¹				
Educational	2013	177	1000sqft	707
Residential		122	1000sqft	128
Existing Conditions Total Waste Generation				835
Full Buildout Conditions ²				
Educational	2035	2509	Persons	1,194
Total 2035 Buildout Total Waste Generation				1,194

Notes:

1. Solid waste generation rates used for existing conditions are from Table G-36 of Appendix G of the CalEEMod User's Guide. A weighted average waste generation rate was used to account for the number of students and employees present during the existing conditions.
2. Solid waste generation rates of the Project are based on Stanford's main campus's 2021 solid waste generation.
3. Partial buildout generation rates were calculated from full buildout using scaling factors by land use type and phase.

Abbreviations:

CalEEMod - California Emissions Estimator Model

sqft - square feet

DU - dwelling unit

References

California Air Pollution Control Officers Association (CAPCOA). California Emissions Estimator Model (CalEEMod), Version 2022.1. Available online at <http://www.caleemod.com/>

Table 38
Solid Waste Emissions from Existing Conditions and Project Operations
Stanford Belmont Project
Belmont, CA

Solid Waste Landfill Gas (LFG) Treatment Types

County	Landfill, No Gas Capture	Landfill, Capture Gas Flare
San Mateo	6%	94%

Solid Waste Landfill Gas Emission Factors

Waste Treatment Type	CO ₂ Emissions	CH ₄ Emissions
	(ton/ton waste)	(ton/ton waste)
Burn	0.098	0.0084
No Gas Collection	0.097	0.032
Cogen	0	0.0084

Location	CalEEMod® Land Use Subtype	Biogenic CO ₂	CH ₄	Non-biogenic CO ₂ e ¹
		(MT/year)	(MT/year)	(MT/year)
Existing Conditions ²				
Educational	University/College (4yr)	63	6.3	158
Residential	Apartments Mid Rise	11	1.1	29
Total Existing Emissions		75	7.4	186
Full Buildout Conditions ²				
Educational	University/College (4yr)	106	11	266
Total 2035 Buildout Emissions		106	11	266
2030 Partial Buildout Emissions ³		53	5.3	133

Notes:

- ¹ CH₄ emissions from solid waste are considered non-biogenic.
- ² Emissions shown in this table were calculated using emission factors and methods from CalEEMod Version 2022, Appendix G Table G-37.
- ³ Partial buildout emissions were calculated from full buildout using scaling factors by land use type and phase.

Abbreviations:

CalEEMod - California Emissions Estimator Model	LFG - Landfill Gas
CH ₄ - methane	MT - metric ton
CO ₂ - carbon dioxide	CO ₂ e - carbon dioxide equivalents

References:

California Air Pollution Control Officers Association (CAPCOA). California Emissions Estimator Model (CalEEMod), Version 2022.1. Available online at <http://www.caleemod.com/>

Table 39
Refrigerant GHG Emissions
Stanford Belmont Project
Belmont, CA

Land Use Type	Refrigeration Equipment ¹	Refrigerant	Equipment Charge Size	Annual Operational Leak Rate	Service Leak Rate	Times Serviced	Lifetime	Global Warming Potential	Land Use	Average Annual Refrigerant Emissions ^{1,2}
			kg refrigerant/KSF				years		1000 sqft	MT CO ₂ e/yr
Existing Conditions										
Educational	Household refrigerators and/or freezers	R-134a	0.017	0.6%	0.0%	1	14	1,430	177	0.025
Educational	Other commercial A/C and heat pumps	R-410A	0.002	4.0%	4.0%	18	25	2,088	177	0.046
Educational	Stand-alone retail refrigerators and freezers	R-134a	0.000	1.0%	0.0%	1	10	1,430	177	9.5E-05
Educational	Walk-in refrigerators and freezers	R-404A	0.0004	7.5%	7.5%	20	20	3,922	177	0.042
Residential	Average room A/C & Other residential A/C and heat pumps	R-410A	0.002	2.5%	2.5%	10	15	2,088	122	0.024
Residential	Household refrigerators and/or freezers	R-134a	0.115	0.6%	0.0%	1	14	1,430	122	0.12
Total Existing Emissions										0.11
Full Buildout Conditions										
Educational	Household refrigerators and/or freezers	R-134a	0.017	0.6%	0.0%	1	14	1,430	500	0.072
Educational	Other commercial A/C and heat pumps	R-410A	0.0018	4.0%	4.0%	18	25	2,088	500	0.13
Educational	Stand-alone retail refrigerators and freezers	R-134a	3.7E-05	1.0%	0.0%	1	10	1,430	500	2.7E-04
Educational	Walk-in refrigerators and freezers	R-404A	4.0E-04	7.5%	7.5%	20	20	3,922	500	0.12
Residential	Average room A/C & Other residential A/C and heat pumps	R-410A	0.0023	2.5%	2.5%	10	15	2,088	200	0.039
Residential	Household refrigerators and/or freezers	R-134a	0.12	0.6%	0.0%	1	14	1,430	200	0.20
Total 2035 Buildout Emissions										0.56
2030 Partial Buildout Emissions										0.28

Notes

- Refrigeration equipment types for each land use type were determined using Table 38 from CalEEMod Appendix G.
- Refrigeration Equipment, Refrigerant, Equipment charge size, Annual Operational Leak Rate, Service Leak Rate, Times Serviced, Lifetime, and Global Warming Potential were based on CalEEMod defaults in Appendix G Tables 38 and 39.
- $$E = \sum (((CS \times OLR) + (CS \times SLR \times (TS / L))) \times GWP) \times KSF \times UC_{I_r}$$
 where:
 - = E, average annual refrigerant emissions (MT CO₂e/yr)
 - = CS, equipment charge size (kg refrigerant/KSF). The equipment charge size is the total quantity of Refrigerant installed in the refrigeration or A/C equipment.
 - = OLR, annual operational leak rate (%)
 - = SLR, service leak rate (%)
 - = TS, times serviced (number of times serviced over equipment lifetime)
 - = L, average equipment operation lifetime (years)
 - = GWP, global warming potential (unitless)
 - = KSF, land use size (1000 sqft)
 - = UC_{I,r}, unit conversion form kg to MT
 - = r, refrigerant
 - = I, equipment type

Abbreviations

kg - kilogram
 sqft - square feet
 KSF - 1000 sqft
 MT- metric tons

CalEEMod® - California Emissions Estimate Model
 CO₂e - carbon dioxide equivalent
 GHG - greenhouse gas
 yr - year

References:

California Air Pollution Control Officers Association (CAPCOA). California Emissions Estimator Model (CalEEMod). Version 2022.1. Available online at <http://www.caleemod.com/>

Table 40
Summary of Construction Energy Consumption
Stanford Belmont Project
Belmont, CA

Source^{1,2}	Gasoline Usage (gal)	Conventional Diesel Usage (gal)	Renewable Diesel Usage³ (gal)
Off-Road Construction Equipment ³	--	--	118,116
On-Road Construction Trips	100,820	147,509	--
Total	100,820	147,509	118,116

Notes:

- ¹. Off-Road fuel usage is calculated in Table 42.
- ². On-Road fuel usage is calculated in Table 41.
- ³. Diesel used by off-road construction equipment is renewable diesel.

Abbreviations:

gal - gallons

Table 41
Estimated Energy Consumption by On-Road Construction Vehicles
Stanford Belmont Project
Belmont, CA

Project Construction Onroad Data¹

Subphase	Year	Trips (one-way trips/activity)		
		Worker Trips	Vendor Trips	Hauling Trips
Demolition	1	780	0	1,103
Site Preparation	1	576	0	8,094
Grading	1	1,520	0	8,094
Building Construction	1	115,634	32,578	0
	2	124,032	34,944	0
Paving	2	840	0	0
Architectural Coating	2	3,640	0	0

EMFAC2021 Onroad Data by Vehicle Category²

Vehicle Category	Year	Fuel Consumption ³					Default VMT ⁴			
		Gasoline	Diesel	Natural Gas	Electricity	Plug-in Hybrid - Gasoline	Gasoline	Diesel	Natural Gas	Electricity
		gal/day	gal/day	DGE/day	kWh/day	gal/day	mi/day			
LDA	1	243,789	--	0	308,861	4,431	7,587,857	--	0	830,766
	2	230,167	--	0	332,952	4,465	7,320,237	--	0	894,815
LDT1	1	28,000	--	0	1,629	32	729,680	--	0	4,482
	2	27,190	--	0	2,141	44	724,296	--	0	5,918
LDT2	1	193,391	--	0	24,641	975	4,944,105	--	0	71,120
	2	194,764	--	0	30,855	1,107	5,105,177	--	0	88,574
MHDT	1	--	21,007	0.28	980	0	--	177,028	1,936	871
	2	--	20,964	0.29	2,680	0	--	177,558	2,054	2,408
HHDT	1	--	22,429	2.3	680	0	--	119,489	11,188	364
	2	--	22,066	2.4	1,682	0	--	119,561	11,843	901

EMFAC2021 Onroad Data by Fleet Type⁵

Fleet Type	Year	Fuel Consumption					Default VMT			
		Gasoline	Diesel	Natural Gas	Electricity	Plug-in Hybrid - Gasoline	Gasoline	Diesel	Natural Gas	Electricity
		gal/day	gal/day	DGE/day	kWh/day	gal/day	mi/day			
Worker	1	123,295	--	0	84,190	1,368	3,497,830	--	0	227,712
	2	119,828	--	0	92,022	1,415	3,468,502	--	0	248,806
Vendor	1	--	21,718	1.3	830	0	--	148,259	6,562	618
	2	--	21,515	1.4	2,181	0	--	148,559	6,948	1,654
Hauling	1	--	22,429	2.3	680	0	--	119,489	11,188	364
	2	--	22,066	2.4	1,682	0	--	119,561	11,843	901

Project Fuel Efficiency Data by Fleet Type

Scenario	Year	Fuel Efficiency ⁶		VMT by Vehicle Fuel Type ⁷	
		Gasoline	Diesel	Gasoline	Diesel
		mi/gal	mi/gal	Percentage (%)	
Worker	1	28	--	100%	--
	2	29	--	100%	--
Vendor	1	--	6.8	--	100%
	2	--	6.9	--	100%
Hauling	1	--	5.3	--	100%
	2	--	5.4	--	100%

Fuel Consumption

Scenario	Year	Trip Rate (trips/year) ⁸	Trip Length (mi/trip) ⁹	Annual VMT (mi/yr)	Fuel Consumption ¹⁰	
					Gasoline	Diesel
					gallons	gallons
Worker	1	118,510	12	1,386,567	48,875	--
	2	128,512	12	1,503,590	51,945	--
Vendor	1	32,578	8.4	273,655	--	40,088
	2	34,944	8.4	293,530	--	42,510
Hauling	1	17,290	20	345,805	--	64,912
	2	0	20	0	--	0
Annual Construction On-Road Fuel Usage					Fuel Consumption ¹⁰	
					Gasoline	Diesel
					gallons	gallons
Year	1				48,875	104,999
	2				51,945	42,510

Notes:

- ¹. Worker, vendor, and hauling trip rates were provided by the Project Sponsor.
- ². Data obtained from EMFAC2021 for San Mateo County using the following inputs: emission mode, annual time period, EMFAC2007 vehicle classes, aggregated model year, aggregated speed.
- ³. Fuel consumption rates summed by fuel type and year. EMFAC2021 outputs gasoline and diesel fuel consumption rates in 1000 gallons per day.
- ⁴. Daily VMT summed by fuel type and year.
- ⁵. Construction fleets were defined consistent with CalEEMod 2022.1.0. assumptions. The worker fleet is assumed to be 25% LDA, 50% LDT1, and 25% LDT2. The vendor fleet is assumed to be 50% MHDT and 50% HHDT. The hauling fleet is assumed to be 100% HHDT. Fuel consumption and VMT data by vehicle category were converted to fuel consumption and VMT data by fleet type using weighted sums.
- ⁶. Fuel efficiency for gasoline and diesel was calculated as daily fuel consumption rate divided by daily total VMT as shown in the EMFAC2021 Onroad Data by Fleet Type table.
- ⁷. Worker vehicle fuel type were assumed to be 100% gasoline; vendor and hauling vehicle fuel types were assumed to be 100% diesel.
- ⁸. Annual trip rates calculated by summing worker, vendor, and hauling trips rates per activity by year.
- ⁹. Worker, vendor and haul trip lengths are based on CalEEMod default values.
- ¹⁰. Annual energy usage rate calculated as follows: (Annual VMT) * (% of VMT attributed to fuel type) / (Fuel Efficiency).

Abbreviations:

gal - gallons
kWh - kilowatt-hour
mi - mile(s)

MMBTU - million British Thermal Units
VMT - vehicle miles traveled
gal - gallon(s)

References:

California Air Resources Board (ARB) 2021. EMFAC2021. Available at: <https://ww2.arb.ca.gov/our-work/programs/mobile-source-emissions-inventory/msei-modeling-tools>
California Air Pollution Control Officers Association (CAPCOA). California Emissions Estimator Model (CalEEMod), Version 2022.1. Available online at <http://www.caleemod.com/>

Table 42
Estimated Energy Consumption by Off-Road Construction Equipment
Stanford Belmont Project
Belmont, CA

Construction Subphase ¹	Equipment Type ¹	Fuel ¹	Number ¹	Horsepower ¹	kW	Load Factor	Daily Usage ¹ (hours/day)	Days/Phase ¹	Utilization ¹	Fuel Usage (gal renewable diesel) ²
Demolition	Rubber Tired Dozers	Renewable Diesel	4	367	274	0.40	8	26	100%	6,239
	Excavators	Renewable Diesel	6	36	27	0.38	8	26	100%	872
	Concrete/Industrial Saws	Renewable Diesel	2	33	25	0.73	8	26	100%	512
Site Preparation	Rubber Tired Dozers	Renewable Diesel	6	367	274	0.40	8	16	100%	5,759
	Tractors/Loaders/Backhoes	Renewable Diesel	8	84	63	0.37	8	16	100%	1,626
Grading	Excavators	Renewable Diesel	4	36	27	0.38	8	38	100%	850
	Graders	Renewable Diesel	2	148	110	0.41	8	38	100%	1,885
	Rubber Tired Dozers	Renewable Diesel	2	367	274	0.40	8	38	100%	4,559
	Scrapers	Renewable Diesel	4	423	315	0.48	8	38	100%	12,612
	Tractors/Loaders/Backhoes	Renewable Diesel	4	84	63	0.37	8	38	100%	1,931
Building Construction	Cranes	Renewable Diesel	2	367	274	0.29	7	371	100%	28,239
	Forklifts	Renewable Diesel	6	82	61	0.20	8	371	100%	14,919
	Generator Sets	Renewable Diesel	2	14	10	0.74	8	371	100%	3,141
	Tractors/Loaders/Backhoes	Renewable Diesel	6	84	63	0.37	7	371	100%	24,739
	Welders	Renewable Diesel	2	46	34	0.45	8	371	100%	6,277
Paving	Pavers	Renewable Diesel	4	81	60	0.42	8	28	100%	1,557
	Paving Equipment	Renewable Diesel	4	89	66	0.36	8	28	100%	1,467
	Rollers	Renewable Diesel	4	36	27	0.38	8	28	100%	626
Architectural Coating	Air Compressors	Renewable Diesel	2	37	28	0.48	6	28	100%	305

Notes:

- ¹ Construction equipment information was provided by the Project Sponsor. All off-road equipment is assumed to have diesel engines. Utilizations for duration represent the usage percentage during the indicated equipment date range. Utilization percentage is multiplied by the number of hours per day to calculate off-road emissions.
- ² Fuel usage is calculated by taking the horsepower-hours for each piece of equipment (calculated as horsepower * usage hours * load factor*utilization percent) and multiplying it by the gallons of diesel consumption per horsepower-hour consistent with USEPA AP-42 diesel fuel data in Table 3.4.1, which cites an average brake-specific fuel consumption (BSFC) of 7,000 BTU/hp-hr, a heating value of 19,300 BTU/lb, and density of 7.1 lb/gal. Consistent with ARB guidelines, renewable diesel is treated the same as conventional diesel.

Abbreviations:

kW - kilowatt
gal - gallon(s)

BTU - British Thermal Unit
lb - pound(s)

References:

ARB. 2022. Renewable Diesel Joint Statement. Available online at: <https://ww2.arb.ca.gov/our-work/programs/alternative-diesel-fuels/biodiesel-renewable-diesel>
USEPA. 1996. AP-42 Chapter 3.4 Large Stationary Diesel And Stationary Dual-fuel Engines. Available at: <https://www.epa.gov/sites/default/files/2020-10/documents/c03s04.pdf>

Table 43
Summary of Operational Energy Use
Stanford Belmont Project
Belmont, CA

Summary Operational Energy Usage

Operational Energy Use	Existing Conditions				Full Buildout Conditions				Net Operational Energy Use ¹			
	Electricity	Natural Gas	Gasoline	Diesel	Electricity	Natural Gas	Gasoline	Diesel	Electricity	Natural Gas	Gasoline	Diesel
	MWh	MMBtu	gallon	gallons	MWh	MMBtu	gallons	gallons	MWh	MMBtu	gallons	gallons
Landscaping Equipment ²	--	--	382	--	--	--	1,310	--	--	--	928	--
Building Energy Use ³	1,771	16,409	--	--	7,971	--	--	--	6,201	-16,409	--	--
Water Energy Use ⁴	287	--	--	--	272	--	--	--	-16	--	--	--
Mobile Energy Use ⁵	243	220	243,761	29,222	540	323	365,536	41,327	297	103	121,775	12,105
Total	2,301	16,628	244,143	29,222	8,783	323	366,846	41,327	6,482	-16,305	122,703	12,105

Notes:

1. Net operational energy use is calculated as Project energy use minus existing conditions' energy use.
2. Landscaping equipment fuel use is detailed in Table 44.
3. Building energy use for existing conditions and Project operations is detailed in Table 19.
4. Energy use from water for both the existing conditions and Project operations were calculated using the Electricity Intensity Factors (kWh/Mgal) from CalEEMod and water usage (gallons/yr) from the Project Sponsor, as shown in Table 45.
5. Mobile energy use calculations are summarized in Table 46.

Abbreviations

CalEEMod - California Emissions Estimator Model
kWh - kilowatt-hour
Mgal - million gallons

MMBtu - Metric Million British Thermal Units
MWh - Megawatt-hour
yr - year

References:

California Air Pollution Control Officers Association (CAPCOA). California Emissions Estimator Model (CalEEMod), Version 2022.1. Available online at <http://www.caleemod.com/>

Table 44
Landscaping Equipment Energy Use
Stanford Belmont Project
Belmont, CA

Land Use Type	Landscape Equipment	Fuel	Horsepower ²	Load Factor	Hours/Day ¹	Number of Equipment Days ¹	Gallons of Gasoline ³
Existing Conditions							
Non-Residential	Chainsaws	Gasoline 2-Stroke	1.9	0.70	1.6	250	30
	Chainsaws Preempt	Gasoline 2-Stroke	1.9	0.70	0.9	250	16
	Lawn Mowers	Gasoline 4-Stroke	3.9	0.36	2.4	250	46
	Leaf Blowers/Vacuums	Gasoline 2-Stroke	1.8	0.94	3.4	250	80
	Leaf Blowers/Vacuums	Gasoline 4-Stroke	4.5	0.94	0.35	250	21
	Other Lawn & Garden Equipment	Gasoline 4-Stroke	6.1	0.58	0.024	250	1.2
	Riding Mowers	Gasoline 4-Stroke	21	0.38	0.20	250	23
	Tillers	Gasoline 2-Stroke	1.4	0.40	0.0021	250	0.016
	Tillers	Gasoline 4-Stroke	4.4	0.40	0.0034	250	0.08
	Trimmers/Edgers/Brush Cutters	Gasoline 2-Stroke	1.1	0.91	2.6	250	38
Residential	Chainsaws	Gasoline 2-Stroke	1.9	0.70	0.85	180	11
	Chainsaws Preempt	Gasoline 2-Stroke	1.9	0.70	0.46	180	6.0
	Chippers/Stump Grinders/Shredder Preempt	Gasoline 4-Stroke	4.9	0.78	0.0063	180	0.24
	Lawn Mowers	Gasoline 4-Stroke	3.9	0.36	2.6	180	36
	Leaf Blowers/Vacuums	Gasoline 2-Stroke	1.8	0.94	0.62	180	11
	Leaf Blowers/Vacuums	Gasoline 4-Stroke	4.5	0.94	0.064	180	2.7
	Other Lawn & Garden Equipment	Gasoline 4-Stroke	6.1	0.58	0.018	180	0.64
	Riding Mowers	Gasoline 4-Stroke	21	0.38	1.1	180	93
	Tillers	Gasoline 2-Stroke	1.4	0.40	0.027	180	0.15
	Tillers	Gasoline 4-Stroke	4.4	0.40	0.045	180	0.80
	Trimmers/Edgers/Brush Cutters	Gasoline 2-Stroke	1.1	0.91	1.1	180	12
	Trimmers/Edgers/Brush Cutters	Gasoline 4-Stroke	1.7	0.91	0.28	180	4.4
	Wood Splitters	Gasoline 4-Stroke	6.9	0.69	0.20	180	10
Total Existing Energy Usage							442
Full Buildout Conditions							
Non-Residential	Chainsaws	Gasoline 2-Stroke	1.9	0.70	7.1	250	130
	Chainsaws Preempt	Gasoline 2-Stroke	1.9	0.70	3.9	250	70
	Lawn Mowers	Gasoline 4-Stroke	3.9	0.36	10.3	250	200
	Leaf Blowers/Vacuums	Gasoline 2-Stroke	1.8	0.94	14.8	250	348
	Leaf Blowers/Vacuums	Gasoline 4-Stroke	4.5	0.94	1.52	250	90
	Other Lawn & Garden Equipment	Gasoline 4-Stroke	6.1	0.58	0.105	250	5.2
	Riding Mowers	Gasoline 4-Stroke	21	0.38	0.87	250	99
	Tillers	Gasoline 2-Stroke	1.4	0.40	0.0090	250	0.070
	Tillers	Gasoline 4-Stroke	4.4	0.40	0.0149	250	0.37
	Trimmers/Edgers/Brush Cutters	Gasoline 2-Stroke	1.1	0.91	11.6	250	166
Residential	Chainsaws	Gasoline 2-Stroke	1.9	0.70	0.92	180	12
	Chainsaws Preempt	Gasoline 2-Stroke	1.9	0.70	0.49	180	6.5
	Chippers/Stump Grinders/Shredder Preempt	Gasoline 4-Stroke	4.9	0.78	0.0068	180	0.26
	Lawn Mowers	Gasoline 4-Stroke	3.9	0.36	2.8	180	39
	Leaf Blowers/Vacuums	Gasoline 2-Stroke	1.8	0.94	0.67	180	11
	Leaf Blowers/Vacuums	Gasoline 4-Stroke	4.5	0.94	0.069	180	2.9
	Other Lawn & Garden Equipment	Gasoline 4-Stroke	6.1	0.58	0.019	180	0.68
	Riding Mowers	Gasoline 4-Stroke	21	0.38	1.2	180	100
	Tillers	Gasoline 2-Stroke	1.4	0.40	0.029	180	0.16
	Tillers	Gasoline 4-Stroke	4.4	0.40	0.048	180	0.86
	Trimmers/Edgers/Brush Cutters	Gasoline 2-Stroke	1.1	0.91	1.2	180	12
	Trimmers/Edgers/Brush Cutters	Gasoline 4-Stroke	1.7	0.91	0.30	180	4.7
	Wood Splitters	Gasoline 4-Stroke	6.9	0.69	0.22	180	11
Total 2035 Buildout Energy Usage							1,310

Notes:

- Information on landscaping equipment list, quantity, hours/day, and number of days are based on CalEEMod default values. All landscaping equipment are assumed to have gasoline engines.
- CalEEMod default horsepower ratings were used for the corresponding CalEEMod equipment category.
- Fuel usage is calculated by taking the horsepower-hours for each piece of equipment (calculated as horsepower * usage hours * load factor) and multiplying it by the gallons of gasoline consumption per horsepower-hour consistent with USEPA AP-42 gasoline fuel data in Table 3.3-1 and Appendix A, which cites an average brake-specific fuel consumption (BSFC) of 7,000 Btu/hp-hr, a heating value of 20,300 Btu/lb, and density of 6.17 lb/gal.

Abbreviations:

Btu - British Thermal Units
 CalEEMod - California Emissions Estimator MODEL
 gal - gallon

hp-hr - horsepower-hour
 lb - pound

References:

California Air Pollution Control Officers Association (CAPCOA). California Emissions Estimator Model (CalEEMod), Version 2022.1. Available online at <http://www.caleemod.com/>
 USEPA. AP-42, Vol. I, 3.4: Large Stationary and All Stationary Dual Fuel Engines. Available at: <https://www3.epa.gov/ttnchie1/ap42/ch03/final/c03s04.pdf>

Table 45
Water Energy Use
Stanford Belmont Project
Belmont, CA

Land Use Type	Year	Water Use Type	Water Use ¹		Electricity Use ²	
			gal/yr	Mgal/yr	kWh/yr	MWh/yr
Existing Conditions						
Educational	2013	Indoor	31,478,513	31	203,848	204
Residential			9,657,900	10	62,543	63
Outdoor		Outdoor	4,234,770	4.2	20,894	21
Total Existing Conditions Usage			45,371,183	45	287,285	287
Full Buildout Conditions						
Educational	2035	Indoor	31,882,750	32	206,466	206
Residential			7,416,800	7.4	48,030	48
Outdoor		Outdoor	3,456,150	3.5	17,052	17
Total 2035 Buildout Usage			42,755,700	43	271,548	272

Notes:

¹ Water Use for Existing Conditions and the Project were provided by the Project Sponsor.

² Energy use for Existing Conditions and Project were calculated by multiplying the Electricity Intensity Factor and the Water use (Mgal/yr). Electricity Intensity Factors by activity are CalEEMod defaults obtained from Appendix G.

Abbreviations:

gal - gallon

kWh - kilowatt hour

Mgal - Million Gallons

MWh - Megawatt-hour

yr - year

References:

California Air Pollution Control Officers Association (CAPCOA). California Emissions Estimator Model (CalEEMod), Version 2022.1. Available online at <http://www.caleemod.com/>

Table 46
Estimated Energy Consumption from Mobile Sources, including Electric Vehicles
Stanford Belmont Project
Belmont, CA

Existing Conditions

EMFAC Fleet Type	VMT-Based Fleet Mix ¹ (%)	Annual VMT ²	Fuel Efficiency ³				Default VMT ⁴				Annual Fuel Consumption ⁵			
			Gasoline	Diesel	Natural Gas	Electricity	Gasoline	Diesel	Natural Gas	Electricity	Gallons of Gasoline	Gallons of Diesel	MMBtu of Natural Gas	MWh of Electricity ⁶
			mi/gal	mi/gal	mi/DGE	mi/kWh	mi/day				Gallons of Gasoline	Gallons of Diesel	MMBtu of Natural Gas	MWh of Electricity ⁶
LDA	39.3%	2,963,499	34	47	--	2.6	2,575,161	3,214	--	385,123				
LDT1	3.8%	287,633	29	29	--	2.6	281,506	2.4	--	6,124	9,714	0.08	--	2
LDT2	31.0%	2,335,615	28	38	--	2.6	2,260,129	8,429	--	67,057	79,741	224	--	26
MDV	18.2%	1,373,810	24	29	--	2.6	1,301,686	15,133	--	56,991	55,372	531	--	22
LHDT1	3.6%	273,976	11	17	--	1.5	159,332	86,548	--	28,096	14,791	5,235	--	18
LHDT2	0.8%	63,437	9.6	14	--	1.6	17,485	39,168	--	6,784	1,829	2,777	--	4.4
MHDT	1.3%	96,587	5.2	8.7	7.1	0.91	18,504	67,653	1,003	9,427	3,585	7,772	19	10
HHDT	0.7%	55,164	4.0	5.9	5.2	0.54	139	46,489	5,460	3,077	34	7,856	145	6
OBUS	0.5%	35,592	5.2	8.6	8.3	0.90	4,195	30,474	380	543	0,806	3,530	6	0.6
UBUS	0.2%	13,748	9.2	8.3	6.2	0.57	1,687	7,203	2,137	2,721	183	0,871	47	4.7
MCY	0.4%	33,883	43	--	--	--	33,883	--	--	--	0,793	--	--	--
SBUS	0.0%	3,337	11	8.4	5.7	0.95	1,604	1,402	72	259	152	167	1.7	0.27
MH	0.1%	5,322	4.4	9.3	--	--	3,536	1,786	--	--	0,800	191	--	--
Fleetwide Total		7,541,604	--	--	--	--	6,658,847	307,503	9,052	566,202	243,761	29,222	220	243

Full Buildout Conditions

EMFAC Fleet Type	VMT-Based Fleet Mix ¹ (%)	Annual VMT ²	Fuel Efficiency ³				Default VMT ⁴				Annual Fuel Consumption ⁵			
			Gasoline	Diesel	Natural Gas	Electricity	Gasoline	Diesel	Natural Gas	Electricity	Gallons of Gasoline	Gallons of Diesel	MMBtu of Natural Gas	MWh of Electricity ⁶
			mi/gal	mi/gal	mi/DGE	mi/kWh	mi/day				Gallons of Gasoline	Gallons of Diesel	MMBtu of Natural Gas	MWh of Electricity ⁶
LDA	36.7%	4,418,548	36	51	--	2.6	3,783,092	2,988	--	632,468				
LDT1	3.8%	454,759	30	30	--	2.6	439,165	4.6	--	15,590	14,409	0.2	--	6.0
LDT2	32.3%	3,886,493	30	40	--	2.6	3,726,554	13,893	--	146,046	125,858	351	--	56
MDV	19.1%	2,298,232	24	30	--	2.6	2,153,961	23,677	--	120,593	87,959	0,787	--	47
LHDT1	3.8%	462,465	11	17	--	1.5	220,430	126,291	--	115,744	20,037	7,585	--	76
LHDT2	0.9%	109,672	9.8	14	--	1.6	24,083	57,753	--	27,835	2,463	4,056	--	18.0
MHDT	1.4%	164,422	5.3	9.0	7.2	0.91	24,550	94,402	1,605	43,865	4,632	10,510	31	48.0
HHDT	0.8%	94,129	4.3	6.4	5.4	0.54	129	72,414	8,611	12,975	30	11,276	220	24.2
OBUS	0.5%	56,063	5.4	8.9	8.5	0.90	4,793	48,465	720	2,085	0,895	5,425	12	2.31
UBUS	0.2%	21,800	10.1	9.0	6.3	0.57	2485	6,539	2642	10,134	246	0,727	58	17.7
MCY	0.5%	55,590	43	--	--	--	55,590	--	--	--	1,306	--	--	--
SBUS	0.0%	5,585	11	8.6	5.7	0.95	2,436	1,911	112	1,126	225	223	2.7	1.19
MH	0.1%	8,974	4.4	9.3	--	--	5,898	3,076	--	--	1,334	0,330	--	--
Fleetwide Total		12,036,733	--	--	--	--	10,443,167	451,414	13,690	1,128,462	365,536	41,327	323	540

Notes:

- ¹ Fleet mix is based on EMFAC2021's default fleet mix and was adjusted to incorporate the California Air Resource Board's (CARB) Advanced Clean Cars II Regulation, which states that all new passenger vehicles sold in California have to be zero emissions by 2035.
- ² Annual VMT was calculated using EMFAC2021 outputs for San Mateo County in 2030 and 2035, and was adjusted to incorporate CARB's Advanced Clean Cars II Regulation.
- ³ Fuel efficiency for each fleet type was estimated using EMFAC2021 outputs for San Mateo County in 2030 and 2035. Plug-in Hybrid vehicles were included in the calculation of gasoline and electricity consumption, where applicable.
- ⁴ EV Adjusted VMT for each fuel type was estimated using EMFAC2021 outputs for San Mateo County in 2030 and 2035, and incorporates CARB's Advanced Clean Cars II Regulation. Fuel percentage of VMT for each fleet type was estimated according to fuel type activity.
- ⁵ Fuel consumption for each fuel and fleet type was calculated by dividing default VMT by fuel efficiency. Natural gas energy use was estimated from DGE assuming a conversion ratio of 137,381 Btu/DGE, per the US Energy Information Administration.
- ⁶ Electricity consumption by electric vehicles are equivalent to electricity supplied at electric vehicle charging stations, both on-site and outside of the Project site.

Abbreviations:

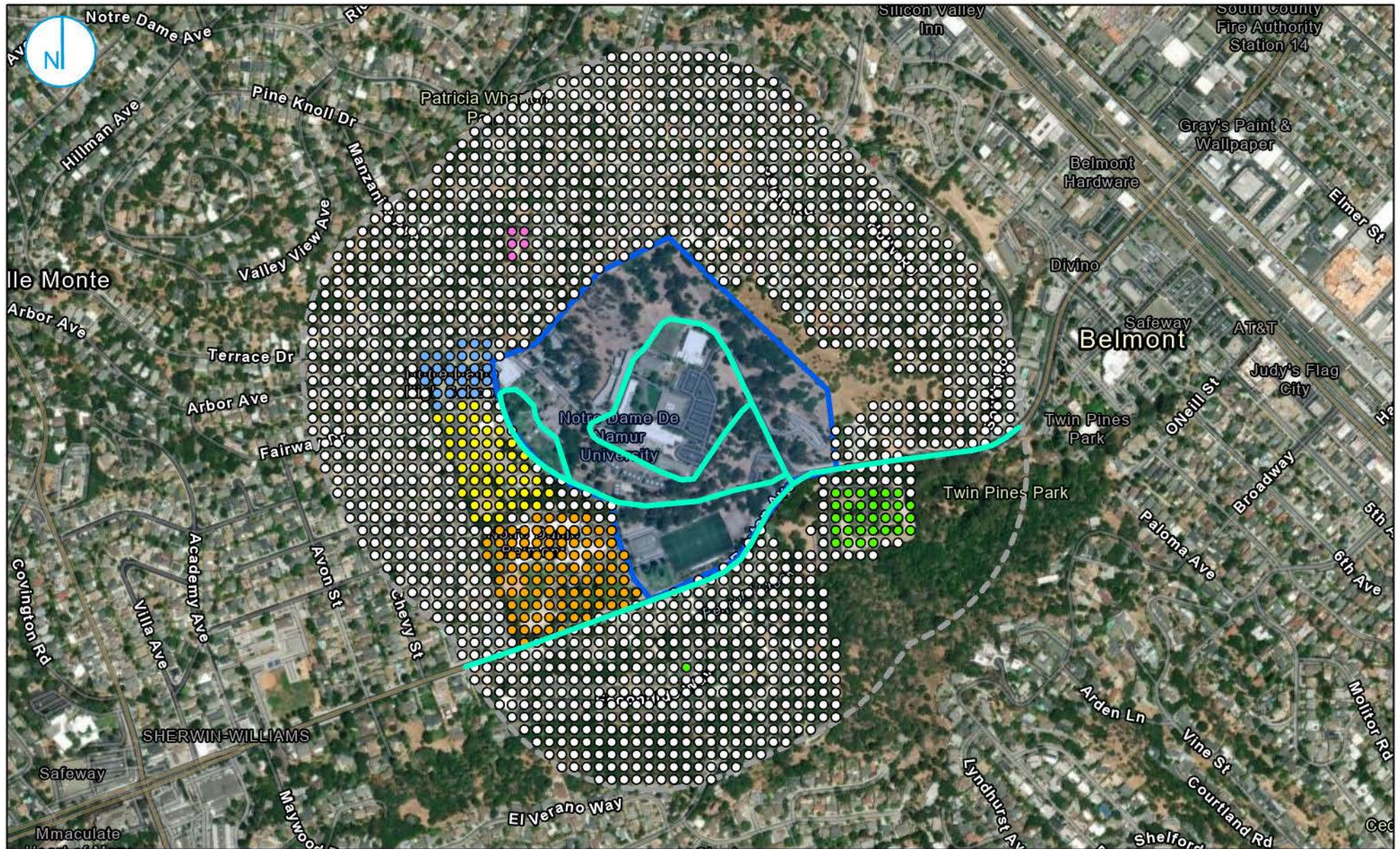
EMFAC - California Air Resources Board Emission FACTor model
DGE - diesel gallon equivalent
mi - mile(s)
MMBtu - million british thermal units

gal - gallon(s)
kWh - kilowatt-hour
MWh - megawatt-hour
VMT - vehicle miles traveled

References:

U.S. Energy Information Administration. 2022. Units and calculators explained, British Thermal Units. Available online at: <https://www.eia.gov/energyexplained/units-and-calculators/british-thermal-units.php>
California Air Resources Board (ARB) 2021. EMFAC2021. Available at: <https://ww2.arb.ca.gov/our-work/programs/mobile-source-emissions-inventory/msei-modeling-tools>
California Air Resources Board (ARB) 2023. Advanced Clean Cars II. Available at: <https://ww2.arb.ca.gov/our-work/programs/advanced-clean-cars-program/advanced-clean-cars-ii>

FIGURES



- Haul Routes
- Daycare and Offsite Worker Receptors
- Elementary School and Offsite Worker Receptors
- High School and Offsite Worker Receptors
- Preschool and Offsite Worker Receptors
- Residential Receptors
- Residential and Offsite Worker Receptors

 Project Site (Construction Area Sources)

 1000-foot Radius of Project Site

0 0.05 0.1 Miles

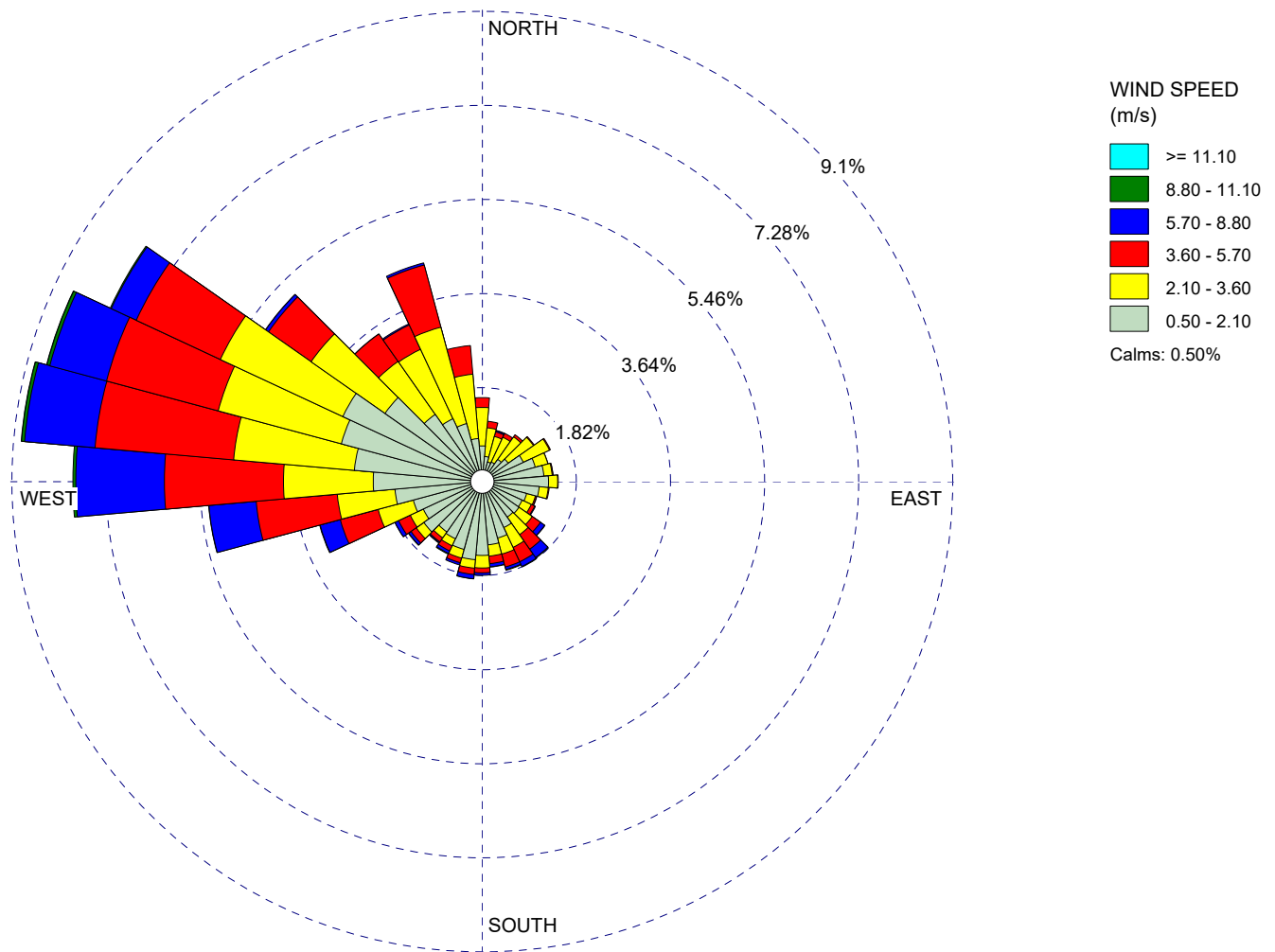
PROJECT SITE , VICINITY, MODELED SOURCES AND MODELED RECEPTORS

Stanford Belmont Project
1500 Ralston Avenue
Belmont, CA

FIGURE 01

RAMBOLL US CONSULTING, INC.
A RAMBOLL COMPANY

RAMBOLL



**EVALUATION OF SITE WINDS AT
SAN CARLOS METEOROLOGICAL
STATION (STATION #23254)**

FIGURE 02

Stanford Belmont
1500 Ralston Ave
Belmont, CA

RAMBOLL US CORPORATION
A RAMBOLL COMPANY



Appendix A. Dust Control Measures in BAAQMD’s CEQA Guidelines and in City of Belmont’s Conditions of Approval

Description of dust control measures	BAAQMD's Basic Dust Mitigation Measures	BAAQMD's Enhanced Dust Mitigation Measures	City of Belmont's Conditions of Approval on Dust Control
Water all active construction sites at least twice daily.	x		x
Cover all trucks hauling soil, sand, and other loose materials or require all trucks to maintain at least two feet of freeboard.	x		x
Pave, apply water three times daily, or apply (non-toxic) soil stabilizers on all unpaved access roads, parking areas, and staging areas at construction sites.			x
Sweep daily (with water sweepers) all paved access roads, parking areas and staging areas at construction sites. All sidewalks shall be kept clear of dust and debris unless the sidewalk is closed as part of a City approved traffic control plan.	x		x
Sweep streets daily along the haul route (with water sweepers) if visible soil material is carried onto adjacent public streets.	x		x
Entry and exit from the site will use rock or rumble strips to prevent tracking.			x
Hydroseed or apply (non-toxic) soil stabilizers to inactive construction areas (previously graded areas inactive for ten days or more).		x	x
Enclose, cover, water twice daily, or apply non-toxic soil binders to exposed stockpiled materials.			x
Install sandbags or other erosion-control measures to prevent silt runoff to public roadways.		x	x

Appendix A. Dust Control Measures in BAAQMD’s CEQA Guidelines and in City of Belmont’s Conditions of Approval

Description of dust control measures	BAAQMD's Basic Dust Mitigation Measures	BAAQMD's Enhanced Dust Mitigation Measures	City of Belmont's Conditions of Approval on Dust Control
Replant vegetation in disturbed areas as quickly as possible.		x	x
Watering should be used to control dust generation during the break-up of pavement.			x
Cover all trucks hauling demolition debris from the site.			x
Use dust-proof chutes to load debris into trucks whenever feasible.			x
Water or cover stockpiles of debris, soil, sand or other materials that can be blown by the wind.			x
All construction equipment shall be maintained and properly tuned in accordance with manufacturer’s specifications. All equipment shall be checked by a certified mechanic and determined to be in proper running order prior to operation.			x
Diesel powered equipment shall not be left inactive and idling for more than five minutes, and shall comply with applicable BAAQMD rules.			x
Use alternative fueled construction equipment, if possible.			x
All vehicle speeds on unpaved roads shall be limited to 15 mph.	x		x

Appendix A. Dust Control Measures in BAAQMD’s CEQA Guidelines and in City of Belmont’s Conditions of Approval

Description of dust control measures	BAAQMD's Basic Dust Mitigation Measures	BAAQMD's Enhanced Dust Mitigation Measures	City of Belmont's Conditions of Approval on Dust Control
Post a visible sign with the telephone number and person to contact at the Lead Agency regarding dust complaints. This person shall respond and take corrective action within 24 hours. The Air District phone number shall also be visible to ensure compliance with applicable regulations.	x		x
All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible. Building pads shall be laid as soon as possible after grading unless seeding or soil binders are used.	x		
All excavation, grading, and/or demolition activities shall be suspended when average wind speeds exceed 20 mph.	x		
All trucks and equipment, including their tires, shall be washed off prior to leaving the site.	x		
Unpaved roads providing access to sites located 100 feet or further from a paved road shall be treated with a 6- to 12-inch layer of compacted layer of wood chips, mulch, or gravel.	x		
Limit the simultaneous occurrence of excavation, grading, and ground-disturbing construction activities.		x	
Install wind breaks (e.g., trees, fences) on the windward side(s) of actively disturbed areas of construction. Wind breaks should have at maximum 50 percent air porosity.		x	