Appendix A
Air Quality and Noise Impact Assessment

CONSULTING COMPANY
ENVIRONMENTAL & SAFETY

AIR QUALITY AND NOISE IMPACT ASSESSMENT

Tramonto Revello Project
17538, 17544 and 17550 Tramonto Drive
17532, 17540 and 17548 Revello Drive
17523 and 17529 Revello Drive
17533, 17537, 17541 and 17547 Revello Drive
Pacific Palisades, CA 90272

August 6, 2020

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Tramonto Revello Project

August 6, 2020

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Tramonto Revello Project
Pacific Palisades, CA 90272

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SECTION 1 INTRODUCTION

This Air Quality and Noise Impact Assessment (Assessment) quantifies and determines the significance of air quality and noise impacts associated with the construction of four (4) single family residences (SFR) located at the following addresses in the Pacific Palisades (Project):

- 17538, 17544 and 17550 Tramonto Drive (SFR 1)
- 17532, 17540 and 17548 Revello Drive (SFR 2)
- 17523 and 17529 Revello Drive (SFR 3)
- 17533, 17537, 17541 and 17547 Revello Drive (SFR 4)

This Assessment quantifies criteria pollutant emissions impacts, greenhouse gas (GHG) emissions impacts, and noise impacts associated with the Project's construction phase. Cumulative impacts from nearby residential projects currently in construction or in Los Angeles City's permitting pipeline are also addressed.

South Coast Air Quality Management District (SCAQMD) methodologies and significance thresholds form the basis of the air analysis within this Assessment. Specifically, the following references are utilized:

- Air Quality Analysis Handbook (2015);
- CEQA Air Quality Handbook (1993);
- Localized Significance Threshold Methodology (July 2008);
- Interim CEQA GHG Significance Threshold for Stationary Sources, Rules and Plans (December 2008); and
- CalEEMod model (version 2016.3.2) with supporting documentation.

The noise analysis within this Assessment follows the methodologies and significance thresholds outlined in the following reference:

- Los Angeles *Construction Noise Ordinance* (Sec. 41.40 and Sec. 112.03 through 112.05).

SECTION 2 PROJECT DESCRIPTION

The Project includes the construction of four (4) new SFRs on adjacent lots and improvement of associated offsite roads. Although this Assessment focuses on the residences planned for the Tramonto Revello Project, the cumulative impacts of multiple residential development projects in the area are also quantified and compared to appropriate significance thresholds (Section 5). See the Project Vicinity and Site Plan figures in Appendix A for the location and design of the Project as well as the locations of nearby construction projects.

The following Project specifications have been provided by the Applicant:

- The Project is 1.59 acres (69,189 sf) in total (4 SFRs and offsite roads) and is currently vacant;
- The Project includes the construction of four SFRs with a total size of 43,736 sf;
- Total material transported from the Project site is 38,095 cy (includes materials generated offsite and a 20% expansion factor); and
- The approximate construction schedule, equipment list, and vehicle count in Table 1.

Table 1 Construction Schedule and Equipment

Construction Phase	Timeframe		Duration (workdays)	Equipment	One Way Vehicle Trips	
	Start	Stop			Worker Trips/Day	Total Haul & Concrete Trips
Site Preparation	5/1/2021	5/18/2021	15	Tractor/Loader/Backhoes (2) Dump Trucks	20	40
Grading / Excavation	5/19/2021	3/5/2022	250	Tractor/Loader/Backhoe Excavators (2) Grader Drill Rig Dump Trucks	20	9,524
Building Construction	3/6/2022	2/3/2024	600	Generator Set Drill Rigs (2) Crane Welders (3) Forklift Tractor/Loader/Backhoe Concrete Trucks Concrete Pump Trucks	160	4,800
Paving	2/4/2024	3/27/2024	45	Cement and Mortar Mixer Paver Roller Tractor/Loader/Backhoe Paving Equipment Concrete Trucks Concrete Pump Trucks	80	100
Architectural Coating	3/28/2024	5/1/2024	30	Air Compressor Dump Trucks	80	20

Project construction will include the following noise control features:

- **Restricted construction hours.** Project construction activities that generate noise will be confined to daytime hours only, as defined by the City of Los Angeles *Construction Noise Ordinance* (7:00 AM-9:00 PM, Monday through Friday, 8:00 AM-6:00 PM Saturdays). Construction activities that generate noise will also be prohibited on Sundays and all federal holidays.
- **Mufflers.** All heavy construction equipment that are able to utilize mufflers will do so. As engine noise is the predominant source of noise associated with most construction equipment, utilization of mufflers will substantially reduce noise impacts.

SECTION 3 SIGNIFICANCE THRESHOLDS

3.1 Air Quality Standards

SCAQMD has established thresholds of significance for use in air quality assessments. The SCAQMD *Air Quality Analysis Handbook* (2015), the *Localized Significance Threshold* Methodology (July 2008), and the *Interim CEQA GHG Significance Threshold for Stationary Sources, Rules and Plans* (December 2008), contain the significance thresholds utilized for this Project. The following sections present and discuss these significance thresholds in more detail.

3.1.1 Localized Criteria Pollutant Thresholds (LST)

SCAQMD's LST Methodology presents a method by which a project's onsite emissions of CO, NOx, PM_{10}, and $PM_{2.5}$ can be compared to screening thresholds that the SCAQMD derived from air dispersion models. The following information was utilized to determine the LST thresholds for this Project:

- **Project size**: As presented in Section 2, this Project site is approximately 1.59 acres (including the four SFRs and offsite road improvements. This is between the 1-acre and 2-acre project size categories in the SCAQMD's LST methodology. Therefore, per LST guidance, significance thresholds are determined by interpolating between the appropriate 1-acre and 2-acre thresholds.

- **Distance to the nearest receptor**: The Project site is located near multiple existing and potential future residential receptors. The nearest residential receptor is located less than 25 meters from the Project site. Therefore, per LST guidance, the smallest available source-receptor distance of 25 meters is used to determine the applicable thresholds.

- **The source receptor (SR) area**: This Project is in Pacific Palisades, which is in SR Area 2 – Northwest Coastal Los Angeles County.

Table 2 presents the construction significance thresholds applicable to the Project, as specified in the SCAQMD LST Tables.

Table 2 LST Construction Significance Threshold

Parameter	CO (lbs/day)	NOx (lbs/day)	PM_{10} (lbs/day)	$PM_{2.5}$ (lbs/day)
Construction Thresholds	718	129	5.18	3.59

3.1.2 Regional Criteria Pollutants Thresholds (Mass Daily Thresholds)

To determine the regional significance of criteria pollutant emissions, they must also be compared to the Mass Daily Thresholds found in the SCAQMD's *Air Quality Analysis Handbook* (2015) and *CEQA Air Quality Handbook* (1993). The emissions compared to these regional thresholds should include emissions generated both onsite and offsite. Table 3 presents the mass daily thresholds that are used to determine the significance of emission impacts in this assessment.

Table 3 Regional Criteria Pollutant Significance Thresholds (Mass Daily Thresholds)

Parameter	CO (lbs/day)	NOx (lbs/day)	PM_{10} (lbs/day)	$PM_{2.5}$ (lbs/day)	ROG (lbs/day)	SOx (lbs/day)
Construction Thresholds	550.0	100.0	150.0	55.0	75.0	150.0

3.1.3 Greenhouse Gas (GHG) Emissions Thresholds

The Thresholds Manual does not include thresholds for GHG impacts. However, the SCAQMD has released *Interim CEQA GHG Significance Threshold for Stationary Sources, Rules and Plans* (December 2008), which indicates that a GHG emissions threshold of 3,000 MT CO_2e/year is appropriate for residential projects. While the SCAQMD recommends that GHG emissions from construction should be amortized over 30 years and added to operational GHG emissions to determine the overall Project impact, this approach is not suitable for residential projects, as they produce extremely low amounts operational GHG emissions. Instead of this approach, the GHG emissions that occur in the peak year of construction are compared directly to the threshold, resulting in a more conservative significance determination.

Please note that "CO_2 equivalents" (CO_2e) is the quantity of CO_2 that would cause the same level of climate change as a given type and quantity of a GHG emissions. This variation of effect between gases is also known as global warming potential (GWP). For example, one unit of methane emissions has the same GWP as 21 units of carbon dioxide. Therefore, one (1) metric ton of methane is equivalent to 21 metric tons of CO_2. Emissions of multiple types of GHGs are represented collectively in units of CO_2e.

3.2 Noise Standards

This section discusses the noise standard applicable to the Project, the City of Los Angeles' *Noise Ordinance*. The following technical terms are utilized in this standard and in this Assessment:

- **Decibel (dB):** A unit division, on a logarithmic scale, whose base is the tenth root of ten, used to represent ratios of quantities proportional to power. In simple terms, if the power is multiplied by a factor of ten, then ten is added to the representation of the power on the decibel scale. If 0 dB represents 1 unit of power, 30 dB represents one thousand units, 60 dB represents one million units, etc.

- **A-Weighted Sound Level – dBA:** Sound pressure level measured using the A-weighting network, a filter which discriminates against low and very high frequencies in a manner similar to the human hearing mechanism at moderate sound levels. The A-weighted sound level is generally used when discussing environmental noise impacts.

- **Equivalent Continuous Noise Level (L_{eq}):** The noise level, in decibels, of the mean sound pressure averaged over a specific duration, generally one hour. This is often referred to as the "equivalent sound level" (hence the "eq" subscript). The "equivalence" is a sound of constant level that has the same total acoustic energy content as the measurement.

3.2.1 Los Angeles Noise Ordinance

Following the general practice used in Los Angeles for analysis of construction noise impacts from residential projects, the *Noise Ordinance* is used as the significance threshold for this Assessment. The *Noise Ordinance*, which is found within the Los Angeles Municipal Code (Municipal Code), presents noise standards applicable to construction and demolition operations occurring within Los Angeles. Specifically, Section 41.40 of the Municipal Code prohibits construction activities that entail the use of any machine, tool, device or equipment between the hours of 9:00 PM – 7:00 AM that could disturb sleeping persons in any dwelling, apartment or other place of residence.

Additionally, Section 112.05 of the Municipal Code prohibits the operation of any power equipment/tool that produces a maximum noise level that exceeds the applicable noise limit from the following list at a distance of 50 feet between the hours of 7:00 AM – 10:00 PM:

- 75 dB(A) for construction machinery (e.g. tractors, dozers, drills, loaders, shovels/cranes, etc.);
- 75 dB(A) for powered equipment 20 HP or less intended for infrequent use; and
- 65 dB(A) for powered equipment intended for repetitive use in residential areas (e.g. mowers, blowers, riding tractors, etc.).

Per the Municipal Code, these noise limitations shall not apply where compliance is technically infeasible. Technically infeasible means that these noise limitations cannot be complied with despite the use of mufflers, shields, sound barriers, and/or other noise reduction devices/techniques during the operation of the equipment.

SECTION 4 PROJECT IMPACTS

4.1 Air Quality Impacts

This section presents the emissions calculation methodologies and results. Significance of the impacts is determined by comparing calculated emissions to the appropriate significance threshold from Section 3.

Two categories of emissions have been quantified for this Assessment: criteria pollutants and GHGs. The criteria pollutants included in this Assessment are CO, NOx, PM_{10}, and $PM_{2.5}$, ROG, and SO_x. GHGs are presented in terms of CO_2e, which includes emissions of CO_2, CH_4, and N_2O (see Section 3.1.3). The emissions are utilized to determine the significance of three types of impacts: localized criteria pollutants, regional criteria pollutants, and GHG impacts.

Emissions have been calculated for each phase of construction using SCAMQD's CalEEMod model. Project specific information has been used where possible and CalEEMod default assumptions are utilized where necessary and appropriate. The following sources of emissions are included: off-road equipment operations, on-road vehicle travel (haul trucks, concrete trucks, concrete pump trucks, and passenger vehicles), fugitive dust (grading/clearing, material handling, and stockpile wind erosion), and architectural coatings. For more information, see the CalEEMod output files in Appendix B.

4.1.1 Localized Criteria Pollutant Impacts

Localized criteria pollutant significance thresholds exist for emissions of CO, NOx, PM_{10}, and $PM_{2.5}$ (not for ROG or SO_x). As a localized impact, only emissions generated onsite are included in the significance determination. Emissions from on-road vehicles and architectural coatings (architectural coatings only emit ROG emissions) are not included in the assessment of the localized impacts.

Table 4 presents the emissions calculated for each construction phase using SCAMQD's CalEEMod model. All phases are compared to the significance thresholds from Section 3.1.1 to determine the significance of the Project's localized construction emissions. Please note that all localized criteria pollutant impacts from construction are less than significant.

Table 4 Localized Criteria Pollutant Impacts (lbs/day)

Phase	CO	NOx	PM_{10}	$PM_{2.5}$	Significant?
Site Preparation	4.5	3.8	0.34	0.22	**No**
Grading/Excavation	11.9	13.4	1.62	0.61	**No**
Building Construction	16.8	17.0	0.73	0.70	**No**
Paving	8.8	5.9	0.28	0.26	**No**
Architectural Coating	1.8	1.2	0.06	0.06	**No**
Significance Threshold	**718**	**129**	**5.18**	**3.59**	**---**

4.1.2 Regional Criteria Pollutant Impacts

Regional criteria pollutant impacts include all onsite and offsite criteria pollutant emissions generated by Project construction. Regional emissions are the same as the localized emissions except for the addition of offsite emissions (vehicle travel) and ROG/SO_x. The addition of ROG emissions necessitates the inclusion of the architectural coatings emissions source because architectural coatings emit ROG emissions.

Table 5 presents the total regional emissions for each construction phase using SCAMQD's CalEEMod model. All phases are compared to the significance thresholds from Section 3.1.2 to determine the significance of the Project's regional construction emissions. Please note that all construction phases result in less-than-significant regional criteria pollutant impacts.

Table 5 Regional Criteria Pollutant Impacts (lbs/day)

Phase	CO	NOx	PM_{10}	$PM_{2.5}$	SO_x	ROG	Significant?
Site Preparation	5.4	4.0	0.6	0.3	0.0	0.5	**No**
Grading/Excavation	14.0	16.3	2.7	0.9	0.0	1.5	**No**
Building Construction	23.0	18.0	2.8	1.3	0.1	2.8	**No**
Paving	11.4	6.2	1.2	0.5	0.0	0.9	**No**
Architectural Coating	4.4	1.2	1.0	0.3	0.0	6.6	**No**
Significance Threshold	**550.0**	**100.0**	**150.0**	**55.0**	**150.0**	**75.0**	**---**

4.1.3 Greenhouse Gas Impacts

Construction phase GHG emissions are also calculated by CalEEMod. Maximum daily CO_2e emissions are multiplied by the maximum number of construction days in a year to conservatively determine the peak annual emissions. Table 6 presents the construction phase CO_2e emissions and compares them to the significance threshold from Section 3.1.3. Please note that the peak year GHG emissions impacts are less than significant.

Table 6 Construction GHG Emissions

Source	CO_2e Emissions (MT)
Project Construction Phase	854
Significance Threshold	3,000
Significant?	**No**

4.2 Noise Impacts

This section presents the noise assessment methodologies and results. Significance of noise impacts are determined by comparing Project noise levels to the significance threshold presented in Section 3.2.1. In addition, this section briefly describes noise monitoring conducted to quantify the existing ambient noise environment in and around the Project site. For additional detail regarding the noise monitoring and impact calculations, see Appendix C and the noise reference materials in Appendix D.

4.2.1 Ambient Noise Environment

To quantify the existing ambient noise environment in the Project's vicinity, a noise measurement was collected at the Project site on June 10, 2020. The noise measurements were recorded using a Quest DL SoundPro Type 2 noise meter programmed to "slow" mode and "A" weighting. The microphone was equipped with a windscreen during the measurements and the noise meter was calibrated using a Quest QC-10 field calibrator before the measurements were taken. The noise meter and field calibrator were professionally calibrated by TSI Incorporated, within the previous 1-year period.

Table 7 presents the measured ambient noise level at the Project. The noise measurement log is included in Appendix C and a figure showing the monitoring location is included in Appendix A. Because the ambient noise levels are lower than the significance thresholds presented in Section 3.2.1, the significance thresholds do not need to be adjusted for ambient noise.

Table 7 Ambient Noise Levels

Measurement	Location	Noise Level (L_{eq} dBA)
S001	See Figure 1	54.7

4.2.2 Construction Noise Impacts

Noise impacts associated with the heavy equipment utilized for Project construction are determined using equipment data and equations from the Federal Highway Administration's (FHWA) *Roadway Construction Noise Model* (see excerpt in Appendix D). The noise calculations can be found in Appendix C.

The Project will utilize mufflers on heavy construction equipment whenever possible, as described in Section 2. The Environmental Protection Agency's (EPA) *Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances* (see excerpt in Appendix D) indicates that a 10 dBA reduction in noise is expected from use of mufflers. However, this Assessment conservatively utilizes a 5 dBA reduction from the use of mufflers.

Table 8 presents the calculated noise level for each type of construction equipment and compares them to significance threshold of 75 dBA. Please note that all noise impacts are less than significant.

Table 8 Construction Noise Impacts – dBA

Construction Phase	Equipment Type	Noise Level (L_{eq} @ 50')	Sig. Threshold (L_{eq} @ 50')	Exceeds Threshold?
Site Preparation	Tractor/Loader/Backhoe	70	75	No
	Dump Truck	67		No
Grading/Excavation	Grader	73		No
	Excavator	72		No
	Tractor/Loader/Backhoe	70		No
	Drill Rig	67		No
	Dump Truck	67		No
Building Construction	Generator Set	73		No
	Dump Truck	67		No
	Crane	68		No
	Concrete Truck	70		No
	Concrete Pump Truck	69		No
	Welders	70		No
	Forklift	63		No
	Tractor/Loader/Backhoe	70		No
Paving	Cement and Mortar Mixer	75		No
	Paver	69		No
	Roller	68		No
	Tractor/Loader/Backhoe	70		No
	Concrete Truck	70		No
	Concrete Pump Truck	69		No
	Paving Equipment	69		No
Architectural Coating	Air Compressor	69		No
	Dump Truck	67		No

Please note that the Project will be required to comply with the Los Angeles Noise Ordinance from which the noise significance threshold was derived. This provides additional confidence that the construction noise impacts will be less than significant.

SECTION 5 CUMULATIVE IMPACTS

This section addresses the potential for cumulative impacts occurring from the simultaneous construction of multiple projects in this area. Cumulative impacts are considered for each of the four impact classifications included in Section 4.

Based on information from Los Angeles City, there are a total of thirteen nearby construction projects currently active or in the permitting pipeline, not including the Project. The location of these projects is shown on Figure 1.

5.1 Air Quality Impacts

Cumulative air quality impacts are addressed in this section.

5.1.1 Localized Criteria Pollutant Impacts

By grouping nearby projects together and treating them as one larger construction project, the same method for analyzing localized criteria pollutant impacts presented in Section 4.1.1 can be used to determine the significance of cumulative localized criteria pollutant impacts. The following two pieces of information are required to do this:

- **The total emissions from the group of projects.** The nearest construction projects are generally smaller than the Project. As size is the primary factor that influences the amount of emissions a project generates during construction, it is conservative to assume that, on average, each of the nearby projects will produce the same amount of emissions as the Project.

- **The appropriate significance threshold.** According to SCAQMD guidelines, the significance thresholds for localized emissions impacts are based on the size of the project (e.g., the $PM_{2.5}$ threshold is 3.0 lbs/day for a 1-acre project, 4.0 lbs/day for a 2-acre project, and 6 lbs/day for a 5-acre project). Therefore, cumulative localized emissions impacts from multiple projects should be compared to the appropriate significance threshold for the collective size of the considered Projects.

Two (2) different groupings of projects were considered for this cumulative localized criteria pollutant analysis:

- **Cumulative Scenario 1** – Three (3) projects are under construction at the same time in a 2.5-acre area, including the Project. This 2.5-acre area is shown in yellow on Figure 1.
- **Cumulative Scenario 2** – Five (5) projects are under construction at the same time in a five-acre area, including the Project. This 5-acre area is shown in green on Figure 1.

Note that nearby project B on Figure 1 (17537 Tramonto) is not included in the above scenarios because it is nearly complete and is not expected to be active when Project construction begins (see additional discussion after Table 9).

Table 9 presents the cumulative localized criteria pollutant emissions impacts associated with these two scenarios. The maximum emissions are used for each pollutant, regardless of construction phase.

Table 9 Cumulative Localized Criteria Pollutant Emissions Impacts (lbs/day)

Scenario	Parameter	CO	NOx	PM_{10}	$PM_{2.5}$
Cumulative Scenario 1 – 3 projects in 2.5 acres	Cumulative Emissions	50.4	51.1	4.9	2.1
	Significance Threshold	944	159	7.2	4.3
	Significant?	No	No	No	No
Cumulative Scenario 2 – 5 projects in 5 acres	Cumulative Emissions	84.0	85.2	8.1	3.5
	Significance Threshold	1,531	221	13.0	6.0
	Significant?	No	No	No	No

The results in Table 9 demonstrate that the Project does not cause or contribute to a cumulative exceedance of the localized criteria pollutant significance thresholds. Additionally, please note that this analysis presents a conservative maximum representation of cumulative emissions because it assumes that all of the projects are the same size as the Project and that they will all be in the most polluting phase of construction simultaneously.

As mentioned above, nearby project B on Figure 1 (17537 Tramonto) is not included in the impacts presented in Table 9 because it is nearly complete and is not expected to be active when Project construction begins. However, please note that the impacts in Table 9 remain below the applicable significance thresholds if this project is included (this can be established by multiplying the Cumulative Scenario 1 impacts by 4/3 and multiplying the Cumulative Scenario 2 impacts by 6/5). Therefore, Project impacts are less than significant with or without concurrent construction of nearby project B.

5.1.2 Regional Criteria Pollutant Impacts

Regional impacts are cumulative impacts by their nature. The regional significance thresholds were selected to ensure that a project does not disproportionately impact the cumulate air quality of the air basin. If a project has less than significant impacts for regional criteria pollutants, its cumulative impacts on a regional basis are also less than significant.

5.1.3 Greenhouse Gas Impacts

GHG impacts are global in their effects. For the same reason as the regional criteria pollutant impacts, if a project has a less than significant GHG emissions impact based on the SCAQMD's thresholds, it also has less-than-significant cumulative GHG impacts.

5.2 Noise Impacts

This section discusses the potential for cumulative noise impacts from the Project. The noise significance threshold utilized in this Assessment is applied to each piece of equipment individually, so it cannot be utilized to determine the cumulative impacts of multiple projects. Instead, the physics of sound will be utilized to show that the Project will generate less than significant cumulative noise impacts.

Noise is measured and experienced on a logarithmic scale. This causes some unexpected properties, such as the following rule of thumb: if two simultaneous noises have volumes at least 10 dBA apart, the louder noise will entirely drown out the lower volume noise. Stated another way, if you add a 50-dBA noise to a 60-dBA noise, the resulting noise level remains 60 dBA.

Any substantial material (buildings, terrain, walls, etc.) that breaks line-of-site between a noise source and the receptor will reduce the noise level experienced by that receptor by at least 10 dBA. Because a large amount of shielding exists in the area due to the extreme elevation variations and the limited line of site to nearby projects, this Project is not expected to cause or contribute to any significant cumulative noise impacts. Therefore, this Project has less than significant cumulative noise impacts.

SECTION 6 MITIGATIONS

All construction air quality and noise impacts are less than significant without mitigation. Therefore, no mitigation is necessary.

SECTION 7 CONCLUSION

The Assessment finds that this Project's construction will have the following impacts on an individual and cumulative basis:

- Less than significant impacts from **localized criteria pollutant emissions**;
- Less than significant impacts from **regional criteria pollutant emissions**;
- Less than significant impacts from **GHG emissions**; and
- Less than significant impacts from **noise**.

APPENDIX A - FIGURES

Figure 1 – Site Location Map
Figures 2 – Construction Site Plan

Figure 1 - Project Vicinity

Nearby active and planned construction projects shown in red.
Yellow line is Cumulative Scenario 1, which includes 3* projects in a 2.5 acre area.
Green line is Cumulative Scenario 2, which includes 5* projects in a 5 acre area.

*Note that nearby project B is not included in the cumulative scenarios because it is nearly complete and is not expected to be active when Project construction begins. See additional discussion in Section 5.1.1 of report.

1 SITE PLAN
SCALE 1" = 20'-0"

SITE PLAN

ISSUE AND DATE:
5/20/2020 11:01:16 AM

PROJECT STATUS:
IN PROGRESS

PROJECT NO:
DRAWN BY:
CHECKED BY:
SCALE: 1" = 20'-0"
SHEET NO:

A1-1.2

APPENDIX B – CALEEMOD OUTPUT

Tramonto Revello

Los Angeles-South Coast County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Single Family Housing	4.00	Dwelling Unit	1.59	43,736.00	11

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	33
Climate Zone	11			**Operational Year**	2024
Utility Company	Los Angeles Department of Water & Power				
CO2 Intensity (lb/MWhr)	1227.89	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Note: CalEEMod used to calculate construction emissions only. Operational emissions calculations redacted to avoid confusion.

Tramonto Revello - Los Angeles-South Coast County, Summer

Project Characteristics -

Land Use - Total acreage and structure sizes from Project applicant. Total acreage includes four SFRs and offsite road improvements. Assume 6 people per residence (6 x 4 = 24).

Construction Phase - Estimated based on anticipated construction start/end dates from Applicant

Off-road Equipment - CalEEMod defaults

Off-road Equipment - CalEEMod defaults

Off-road Equipment - CalEEMod defaults adjusted per Project specifications

Off-road Equipment - CalEEMod defaults

Off-road Equipment - CalEEMod defaults adjusted per Project specifications

Trips and VMT - Worker and haul truck (including dump and concrete trucks) trips per info provided by Applicant. Due to hillside vehicle size restrictions, haul trucks assumed to be MHDT class. Grading phase haul truck trips based on 8 cy per load.

Grading - Material export from Applicant and includes expansion. Entire size of site assumed to be disturbed once during site prep phase. 1 acre assumed to be disturbed per day of grading phase (1 x 250 = 250 acres).

Architectural Coating - Residential interior based on site of structures, residential exterior conservatively assumes entire size of project not occupied by structures (ie lot size - structure footprint).

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	ConstArea_Residential_Exterior	29,522.00	45,814.00
tblArchitecturalCoating	ConstArea_Residential_Interior	88,565.00	43,736.00
tblConstructionPhase	NumDays	2.00	15.00
tblConstructionPhase	NumDays	4.00	250.00
tblConstructionPhase	NumDays	200.00	600.00
tblConstructionPhase	NumDays	10.00	45.00
tblConstructionPhase	NumDays	10.00	30.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00

tblGrading	AcresOfGrading	93.75	250.00
tblGrading	AcresOfGrading	0.00	1.59
tblGrading	MaterialExported	0.00	38,095.00
tblLandUse	LandUseSquareFeet	7,200.00	43,736.00
tblLandUse	LotAcreage	1.30	1.59
tblOffRoadEquipment	OffRoadEquipmentType		Bore/Drill Rigs
tblOffRoadEquipment	OffRoadEquipmentType		Bore/Drill Rigs
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	UsageHours	8.00	0.00
tblOffRoadEquipment	UsageHours	6.00	0.00
tblOffRoadEquipment	UsageHours	7.00	0.00
tblTripsAndVMT	HaulingTripNumber	0.00	40.00
tblTripsAndVMT	HaulingTripNumber	4,762.00	9,524.00
tblTripsAndVMT	HaulingTripNumber	0.00	4,800.00
tblTripsAndVMT	HaulingTripNumber	0.00	100.00
tblTripsAndVMT	HaulingTripNumber	0.00	20.00
tblTripsAndVMT	HaulingVehicleClass	HHDT	MHDT
tblTripsAndVMT	HaulingVehicleClass	HHDT	MHDT
tblTripsAndVMT	HaulingVehicleClass	HHDT	MHDT
tblTripsAndVMT	HaulingVehicleClass	HHDT	MHDT
tblTripsAndVMT	HaulingVehicleClass	HHDT	MHDT
tblTripsAndVMT	WorkerTripNumber	5.00	20.00
tblTripsAndVMT	WorkerTripNumber	13.00	20.00
tblTripsAndVMT	WorkerTripNumber	1.00	160.00

tblTripsAndVMT	WorkerTripNumber	13.00	80.00
tblTripsAndVMT	WorkerTripNumber	0.00	80.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2021	1.4669	16.3102	14.0182	0.0487	2.1873	0.5505	2.7378	0.4343	0.5068	0.9411	0.0000	4,853.0187	4,853.0187	0.8815	0.0000	4,875.0551
2022	2.7707	18.0268	22.9955	0.0625	3.8310	0.7502	4.2903	0.8377	0.7174	1.2729	0.0000	5,998.2345	5,998.2345	0.9909	0.0000	6,023.0070
2023	2.5837	16.6080	22.3655	0.0619	2.0423	0.6612	2.7035	0.5451	0.6318	1.1769	0.0000	5,934.2306	5,934.2306	0.9782	0.0000	5,958.6862
2024	7.3860	15.6543	21.8939	0.0614	3.9543	0.5903	4.5446	1.0144	0.5634	1.5778	0.0000	5,885.5294	5,885.5294	0.9692	0.0000	5,909.7582
Maximum	**7.3860**	**18.0268**	**22.9955**	**0.0625**	**3.9543**	**0.7502**	**4.5446**	**1.0144**	**0.7174**	**1.5778**	**0.0000**	**5,998.2345**	**5,998.2345**	**0.9909**	**0.0000**	**6,023.0070**

2.1 Overall Construction (Maximum Daily Emission)

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2021	1.4669	16.3102	14.0182	0.0487	2.1873	0.5505	2.7378	0.4343	0.5068	0.9411	0.0000	4,853.0187	4,853.0187	0.8815	0.0000	4,875.0551
2022	2.7707	18.0268	22.9955	0.0625	3.8310	0.7502	4.2903	0.8377	0.7174	1.2729	0.0000	5,998.2345	5,998.2345	0.9909	0.0000	6,023.0070
2023	2.5837	16.6080	22.3655	0.0619	2.0423	0.6612	2.7035	0.5451	0.6318	1.1769	0.0000	5,934.2306	5,934.2306	0.9782	0.0000	5,958.6862
2024	7.3860	15.6543	21.8939	0.0614	3.9543	0.5903	4.5446	1.0144	0.5634	1.5778	0.0000	5,885.5294	5,885.5294	0.9692	0.0000	5,909.7582
Maximum	**7.3860**	**18.0268**	**22.9955**	**0.0625**	**3.9543**	**0.7502**	**4.5446**	**1.0144**	**0.7174**	**1.5778**	**0.0000**	**5,998.2345**	**5,998.2345**	**0.9909**	**0.0000**	**6,023.0070**

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

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

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	5/1/2021	5/18/2021	6	15	
2	Grading	Grading	5/19/2021	3/5/2022	6	250	
3	Building Construction	Building Construction	3/6/2022	2/3/2024	6	600	
4	Paving	Paving	2/4/2024	3/27/2024	6	45	
5	Architectural Coating	Architectural Coating	3/28/2024	5/1/2024	6	30	

Acres of Grading (Site Preparation Phase): 1.59

Acres of Grading (Grading Phase): 250

Acres of Paving: 0

Residential Indoor: 43,736; Residential Outdoor: 45,814; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Tramonto Revello - Los Angeles-South Coast County, Summer

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Graders	0	0.00	187	0.41
Site Preparation	Rubber Tired Dozers	0	0.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Grading	Excavators	2	8.00	158	0.38
Grading	Graders	1	6.00	187	0.41
Grading	Rubber Tired Dozers	0	0.00	247	0.40
Grading	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Building Construction	Cranes	1	6.00	231	0.29
Building Construction	Forklifts	1	6.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	1	6.00	97	0.37
Building Construction	Welders	3	8.00	46	0.45
Paving	Cement and Mortar Mixers	1	6.00	9	0.56
Paving	Pavers	1	6.00	130	0.42
Paving	Paving Equipment	1	8.00	132	0.36
Paving	Rollers	1	7.00	80	0.38
Paving	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Architectural Coating	Air Compressors	1	6.00	78	0.48
Grading	Bore/Drill Rigs	1	8.00	221	0.50
Building Construction	Bore/Drill Rigs	2	8.00	221	0.50

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	2	20.00	0.00	40.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	MHDT
Grading	5	20.00	0.00	9,524.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	MHDT
Building Construction	9	160.00	0.00	4,800.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	MHDT
Paving	5	80.00	0.00	100.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	MHDT
Architectural Coating	1	80.00	0.00	20.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	MHDT

3.1 Mitigation Measures Construction

3.2 Site Preparation - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.1124	0.0000	0.1124	0.0121	0.0000	0.0121			0.0000			0.0000
Off-Road	0.3746	3.7916	4.5205	6.2100e-003		0.2236	0.2236		0.2057	0.2057		601.8002	601.8002	0.1946		606.6660
Total	**0.3746**	**3.7916**	**4.5205**	**6.2100e-003**	**0.1124**	**0.2236**	**0.3360**	**0.0121**	**0.2057**	**0.2178**		**601.8002**	**601.8002**	**0.1946**		**606.6660**

3.2 Site Preparation - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0113	0.1974	0.0904	1.3200e-003	0.0521	6.7000e-004	0.0528	0.0156	6.4000e-004	0.0163		137.7760	137.7760	1.0800e-003		137.8030
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0857	0.0589	0.8056	2.2900e-003	0.2236	1.8100e-003	0.2254	0.0593	1.6600e-003	0.0610		227.7540	227.7540	6.7100e-003		227.9217
Total	**0.0970**	**0.2563**	**0.8960**	**3.6100e-003**	**0.2756**	**2.4800e-003**	**0.2781**	**0.0749**	**2.3000e-003**	**0.0772**		**365.5300**	**365.5300**	**7.7900e-003**		**365.7247**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.1124	0.0000	0.1124	0.0121	0.0000	0.0121			0.0000			0.0000
Off-Road	0.3746	3.7916	4.5205	6.2100e-003		0.2236	0.2236		0.2057	0.2057	0.0000	601.8002	601.8002	0.1946		606.6660
Total	**0.3746**	**3.7916**	**4.5205**	**6.2100e-003**	**0.1124**	**0.2236**	**0.3360**	**0.0121**	**0.2057**	**0.2178**	**0.0000**	**601.8002**	**601.8002**	**0.1946**		**606.6660**

3.2 Site Preparation - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0113	0.1974	0.0904	1.3200e-003	0.0521	6.7000e-004	0.0528	0.0156	6.4000e-004	0.0163		137.7760	137.7760	1.0800e-003		137.8030
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0857	0.0589	0.8056	2.2900e-003	0.2236	1.8100e-003	0.2254	0.0593	1.6600e-003	0.0610		227.7540	227.7540	6.7100e-003		227.9217
Total	**0.0970**	**0.2563**	**0.8960**	**3.6100e-003**	**0.2756**	**2.4800e-003**	**0.2781**	**0.0749**	**2.3000e-003**	**0.0772**		**365.5300**	**365.5300**	**7.7900e-003**		**365.7247**

3.3 Grading - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.0777	0.0000	1.0777	0.1171	0.0000	0.1171			0.0000			0.0000
Off-Road	1.2201	13.4318	11.9207	0.0275		0.5391	0.5391		0.4960	0.4960		2,656.9970	2,656.9970	0.8593		2,678.4802
Total	**1.2201**	**13.4318**	**11.9207**	**0.0275**	**1.0777**	**0.5391**	**1.6168**	**0.1171**	**0.4960**	**0.6131**		**2,656.9970**	**2,656.9970**	**0.8593**		**2,678.4802**

3.3 Grading - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.1610	2.8195	1.2919	0.0189	0.8860	9.6200e-003	0.8956	0.2579	9.1900e-003	0.2671		1,968.2677	1,968.2677	0.0154		1,968.6532
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0857	0.0589	0.8056	2.2900e-003	0.2236	1.8100e-003	0.2254	0.0593	1.6600e-003	0.0610		227.7540	227.7540	6.7100e-003		227.9217
Total	**0.2468**	**2.8784**	**2.0975**	**0.0212**	**1.1096**	**0.0114**	**1.1210**	**0.3172**	**0.0109**	**0.3280**		**2,196.0217**	**2,196.0217**	**0.0221**		**2,196.5750**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.0777	0.0000	1.0777	0.1171	0.0000	0.1171			0.0000			0.0000
Off-Road	1.2201	13.4318	11.9207	0.0275		0.5391	0.5391		0.4960	0.4960	0.0000	2,656.9970	2,656.9970	0.8593		2,678.4802
Total	**1.2201**	**13.4318**	**11.9207**	**0.0275**	**1.0777**	**0.5391**	**1.6168**	**0.1171**	**0.4960**	**0.6131**	**0.0000**	**2,656.9970**	**2,656.9970**	**0.8593**		**2,678.4802**

3.3 Grading - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.1610	2.8195	1.2919	0.0189	0.8860	9.6200e-003	0.8956	0.2579	9.1900e-003	0.2671		1,968.2677	1,968.2677	0.0154		1,968.6532
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0857	0.0589	0.8056	2.2900e-003	0.2236	1.8100e-003	0.2254	0.0593	1.6600e-003	0.0610		227.7540	227.7540	6.7100e-003		227.9217
Total	**0.2468**	**2.8784**	**2.0975**	**0.0212**	**1.1096**	**0.0114**	**1.1210**	**0.3172**	**0.0109**	**0.3280**		**2,196.0217**	**2,196.0217**	**0.0221**		**2,196.5750**

3.3 Grading - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.0777	0.0000	1.0777	0.1171	0.0000	0.1171			0.0000			0.0000
Off-Road	1.0843	11.2298	11.8009	0.0275		0.4488	0.4488		0.4129	0.4129		2,658.1347	2,658.1347	0.8597		2,679.6270
Total	**1.0843**	**11.2298**	**11.8009**	**0.0275**	**1.0777**	**0.4488**	**1.5266**	**0.1171**	**0.4129**	**0.5301**		**2,658.1347**	**2,658.1347**	**0.8597**		**2,679.6270**

3.3 Grading - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.1495	2.6908	1.1482	0.0188	2.5297	8.7100e-003	2.5384	0.6613	8.3200e-003	0.6696		1,960.1834	1,960.1834	0.0135		1,960.5220
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0803	0.0532	0.7432	2.2100e-003	0.2236	1.7500e-003	0.2253	0.0593	1.6100e-003	0.0609		219.7425	219.7425	6.0600e-003		219.8941
Total	**0.2298**	**2.7440**	**1.8915**	**0.0210**	**2.7533**	**0.0105**	**2.7637**	**0.7206**	**9.9300e-003**	**0.7305**		**2,179.9259**	**2,179.9259**	**0.0196**		**2,180.4161**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.0777	0.0000	1.0777	0.1171	0.0000	0.1171			0.0000			0.0000
Off-Road	1.0843	11.2298	11.8009	0.0275		0.4488	0.4488		0.4129	0.4129	0.0000	2,658.1347	2,658.1347	0.8597		2,679.6270
Total	**1.0843**	**11.2298**	**11.8009**	**0.0275**	**1.0777**	**0.4488**	**1.5266**	**0.1171**	**0.4129**	**0.5301**	**0.0000**	**2,658.1347**	**2,658.1347**	**0.8597**		**2,679.6270**

3.3 Grading - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.1495	2.6908	1.1482	0.0188	2.5297	8.7100e-003	2.5384	0.6613	8.3200e-003	0.6696		1,960.1834	1,960.1834	0.0135		1,960.5220
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0803	0.0532	0.7432	2.2100e-003	0.2236	1.7500e-003	0.2253	0.0593	1.6100e-003	0.0609		219.7425	219.7425	6.0600e-003		219.8941
Total	**0.2298**	**2.7440**	**1.8915**	**0.0210**	**2.7533**	**0.0105**	**2.7637**	**0.7206**	**9.9300e-003**	**0.7305**		**2,179.9259**	**2,179.9259**	**0.0196**		**2,180.4161**

3.4 Building Construction - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.0969	17.0359	16.8087	0.0409		0.7344	0.7344		0.7027	0.7027		3,828.6645	3,828.6645	0.9395		3,852.1529
Total	**2.0969**	**17.0359**	**16.8087**	**0.0409**		**0.7344**	**0.7344**		**0.7027**	**0.7027**		**3,828.6645**	**3,828.6645**	**0.9395**		**3,852.1529**

3.4 Building Construction - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0314	0.5651	0.2411	3.9500e-003	0.2964	1.8300e-003	0.2983	0.0812	1.7500e-003	0.0830		411.6303	411.6303	2.8400e-003		411.7014
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.6424	0.4258	5.9456	0.0176	1.7884	0.0140	1.8024	0.4743	0.0129	0.4872		1,757.9397	1,757.9397	0.0485		1,759.1527
Total	**0.6738**	**0.9909**	**6.1868**	**0.0216**	**2.0849**	**0.0158**	**2.1007**	**0.5555**	**0.0146**	**0.5702**		**2,169.5700**	**2,169.5700**	**0.0514**		**2,170.8541**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.0969	17.0359	16.8087	0.0409		0.7344	0.7344		0.7027	0.7027	0.0000	3,828.6645	3,828.6645	0.9395		3,852.1529
Total	**2.0969**	**17.0359**	**16.8087**	**0.0409**		**0.7344**	**0.7344**		**0.7027**	**0.7027**	**0.0000**	**3,828.6645**	**3,828.6645**	**0.9395**		**3,852.1529**

3.4 Building Construction - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0314	0.5651	0.2411	3.9500e-003	0.2964	1.8300e-003	0.2983	0.0812	1.7500e-003	0.0830		411.6303	411.6303	2.8400e-003		411.7014
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.6424	0.4258	5.9456	0.0176	1.7884	0.0140	1.8024	0.4743	0.0129	0.4872		1,757.9397	1,757.9397	0.0485		1,759.1527
Total	**0.6738**	**0.9909**	**6.1868**	**0.0216**	**2.0849**	**0.0158**	**2.1007**	**0.5555**	**0.0146**	**0.5702**		**2,169.5700**	**2,169.5700**	**0.0514**		**2,170.8541**

3.4 Building Construction - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.9535	15.7895	16.6768	0.0410		0.6466	0.6466		0.6183	0.6183		3,832.5942	3,832.5942	0.9320		3,855.8953
Total	**1.9535**	**15.7895**	**16.6768**	**0.0410**		**0.6466**	**0.6466**		**0.6183**	**0.6183**		**3,832.5942**	**3,832.5942**	**0.9320**		**3,855.8953**

3.4 Building Construction - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0269	0.4333	0.2133	3.9200e-003	0.2539	1.0200e-003	0.2549	0.0708	9.8000e-004	0.0718		408.0652	408.0652	2.4300e-003		408.1261
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.6033	0.3853	5.4754	0.0170	1.7884	0.0136	1.8020	0.4743	0.0125	0.4868		1,693.5712	1,693.5712	0.0438		1,694.6649
Total	**0.6302**	**0.8185**	**5.6887**	**0.0209**	**2.0423**	**0.0146**	**2.0569**	**0.5451**	**0.0135**	**0.5586**		**2,101.6364**	**2,101.6364**	**0.0462**		**2,102.7909**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.9535	15.7895	16.6768	0.0410		0.6466	0.6466		0.6183	0.6183	0.0000	3,832.5942	3,832.5942	0.9320		3,855.8953
Total	**1.9535**	**15.7895**	**16.6768**	**0.0410**		**0.6466**	**0.6466**		**0.6183**	**0.6183**	**0.0000**	**3,832.5942**	**3,832.5942**	**0.9320**		**3,855.8953**

3.4 Building Construction - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0269	0.4333	0.2133	3.9200e-003	0.2539	1.0200e-003	0.2549	0.0708	9.8000e-004	0.0718		408.0652	408.0652	2.4300e-003		408.1261
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.6033	0.3853	5.4754	0.0170	1.7884	0.0136	1.8020	0.4743	0.0125	0.4868		1,693.5712	1,693.5712	0.0438		1,694.6649
Total	**0.6302**	**0.8185**	**5.6887**	**0.0209**	**2.0423**	**0.0146**	**2.0569**	**0.5451**	**0.0135**	**0.5586**		**2,101.6364**	**2,101.6364**	**0.0462**		**2,102.7909**

3.4 Building Construction - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.8410	14.8658	16.5939	0.0410		0.5759	0.5759		0.5501	0.5501		3,836.6481	3,836.6481	0.9268		3,859.8176
Total	**1.8410**	**14.8658**	**16.5939**	**0.0410**		**0.5759**	**0.5759**		**0.5501**	**0.5501**		**3,836.6481**	**3,836.6481**	**0.9268**		**3,859.8176**

3.4 Building Construction - 2024

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0259	0.4371	0.1957	3.9200e-003	2.1658	1.0300e-003	2.1669	0.5401	9.8000e-004	0.5411		407.7961	407.7961	2.2400e-003		407.8521
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.5707	0.3513	5.1044	0.0165	1.7884	0.0134	1.8018	0.4743	0.0123	0.4866		1,641.0852	1,641.0852	0.0401		1,642.0886
Total	**0.5966**	**0.7884**	**5.3000**	**0.0204**	**3.9543**	**0.0144**	**3.9687**	**1.0144**	**0.0133**	**1.0277**		**2,048.8813**	**2,048.8813**	**0.0424**		**2,049.9406**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.8410	14.8658	16.5939	0.0410		0.5759	0.5759		0.5501	0.5501	0.0000	3,836.6481	3,836.6481	0.9268		3,859.8176
Total	**1.8410**	**14.8658**	**16.5939**	**0.0410**		**0.5759**	**0.5759**		**0.5501**	**0.5501**	**0.0000**	**3,836.6481**	**3,836.6481**	**0.9268**		**3,859.8176**

3.4 Building Construction - 2024

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0259	0.4371	0.1957	3.9200e-003	2.1658	1.0300e-003	2.1669	0.5401	9.8000e-004	0.5411		407.7961	407.7961	2.2400e-003		407.8521
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.5707	0.3513	5.1044	0.0165	1.7884	0.0134	1.8018	0.4743	0.0123	0.4866		1,641.0852	1,641.0852	0.0401		1,642.0886
Total	**0.5966**	**0.7884**	**5.3000**	**0.0204**	**3.9543**	**0.0144**	**3.9687**	**1.0144**	**0.0133**	**1.0277**		**2,048.8813**	**2,048.8813**	**0.0424**		**2,049.9406**

3.5 Paving - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.6180	5.8607	8.8253	0.0136		0.2810	0.2810		0.2594	0.2594		1,297.8688	1,297.8688	0.4114		1,308.1547
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.6180**	**5.8607**	**8.8253**	**0.0136**		**0.2810**	**0.2810**		**0.2594**	**0.2594**		**1,297.8688**	**1,297.8688**	**0.4114**		**1,308.1547**

3.5 Paving - 2024

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	7.1900e-003	0.1214	0.0544	1.0900e-003	0.0434	2.9000e-004	0.0437	0.0130	2.7000e-004	0.0133		113.2767	113.2767	6.2000e-004		113.2922
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.2854	0.1757	2.5522	8.2300e-003	0.8942	6.7000e-003	0.9009	0.2372	6.1700e-003	0.2433		820.5426	820.5426	0.0201		821.0443
Total	**0.2925**	**0.2971**	**2.6065**	**9.3200e-003**	**0.9376**	**6.9900e-003**	**0.9446**	**0.2502**	**6.4400e-003**	**0.2566**		**933.8193**	**933.8193**	**0.0207**		**934.3365**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.6180	5.8607	8.8253	0.0136		0.2810	0.2810		0.2594	0.2594	0.0000	1,297.8688	1,297.8688	0.4114		1,308.1547
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.6180**	**5.8607**	**8.8253**	**0.0136**		**0.2810**	**0.2810**		**0.2594**	**0.2594**	**0.0000**	**1,297.8688**	**1,297.8688**	**0.4114**		**1,308.1547**

3.5 Paving - 2024

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	7.1900e-003	0.1214	0.0544	1.0900e-003	0.0434	2.9000e-004	0.0437	0.0130	2.7000e-004	0.0133		113.2767	113.2767	6.2000e-004		113.2922
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.2854	0.1757	2.5522	8.2300e-003	0.8942	6.7000e-003	0.9009	0.2372	6.1700e-003	0.2433		820.5426	820.5426	0.0201		821.0443
Total	**0.2925**	**0.2971**	**2.6065**	**9.3200e-003**	**0.9376**	**6.9900e-003**	**0.9446**	**0.2502**	**6.4400e-003**	**0.2566**		**933.8193**	**933.8193**	**0.0207**		**934.3365**

3.6 Architectural Coating - 2024

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	6.9177					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1808	1.2188	1.8101	2.9700e-003		0.0609	0.0609		0.0609	0.0609		281.4481	281.4481	0.0159		281.8443
Total	**7.0985**	**1.2188**	**1.8101**	**2.9700e-003**		**0.0609**	**0.0609**		**0.0609**	**0.0609**		**281.4481**	**281.4481**	**0.0159**		**281.8443**

3.6 Architectural Coating - 2024

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	2.1600e-003	0.0364	0.0163	3.3000e-004	0.0130	9.0000e-005	0.0131	3.9000e-003	8.0000e-005	3.9800e-003		33.9830	33.9830	1.9000e-004		33.9877
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.2854	0.1757	2.5522	8.2300e-003	0.8942	6.7000e-003	0.9009	0.2372	6.1700e-003	0.2433		820.5426	820.5426	0.0201		821.0443
Total	**0.2875**	**0.2121**	**2.5685**	**8.5600e-003**	**0.9072**	**6.7900e-003**	**0.9140**	**0.2411**	**6.2500e-003**	**0.2473**		**854.5256**	**854.5256**	**0.0203**		**855.0320**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	6.9177					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1808	1.2188	1.8101	2.9700e-003		0.0609	0.0609		0.0609	0.0609	0.0000	281.4481	281.4481	0.0159		281.8443
Total	**7.0985**	**1.2188**	**1.8101**	**2.9700e-003**		**0.0609**	**0.0609**		**0.0609**	**0.0609**	**0.0000**	**281.4481**	**281.4481**	**0.0159**		**281.8443**

3.6 Architectural Coating - 2024

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	2.1600e-003	0.0364	0.0163	3.3000e-004	0.0130	9.0000e-005	0.0131	3.9000e-003	8.0000e-005	3.9800e-003		33.9830	33.9830	1.9000e-004		33.9877
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.2854	0.1757	2.5522	8.2300e-003	0.8942	6.7000e-003	0.9009	0.2372	6.1700e-003	0.2433		820.5426	820.5426	0.0201		821.0443
Total	**0.2875**	**0.2121**	**2.5685**	**8.5600e-003**	**0.9072**	**6.7900e-003**	**0.9140**	**0.2411**	**6.2500e-003**	**0.2473**		**854.5256**	**854.5256**	**0.0203**		**855.0320**

APPENDIX C - NOISE CALCULATIONS AND MEASUREMENT LOGS

Session Report

6/23/2020

Ambient Noise Measurement

Description	Meter	Value	Description	Meter	Value
Leq	1	54.7 dB	Lmax	1	63.8 dB
Weighting	1	A	Response	1	SLOW

Information Panel

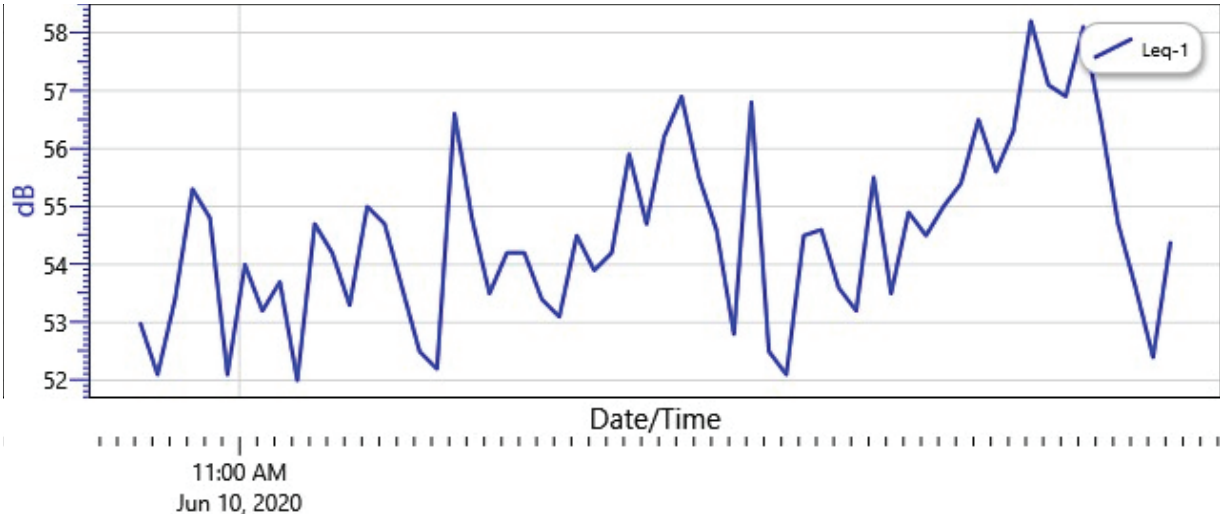
Name	S001
Model Type	SoundPro DL
Device Name	BIN010003
Start Time	6/10/2020 10:53:19 AM
Stop Time	6/10/2020 11:53:19 AM
Run Time	01:00:00
Serial Number	BIN010003
Device Firmware Rev	R.13H

Calibration History

Date	Calibration Action	Level	Cal. Model Type	Serial Number	Cert. Due Date
6/10/2020 10:49:27 AM	Calibration	114.0			
6/10/2020 11:59:18 AM	Verification	114.0			

Logged Data Chart

S001: Logged Data Chart



Logged Data Table

Date/Time	Leq-1
6/10/2020 10:54:19 AM	53
10:55:19 AM	52.1
10:56:19 AM	53.4
10:57:19 AM	55.3
10:58:19 AM	54.8
10:59:19 AM	52.1
11:00:19 AM	54
11:01:19 AM	53.2
11:02:19 AM	53.7
11:03:19 AM	52
11:04:19 AM	54.7
11:05:19 AM	54.2
11:06:19 AM	53.3
11:07:19 AM	55
11:08:19 AM	54.7
11:09:19 AM	53.6
11:10:19 AM	52.5
11:11:19 AM	52.2
11:12:19 AM	56.6
11:13:19 AM	54.8
11:14:19 AM	53.5
11:15:19 AM	54.2
11:16:19 AM	54.2
11:17:19 AM	53.4
11:18:19 AM	53.1
11:19:19 AM	54.5
11:20:19 AM	53.9
11:21:19 AM	54.2
11:22:19 AM	55.9
11:23:19 AM	54.7
11:24:19 AM	56.2
11:25:19 AM	56.9
11:26:19 AM	55.5
11:27:19 AM	54.6
11:28:19 AM	52.8

Date/Time	Leq-1
11:29:19 AM	56.8
11:30:19 AM	52.5
11:31:19 AM	52.1
11:32:19 AM	54.5
11:33:19 AM	54.6
11:34:19 AM	53.6
11:35:19 AM	53.2
11:36:19 AM	55.5
11:37:19 AM	53.5
11:38:19 AM	54.9
11:39:19 AM	54.5
11:40:19 AM	55
11:41:19 AM	55.4
11:42:19 AM	56.5
11:43:19 AM	55.6
11:44:19 AM	56.3
11:45:19 AM	58.2
11:46:19 AM	57.1
11:47:19 AM	56.9
11:48:19 AM	58.1
11:49:19 AM	56.5
11:50:19 AM	54.7
11:51:19 AM	53.6
11:52:19 AM	52.4
11:53:19 AM	54.4

CONSTRUCTION EQUIPMENT NOISE CALCULATIONS - dBA

Construction Phase	Equipment Type	L_{max} @ 50-feet[A]	Usage Factor (%)[B]	L_{eq} @ 50-feet[C]	Noise Controls[D]	L_{eq} @ 50-feet
Site Preparation	Tractor/Loader/Backhoe	79	40	75	-5	70
	Dump Truck	76	40	72	-5	67
Grading/Excavation	Grader	82	40	78	-5	73
	Excavator	81	40	77	-5	72
	Tractor/Loader/Backhoe	79	40	75	-5	70
	Drill Rig	79	20	72	-5	67
	Dump Truck	76	40	72	-5	67
Building Construction	Generator Set	81	50	78	-5	73
	Drill Rig	79	20	72	-5	67
	Crane	81	16	73	-5	68
	Concrete Truck	79	40	75	-5	70
	Concrete Pump Truck	81	20	74	-5	69
	Welders	74	40	70	0	70
	Forklift	75	20	68	-5	63
	Tractor/Loader/Backhoe	79	40	75	-5	70
Paving	Cement and Mortar Mixer	79	40	75	0	75
	Paver	77	50	74	-5	69
	Roller	80	20	73	-5	68
	Tractor/Loader/Backhoe	79	40	75	-5	70
	Concrete Truck	79	40	75	-5	70
	Concrete Pump Truck	81	20	74	-5	69
	Paving Equipment	77	50	74	-5	69
Architectural Coating	Air Compressor	78	40	74	-5	69
	Dump Truck	76	40	72	-5	67

Footnotes:

A - Maximum (L_{max}) equipment noise levels are the "actual measured Lmax" from the FHWA's *Roadway Construction Noise Model* reference document (see Appendix D). As the "actual measured L_{max}" data is not available for the grader, data for a dozer is used in its place.

B - Usage factor (UF) is "percentage of time during the work period that the equipment is operating under full load or near full power." The UF's presented above are the default factors (%) taken form the FHWA's *Roadway Construction Noise Model*.

C - Per the FHWA, the $L_{eq} = L_{max} + 10*\log(UF\%/100)$.

D - All heavy construction equipment able to utilize mufflers will do so. The EPA's *Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances* (excerpt attached) indicates that these type of controls reduce noise levels by 10 dBA. Conservatively, this analysis assumes only 5 dBA reduction from mufflers.

APPENDIX D - NOISE REGULATORY REFERENCES

Table 1. CA/T equipment noise emissions and acoustical usage factors database.

CA/T Noise Emission Reference Levels and Usage Factors					
filename: EQUIPLST.xls					
revised: 7/26/05		Acoustical	Spec 721.560	Actual Measured	No. of Actual
	Impact	Use Factor	Lmax @ 50ft	Lmax @ 50ft	Data Samples
Equipment Description	Device ?	(%)	(dBA, slow)	(dBA, slow)	(Count)
				(samples averaged)	
All Other Equipment > 5 HP	No	50	85	-- N/A --	0
Auger Drill Rig	No	20	85	84	36
Backhoe	No	40	80	78	372
Bar Bender	No	20	80	-- N/A --	0
Blasting	Yes	-- N/A --	94	-- N/A --	0
Boring Jack Power Unit	No	50	80	83	1
Chain Saw	No	20	85	84	46
Clam Shovel (dropping)	Yes	20	93	87	4
Compactor (ground)	No	20	80	83	57
Compressor (air)	No	40	80	78	18
Concrete Batch Plant	No	15	83	-- N/A --	0
Concrete Mixer Truck	No	40	85	79	40
Concrete Pump Truck	No	20	82	81	30
Concrete Saw	No	20	90	90	55
Crane	No	16	85	81	405
Dozer	No	40	85	82	55
Drill Rig Truck	No	20	84	79	22
Drum Mixer	No	50	80	80	1
Dump Truck	No	40	84	76	31
Excavator	No	40	85	81	170
Flat Bed Truck	No	40	84	74	4
Front End Loader	No	40	80	79	96
Generator	No	50	82	81	19
Generator (<25KVA, VMS signs)	No	50	70	73	74
Gradall	No	40	85	83	70
Grader	No	40	85	-- N/A --	0
Grapple (on backhoe)	No	40	85	87	1
Horizontal Boring Hydr. Jack	No	25	80	82	6
Hydra Break Ram	Yes	10	90	-- N/A --	0
Impact Pile Driver	Yes	20	95	101	11
Jackhammer	Yes	20	85	89	133
Man Lift	No	20	85	75	23
Mounted Impact Hammer (hoe ram)	Yes	20	90	90	212
Pavement Scarafier	No	20	85	90	2
Paver	No	50	85	77	9
Pickup Truck	No	40	55	75	1
Pneumatic Tools	No	50	85	85	90
Pumps	No	50	77	81	17
Refrigerator Unit	No	100	82	73	3
Rivit Buster/chipping gun	Yes	20	85	79	19
Rock Drill	No	20	85	81	3
Roller	No	20	85	80	16
Sand Blasting (Single Nozzle)	No	20	85	96	9
Scraper	No	40	85	84	12
Shears (on backhoe)	No	40	85	96	5
Slurry Plant	No	100	78	78	1
Slurry Trenching Machine	No	50	82	80	75
Soil Mix Drill Rig	No	50	80	-- N/A --	0
Tractor	No	40	84	-- N/A --	0
Vacuum Excavator (Vac-truck)	No	40	85	85	149
Vacuum Street Sweeper	No	10	80	82	19
Ventilation Fan	No	100	85	79	13
Vibrating Hopper	No	50	85	87	1
Vibratory Concrete Mixer	No	20	80	80	1
Vibratory Pile Driver	No	20	95	101	44
Warning Horn	No	5	85	83	12
Welder / Torch	No	40	73	74	5

TABLE V. NOISE CONTROL FOR CONSTRUCTION EQUIPMENT

Source	Control Techniques	Probable Noise Reduction in dB(A)*
Engine		
exhaust	improved muffler	10
casing	improved design of block	2
	enclosure	10
fan (cooling)	redesign	5
	silencers, ducts and mufflers	5
intake	silencers	5
Transmission	redesign, new materials	7
	enclosure	7
Hydraulics	redesign, new materials	7
	enclosure	10
Exhaust		
(pneumatic)	muffler	5-10
Tool-Work		
interaction	enclosure	7-20
	change in principle	10-30

*Note that noise reductions are not additive. Incremental reductions can be realized only by simultaneous quieting of all sources of equal strength.