Memorandum

Date: August 11, 2016

To: Sid Lindmark, Sid Lindmark and Associates
Mika Klein, Mt. San Antonio College

From: Fred Greve, Greve & Associates, LLC

Subject: Responses to Comments from SWAPE (Report #16-025)

6-2.57 We have reviewed the Mt. San Antonio College 2015 Facilities Master Plan Update and Physical Education Projects Draft Subsequent Program/Project EIR to Final Program EIR (DEIR); the April 15, 2016 Air Quality Assessment for the Mt. San Antonio College Facilities Master Plan Update and Physical Education Projects ("Air Quality Assessment"); and the April 15, 2016 Greenhouse Gas Assessment for the Mt. San Antonio College Facilities Master Plan Update and Physical Education Projects ("Greenhouse Gas Assessment") prepared for the proposed Mt. San Antonio College Project ("Project"). This subsequent DEIR was prepared because substantial changes have occurred in the Project since the 2012 Facilities Master Plan Final EIR was certified, one or more significant impacts may occur, and new information is available on prior projects that was not previously assessed.

Buildout of the 2015 Facilities Master Plan Update (2015 FMPU) in 2020 will result in a net increase of 238,098 assignable square feet (ASF) from existing conditions, and a net increase of approximately 4.5 percent ASF when compared to the 2012 Facilities Master Plan (2012 FMP) (DEIR, p. 59). The DEIR proposes development of the Physical Education Project (PEP) in two phases, the Athletic Complex East (Phase 1) and the Physical Education Complex (Phase 2) (DEIR, p. 78).

6.2.57 The comment simply provides a summary of the project. No response is needed.

6-2.58 Our review concludes that the subsequent DEIR fails to adequately assess the Project's health risk and air quality impacts. As a result, the Project's impact on regional and local air quality is underestimated. An updated DEIR should be prepared to adequately assess the

638 Camino de los Mares, Suite H130-153, San Clemente, CA 92673
Voice: 949•466•2967 Email: fred@greveandassociates.com

Project's health risk and air quality impacts, and additional mitigation measures should be implemented, where necessary.

6.2.58 As shown in the following responses, we disagree with SWAPE's conclusions. No additional health risk assessment is needed beyond what has already been provided in the Air Quality Assessment. Air quality impacts have been adequately addressed and additional analysis and mitigation measures are not needed.

6-2.59 Health Risk from Diesel Particulate Matter Emissions Inadequately Evaluated
The Air Quality Assessment concludes that the health risk posed to nearby sensitive receptors from exposure to diesel particulate matter (DPM) emissions released during Project construction and operation would be less than significant, yet fails to quantify the risk and compare it to applicable thresholds (p. 30). By failing to prepare a construction or an operational health risk assessment, the Air Quality Assessment is inconsistent with SCAQMD CEQA Guidelines, as well as with recommendations set forth by the Office of Environmental Health Hazard Assessment (OEHHA), the organization responsible for providing recommendations for health risk assessments in California.

6.2.59 Section 2.3.3 Diesel Particulate Matter Emissions During Construction addresses DPM and the potential cancer risk. The SCAQMD CEQA Guidelines were again reviewed and there is no requirement from the SCAQMD to prepare a health risk assessment (HRA) for school type operations or for construction projects of the type proposed (http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook and associated links). The comment ignores a basic understanding of what causes a health risk. Two factors need to occur to have a potential health risk. First, a significant source of DPM must be present. DPM, as the name implies, comes from large diesel engines such as those in trucks, trains, construction equipment, and some ships. For typical operations, the college does not and will not have large diesel engines in operation. The vehicular traffic associated with normal college operations has very few trucks. The majority of construction is relatively small and short term and usually consists of a building or a building complex. Almost no grading is involved for these projects which usually constitute the phase of construction with the highest level of DPM emissions. The PEP projects are slightly larger and would last less than 2-1/2 years. Again these are relatively small construction projects as indicated by the fact that the emissions are well below the SCAQMD thresholds (Tables 13 and 15 of the Air Quality Assessment), and relatively few pieces of large diesel construction equipment will be operating.

Second, there must long-term exposure of DPM. The impacts from toxic substances are assessed over a 30 or 70-year period. The construction projects, which are mostly small and relatively short-term, do not present a situation where long-term exposure will occur.

Finally, the need for a health risk assessment needs to be put into perspective. Typically, health risk assessments are needed for projects that will generate large quantities of diesel particulate emissions over a long time period. The typical example would be large warehousing projects where large diesel trucks are coming and going 24-hours a day. Another example, would be within 500 feet of a freeway with daily traffic of 100,000 or more which could have anywhere from 5,000 trucks to 25,000 trucks per day (California Air Resources Board, "Air Quality and Land Use Handbook: A Community Health Perspective," April 2005). The college operations, including construction projects, does not have anywhere near these levels of diesel vehicular activity. It is unreasonable to require a health risk assessment for this type of project. And as will be shown, the screening analysis provided by SWAPE is so conservative and flawed that it does not provide a convincing argument for additional analysis.

6-2.60 In an effort to demonstrate the potential risk posed by the Project to nearby sensitive receptors, we prepared a simple screening-level health risk assessment. The results of our assessment, as described below, demonstrate that construction-related and operational DPM emissions may result in a potentially significant health risk impact. As a result, a revised DEIR should be prepared to adequately assess the health risk impacts from construction and operation of the Project.

6.2.60 A step-by-step review of the SWAPE screening-level analysis is presented in the following responses. The SWAPE analysis is so conservative and flawed that it is not a good indicator or whether or not a health risk assessment is necessary. For reasons stated in the Air Quality Assessment, Response 3 above, and other responses we do not believe that a health risk assessment is warranted.

6-2.61 Failure to Quantify Risk from Project Construction
The Air Quality Assessment attempts to justify the omission of an actual construction-related health risk assessment (HRA) by stating the following:

> *"Impacts from toxic substances are related to cumulative exposure and are assessed over a 70-year period. Cancer risk is expressed as the maximum number of new cases of cancer projected to occur in a population of one million people due to exposure to the cancer causing substance over a 70-year lifetime (California Environmental Protection Agency, Office of Environmental Health Hazard Assessment, Guide to Health Risk Assessment.) Grading for the PEP Phase 1 and Phase 2, when the peak diesel exhaust emissions would occur, is expected to take less than 6 months total with all construction expected to be completed in less than 4 years. Because of the relatively short duration of construction compared to a 70-year lifespan, diesel emissions resulting from the construction of the project, including truck traffic associated with the project, are not expected to result in a significant impact" (p. 28).*

This justification, however, is incorrect. By failing to quantify the risk associated with Project construction, the Air Quality Assessment is inconsistent with the most recent guidance published by Office of Environmental Health Hazard Assessment (OEHHA), the organization responsible for providing recommendations and guidance on how to conduct health risk assessments in California. In February of 2015, OEHHA released its most recent Risk Assessment Guidelines: Guidance Manual for Preparation of Health Risk Assessments, which was formally adopted in March of 2015. This guidance document describes the types of projects that warrant the preparation of a health risk assessment. Construction of the entire Project will produce emissions of DPM, a human carcinogen, through the exhaust stacks of construction equipment over a construction period of at least five years (Air Quality Assessment, p. 13). The OEHHA document recommends that all short-term projects lasting at least two months be evaluated for cancer risks to nearby sensitive receptors. This recommendation reflects the most recent health risk policy, and as such, an assessment of health risks to nearby sensitive receptors from construction should be included in a revised DEIR for the Project.

6.2.61 The OEHHA document recommendation is taken out of context and misconstrued. First, the OEHHA document does not recommend as SWAPE has stated that "<u>all</u> short-term projects lasting at least two months be evaluated…" [emphasis added]. The OEHHA document states, "Due to the uncertainty in assessing cancer risk from very short-term exposures, we do not recommend assessing cancer risk for projects lasting less than two months…" (p 8-18 of OEHHA Guidelines). This clearly is not a requirement to evaluate <u>all</u> projects lasting more 2 months. While this quote is from Chapter 8, it is in Chapter 1, specifically Section 1.3 – Who Is Required to Conduct a Risk Assessment, where the need for a risk assessment is discussed. The very first sentence of the Section 1.3 states; "The Hot Spots Act requires that each local Air Pollution Control District or Air Quality Management District determine which facilities prepare an HRA." The SCAQMD CEQA Guidelines do not contain any requirement for college construction projects or the normal operation of a college to conduct a Health Risk Assessment (HRA). Finally, it should be noted that we have received comments from the SCAQMD on the Air Quality Assessment, and there is no mention of a lack of a HRA. In summary, projects of the type proposed do not need a HRA because of the very limited amount of DPM that will be generated.

6.2-62 *Failure to Quantify Risk from Project Operation*
Furthermore, instead of preparing a health risk assessment to determine the Project's operational impact, the Air Quality Assessment instead relies on the South Coast Air Quality Management District's (SCAQMD) Localized Significance Thresholds (LST) Methodology to determine whether or not operation of the Project would expose sensitive receptors to substantial air pollutants (p. 11-12). Using this method, the Air Quality Assessment concludes that the Project would not expose sensitive receptors to substantial air pollutants, thus resulting is a less than significant long term impact (p. 30). The use of this method, as well as the significance determination made using this method, is entirely incorrect. While the LST

method assesses the impacts of pollutants at a local level, it only evaluates impacts from criteria air pollutants. As a result, health impacts from exposure to toxic air contaminants (TACs), such as DPM, were not analyzed, thus leaving a gap within the Air Quality Assessment's analysis.

According to the Air Quality Assessment, the Final Localized Significance Threshold Methodology document prepared by the SCAQMD applies to projects that are less than 5 acres in size and are only applicable with NOx, CO, PM10, and PM2.5 emissions, which are collectively referred to as criteria air pollutants (p. 12). Because the LST method can only be applied to criteria air pollutants, this method cannot be used to determine whether operational emissions from diesel particulate matter (DPM), a known human carcinogen, will result in a significant health risk impact to nearby sensitive receptors. By failing to prepare a health risk assessment in addition to the LST analysis, the Air Quality Assessment fails to provide a comprehensive analysis of the sensitive receptor impacts that may occur as a result of exposure to substantial air pollutants. The SCAQMD provides a specific numerical threshold of 10 in one million for determining a project's health risk impact. Therefore, the Air Quality Assessment should have conducted an assessment that compares the Project's operational health risk to this threshold in order to determine the Project's health risk impact.

6.2.62 See Response to Comment 6.2.61. There is no requirement or need to prepare a HRA.

6-2.63 Modeling Parameters
As of 2011, the EPA recommends AERSCREEN as the leading air dispersion model, due to improvements in simulating local meteorological conditions based on simple input parameters. The model replaced SCREEN3, which is included in OEHHA and CAPCOA guidance as the appropriate air dispersion model for Level 2 health risk screening assessments ("HRSAs"). A Level 2 HRSA utilizes a limited amount of site specific information to generate maximum reasonable downwind concentrations of air contaminants to which nearby sensitive receptors may be exposed. If an unacceptable air quality hazard is determined to be possible using AERSCREEN, a more refined modeling approach is required prior to approval of the Project.

6.2.63 We agree that AERSCREEN has replaced SCREEN3. However, it should be noted that AERSCREEN was originally intended to model smokestacks. As a result, the modeler must be very careful in applying this model correctly for the college projects which are are spread out over a large area and very substantially over time, unlike a smokestack.

6-2.64 We prepared a preliminary health risk screening assessment of the Project's construction and operational impact to sensitive receptors using the annual estimates from the Project's CalEEMod model, which can be found within the DEIR's Air Quality Assessment and Greenhouse Gas Assessment. According to the Air Quality Assessment, "construction *emissions will vary for different phases of construction, and from project to project" (p. 13). As a result of this variability, we conducted a construction-related health risk assessment for each component of the proposed Project using each component's emission estimates and construction durations. Specifically, we assessed the health risk impacts from construction of the following Project components: Building G, Building A, PEP Phase 1, and PEP Phase 2 (p. 13). Using the CalEEMod construction schedules for each component, and accounting for the overlap that will potentially occur between these phases, we estimate that construction of Building G, PEP Phase 1, and PEP Phase 2 would occur over the course of approximately four years with a total of 1,457 days (see table below).*

Construction Phase	Start	End	Duration (Years)	Duration (Days)
PEP Phase 1	10/3/2016	1/31/2018	1.3	486
PEP Phase 1 & Phase 2	2/1/2018	8/16/2018	0.5	197
PEP Phase 2	8/17/2018	12/31/2018	0.4	137
Building G & PEP Phase 2	1/1/2019	2/24/2020	1.2	420
PEP Phase 2	2/25/2020	9/28/2020	0.6	217
Total Construction Duration			**4.0**	**1,457**

6.2.64 It should be noted that the construction timing for Building G is not known at this time, but the commenter used the timing in the Air Quality Assessment, which is a reasonable estimate. The commenter otherwise is quoting materials from the SEIR documents.

6-2.65 According to the Air Quality Assessment, construction of Building A is not anticipated to occur until 2025, which leaves a gap between the completion of PEP Phase 2 and the start of Building A construction (p. 15). However, OEHHA requires that continuous residential exposure duration of 30 years be used when assessing health risks, starting from the infantile stage of life. Therefore, to remain consistent with recommendations set forth by OEHHA, we assumed for the remaining 26 years of exposure, operation of Building G, PEP Phase 1, and PEP Phase 2 would occur right after construction of PEP Phase 2 was complete, and up until construction of Building A began. Then after construction of Building A was completed, we assumed that operation of the entire Project would occur, with no gaps between stages (see table below).

Phase	Start	End	Duration (Years)	Duration (Days)
FMPU 2020 - Operation	9/29/2020	12/31/2024	4.26	1,555
Building A	1/1/2025	12/11/2025	0.95	345
FMPU 2025 - Operation	12/12/2025	9/26/2046	20.8	7,593
Total Duration			**26.0**	**9,493**

6.2.65 The comment acknowledges that the OEHHA requires a continuous exposure of 30 years, and only 4 years have substantial construction. SWAPE incorrectly fills the missing 26 years with operational emissions from the FMPU which appears to include all of the college operating emissions. This is major mistake which causes the emissions to be grossly overestimated and the HRA impact to be overstated. First, most of the emissions for the operation of the FMPU are from vehicles traveling to and from campus. These emissions will be spread out over a large geographical area and the vast majority of these emissions will have no impact on areas local to the college, and should not be included in the modeling. Second, the HRA goal is to determine the <u>increase</u> in health risk exposure, and most of the operational FMPU emissions represent emissions from ongoing activities and are not new emissions caused by the project. As shown in Section 2.2.2 of the Air Quality Assessment, emissins associated with the college will be going down in future years. In summary, this approach to determining the health risk appears to vastly overestimate the exposure generated by the project.

6-2.66 The Air Quality Assessment assumes the closest sensitive receptors to the Project site are located about 978 feet north (p. 15, 16).

6.2.66 The SWAPE analysis takes a worst-case distance and uses it for all construction and operation. The distance of 978 feet was used for Buildings A and G in the Air Quality Assessment for the Localized Significance Threshold analysis. In that analysis, the distance is measured from the edge of the construction area. For a dispersion analysis, such as the SWAPE analysis, the distance should be measured from the center of the construction area, or in this case 1,294 feet. More importantly for the PEP1 and PEP2, SWAPE continued to use 978 feet, while the closest distance from the site to residences is 2,035 feet and from the center of the stadium is 2,910 feet. Using a closer than actual distance will over-estimate the concentrations at the receptor.

6-2.67 The AERSCREEN model relies on a continuous average emissions rate to simulate maximum downwind concentrations from point, area, and volume emissions sources. To account for the variability in construction equipment usage over the many phases of Project construction and operation, we calculated an average DPM emissions rate for construction by the following equation.

$$Emission\ Rate\ \left(\frac{grams}{second}\right) = \frac{lbs\ of\ DPM}{days\ of\ Construction} \times \frac{453.6\ grams}{lb} \times \frac{1\ day}{24\ hours} \times \frac{1\ hour}{3{,}600\ seconds}$$

Because the duration, start year, year of completion, and activity type vary between each phase of construction and operation, we calculated an emission rate specific to each of the Project phases (see table below).

Project Phase	Duration (Years)	Duration (Days)	DPM Emissions (Tons/Phase Duration)	DPM Emission Rate (g/s)
PEP Phase 1	1.33	486	0.3459	0.0075
PEP Phase 1 & Phase 2	0.54	197	0.7698	0.0410
PEP Phase 2	0.38	137	0.4239	0.0325
Building G & PEP Phase 2	1.15	420	0.6088	0.0152
PEP Phase 2	0.59	217	0.4239	0.0205
FMPU 2020 - Operation	4.26	1,555	4.4009	0.0297
Building A	0.95	345	0.0485	0.0015
FMPU 2025 - Operation	20.8	7,593	23.4946	0.0325
Total Exposure Duration	**30.0**	**10,950**	**-**	**-**

6.2.67 The equation for "Emission Rate" is correct, but SWAPE has not identified how they generated the most critical parameter which is pounds (lbs.) of DPM per days of construction or operation. We believe that their estimate of DPM Emission and the DPM Emission Rate is high by a factor of 10 to 100. DPM, diesel particulate matter, is just what the name implies; it is the particulate emissions from diesel exhaust. Motor vehicle emissions should not be included in this calculation because the vast majority of vehicular traffic is off-site and gasoline vehicles, not diesel. Energy emissions should not be included because natural gas, not diesel, is used for space and water heating at the college. Area emissions are mainly associated with landscaping equipment, most of which is gasoline powered, not diesel. SWAPE has not justified their DPM emissions and we believe that they may be over-estimated by a factor of 10 to 100 or more.

6-2.68 Using Google Earth, we measured the total area that each of the Project phases would encompass, as the location and total area of each construction and operational activity varies. Each Project phase was simulated as a rectangular area source in AERSCREEN, with dimensions that reflected these phase specific areas measured in Google Earth. A release height of three meters was selected to represent the height of exhaust stacks on construction equipment and on-road vehicles, and an initial vertical dimension of one and a half meters was used to simulate instantaneous plume dispersion upon release. An urban meteorological setting was selected with model-default inputs for wind speed and direction distribution.

6.2.68 This is a statement of some of the assumptions that SWAPE used in their modeling. Two of the assumptions are problematic. First, an "initial vertical dimension of one and half meters" (5 feet) was used. With construction equipment moving around the pollutants undergo an initial mixing which is referred to as a mixing cell. The modeling assumption that was used is relevant for modeling a smokestack, but isn't appropriate for a construction site. A mixing cell height of 4.6 meters (15 feet) would be more appropriate. The initial vertical dimension can have a significant effect on the final concentrations. In this case, the concentrations may be over-predicted by a factor of 3 just because of the selection of an overly conservation initial mixing height.

Second, using site relevant wind data is not always necessary for a screening analysis such as that performed by SWAPE. But for this situation it would have been highly desirable, and very appropriate. Exhibit 1 shows a wind rose for Ontario International Airport. Each bar shows the percent of time the wind is blowing from a direction. The residences lie northwest of the college, and therefore, a wind from the southeast would be the direction of most concern. The wind rose data shows that winds from this direction occur about 5% of the time or less. Because of the mountains just north of the residences, the winds are channeled parallel to the mountains and present a unique situation. Emissions from the college will usually blow away from the residences and not towards the residents. The SCAQMD provides meteorological data for 27 locations in the air basin that can be used in modeling (http://www.aqmd.gov/home/library/air-quality-data-studies/meteorological-data/data-for-aermod). The MAKEMET subroutine in the AERSCREEN model is designed to format meteorological data to be used in the model and would have provided a much more realistic projection of emission concentrations. Therefore, wind data is readily available and could have easily been incorporated into the SWAPE modeling. Since actual wind data was not used, the emission concentrations were significantly overestimated.

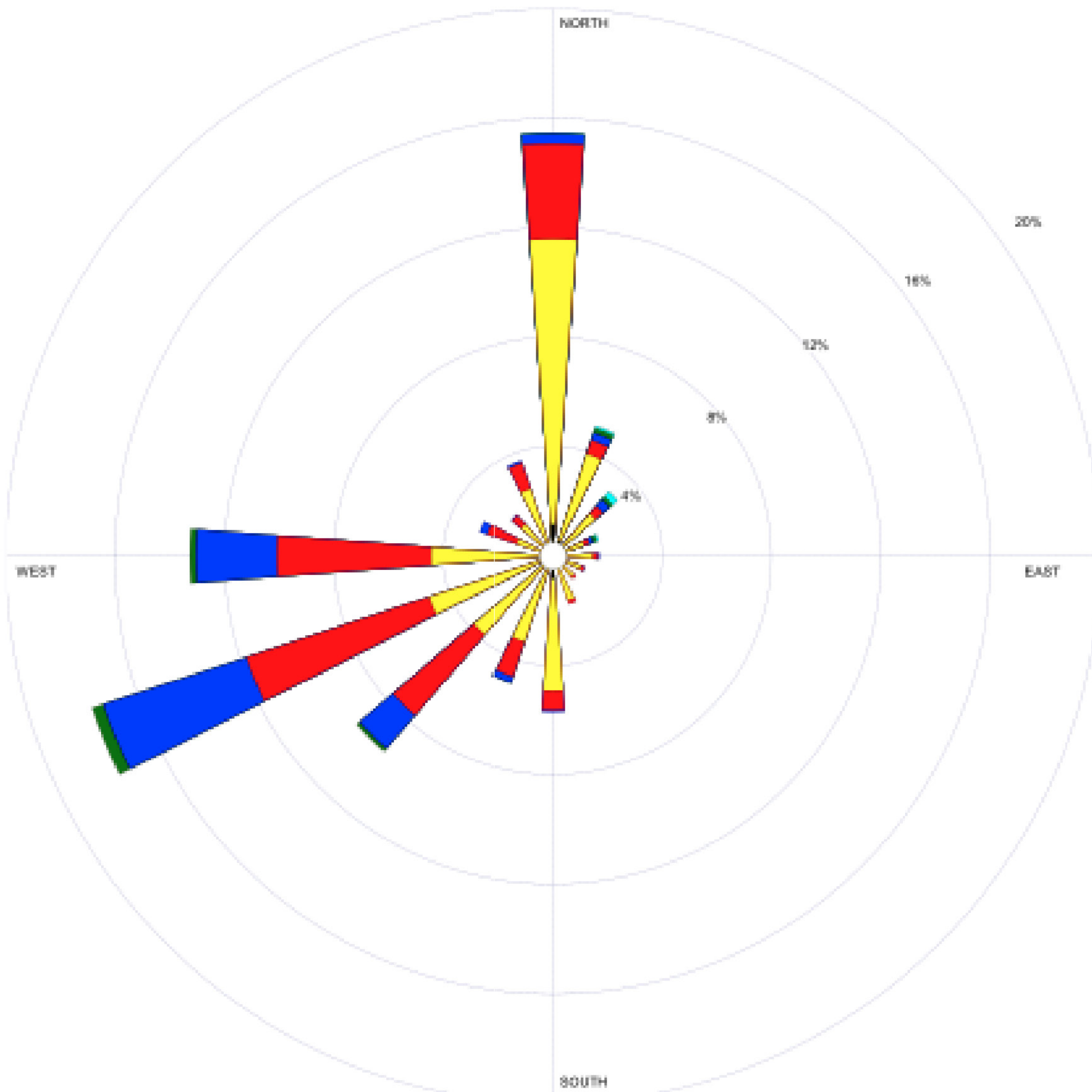
6-2.69 Modeling Results
The AERSCREEN model generated maximum reasonable estimates of single hour downwind DPM concentrations from the Project site. EPA guidance suggests that in screening procedures, the annualized average concentration of an air pollutant may be estimated by multiplying the single-hour concentration by 10%. For example, the maximum single-hour downwind concentration in the AERSCREEN output for construction of PEP Phase I was approximately 1.95 µg/m3 DPM 298 meters (978 feet) downwind. Therefore, the annualized average concentration for the sensitive receptor located 298 meters away from the Project site during construction of PEP Phase I was estimated to be 0.195 µg/m3. We estimated the annualized average concentration for the remaining phases of the Project in this same fashion (see table below).

Project Phase	Maximum Single Hour DPM Concentration (µg/m^3)	Annualized Average DPM Concentration (µg/m^3)
PEP Phase 1	1.95	0.195
PEP Phase 1 & Phase 2	11.06	1.106
PEP Phase 2	11.92	1.192
Building G & PEP Phase 2	4.83	0.483
PEP Phase 2	7.52	0.752
FMPU 2020 - Operation	9.65	0.965
Building A	5.66	0.566
FMPU 2025 - Operation	10.17	1.017

Exhibit 1 - Wind Rose for Ontario Airport

WIND ROSE PLOT

Station #3102 - , 1972



Wind Speed (m/s)			
> 11.06 8.49 - 11.06 5.40 - 8.49 3.34 - 5.40 1.80 - 3.34 0.51 - 1.80	MODELER	DATE **5/29/2003**	COMPANY NAME
	DISPLAY **Wind Speed**	UNIT **m/s**	COMMENTS
	AVG. WIND SPEED **3.69 m/s**	CALM WINDS **9.24%**	
	ORIENTATION **Direction (blowing from)**	PLOT YEAR-DATE-TIME **1972** **Jan 1 - Dec 31** **Midnight - 11 PM**	PROJECT/PLOT NO. **1972**

WRPLOT View 3.5 by Lakes Environmental Software - www.lakes-environmental.com

G&A

6.2.69 The use of a 10% factor to get from a one-hour concentration to an annual concentration is questionable. The EPA reference provided by SWAPE recommends 8%, not 10%. Second, the EPA reference is clear to point out that these values are for a point source such as a smokestack, not the area source that is modeled by SWAPE. And finally, the site with the nearby hills that direct airflow away from the receptors is a special case not accounted for in the SWAPE analysis.

As already discussed, we believe that the SWAPE assessment of DPM emissions and concentrations is seriously flawed to the point where the concentrations projections are not credible. The following points recap why we believe that the concentration estimates are flawed.

1. SWAPE has failed to identify what diesel equipment will be operating that is so excessive to warrant a HRA. The HRA is not required by the SCAQMD for the proposed project.
2. There will not be any long-term exposure from heavy-duty diesel construction. A 30-year exposure is needed and significant construction will be operating for roughly 4 years.
3. The OEHHA guidelines require a continuous exposure of 30 years, but this project only has 4 years have substantial construction.
4. SWAPE appears to have included emissions from motor vehicles and other sources which are not diesel.
5. SWAPE appears to have included emissions from motor vehicles where most of their travel is outside of the college area.
6. Total emissions from campus operations have been included in the projections. Only the increase in operational emissions should be included to determine the increase in health risk due to the project.
7. Incorrect distances have been used in the determination of concentrations.
8. The DPM emissions appear to be overestimated by a factor of 10 to 100 or more. If emissions were taken from the CalEEMod printouts in the Air Quality Assessment, it should be noted that the construction equipment levels represent an absolute daily maximum. The goal of the construction-related CalEEMod runs was to project peak daily emissions, and will overestimate significantly annual emissions.
9. The initial vertical dimension used is too small.
10. Real weather data should have been used to account for the unique orientation of the college campus, nearby residences, and mountains which channel the wind in a direction away from the residences.

6-2.70 Exposure Assumptions

We calculated the excess cancer risk for each sensitive receptor location, for adults, children, and/or infant receptors using applicable HRA methodologies prescribed by OEHHA. OEHHA recommends the use of Age Sensitivity Factors ("ASFs") to account for the heightened susceptibility of young children to the carcinogenic toxicity of air pollution. According to the *revised guidance, quantified cancer risk should be multiplied by a factor of ten during the first two years of life (infant), and by a factor of three for the subsequent fourteen years of life (child aged two until sixteen). Furthermore, in accordance with guidance set forth by the SCAQMD and OEHHA, we used 95th percentile breathing rates for infants and 80th percentile breathing rates for children and adults. We used a cancer potency factor of 1.1 (mg/kgday) and an averaging time of 25,550 days.*

6.2.70 The exposure assumptions appear to be consistent with the OEHHA recommendations. The averaging time of 25,550 days is an extreme worst case, and represents 70 years. The concern is that the college operates at a substantially reduced level for 3 months (25%) of each year and this has not been accounted for in the SWAPE modeling.

6-2.71 Health Risk Impact to Sensitive Receptor
As previously discussed, OEHHA recommends that a 30-year exposure duration be used as the basis for estimating cancer risk at the closest residential receptor. Health Risk Impact from Exposure to Construction and Operational Diesel Exhaust Emissions Consistent with OEHHA guidance, exposure to the receptor was assumed to begin in the infantile stage of life to provide the most conservative estimate of air quality hazards. The results of our calculations are shown below.

Health Risk Impact from Exposure to Construction and Operational Diesel Exhaust Emissions

Project Phase	Start Date	End Date	Duration (years)	Concentration ($\mu g/m^3$)	Breathing Rate (L/kg-day)	Age Sensitivity Factor	Cancer Risk
PEP Phase 1	10/3/2016	1/31/2018	1.33	0.195	1090	10	4.3E-05
PEP Phase 1 & Phase 2	2/1/2018	8/16/2018	0.54	1.106	1090	10	9.8E-05
PEP Phase 2	8/17/2018	12/31/2018	0.38	1.192	1090	10	7.3E-05
		Infant Exposure Duration	***2.25***			***Infant Exposure***	***2.14E-04***
Building G & PEP Phase 2	1/1/2019	2/24/2020	1.15	0.48	572	3	1.4E-05
PEP Phase 2	2/25/2020	9/28/2020	0.59	0.75	572	3	1.2E-05
FMPU 2020 - Operation	9/29/2020	12/31/2024	4.26	0.96	572	3	1.1E-04
Building A	1/1/2025	12/11/2025	0.95	0.57	572	3	1.4E-05
FMPU 2025 - Operation	12/12/2025	9/27/2032	6.80	1.02	572	3	1.8E-04
		Child Exposure Duration	***13.75***			***Child Exposure***	***3.25E-04***
FMPU 2025 - Operation	9/28/2032	9/26/2046	14.0	1.02	233	1	5.0E-05
		Adult Exposure Duration	***14.0***			***Adult Exposure***	***5.00E-05***
		Lifetime Exposure Duration	**30.0**			**Lifetime Exposure**	**5.89E-04**

The excess cancer risk to adults, children, and infants at the sensitive receptor closest to the Project site are 50, 325, and 214 in one million, respectively. Furthermore, the excess cancer risk over the course of a residential lifetime (30 years) is approximately 589 in one million. The infantile, child, and lifetime cancer risk greatly exceed the SCAQMD threshold of 10 in one million. As a result, construction and operation of the Project could have a potentially significant health risk impact to sensitive receptors located nearby.

6.2.71 For all of the reasons stated in Response 13 and elsewhere, the 30 year exposures shown in the table are extremely overstated to the point that do not answer the question of what is the additional health risk generated by the project nor does it answer the question of whether a more detailed HRA is needed. Since this project, like most projects in California, do not generate significant levels of diesel particulate matter, and no adverse health risk would be expected. Finally, there is no requirement by SCAQMD or other over-sight agency to conduct a health risk assessment for this type of project because this type of project has an extremely low potential for adverse impact.

6-2.72 It should be noted that our health risk assessment summarized in the table above takes into account the DPM emissions from existing operations, as well as the DPM emissions from 2020 and 2025 FMPU buildout operations. Therefore, the values provided in the table above may overestimate the Project's health risk impact. In an effort to correct for this issue, we prepared an additional health risk assessment that only accounts for the Project's construction-related health risk. As you can see in the table below, even if we were to remove the operational risk and only calculate the construction health risk impact, we find that nearby sensitive receptors are subject to a potentially significant health risk impact (see table below).

Health Risk Impact from Exposure to Construction Diesel Exhaust Emissions Only							
Project Phase	**Start Date**	**End Date**	**Duration**	**Concentration ($\mu g/m^3$)**	**Breathing Rate (L/kg-day)**	**Age Sensitivity Factor**	**Cancer Risk**
PEP Phase 1	10/3/2016	1/31/2018	1.33	0.195	1090	10	4.3E-05
PEP Phase 1 & Phase 2	2/1/2018	8/16/2018	0.54	1.106	1090	10	9.8E-05
PEP Phase 2	8/17/2018	12/31/2018	0.38	1.192	1090	10	7.3E-05
		Infant Exposure Duration	***2.25***			***Infant Exposure***	***2.14E-04***
Building G & PEP Phase 2	1/1/2019	2/24/2020	1.15	0.48	572	3	1.4E-05
PEP Phase 2	2/25/2020	9/28/2020	0.59	0.75	572	3	1.2E-05
FMPU 2020 - Operation	9/29/2020	12/31/2024	-	-	-	-	-
Building A	1/1/2025	12/11/2025	0.95	0.57	572	3	1.4E-05
FMPU 2025 - Operation	12/12/2025	9/27/2032	-	-	-	-	-
		Child Exposure Duration	***13.75***			***Child Exposure***	***3.97E-05***
FMPU 2025 - Operation	9/28/2032	9/26/2046	-	-	-	-	-
		Adult Exposure Duration	***14.0***			***Adult Exposure***	***-***
		Lifetime Exposure Duration	**30.0**			**Lifetime Exposure**	**2.54E-04**

As demonstrated in the table above, even when emissions from operation are excluded, the excess cancer risk to children and infants at the sensitive receptor closest to the Project site are 39.7 and 214 in one million, respectively. Furthermore, the excess cancer risk over the course of a residential lifetime (30 years) is approximately 254 in one million when operation is not included, which still greatly exceeds the SCAQMD threshold of 10 in one million. Our analysis demonstrates that the infantile, child, and lifetime cancer risk still greatly exceed the SCAQMD threshold of 10 in one million, even when emissions from operation are excluded. As a result, construction of the Project could have a potentially significant health risk impact to sensitive receptors located nearby.

6.2.72 For all of the reasons stated in Response 13 and elsewhere, the 30 year exposures shown in the table are extremely overstated to the point that do not answer the question of what is the additional health risk generated by the project nor does it answer the question of whether a more detailed HRA is needed. Since this project, like most projects in California, do not generate significant levels of diesel particulate matter, and no adverse health risk would be expected. Finally, there is no requirement by SCAQMD or other over-sight agency to conduct a health risk assessment for this type of project because this type of project has an extremely low potential for adverse impact.

6-2.73 Failure to Adequately Compare Project Emissions to Applicable Thresholds
According to the DEIR's Air Quality Assessment, since the Project's overall construction emissions are well below the significance thresholds established by the SCAQMD, construction will generally not impact regional air quality, resulting in a less than significant impact (p. 14, p. 30). This significance determination, however, is incorrect, as it compares averaged emissions, rather than maximum daily emissions, to the SCAQMD's maximum daily emission thresholds. As a result, the Air Quality Assessment's conclusion of a less than significant air quality impact from construction-related emissions is incorrect. An updated DEIR should be prepared to adequately assess the Project's construction-related impacts by comparing the correct emissions estimates to the appropriate significance thresholds, and additional mitigation should be incorporated, where necessary.

6.2.73 The comment is incorrect. The greatest potential for construction emissions to exceed the SCAQMD Thresholds would be during one of the larger construction projects. Therefore, the Air Quality Assessment analyzes peak daily construction emissions for Building G (p. 14), Building A (p. 15), PEP Phase 1 (p. 22) and PEP Phase 2 (p. 25). The potential for construction projects to exceed the SCAQMD Thresholds has been analyzed for the proposed major components of the project.

6-2.74 Since construction schedules have not been developed for most of the projects in the FMPU, the emissions potentially generated during construction of the FMPU are considered for various scenarios within the DEIR's Air Quality Assessment (p. 12). Overall construction emissions for the 2015 FMPU are first considered, and are summarized in Table 5 of the Air Quality Assessment (see excerpt below) (p. 12, 13).

Table 5 Construction Emissions for the 2015 FMPU

	ROG	NOx	CO	SOx	PM10	PM2.5
			Pollutant Emissions (lbs.)			
FMPU (Excluding PEP)	2,922	9,526	8,672	14	1,093	695
PEP Phase 1	12,130	23,763	32,064	63	4,438	1,942
PEP Phase 2	2,219	6,537	6,858	12	701	442
Total Construction	17,271	39,826	47,594	90	6,232	3,079
			Pollutant Emissions (lbs. per day)			
Average Over 5 Years	13.2	30.6	36.5	0.1	4.8	2.4
Average Over 10 Years	6.6	15.3	18.3	0.0	2.4	1.2
SCQAMD Thresholds	*75*	*100*	*550*	*150*	*150*	*55*
Exceed Threshold?	*No*	*No*	*No*	*No*	*No*	*No*

According to the Air Quality Assessment, "the first lines of the table present the total emissions generated by the buildout and associated demolition of the FMPU (excluding PEP), then the emissions for PEP Phases 1 and 2, and finally the total emissions for everything combined. The following two lines in Table 5 average the total emissions over a 5 year and 10 year period assuming a 5- day workweek" (p. 13). The Air Quality Assessment then takes these averaged overall construction emissions and compares them to the SCAQMD's significance thresholds. This method of determining Project significance, however, is incorrect, as the SCAQMD requires that the Project's maximum daily emissions be compared to the mass daily significance thresholds, not the Project's average daily emissions. By taking the average daily construction emissions and comparing them to the SCAQMD mass daily thresholds, the Air Quality Assessment greatly underestimates the Project's maximum daily impact.

As is common practice, significance determinations are based on the maximum daily emissions during a construction period, which provides a "worst-case" analysis of the construction emissions. Therefore, as is conducted in other CEQA evaluations, if the Project's peak daily construction emissions exceed the SCAQMD's mass daily thresholds, then the Project would have a potentially significant air quality impact. And while the Air Quality Assessment's claim that the 5-year averaging period represents the "worst-case approach for construction on campus" may be true, the emissions averaged over this period do not reflect a "worst-case" analysis of the construction emissions (p. 13). Rather, the maximum daily emissions that would occur during this 5-year construction period are representative of a "worst-case" analysis, and as such, these peak emissions should have been used.

6.2.74 The analysis presented in Table 5 of the Air Quality Assessment is not the sole assessment of construction emissions in the report. The comment fails to acknowledge the other construction emissions assessments in the report. The greatest potential for construction emissions to exceed the SCAQMD Thresholds would be during one of the larger construction projects. Therefore, the Air Quality Assessment presents peak daily construction emissions for Building G (p. 14), Building A (p. 15), PEP Phase 1 (p. 22) and PEP Phase 2 (p. 25). The potential for construction projects to exceed the SCAQMD Thresholds has been analyzed for the proposed major components of the project.

6-2.75 In an effort to correctly determine the Project's short term regional impact, we took the maximum daily construction emissions for each of the phases included in Table 5, which can be found in the CalEEMod output files provided at the end of the Air Quality Assessment, and compared them to the SCAQMD's mass daily thresholds. When the Project's maximum daily construction emissions are correctly summarized and then compared to thresholds, we find that the Project's construction-related emissions, even after mitigation, would result in a significant impact (see table below).

Mitigated Construction Emissions for the 2015 FMPU (lbs/day)

Activity	Year	ROG	NO_x	CO	SO_x	PM_{10}	$PM_{2.5}$
FMPU (Excluding PEP)	2017	5	52	40	0	11	7
FMPU (Excluding PEP)	2018	**90**	27	27	0	3	2
PEP Phase 1	2016	11	**147**	107	0	33	12
PEP Phase 1	2017	11	**136**	102	0	14	7
PEP Phase 1	2018	10	44	72	0	10	4
PEP Phase 2	2018	4	46	37	0	11	7
PEP Phase 2	2019	3	24	25	0	3	2
PEP Phase 2	2020	10	81	81	0	31	7
SCAQMD Threshold	**-**	**75**	**100**	**550**	**150**	**150**	**55**
Exceed?		***Yes***	***Yes***	*No*	*No*	*No*	*No*

Specifically, we find that the peak daily ROG emissions of 90 lbs/day generated during construction of the FMPU would exceed the SCAQMD threshold of 75 lbs/day for ROG, and that the peak daily NOx emissions of 147 and 136 lbs/day generated during construction of PEP Phase 1 would exceed the SCAQMD threshold of 100 lbs/day for NOx. Our analysis demonstrates that when emissions are summarized correctly and compared to thresholds, the Project would result in a potentially significant impact, contrary to the conclusion made in the Air Quality Assessment. As a result, an updated DEIR should be prepared to include a revised air quality analysis that correctly determines the Project's overall construction-related regional air quality impact, and additional mitigation measures should be implemented, where necessary.

6.2.75 The SWAPE analysis shows two basic exceedances; ROG exceedance due to the buildout of the FMPU and NOx exceedances due to PEP Phase 1 construction. The ROG exceedance is due to painting emissions. The purpose of the CalEEMod run in the Air Quality Assessment was used to generate total emissions due to the construction of the FMPU (excluding PEP). The buildout of the FMPU will occur over a 10 to 15 year period [Sid, confirm this time period]. Since the construction schedule is not known for the FMPU buildout, CalEEMod defaults were used. CalEEMod assumed that all painting would occur over a 1-month period. When all the painting is assumed to occur over a 1-month period for the entire FMPU (excluding PEP) the result is a 90 pounds per day forecast which is quoted by SWAPE and is clearly wrong. The painting will occur sporadically over a 10 to 15 year period. The painting emissions will be orders of magnitude lower than 90 pounds per day, and will be well below the SCAQMD Threshold of 75 pounds per day.

The NOx exceedances are already acknowledged in Table 13 and associated text of the Air Quality Assessment. Mitigation Measure AQ-1 is proposed on page 30 of the Air Quality Assessment to eliminate this impact. Therefore, the concern raised in the comment regarding NOx emissions is already addressed in the Air Quality Assessment.

6-2.76 Additional Mitigation Measures Available to Reduce Construction Emissions
Numerous additional, feasible mitigation measures are available to reduce ROG emissions, also referred to as VOC emissions (for the sake of this analysis, the terms ROG and VOC are used interchangeably), including the following which are routinely identified in other CEQA matters as feasible mitigation measures:

Use of Zero-VOC Emissions Paint
The Mitigation Monitoring Program only commits to using VOC coatings with VOC content of 80 g/L or less (p. 5 of 33). The use of zero-VOC emission paint has been required for numerous projects that have undergone CEQA review. Zero-VOC emission VOC paints are commercially available. Other low-VOC standards should be incorporated into mitigation including use of "supercompliant" paints, which have a VOC standard of less than 10 g/L.

Use of Material that do Not Require Paint
Using materials that do not require painting is a common mitigation measure where VOC emissions are a concern. Interior and exterior surfaces, such as concrete, can be left unpainted.

Use of Spray Equipment with Greater Transfer Efficiencies
Various coatings and adhesives are required to be applied by specified methods such as electrostatic spray, high-volume, low-pressure (HVLP) spray, roll coater, flow coater, dip coater, etc. in order to maximize the transfer efficiency. Transfer efficiency is typically defined as the ratio of the weight of coating solids adhering to an object to the total weight of coating solids used in the application process, expressed as a percentage. When it comes to spray applications, the rules typically require the use of either electrostatic spray equipment or HVLP spray equipment. The SCAQMD is now able to certify high volume low-pressure (HVLP) spray applicators and other application technologies at efficiency rates of 65 percent or greater.

When combined together, these measures offer a feasible way to effectively reduce the Project's construction-related VOC emissions to a less than significant level. As such, these mitigation measures should be considered in a DEIR to reduce these emissions to a less than significant level.

Furthermore, there are additional mitigation measures available to reduce the Project's construction-related NOx emissions. Additional mitigation measures can be found in CAPCOA's Quantifying Greenhouse Gas Mitigation Measures, which attempt to reduce Greenhouse Gas (GHG) levels, as well as reduce Criteria Air Pollutants such as NOx. NOx is a byproduct of fuel combustion, and is emitted by on-road vehicles and by off-road construction equipment. Mitigation for criteria pollutant emissions should include consideration of the following measures in an effort to reduce NOx construction emissions to below SCAQMD thresholds.

Limit Construction Equipment Idling Beyond Regulation Requirements
Heavy duty vehicles will idle during loading/unloading and during layovers or rest periods with the engine still on, which requires fuel use and results in emissions. The California Air Resources Board (CARB) Heavy-Duty Vehicle Idling Emissions Reduction Program limits idling of diesel-fueled commercial motor vehicles to five minutes. Reduction in idling time beyond the five minutes required under the regulation would further reduce fuel consumption and thus emissions. The Project applicant must develop an enforceable mechanism that monitors the idling time to ensure compliance with this mitigation measure.

Repower or Replace Older Construction Equipment Engines
The NEDC recognizes that availability of equipment that meets the EPA's newer standards is limited. Due to this limitation, the NEDC proposes actions that can be taken to reduce emissions from existing equipment in the Best Practices for Clean Diesel Construction report. These actions include but are not limited to:

- *Repowering equipment (i.e. replacing older engines with newer, cleaner engines and leaving the body of the equipment intact).*

Engine repower may be a cost-effective emissions reduction strategy when a vehicle or machine has a long useful life and the cost of the engine does not approach the cost of the entire vehicle or machine. Examples of good potential replacement candidates include marine vessels, locomotives, and large construction machines. Older diesel vehicles or machines can be repowered with newer diesel engines or in some cases with engines that operate on alternative fuels (see section "Use Alternative Fuels for Construction Equipment" for details). The original engine is taken out of service and a new engine with reduced emission characteristics is installed. Significant emission reductions can be achieved, depending on the newer engine and the vehicle or machine's ability to accept a more modern engine and emission control system. It should be noted, however, that newer *engines or higher tier engines are not necessarily cleaner engines, so it is important that the Project Applicant check the actual emission standard level of the current (existing) and new engines to ensure the repower product is reducing emissions for NOx.*

- *Replacement of older equipment with equipment meeting the latest emission standards.*

Engine replacement can include substituting a cleaner highway engine for a nonroad engine. Diesel equipment may also be replaced with other technologies or fuels. Examples include hybrid switcher locomotives, electric cranes, LNG, CNG, LPG or propane yard tractors, forklifts or loaders. Replacements using natural gas may require changes to fueling infrastructure. Replacements often require some re-engineering work due to differences in size and configuration. Typically there are benefits in fuel efficiency, reliability, warranty, and maintenance costs.

Install Retrofit Devices on Existing Construction Equipment
PM and NOx emissions from alternatively-fueled construction equipment can be further reduced by installing retrofit devices on existing and/or new equipment. The most common retrofit technologies are retrofit devices for engine exhaust after-treatment. These devices are installed in the exhaust system to reduce emissions and should not impact engine or vehicle operation. Below is a table, prepared by the EPA, that summarizes the commonly used retrofit technologies and the typical cost and emission reductions associated with each technology. It should be noted that actual emissions reductions and costs will depend on specific manufacturers, technologies and applications.

Technology	**Typical Emissions Reductions (percent)**				**Typical Costs ($)**
	PM	**NOx**	**HC**	**CO**	
Diesel Oxidation Catalyst (DOC)	20-40	-	40-70	40-60	Material: $600-$4,000 Installation: 1-3 hours
Diesel Particulate Filter (DPF)	85-95	-	85-95	50-90	Material: $8,000-$50,000 Installation: 6-8 hours
Partial Diesel Particulate Filter (pDPF)	up to 60	-	40-75	10-60	Material: $4,000-$6,000 Installation: 6-8 hours
Selective Catalyst Reduction (SCR)	-	up to 75	-	-	$10,000-$20,000; Urea $0.80/gal
Closed Crankcase Ventilation (CCV)	varies	-	-	-	-
Exhaust Gas Recirculation (EGR)	-	25-40	-	-	-
Lean NOx Catalyst (LNC)	-	5-40	-	-	$6,500-$10,000

Use Electric and Hybrid Construction Equipment
CAPCOA's Quantifying Greenhouse Gas Mitigation Measures report also proposes the use of electric and/or hybrid construction equipment as a way to mitigate NOx emissions. When construction equipment is powered by grid electricity rather than fossil fuel, direct emissions from fuel combustion are replaced with indirect emissions associated with the electricity used to power the equipment. Furthermore, when construction equipment is powered by hybrid-electric drives, emissions from fuel combustion are also greatly reduced. Electric construction equipment is available commercially from companies such as Peterson Pacific Corporation, which specialize in the mechanical processing equipment like grinders and shredders. Construction equipment powered by hybrid-electric drives is also commercially available from companies such as Caterpillar. For example, Caterpillar reports that during an 8-hour shift, its D7E hybrid dozer burns 19.5 percent fewer gallons of fuel than a conventional dozer while achieving a 10.3 percent increase in productivity. The D7E model burns 6.2 gallons per hour compared to a conventional dozer which burns 7.7 gallons per hour. Fuel usage and savings are dependent on the make and model of the construction equipment used. The Project Applicant should calculate project-specific savings and provide manufacturer specifications indicating fuel burned per hour.

Furthermore, the contractor should submit to the developer's representative a monthly report that, for each onroad construction vehicle, nonroad construction equipment, or generator onsite, includes:

- *Hour-meter readings on arrival on-site, the first and last day of every month, and on off-site*
  date.
- *Any problems with the equipment or emission controls.*
- *Certified copies of fuel deliveries for the time period that identify:*
  - *o Source of supply*
  - *o Quantity of fuel*
  - *o Quality of fuel, including sulfur content (percent by weight).*

In addition to these measures, we also recommend the Applicant to implement the following NOx mitigation measures, called "Enhanced Exhaust Control Practices," that are recommended by the Sacramento Metropolitan Air Quality Management District (SMAQMD):

1. *The project representative shall submit to the lead agency a comprehensive inventory of all offroad construction equipment, equal to or greater than 50 horsepower, that will be used an aggregate of 40 or more hours during any portion of the construction project.*
   - *The inventory shall include the horsepower rating, engine model year, and projected hours of use for each piece of equipment.*

- The project representative shall provide the anticipated construction timeline including start date, and name and phone number of the project manager and on-site foreman.
- This information shall be submitted at least 4 business days prior to the use of subject heavy-duty off-road equipment.
- The inventory shall be updated and submitted monthly throughout the duration of the project, except that an inventory shall not be required for any 30-day period in which no construction activity occurs.

2. The project representative shall provide a plan for approval by the lead agency demonstrating that the heavy-duty off-road vehicles (50 horsepower or more) to be used in the construction project, including owned, leased, and subcontractor vehicles, will achieve a project wide fleet-average 20% NOx reduction and 45% particulate reduction compared to the most recent California Air Resources Board (ARB) fleet average.
- This plan shall be submitted in conjunction with the equipment inventory.
- Acceptable options for reducing emissions may include use of late model engines, low emission diesel products, alternative fuels, engine retrofit technology, after-treatment products, and/or other options as they become available.
- The District's Construction Mitigation Calculator can be used to identify an equipment fleet that achieves this reduction.

3. The project representative shall ensure that emissions from all off-road diesel powered equipment used on the project site do not exceed 40% opacity for more than three minutes in any one hour.
- Any equipment found to exceed 40 percent opacity (or Ringelmann 2.0) shall be repaired immediately. Non-compliant equipment will be documented and a summary provided to the lead agency monthly.
- A visual survey of all in-operation equipment shall be made at least weekly.
- A monthly summary of the visual survey results shall be submitted throughout the duration of the project, except that the monthly summary shall not be required for any 30-day period in which no construction activity occurs. The monthly summary shall include the quantity and type of vehicles surveyed as well as the dates of each survey.

4. The District and/or other officials may conduct periodic site inspections to determine compliance. Nothing in this mitigation shall supersede other District, state or federal rules or regulations.

These measures are more stringent and prescriptive than those measures identified in the DEIR, Mitigation Monitoring Plan, and Air Quality Assessment. When combined together, these measures offer a cost-effective, feasible way to incorporate lower-emitting equipment into the Project's construction fleet, which subsequently, reduces NOx emissions released during Project construction. A DEIR must be prepared to include additional mitigation *measures, as well as include an updated air quality assessment to ensure that the necessary mitigation measures are implemented to reduce construction emissions to below thresholds. Furthermore, the Project Applicant needs to demonstrate commitment to the implementation of these measures prior to Project approval, to ensure that the Project's construction-related emissions are reduced to the maximum extent possible.*

6.2.76 The comment by SWAPE is a list of potential mitigation measures that could reduce ROG and NOx emissions. With the mitigation measures identified in the Air Quality Assessment, no additional mitigation measures are needed.

6-2.77 Incorrectly Presumed the Use of Tier 4 Final Engines
According to the 2016 Mitigation Monitoring Program (MMP) for the proposed Project, all off-road diesel-powered construction equipment greater than 50 HP will meet Tier 4 emission standards "where available" (AQ-05, p. 4 of 33). Furthermore, the MMP also states that all off-road diesel-powered construction equipment greater than 50 hp used during construction of PEP Phase 1 will also comply with EPA-Certified Tier 4 emission controls "where available" (AQ-09, p. 5 of 33). The MMP makes no mention, however, of an actual commitment to the implementation of these mitigation measures, nor does it discuss the feasibility of actually obtaining an entirely Tier 4 fleet. Although off-road Tier 4 equipment is available for purchase, it is not required that off-road construction fleets be comprised solely of Tier 4 Final engines. Furthermore, based on availability and cost, it is unrealistic to presume that all of the construction equipment utilized for the Project will have Tier 4 engines. As a result, this mitigation measure should not be relied upon to reduce the Project's construction emissions to below levels of significance. Rather, the Project should pursue additional mitigation measures that are more technically feasible to implement.

The United States Environmental Protection Agency's (USEPA) 1998 nonroad engine emission standards were structured as a three-tiered progression. Tier 1 standards were phased-in from 1996 to 2000 and Tier 2 emission standards were phased in from 2001 to 2006. Tier 3 standards, which applied to engines from 37-560 kilowatts (kW) only, were phased in from 2006 to 2008. The Tier 4 emission standards were introduced in 2004, and were phased in from 2008 – 2015. These tiered emission standards, however, are only applicable to newly manufactured nonroad equipment. According to the United States Environmental Protection Agency (USEPA) "if products were built before EPA emission standards started to apply, they are generally not affected by the standards or other regulatory requirements."

Therefore, pieces of equipment manufactured prior to 2000 are not required to adhere to Tier 2 emission standards, and pieces of equipment manufactured prior to 2008 are not required to adhere to Tier 4 emission standards. Construction equipment often lasts more than 30 years; as a result, Tier 1 equipment and non-certified equipment are currently still in *use. It is estimated that of the two million diesel engines currently used in construction, 31 percent were manufactured before the introduction of emissions regulations.*

Furthermore, in a 2010 white paper, the California Industry Air Quality Coalition estimated that approximately 7% and less than 1% of all off-road heavy duty diesel equipment in California was equipped with Tier 2 and Tier 3 engines, respectively. It goes on to explain that "cleaner burning Tier 4 engines…are not expected to come online in significant numbers until 2014." Given that significant production activities have only just begun within the last couple of years, it can be presumed that there is limited availability of Tier 4 equipment. Furthermore, due to the complexity of Tier 4 engines, it is very difficult if not nearly impossible, to retrofit older model machinery with this technology. Therefore, available off-road machinery equipped with Tier 4 engines are most likely new. According to a September 20, 2013 EPA Federal Register document, a new Tier 4 scraper or bulldozer would cost over $1,000,000 to purchase. Utilizing the construction equipment list from the CalEEMod output file, it would be completely unrealistic to assume that all 18 pieces of equipment would be purchased at this price Appendix E, pp. 144). It is also relatively expensive to retrofit a piece of old machinery with a Tier 3 engine. For example, replacing a Tier 0 engine with a Tier 3 engine would cost roughly $150,000 or more.

It should be noted that there are regulations, currently enforced by the California Air Resources Board (CARB), with regards to construction fleets. According to CARB, large and medium fleets (fleets with over 2,500 horsepower) will not be allowed to add a vehicle with a Tier 1 engine to its fleet starting on January 1, 2014. The engine tier must be Tier 2 or higher. Therefore, it is more realistic to assume that the fleet will include a mix of Tier 2, 3, and 4 engines, rather than just Tier 4 Final equipment exclusively.

Unless the Project applicant can demonstrate to the public, either through budget or through a preliminary agreement with a contractor or supplier, that they will purchase/rent exclusively Tier 4 construction equipment, the use of Tier 2 equipment should be conservatively assumed, and an updated air quality analysis should be conducted to reflect this more realistic scenario.

6.2.77 The comment provides a good history of the phase in of Tier 4 construction equipment. However, it fails to note that Tier 4 equipment has been available for several years and that there has been a big push in California to get more Tier 4 equipment available. Now many major projects, which are substantially bigger than any of the college projects, are requiring the use of Tier 4 equipment (e.g., Berths 136-147 (TraPac) Container Terminal Project FEIS/FEIR, Port of Los Angeles, Mitigation Measure AQ-3).

The use of Tier 4 equipment for MtSAC construction projects has been required for several years. The requirement comes from the 2013 Mitigation Monitoring Program Measure 3f.

Finally, a quick check was made using CalEEMod on what would happen if only Tier 3 equipment was available and no Tier 4 equipment was available during the grading of PEP Phase 1. The results are that NOx emissions for 2016 would peak at 102 pounds per day and for 2017 the peak emissions would be 96 pounds per day. (CalEEMod printout is attached.) The corresponding SCAQMD threshold is 100 pounds per day. Therefore, even if not all of the construction equipment during the grading phase of PEP Phase could be Tier 4, and Tier 3 equipment had to be used for a portion of the construction equipment, the threshold would not be exceeded.

In summary, Tier 4 equipment is available for major construction projects. If for some reason all Tier 4 equipment could not be rented, and some had to be substituted by Tier 3 equipment, no construction impact would occur.

6-2.78 Incorrect Evaluation of Operational Criteria Air Pollutant Emissions
The DEIR's Air Quality Assessment uses the change between the Project's 2020 and 2025 operational emissions and the existing 2015 baseline emissions to determine Project significance (p. 17). Using this method, the Air Quality Assessment makes the following conclusion:

> *"The analysis indicates that the emissions of ROG, NOx, and CO will decrease in future years even though the headcount will increase. The vehicular emission rates will continue to decrease in future for these emissions, and will more than offset the increase in headcount. Emissions of SOx, PM10, and PM2.5 will increase slightly in future years. Again the emission rates for these pollutants will go down in future years, offsetting a portion of the increase in emissions caused by increasing headcount. Most importantly, all emission changes are less than the SCAQMD thresholds and no impact on regional air quality is projected" (p. 17-18).*

This method of determining Project significance, however, is incorrect and is inconsistent with recommendations set forth by the SCAQMD. Per SCAQMD recommendations, when measuring Project emissions, it is appropriate to include regulatory requirements, such as the federal and state regulations that require vehicles to be more efficient and lower-emitting. However, "the proposed Project's emissions themselves should not be masked by comparing it to an existing condition baseline where air quality is worse than what it will be when the proposed Project is operational". It is appropriate to assume that vehicles will comply with existing regulatory requirements; however their increase in activity needs to be accounted for and shouldn't be masked by improvements brought on by those regulations.

According to a comment letter prepared by the SCAQMD for the Recirculated Draft Environmental Impact Report (RDEIR) for the Proposed General Plan Amendment No. 960: General Plan Update Project, *"By comparing project impacts to a baseline of actual 2008 conditions, the RDEIR fails as an information document because it does not disclose true air quality impacts from the project. This is exactly the type of situation which led the California Supreme Court to state that, '[t]o the extent a departure from the 'norm[ ]' of an existing conditions baseline (Guidelines, § 15125(a)) promotes public participation and more informed decision making by providing a more accurate picture of a proposed project's likely impacts, CEQA permits the departure.' (Neighbors for Smart Rail v. Exposition Metro Line Const. Authority (2013) 57 Cal. 4th 439, 453.)."*

Similar to the proposed Project, the RDEIR for the Proposed General Plan Amendment No. 960: General Plan Update Project compared future 2040 emissions to the existing 2008 baseline emissions, and found that the emissions between these two scenarios would result in a negative net increase. Consistent with the proposed Project, these negative net emissions were due to the substantial decrease in anticipated vehicle emissions from vehicles mandated by increased efficiency requirements in current Federal and State law that have been implemented and will continue to affect the motor vehicle fleet between the existing year and 2040.

In response to the conclusions made regarding this project's air quality impacts, the SCAQMD staff concludes that "although existing regulatory and other requirements have shown an improvement in the region's air quality and is expected to continue to improve over time, the decrease in emissions from compliance from such requirements should not be considered mitigation since the reduced emissions are not a result of additional actions incorporated in the project to reduce the unmitigated emissions from mobile source vehicle emission activities." In order to ensure that the project's air quality impacts are accurately represented, the SCAQMD staff recommends that if a baseline analysis is being conducted to evaluate emissions impacts, it is more appropriate to compare baseline emission activities with future vehicle activity using the same baseline emission factors to show the situation if no changes are made.

Therefore, to remain consistent with SCAQMD recommendations, the Air Quality Assessment should remodel the future 2020 and 2025 FMPU Buildout emissions utilizing the same vehicle emission factors as the 2015 existing model. An updated DEIR should be prepared to include an updated air quality assessment that correctly analyzes the future operational emissions to the baseline existing emissions following SCAQMD recommendations.

6.2.78 [Sid- You and Sean should probably take a look at this and add to the response. It is in large part a CEQA issue.] The comment is based on a letter sent by the SCAQMD ("Recirculated Draft Environmental Impact Report (RDEIR) for the Proposed General Plan Amendment No. 960: General Plan Update Project (EIR No. 521/SCH 2009041065)," dated April 3, 2015) to Ms. Kristi Lovelady, Riverside County. The letter simply states an opinion of the SCAQMD on how a particular analysis should be conducted, and is not necessarily supported by CEQA law. The situation faced by Riverside County may not be analogous to the proposed FMPU. In the letter the SCAQMD states "…the decrease in emissions from such requirements should not be considered mitigation…" The FMPU analysis under scrutiny does not count vehicular emission rate decreases as <u>mitigation</u> in the analysis.

The analysis presented on pages 17-18 of the Air Quality Assessment answers the question for the decision-makers of "Will college generated emissions increase or decrease in future years as the student population increases?" To artificially hold vehicular emission rates at year 2015 while the student population increases in future years, does not represent a situation that would occur, and therefore, does not provide useful information to the decision-makers.

6-2.79 Updated Analysis Demonstrates a Potentially Significant Impact
In an effort to more accurately estimate the Project's emissions, we prepared an updated model for the 2025 FMPU operations using CalEEMod. It should be noted that we did not remodel 2020 FMPU operational emissions and only remodeled 2025 FMPU emissions, as the 2025 scenario represents the emissions that would occur at full Project buildout. An operational year of 2015 was inputted so that the same 2015 emission factors as the existing model were utilized, consistent with SCAQMD recommendations. All other parameters remained the same.

When correct input parameters are used to model emissions, we find that the net emissions between the 2025 FMPU buildout and existing conditions increase when compared to what is estimated in the Air Quality Assessment. Furthermore, we find that the difference in NO_x emissions exceed the SCAQMD threshold of 55 pounds per day (see table below).

Campus Emissions for Future Years (pounds per day)

Existing	221	507	1,932	4	284	81
Year 2025	265	608	2,351	5	341	97
Net Increase	**44**	**101**	**419**	**1**	**57**	**16**
SCAQMD Thresholds	**55**	**55**	**550**	**150**	**150**	**55**
Exceeds Thresholds?	No	***Yes***	No	No	No	No

As demonstrated in the table above, the net change between the future and baseline NO_x emissions, when estimated correctly, greatly exceed the SCAQMD threshold of 55 lbs/day. Our analysis demonstrates that a potentially significant impact may occur as a result of Project operation, which was not previously identified. As such, a DEIR should be prepared that includes an updated air quality analysis to correctly evaluate the Project's air quality impacts, and should include additional mitigation measures where necessary.

6.2.79 [Sid- this is really a continuation of the previous comment. Take a look at it and add stuff as necessary.] This comment shows the emissions for the existing college operations and then shows the college emissions that would occur for the college in 2025 but using 2015 vehicle emission rates. This analysis presents a situation that could not occur, and therefore, provides no useful information to the decision-makers. See also Response to Comment 6.2.78.

Appendix

Physical Education Projects-- Phase 1 -- Construction Only

South Coast AQMD Air District, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Junior College (2Yr)	91.73	1000sqft	2.11	91,730.00	0
General Light Industry	79.40	1000sqft	1.82	79,400.00	0
Other Non-Asphalt Surfaces	174.43	1000sqft	4.00	174,430.00	0
Parking Lot	107.57	1000sqft	2.47	107,570.00	0
City Park	21.80	Acre	21.80	949,608.00	0

1.2 Other Project Characteristics

Urbanization Urban **Wind Speed (m/s)** 2.2 **Precipitation Freq (Days)** 31

Climate Zone 9 **Operational Year** 2019

Utility Company Southern California Edison

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

1.3 User Entered Comments & Non-Default Data

Project Characteristics - This has updated painting information from Matt Breyer dated March 3, 2016.

Land Use -

Construction Phase - Demolition duration based on Tilden Coil schedule
Site Prep plus Grading equals 45 days based on Tilden Coil schedule

Trips and VMT - Demolition is 9800 cy, total export of dirt during grading 81429 cy, and concrete import is 15,800 cy

Demolition -

Grading - Entire site will essentially be re-graded

Architectural Coating - Default values based on requirements of Mitigation Monitoring Program and paint info dated March 3, 2016.

Vechicle Emission Factors -

Vechicle Emission Factors -

Vechicle Emission Factors -

Construction Off-road Equipment Mitigation - Tier 4 required for grading mitigation for NOx control

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	ConstArea_Nonresidential_Exterior	649,198.00	9,000.00

tblArchitecturalCoating	ConstArea_Nonresidential_Interior	1,947,593.00	151,650.00
tblArchitecturalCoating	EF_Nonresidential_Exterior	250.00	75.00
tblArchitecturalCoating	EF_Nonresidential_Interior	250.00	75.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	5.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	6.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	9.00
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstructionPhase	NumDays	35.00	58.00
tblConstructionPhase	NumDays	500.00	381.00
tblConstructionPhase	NumDays	30.00	56.00
tblConstructionPhase	NumDays	45.00	40.00
tblConstructionPhase	NumDays	20.00	5.00
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
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	PhaseEndDate	12/12/2016	12/24/2016
tblConstructionPhase	PhaseStartDate	12/25/2016	12/26/2016
tblConstructionPhase	PhaseStartDate	12/7/2016	12/20/2016
tblGrading	AcresOfGrading	100.00	112.50
tblGrading	MaterialImported	0.00	81,429.00
tblProjectCharacteristics	OperationalYear	2014	2019
tblTripsAndVMT	HaulingTripNumber	0.00	1,580.00

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					
2016	11.1635	147.2165	106.8954	0.2517	32.9577	4.6960	37.6537	9.9840	4.3202	13.9404	0.0000	25,504.5115	25,504.5115	2.0834	0.0000	25,548.2623
2017	10.5035	135.9483	102.4764	0.2514	14.4870	4.3333	18.8202	5.0866	3.9865	9.0731	0.0000	25,084.5826	25,084.5826	2.0791	0.0000	25,128.2432
2018	10.3331	44.0146	72.2222	0.1575	8.2418	1.8399	10.0817	2.2117	1.7229	3.9346	0.0000	13,800.3014	13,800.3014	0.9842	0.0000	13,820.9698
Total	**32.0001**	**327.1794**	**281.5940**	**0.6606**	**55.6864**	**10.8692**	**66.5556**	**17.2823**	**10.0296**	**26.9482**	**0.0000**	**64,389.3955**	**64,389.3955**	**5.1467**	**0.0000**	**64,497.4753**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2016	6.1969	102.1825	95.7012	0.2517	27.8784	2.4352	30.3136	7.6033	2.3461	9.9494	0.0000	25,504.5115	25,504.5115	2.0834	0.0000	25,548.2623
2017	6.7103	96.1361	93.6146	0.2514	9.4077	2.3395	11.7472	3.0697	2.2581	5.3277	0.0000	25,084.5826	25,084.5826	2.0791	0.0000	25,128.2432
2018	10.3331	41.6644	72.2363	0.1575	8.2418	1.6698	9.9117	2.2117	1.5921	3.8037	0.0000	13,800.3014	13,800.3014	0.9842	0.0000	13,820.9698
Total	**23.2402**	**239.9830**	**261.5521**	**0.6606**	**45.5280**	**6.4445**	**51.9725**	**12.8847**	**6.1962**	**19.0809**	**0.0000**	**64,389.3955**	**64,389.3955**	**5.1467**	**0.0000**	**64,497.4753**

	ROG	**NOx**	**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	**27.37**	**26.65**	**7.12**	**0.00**	**18.24**	**40.71**	**21.91**	**25.45**	**38.22**	**29.19**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	36.0228	4.5000e-004	0.0490	0.0000		1.8000e-004	1.8000e-004		1.8000e-004	1.8000e-004		0.1039	0.1039	2.8000e-004		0.1099

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Energy	0.1213	1.1026	0.9262	6.6200e-003		0.0838	0.0838		0.0838	0.0838		1,323.1481	1,323.1481	0.0254	0.0243	1,331.2006
Mobile	9.7596	28.3936	107.1520	0.3069	21.5663	0.4385	22.0048	5.7627	0.4043	6.1670		24,633.8959	24,633.8959	0.9075		24,652.9542
Total	**45.9036**	**29.4967**	**108.1272**	**0.3135**	**21.5663**	**0.5225**	**22.0888**	**5.7627**	**0.4883**	**6.2509**		**25,957.1480**	**25,957.1480**	**0.9332**	**0.0243**	**25,984.2647**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	36.0228	4.5000e-004	0.0490	0.0000		1.8000e-004	1.8000e-004		1.8000e-004	1.8000e-004		0.1039	0.1039	2.8000e-004		0.1099
Energy	0.1213	1.1026	0.9262	6.6200e-003		0.0838	0.0838		0.0838	0.0838		1,323.1481	1,323.1481	0.0254	0.0243	1,331.2006
Mobile	9.7596	28.3936	107.1520	0.3069	21.5663	0.4385	22.0048	5.7627	0.4043	6.1670		24,633.8959	24,633.8959	0.9075		24,652.9542
Total	**45.9036**	**29.4967**	**108.1272**	**0.3135**	**21.5663**	**0.5225**	**22.0888**	**5.7627**	**0.4883**	**6.2509**		**25,957.1480**	**25,957.1480**	**0.9332**	**0.0243**	**25,984.2647**

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

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	10/3/2016	12/6/2016	6	56	
2	Site Preparation	Site Preparation	12/20/2016	12/24/2016	6	5	
3	Grading	Grading	12/26/2016	2/9/2017	6	40	
4	Building Construction	Building Construction	2/10/2017	4/30/2018	6	381	
5	Paving	Paving	5/1/2018	6/9/2018	6	35	
6	Architectural Coating	Architectural Coating	6/10/2018	8/16/2018	6	58	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 112.5

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 151,650; Non-Residential Outdoor: 9,000 (Architectural Coating – sqft)

<u>OffRoad Equipment</u>

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Excavators	3	8.00	162	0.38
Demolition	Rubber Tired Dozers	2	8.00	255	0.40
Site Preparation	Rubber Tired Dozers	3	8.00	255	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Excavators	2	8.00	162	0.38
Grading	Graders	1	8.00	174	0.41
Grading	Rubber Tired Dozers	1	8.00	255	0.40
Grading	Scrapers	2	8.00	361	0.48
Grading	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Building Construction	Cranes	1	7.00	226	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Paving	Pavers	2	8.00	125	0.42
Paving	Paving Equipment	2	8.00	130	0.36
Paving	Rollers	2	8.00	80	0.38
Architectural Coating	Air Compressors	1	6.00	78	0.48

<u>Trips and VMT</u>

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	6	15.00	0.00	1,962.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	8	20.00	0.00	10,179.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	589.00	230.00	1,580.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	118.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Water Exposed Area

Clean Paved Roads

3.2 Demolition - 2016

Unmitigated Construction On-Site

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	lb/day										lb/day					
Fugitive Dust					7.5833	0.0000	7.5833	1.1482	0.0000	1.1482			0.0000			0.0000
Off-Road	4.2876	45.6559	35.0303	0.0399		2.2921	2.2921		2.1365	2.1365		4,089.2841	4,089.2841	1.1121		4,112.6374
Total	**4.2876**	**45.6559**	**35.0303**	**0.0399**	**7.5833**	**2.2921**	**9.8754**	**1.1482**	**2.1365**	**3.2847**		**4,089.2841**	**4,089.2841**	**1.1121**		**4,112.6374**

Unmitigated Construction Off-Site

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	lb/day										lb/day					
Hauling	0.6332	9.9525	7.7871	0.0258	0.6105	0.1528	0.7633	0.1672	0.1406	0.3077		2,597.4943	2,597.4943	0.0188		2,597.8881
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	0.0640	0.0860	0.8984	1.9900e-003	0.1677	1.4000e-003	0.1691	0.0445	1.2900e-003	0.0458		167.3573	167.3573	9.1500e-003		167.5495
Total	**0.6971**	**10.0385**	**8.6855**	**0.0278**	**0.7781**	**0.1542**	**0.9323**	**0.2116**	**0.1419**	**0.3535**		**2,764.8516**	**2,764.8516**	**0.0279**		**2,765.4376**

Mitigated Construction On-Site

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	lb/day										lb/day					
Fugitive Dust					3.4125	0.0000	3.4125	0.5167	0.0000	0.5167			0.0000			0.0000
Off-Road	1.4692	20.5260	25.1815	0.0399		1.0287	1.0287		1.0287	1.0287	0.0000	4,089.2841	4,089.2841	1.1121		4,112.6374

Total	**1.4692**	**20.5260**	**25.1815**	**0.0399**	**3.4125**	**1.0287**	**4.4412**	**0.5167**	**1.0287**	**1.5454**	**0.0000**	**4,089.2841**	**4,089.2841**	**1.1121**		**4,112.6374**

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	0.6332	9.9525	7.7871	0.0258	0.6105	0.1528	0.7633	0.1672	0.1406	0.3077		2,597.4943	2,597.4943	0.0188		2,597.8881
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	0.0640	0.0860	0.8984	1.9900e-003	0.1677	1.4000e-003	0.1691	0.0445	1.2900e-003	0.0458		167.3573	167.3573	9.1500e-003		167.5495
Total	**0.6971**	**10.0385**	**8.6855**	**0.0278**	**0.7781**	**0.1542**	**0.9323**	**0.2116**	**0.1419**	**0.3535**		**2,764.8516**	**2,764.8516**	**0.0279**		**2,765.4376**

3.3 Site Preparation - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					18.0663	0.0000	18.0663	9.9307	0.0000	9.9307			0.0000			0.0000
Off-Road	5.0771	54.6323	41.1053	0.0391		2.9387	2.9387		2.7036	2.7036		4,065.0053	4,065.0053	1.2262		4,090.7544
Total	**5.0771**	**54.6323**	**41.1053**	**0.0391**	**18.0663**	**2.9387**	**21.0049**	**9.9307**	**2.7036**	**12.6343**		**4,065.0053**	**4,065.0053**	**1.2262**		**4,090.7544**

Unmitigated Construction Off-Site

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

Worker	0.0768	0.1032	1.0780	2.3900e-003	0.2012	1.6800e-003	0.2029	0.0534	1.5500e-003	0.0549		200.8288	200.8288	0.0110		201.0594
Total	**0.0768**	**0.1032**	**1.0780**	**2.3900e-003**	**0.2012**	**1.6800e-003**	**0.2029**	**0.0534**	**1.5500e-003**	**0.0549**		**200.8288**	**200.8288**	**0.0110**		**201.0594**

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					8.1298	0.0000	8.1298	4.4688	0.0000	4.4688			0.0000			0.0000
Off-Road	0.9515	19.4584	23.4003	0.0391		0.9611	0.9611		0.9611	0.9611	0.0000	4,065.0053	4,065.0053	1.2262		4,090.7544
Total	**0.9515**	**19.4584**	**23.4003**	**0.0391**	**8.1298**	**0.9611**	**9.0909**	**4.4688**	**0.9611**	**5.4299**	**0.0000**	**4,065.0053**	**4,065.0053**	**1.2262**		**4,090.7544**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0768	0.1032	1.0780	2.3900e-003	0.2012	1.6800e-003	0.2029	0.0534	1.5500e-003	0.0549		200.8288	200.8288	0.0110		201.0594
Total	**0.0768**	**0.1032**	**1.0780**	**2.3900e-003**	**0.2012**	**1.6800e-003**	**0.2029**	**0.0534**	**1.5500e-003**	**0.0549**		**200.8288**	**200.8288**	**0.0110**		**201.0594**

3.4 Grading - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					9.2350	0.0000	9.2350	3.6672	0.0000	3.6672			0.0000			0.0000

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Off-Road	6.4795	74.8137	49.1374	0.0617		3.5842	3.5842		3.2975	3.2975		6,414.9807	6,414.9807	1.9350		6,455.6154
Total	**6.4795**	**74.8137**	**49.1374**	**0.0617**	**9.2350**	**3.5842**	**12.8192**	**3.6672**	**3.2975**	**6.9647**		**6,414.9807**	**6,414.9807**	**1.9350**		**6,455.6154**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	4.5988	72.2881	56.5602	0.1873	23.4991	1.1099	24.6091	5.8938	1.0210	6.9148		18,866.3877	18,866.3877	0.1362		18,869.2475
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	0.0853	0.1147	1.1978	2.6500e-003	0.2236	1.8700e-003	0.2254	0.0593	1.7200e-003	0.0610		223.1431	223.1431	0.0122		223.3994
Total	**4.6841**	**72.4028**	**57.7580**	**0.1899**	**23.7227**	**1.1118**	**24.8345**	**5.9531**	**1.0227**	**6.9758**		**19,089.5308**	**19,089.5308**	**0.1484**		**19,092.6469**

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					4.1557	0.0000	4.1557	1.6502	0.0000	1.6502			0.0000			0.0000
Off-Road	1.5128	29.7798	37.9432	0.0617		1.3234	1.3234		1.3234	1.3234	0.0000	6,414.9807	6,414.9807	1.9350		6,455.6154
Total	**1.5128**	**29.7798**	**37.9432**	**0.0617**	**4.1557**	**1.3234**	**5.4791**	**1.6502**	**1.3234**	**2.9736**	**0.0000**	**6,414.9807**	**6,414.9807**	**1.9350**		**6,455.6154**

102.1826

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	4.5988	72.2881	56.5602	0.1873	23.4991	1.1099	24.6091	5.8938	1.0210	6.9148		18,866.3877	18,866.3877	0.1362		18,869.2475

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
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	0.0853	0.1147	1.1978	2.6500e-003	0.2236	1.8700e-003	0.2254	0.0593	1.7200e-003	0.0610		223.1431	223.1431	0.0122		223.3994
Total	**4.6841**	**72.4028**	**57.7580**	**0.1899**	**23.7227**	**1.1118**	**24.8345**	**5.9531**	**1.0227**	**6.9758**		**19,089.5308**	**19,089.5308**	**0.1484**		**19,092.6469**

3.4 Grading - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					9.2350	0.0000	9.2350	3.6672	0.0000	3.6672			0.0000			0.0000
Off-Road	6.0991	69.5920	46.8050	0.0617		3.3172	3.3172		3.0518	3.0518		6,313.3690	6,313.3690	1.9344		6,353.9915
Total	**6.0991**	**69.5920**	**46.8050**	**0.0617**	**9.2350**	**3.3172**	**12.5522**	**3.6672**	**3.0518**	**6.7190**		**6,313.3690**	**6,313.3690**	**1.9344**		**6,353.9915**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	4.3279	66.2528	54.5918	0.1871	5.0284	1.0143	6.0427	1.3602	0.9330	2.2932		18,556.6415	18,556.6415	0.1334		18,559.4430
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	0.0765	0.1035	1.0796	2.6500e-003	0.2236	1.8000e-003	0.2254	0.0593	1.6600e-003	0.0610		214.5722	214.5722	0.0113		214.8087
Total	**4.4044**	**66.3563**	**55.6714**	**0.1897**	**5.2520**	**1.0161**	**6.2681**	**1.4195**	**0.9347**	**2.3542**		**18,771.2136**	**18,771.2136**	**0.1447**		**18,774.2517**

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					

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Fugitive Dust					4.1557	0.0000	4.1557	1.6502	0.0000	1.6502			0.0000			0.0000
Off-Road	1.5128	29.7798	37.9432	0.0617		1.3234	1.3234		1.3234	1.3234	0.0000	6,313.3690	6,313.3690	1.9344		6,353.9915
Total	**1.5128**	**29.7798**	**37.9432**	**0.0617**	**4.1557**	**1.3234**	**5.4791**	**1.6502**	**1.3234**	**2.9736**	**0.0000**	**6,313.3690**	**6,313.3690**	**1.9344**		**6,353.9915**

96.1361

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	4.3279	66.2528	54.5918	0.1871	5.0284	1.0143	6.0427	1.3602	0.9330	2.2932		18,556.6415	18,556.6415	0.1334		18,559.4430
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	0.0765	0.1035	1.0796	2.6500e-003	0.2236	1.8000e-003	0.2254	0.0593	1.6600e-003	0.0610		214.5722	214.5722	0.0113		214.8087
Total	**4.4044**	**66.3563**	**55.6714**	**0.1897**	**5.2520**	**1.0161**	**6.2681**	**1.4195**	**0.9347**	**2.3542**		**18,771.2136**	**18,771.2136**	**0.1447**		**18,774.2517**

3.5 Building Construction - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.1024	26.4057	18.1291	0.0268		1.7812	1.7812		1.6730	1.6730		2,639.8053	2,639.8053	0.6497		2,653.4490
Total	**3.1024**	**26.4057**	**18.1291**	**0.0268**		**1.7812**	**1.7812**		**1.6730**	**1.6730**		**2,639.8053**	**2,639.8053**	**0.6497**		**2,653.4490**

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					

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Hauling	0.0705	1.0797	0.8896	3.0500e-003	0.0926	0.0165	0.1091	0.0248	0.0152	0.0400		302.4032	302.4032	2.1700e-003		302.4488
Vendor	1.9171	18.5201	26.1046	0.0496	1.4379	0.2946	1.7325	0.4096	0.2709	0.6805		4,891.9658	4,891.9658	0.0357		4,892.7149
Worker	2.2525	3.0478	31.7942	0.0781	6.5836	0.0529	6.6366	1.7460	0.0488	1.7948		6,319.1504	6,319.1504	0.3317		6,326.1157
Total	**4.2401**	**22.6476**	**58.7884**	**0.1308**	**8.1141**	**0.3640**	**8.4782**	**2.1803**	**0.3349**	**2.5153**		**11,513.5193**	**11,513.5193**	**0.3695**		**11,521.2794**

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	2.4702	22.9683	17.9932	0.0268		1.4993	1.4993		1.4392	1.4392	0.0000	2,639.8053	2,639.8053	0.6497		2,653.4490
Total	**2.4702**	**22.9683**	**17.9932**	**0.0268**		**1.4993**	**1.4993**		**1.4392**	**1.4392**	**0.0000**	**2,639.8053**	**2,639.8053**	**0.6497**		**2,653.4490**

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	0.0705	1.0797	0.8896	3.0500e-003	0.0926	0.0165	0.1091	0.0248	0.0152	0.0400		302.4032	302.4032	2.1700e-003		302.4488
Vendor	1.9171	18.5201	26.1046	0.0496	1.4379	0.2946	1.7325	0.4096	0.2709	0.6805		4,891.9658	4,891.9658	0.0357		4,892.7149
Worker	2.2525	3.0478	31.7942	0.0781	6.5836	0.0529	6.6366	1.7460	0.0488	1.7948		6,319.1504	6,319.1504	0.3317		6,326.1157
Total	**4.2401**	**22.6476**	**58.7884**	**0.1308**	**8.1141**	**0.3640**	**8.4782**	**2.1803**	**0.3349**	**2.5153**		**11,513.5193**	**11,513.5193**	**0.3695**		**11,521.2794**

3.5 Building Construction - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	lb/day										lb/day					
Off-Road	2.6687	23.2608	17.5327	0.0268		1.4943	1.4943		1.4048	1.4048		2,609.9390	2,609.9390	0.6387		2,623.3517
Total	**2.6687**	**23.2608**	**17.5327**	**0.0268**		**1.4943**	**1.4943**		**1.4048**	**1.4048**		**2,609.9390**	**2,609.9390**	**0.6387**		**2,623.3517**

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	0.0687	1.0013	0.8718	3.0500e-003	0.2203	0.0165	0.2368	0.0561	0.0152	0.0713		297.3784	297.3784	2.2000e-003		297.4247
Vendor	1.7917	16.9886	25.0489	0.0495	1.4379	0.2775	1.7155	0.4096	0.2553	0.6649		4,809.7893	4,809.7893	0.0355		4,810.5344
Worker	2.0256	2.7639	28.7688	0.0781	6.5836	0.0515	6.6352	1.7460	0.0477	1.7937		6,083.1947	6,083.1947	0.3078		6,089.6590
Total	**3.8860**	**20.7537**	**54.6896**	**0.1307**	**8.2418**	**0.3456**	**8.5874**	**2.2117**	**0.3182**	**2.5298**		**11,190.3624**	**11,190.3624**	**0.3455**		**11,197.6181**

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	2.1696	20.9106	17.5467	0.0268		1.3243	1.3243		1.2739	1.2739	0.0000	2,609.9389	2,609.9389	0.6387		2,623.3517
Total	**2.1696**	**20.9106**	**17.5467**	**0.0268**		**1.3243**	**1.3243**		**1.2739**	**1.2739**	**0.0000**	**2,609.9389**	**2,609.9389**	**0.6387**		**2,623.3517**

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	0.0687	1.0013	0.8718	3.0500e-003	0.2203	0.0165	0.2368	0.0561	0.0152	0.0713		297.3784	297.3784	2.2000e-003		297.4247
Vendor	1.7917	16.9886	25.0489	0.0495	1.4379	0.2775	1.7155	0.4096	0.2553	0.6649		4,809.7893	4,809.7893	0.0355		4,810.5344
Worker	2.0256	2.7639	28.7688	0.0781	6.5836	0.0515	6.6352	1.7460	0.0477	1.7937		6,083.1947	6,083.1947	0.3078		6,089.6590
Total	**3.8860**	**20.7537**	**54.6896**	**0.1307**	**8.2418**	**0.3456**	**8.5874**	**2.2117**	**0.3182**	**2.5298**		**11,190.3624**	**11,190.3624**	**0.3455**		**11,197.6181**

3.6 Paving - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.6114	17.1628	14.4944	0.0223		0.9386	0.9386		0.8635	0.8635		2,245.2695	2,245.2695	0.6990		2,259.9481
Paving	0.1849					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.7963**	**17.1628**	**14.4944**	**0.0223**		**0.9386**	**0.9386**		**0.8635**	**0.8635**		**2,245.2695**	**2,245.2695**	**0.6990**		**2,259.9481**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0516	0.0704	0.7327	1.9900e-003	0.1677	1.3100e-003	0.1690	0.0445	1.2100e-003	0.0457		154.9201	154.9201	7.8400e-003		155.0847
Total	**0.0516**	**0.0704**	**0.7327**	**1.9900e-003**	**0.1677**	**1.3100e-003**	**0.1690**	**0.0445**	**1.2100e-003**	**0.0457**		**154.9201**	**154.9201**	**7.8400e-003**		**155.0847**

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	1.6114	17.1628	14.4944	0.0223		0.9386	0.9386		0.8635	0.8635	0.0000	2,245.2695	2,245.2695	0.6990		2,259.9481
Paving	0.1849					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.7963**	**17.1628**	**14.4944**	**0.0223**		**0.9386**	**0.9386**		**0.8635**	**0.8635**	**0.0000**	**2,245.2695**	**2,245.2695**	**0.6990**		**2,259.9481**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0516	0.0704	0.7327	1.9900e-003	0.1677	1.3100e-003	0.1690	0.0445	1.2100e-003	0.0457		154.9201	154.9201	7.8400e-003		155.0847
Total	**0.0516**	**0.0704**	**0.7327**	**1.9900e-003**	**0.1677**	**1.3100e-003**	**0.1690**	**0.0445**	**1.2100e-003**	**0.0457**		**154.9201**	**154.9201**	**7.8400e-003**		**155.0847**

3.7 Architectural Coating - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	9.6286					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2986	2.0058	1.8542	2.9700e-003		0.1506	0.1506		0.1506	0.1506		281.4485	281.4485	0.0267		282.0102
Total	**9.9272**	**2.0058**	**1.8542**	**2.9700e-003**		**0.1506**	**0.1506**		**0.1506**	**0.1506**		**281.4485**	**281.4485**	**0.0267**		**282.0102**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.4058	0.5537	5.7635	0.0156	1.3190	0.0103	1.3293	0.3498	9.5500e-003	0.3594		1,218.7045	1,218.7045	0.0617		1,219.9996
Total	**0.4058**	**0.5537**	**5.7635**	**0.0156**	**1.3190**	**0.0103**	**1.3293**	**0.3498**	**9.5500e-003**	**0.3594**		**1,218.7045**	**1,218.7045**	**0.0617**		**1,219.9996**

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	9.6286					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2986	2.0058	1.8542	2.9700e-003		0.1506	0.1506		0.1506	0.1506	0.0000	281.4485	281.4485	0.0267		282.0102
Total	**9.9272**	**2.0058**	**1.8542**	**2.9700e-003**		**0.1506**	**0.1506**		**0.1506**	**0.1506**	**0.0000**	**281.4485**	**281.4485**	**0.0267**		**282.0102**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.4058	0.5537	5.7635	0.0156	1.3190	0.0103	1.3293	0.3498	9.5500e-003	0.3594		1,218.7045	1,218.7045	0.0617		1,219.9996
Total	**0.4058**	**0.5537**	**5.7635**	**0.0156**	**1.3190**	**0.0103**	**1.3293**	**0.3498**	**9.5500e-003**	**0.3594**		**1,218.7045**	**1,218.7045**	**0.0617**		**1,219.9996**