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Chapter 4: Analyzing Operational Criteria Pollutant Emissions

Analyzing Operational Criteria Pollutant Emissions

4.1. Assessing Operational Impacts for Criteria Pollutants

Operational criteria pollutants emissions are generated from activities associated with the operational phase of a project. Usually, the project's operational emissions would be considered long-term impacts since the impacts occur repeatedly in the project's lifetime. The amount and type of pollution produced, along with the potential to cause significant impacts depends on the type and level of operational activities proposed. Several sources of emissions are considered when evaluating the operational emissions from a proposed project.

Motor vehicle operation, from land use development projects, is often referred to as an "indirect source". The emissions from motor vehicle travel to and from the development are not considered direct emissions from the onsite activities. Some of these projects include shopping centers, office buildings, and residential subdivisions. On the other hand, a development's onsite activities are referred as "direct sources". Direct source projects include refineries, power plants, asphalt batch plants, quarries, and gasoline stations where the equipment or devices operate onsite.

In addition to indirect and direct source emissions, many land use projects also generate "area source" emissions. Area sources include water and space heaters, fireplaces, wood burning appliances, lawn maintenance equipment, and the application of paints and solvents. These sources individually emit a fairly small amount of air pollutants, but cumulatively may represent a significant quantity of emissions. To assess the project's operational emissions, all related indirect, direct, and area sources shall be identified with the potential operational emissions calculated.



The project's indirect operational GHG emissions analysis from electricity usage, solid waste disposal, vegetation planting and/or removal, and water use will be discussed in [CHAPTER 5](#).

4.2. Determining Project Operational Emissions

When estimating emissions from a project's operational activities, each type of source/device should be identified with its specific activity information. Information required for calculating emissions are described below, with each requiring increasingly detailed information to produce more accurate results. If there are existing operational activities on the site, the District recommends that emissions from the existing operation be quantified as the baseline condition and used to identify net emissions between the existing and proposed operation on the site.

The project specific information for calculating the operational emissions are listed but not limited to:

- Proposed project characteristics such as the location and land use setting,
- Proposed land use types and sizes,
- Project specific traffic study if available with the daily trip, traveling distance, or total VMT,
- Project related energy consuming data such as natural gas or propane usage,

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- Project related area sources such as fireplaces/wood burning appliances, consumer products, lawn maintenance equipment, and architectural coating application,
- Project related direct sources/devices such as industrial processes, power generators, boilers, or fuel dispensing equipment, and
- Assumptions and emission rates applied to mobile source emissions, area source emissions, and direct/point source emissions calculations.

For land use development projects, the District recommends using the latest version of CalEEMod to quantify operational emissions for criteria air pollutants (NO_x, ROG, CO, and PM). For the industrial related projects, the District recommends the applicant/consultant contact the District regarding the proposed industrial processes or devices' specialties prior to calculating the emission estimation. All assumptions, modeling settings, modeling outputs, or special calculation methods for industrial projects should be provided for the District review of the project's operational emission calculation.

4.3. Estimating Motor Vehicle Related Emissions

Motor vehicles are a primary source of long-term operational emissions from residential, commercial, institutional, and industrial land uses. These land uses often do not emit substantial amounts of air pollutants directly, but may cause or attract motor vehicle trips that produce significant emissions. Motor vehicle emissions are calculated on the project's daily trip rate for that land use, type of trips, traveling distance for each trip, fleet mix, and emission rates. CalEEMod provides an user-friendly platform which incorporates the most recent vehicle emission factors from the EMFAC model, developed by CARB, along with trip generation factors published by the Institute of Transportation Engineers (ITE). The latest version of CalEEMod can be found at: www.caleemod.com. APPENDIX B summarizes the District's modeling recommendations for the project's CalEEMod analysis.

In addition to CalEEMod, motor vehicle emissions can also be calculated by using EMFAC model directly when only the project's total VMT data is available for the analysis. The most recent EMFAC version web database can be accessed at www.arb.ca.gov/emfac/. When special vehicle activities data is used, information on the vehicle classes, vehicle population, and traveling speeds should be provided as part of the District's CEQA review process. APPENDIX D presents the methods recommended by the District to calculate the project related motor vehicle emissions directly from the EMFAC model.

4.4. Determining Local CO Emission Impact at Roadway Intersection

Air pollutant emissions from a land use project are predominantly generated from vehicle trips on roadways. These land use motor vehicle related emissions do not typically result in high localized carbon monoxide (CO) concentrations since vehicle trips are not occurring at a single location. However, traffic congestion near a roadway's intersection with vehicles moving slowly or idling will result in local CO emissions at that intersection (hotspot), due to a vehicle engine's inefficient combustion. Accordingly, a land use project could result in potential local CO hotspot impact at roadway intersections if the project generates substantial traffic impacts. The Level of Service (LOS) has been commonly used by the lead agency to assess the potential traffic impacts during the environmental review for a land use project. This is a measure of a vehicle delay at intersections or on roadway segments and the result is expressed with a letter grade ranging from A to F. The LOS can be used to evaluate whether or not a project's traffic impact would cause a potential localized CO impact at any given intersection. The District recommends using the following screening criteria to determine whether the evaluation of local CO emission impact should be conducted.

When a project's CO emissions from vehicle operation are more than 550 lbs/day²⁴ **and** if either of the following scenarios is true for any intersection affected by the project traffic, the project should conduct a site-specific CO dispersion modeling analysis to evaluate the potential local CO emission impact at roadway intersections:

- A traffic study for the project indicates that the peak-hour LOS on one or more streets or at one or more intersections (both signalized and non-signalized) in the project vicinity will be degraded from an acceptable LOS (e.g., A, B, C, or D) to an unacceptable LOS (e.g., E or F); or
- A traffic study indicates that the project will substantially worsen an already existing unacceptable peak-hour LOS on one or more streets or at one or more intersections in the project vicinity. "Substantially worsen" includes situations where a delay would increase by 10 seconds or more when project-generated traffic is included.

If a project is identified to have potential CO impacts, for any intersection affected by the project which already has traffic mitigation incorporated, the District would recommend the applicant/consultant conduct a CO dispersion modeling analysis using the CALINE-4 dispersion model to identify potential CO concentrations at the impacted street(s) or intersection(s). The CALINE-4 dispersion model is used to estimate local CO concentrations resulting from motor vehicle emissions. It was developed by the California Department of Transportation (Caltrans) and is available from the Caltrans Environmental Division's web page at http://www.dot.ca.gov/hq/env/air/main_sections/analysistools.htm.

CALINE-4 requires the user to supply specific input parameters. These inputs should be those recommended in the CO Protocol. If other inputs are used instead of those recommended in the Caltrans CO Protocol, they should be documented in the environmental document.

Senate Bill (SB) 743, signed by the Governor on September 27, 2013, requires the Governor's Office of Planning and Research (OPR) to amend the CEQA Guidelines to provide an alternative to LOS for evaluating transportation impacts, with the selected alternative promoting the reduction of GHG emissions. The considerable alternatives include VMT, VMT per capita, vehicle trip generation rates, and vehicle trips generated. Currently, OPR is working on the draft CEQA Guidelines amendment and technical advisory, to be used statewide, which proposes that VMT is the primary metric for transportation impact analysis. Accordingly, the CAPCOA and local air districts are also studying how VMT would be applied into addressing the local CO emission impact. The District will update the above screening criteria when the OPR finalizes the CEQA Guideline amendment.

The following are information regarding SB 743 requirements:

- ✓ [Senate Bill \(SB\) 743: Environmental Quality](#)
- ✓ [OPR's SB 743 Updates](#)
- ✓ [OPR's Revised proposal on Updates to the CEQA Guidelines](#)

4.5. Non-vehicular Emissions from Residential/Commercial Developments

Non-vehicular emission sources associated with residential and commercial development include water heaters, boilers, or space heating equipment, evaporative emissions from paints, solvents, consumer products, fuel combustion by lawnmowers, leaf blowers and other small utility

²⁴ The recommended screening criteria of 550 lbs/day is referred by the District's NSR rule's emission offset threshold for CO emissions.

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equipment, fireplace/residential wood burning, household products, and other small sources. Collectively, these are referred to as “area sources” and are important from a cumulative standpoint even though they may appear insignificant when viewed individually. CalEEMod provides emission estimations from area sources based on land use types.

Within CalEEMod, the default setting under “Hearths” emission module is used for wood burning devices and can result in substantial emissions from wood burning devices for a project. This setting should be carefully modified to be consistent with the project’s design - whether or not the project includes wood burning devices.

4.6. Industrial Emission Sources

From an emissions standpoint, industrial facilities and operations are typically categorized as “point” or “aggregated point” sources. Point sources are stationary and generally located on a site that has one or more emission sources at a facility. (e.g., power plant, refinery, etc.). Aggregated point sources can be stationary, manufacturing processes, or mobile and are typically related but individually may be small within the stationary facility operation but may significant as a group. This includes:

- Devices/equipment/processes along with proposed facilities whose emissions are small individually, but may be significant as a group (e.g., gasoline dispensing devices, kilns, heaters, etc.);
- Sources whose emissions emanate from a broad area (e.g., fugitive dust from storage piles and dirt roads, landfills, etc.); and,
- Mobile equipment used in industrial operations (e.g., drill rigs, loaders, haul-trucks, etc.).



Please note that both industrial-related point and aggregated point sources are subject to the District’s regulatory and control requirements. An “Authority to Construct” permit may be required from the District for the source/device.

During the CEQA analysis, all air quality impacts are evaluated including the stationary point, area and mobile sources if they are part of the proposed land use project. While a specific piece of equipment or process may be covered by a District permit it is not excluded from the CEQA evaluation process.

If the industrial source could emit air toxics, a Health Risk Assessment (HRA) or a “T-Screen” evaluation (less detailed than a HRA) may be required as a part of the review process, depending on the scope and complexity of the proposal. Further discussion of a HRA can be found in [CHAPTER 6](#).

4.7. Significance Thresholds for Project-Level Operational Emissions

Table 4-1 shows the significance thresholds, adopted by the District’s Board of Directors on October 13, 2016. Criteria pollutant emissions are calculated based on the appropriate mitigation levels and then are compared to the thresholds to determine the project’s significance. (as shown in Table 2-1).

Table 4-1: PCAPCD Significance Thresholds for Criteria Pollutants

Operational Phase Project-Level			Operational Phase Cumulative-Level		
ROG	NOx	PM10	ROG	NOx	PM10
(lbs/day)	(lbs/day)	(lbs/day)	(lbs/day)	(lbs/day)	(lbs/day)
55	55	82	55	55	82

Most of the long-term operational mitigation strategies suggested in this chapter focus on methods to reduce vehicle trips along with travel distance, including site design standards that encourage pedestrian and bicycle-friendly transit-oriented development. In addition, the recommendations include design strategies for residential and commercial buildings that address energy conservation and other concepts that reduce total project emissions. These recommendations are not all inclusive and are provided as examples among many possibilities.

4.8. Steps in Determining Significance of Operational Impacts from Criteria Pollutants

The following steps are recommended to determine the significance of criteria pollutants and precursors emissions impacts related to operational emissions:

Step 1: Emissions Quantification

The project's CEQA document should identify the sources which would contribute to the project's operational emissions. Next, an analytical methodology should be identified for estimating the project's operational emissions. The District recommends using the most current version of CalEEMod (previous versions will not be accepted). Using the CalEEMod modeling default settings or the project specific operational activity information, CalEEMod can provide a quantitative analysis to estimate the project's related criteria pollutant emissions from motor vehicle and area sources.

- ✓ For more information and to download the software please go to: www.caleemod.com.
- ✓ **APPENDIX B: PCAPCD Tips for Using CalEEMod**

When a project proposes a conversion for its existing operation or involves the District's permitted devices, the lead agency should plan to consult with the District in identifying a strategy related to the baseline conditions and how such conditions are described within the project's description. Refer to [Section 1.10](#) for further information on baseline conditions.

Step 2: Comparison of Unmitigated Operational Emissions with the District's Significance Thresholds for Criteria Pollutants

The project's air quality analysis should calculate the estimated emissions for the area, mobile, and stationary sources (if any) for each pollutant as explained above and compared to the daily maximum emissions of each criteria pollutant and their precursors with the significance thresholds. At this step, the project's operational emissions should consider all the state and federal rules and regulations. If any of the daily maximum operational-related emissions after state and federal regulatory compliance are below the threshold, the project would then result in a less than significant impact to air quality. If the quantified emissions of operational-related criteria air pollutants or precursors exceeds the threshold, the proposed project may result in a significantly considerable impact to air quality.

Step 3: Identification of the Mitigation Measures and Emission Reductions

When the operational-related emissions exceed the applicable Thresholds of Significance, lead agencies are responsible for identifying all feasible mitigation measures for operational emissions, as they deem necessary, to reduce a project's air quality impacts. Mitigation measures can be

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from 1) special features or designs included within the project description; 2) proposed measures within the CEQA-compliant environmental document; 3) identified measures from previously approved CEQA documents, and 4) regulatory measures as required by the District and local jurisdiction. [APPENDIX A](#) contains the related District's rules and regulations and [APPENDIX E](#) contains examples of mitigation measures that may be applied to projects. For proposed projects, the District recommends identifying all feasible mitigation measures to the maximum extent possible.

- ✓ [APPENDIX A](#): PCAPCD Rules and Regulations
- ✓ [APPENDIX E](#): PCAPCD Recommended Operational Mitigation Measures for Criteria Pollutants

Please note that any commentments made within the project's design features that serve to mitigate impacts should be fully evaluated within the related impact analysis and mitigation discussion, to ensure that the feature does in fact mitigate the project's potential adverse impacts. In addition, it is at the lead agency's discretion that the local jurisdiction's rules and regulations are reflected within the project related emissions, either before or after mitigation, in the modeling analysis for the project's operational impacts.

The District recommends the proposed mitigation measures to reduce operational emissions be as detailed as possible and should clearly identify who is responsible for implementation, funding, monitoring, enforcement, and any required maintenance activities. In cases where operational emission reduction measures relate directly or indirectly to policies within a local jurisdiction's General or Community Plan, the District encourages discussion in the CEQA document on the relationship between the General Plan or Community Plan policy and the proposed reduction measures.

The District recommends that mitigation measures identified in the CEQA document be included as conditions of approval during the entitlement phase of the project approval. In addition, any mitigation monitoring plan (MMP) should also be included as a condition of approval during the entitlement phase.

At the very least, the project's mitigated emissions after the mitigation implementation should be quantified and disclosed in its CEQA document.

Step 4: Impact Significance Determination

The project's CEQA document should provide the calculated project's mitigated emissions after mitigation implementation and compared to the total daily mitigated emissions with the significance thresholds. If the implementation of the mitigation measures, including on-site and off-site mitigation, reduces the operational related criteria air pollutants and precursors to levels below thresholds, the impact to air quality would be reduced to a less than significant level.

If mitigated levels of any criteria air pollutant or precursor still exceeds thresholds, the project's operational impact to air quality would be considered significant and unavoidable.

Figure 4-1 summarizes the steps recommended by the District in determining the potential significance of a project's operational impacts from criteria pollutants.



Figure 4-1: Steps in Determining the Potential Significance of Operational Impacts

4.9. Options for a Project's Operational Impact Mitigation

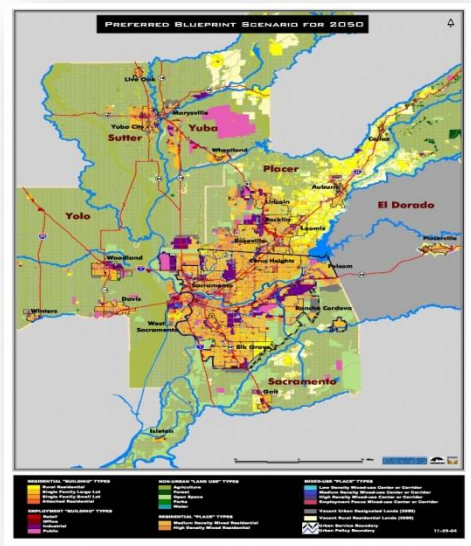
When the operational related emissions exceed a significance threshold, lead agencies are responsible for identifying all feasible mitigation measures to reduce the project's operational emissions. The air quality analysis should quantify the reduction of emissions associated with any proposed mitigation measures and include this information in the project's CEQA document.

The project's mitigation measures can include special features such as green building designs or site designs such as mixed-use, proposed measures within the CEQA-compliant environmental document, identified measures from previously approved CEQA documents, and measures that are required by local rules and regulations. Emissions from motor vehicles that travel to and from residential, commercial, and industrial land uses can generally be mitigated by reducing the vehicle activity through site design (e.g., transit oriented design, infill, mixed use, etc.), implementing transportation demand management measures, using clean fuels and vehicles, and/or off-site mitigation projects.

In addition, area source operational emissions from energy consumption from land uses can be mitigated by improving energy efficiencies, conservation measures and use of alternative energy sources. The mitigation measures discussed in this section are intended to reduce emissions of ROG, NO_x, and Diesel PM (DPM). Greenhouse gas mitigation measures will be discussed in [CHAPTER 5](#). The following categories best capture the types of mitigation measures that can reduce air quality impacts from project operational operations.

Site Design Mitigation Measures

Site design and project layout can be effective methods for mitigating air quality impacts from development. Land use development which incorporates urban infill, higher density, mixed use and walk-able, bike-able, and transit oriented designs can significantly reduce vehicle activity and associated air quality impacts. As early as possible in the scoping phase of a project, the District recommends that the applicant contact the District staff to discuss the project layout and design factors which can influence indirect source emissions and reduce mobile source emissions.



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Energy Efficiency Mitigation Measures

Residential and commercial energy used for lighting, heating and cooling is a significant source of direct and indirect air pollution nationwide. Reducing site and building energy demand reduces emissions at the power plant source along with natural gas combustion in homes and commercial buildings. Commercial and residential buildings' energy efficiency can be improved by orienting buildings to maximize natural heating, enhancing the buildings' insulation beyond the California Building Codes' requirements, and installing energy efficiency appliances.



Transportation Demand Mitigation Measures

Vehicle emissions are often the largest continuing emissions source from the development's operational phase. Reducing the demand for single-occupancy vehicle trips is a simple, cost-effective means of reducing vehicle emissions. In addition, using cleaner fueled vehicles or retrofitting equipment with emission control devices can reduce the overall emissions without impacting operations. Currently clean fuel and vehicle technologies exist for both passenger and heavy-duty applications.

- ✓ See [APPENDIX E](#) for additional mitigation measures for operational impacts



Neighborhood Electric Vehicle (NEV)

Off-Site Mitigation

The District prefers that land use projects implement all feasible on-site mitigation measures. It is understandable that many on-site mitigation measures may not all be suitable for a land use project. If this occurs, off-site mitigation measures would be an option for the project if there are insufficient on-site feasible mitigation measures to mitigate the project's related air quality impacts. Therefore, it is important for the applicant, developer, lead agency, and the District to work closely together whenever off-site mitigation is considered for a project.

When off-site mitigation is an option used to mitigate the project's operational impacts, emission reductions achieved from off-site sources should be equal to the required emission reductions related to the land use project's on-site impacts. This can provide the proper nexus for air quality mitigation under CEQA. For example, excessive NO_x emissions from a land use project's grading activities could be reduced by a project which will generate the same amount of NO_x emission reductions, such as implementing the re-powering of heavy-duty diesel logging equipment used within the region (outside of the project site) as long this equipment is not required by any state and local regulation to be repowered.

When an off-site mitigation measure is required for a land use project, the offsite mitigation measure should explicitly identify the required emission reduction and the implementing method. The project applicant has two options to implement the off-site mitigation measure: 1) proposing their own offsite mitigation project, or 2) paying a mitigation fee into the District's Off-Site Mitigation Fee Program.

If the applicant chooses to implement an offsite mitigation project, the proposed mitigation project should be verified by the District prior to implementation to ensure that the project can

result in an equivalent reduction required by the on-site mitigation measure. If the developer chooses to pay a mitigation fee, the fee will be collected and managed through the District's Off-Site Mitigation Fee Program.

The District's Board of Directors adopted the [Air Quality Mitigation Funds Policy](#) in 2001 (amended in 2008) to establish guidelines for the use of air quality mitigation funds paid by Land Use Applicants. In 2016, the District's Board of Directors adopted the [Review of Land Use Projects under the District's CEQA Policy](#) with the provisions further clarified how the off-site mitigation fee should be calculated by the selected mitigation scenarios, to offset the land use project's related operational emissions. Based on these policies, the District established the Off-Site Mitigation Fee Program as an option for land use applicants to offset their related operational air quality impacts from a land use development project.

The fee rate is calculated from the emission reductions required by the off-site mitigation measures and the cost-effectiveness factor reported by the latest CARB Carl Moyer Program Guideline²⁵. The cost-effectiveness factor may be adjusted to reflect the current emission reduction market conditions. The mitigation fee received will be managed through the District's annual Clean Air Grants program which funds eligible emission reduction projects in close proximity to the land use project.

- ✓ [PCAPCD Air Quality Mitigation Funds Policy](#)
- ✓ [PCAPCD Review of Land Use Projects under CEQA Policy](#)

Examples off-site mitigation projects include, but are not limited to, the following:

- Modernize older transit and school buses with new and cleaner models;
- Modernize or repower heavy-duty diesel construction equipment or on-road vehicles;
- Repower or contribute funding towards clean diesel locomotive engines;
- Install or contribute funding towards alternative fueling infrastructure (e.g., fueling stations for compressed natural gas and electric vehicle charging); and
- Fund the expansion of existing transit services.

When the option of paying a mitigation fee is chosen, the timeframe for the mitigation fee payment will be based on discussions between the lead agency and the District. The District recommends that payment be provided either prior to construction or grading activities. The District is also open to other avenues for the collection of fees such as "prior to final map for a subdivision" or "prior to building issuance for a commercial building permit".

²⁵ CARB's Carl Moyer Memorial Air Quality Standards Attainment Program.
<http://www.arb.ca.gov/msprog/moyer/moyer.htm>

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