

## SMAQMD EXAMPLE OPERATIONAL PROJECTS

### EXAMPLE PROJECT A

#### DESCRIPTION

Example Project A would develop a multi-story, mixed-use building that includes 40 units of residential condominium apartments, 50 thousand square feet [ksf] of offices and 35 ksf of retail land uses on an undeveloped 4.0-acre site. All of the residential condominium apartments would have natural gas lines for space heating but half of the units would be referred to as “suites” and include natural gas fireplaces. The regular apartments would not have natural gas fireplaces. Project construction would last two years beginning in 2010 and the project would be fully operational by 2013.

#### SCREENING ANALYSIS

In the Land Use Module of URBEMIS (Step 2: Enter Land Use Data) the corresponding Land Use Types of the proposed development would be Apartment High Rise units, General Office Building, and Strip Mall.

When each of the Land Use Types (i.e. Apartment High Rise units, General Office Building, and Strip Mall) is considered individually, their respective sizes would not exceed any of the District’s Operational CAP Screening Levels. However, because the project would contain more than one land use type, the operational screening levels cannot be used to assess the project’s operational emissions, as explained in Section 4.3.1, Assessing Mass Emissions. The lead agency would therefore be required to perform a detailed estimation of operational emissions using URBEMIS.

#### EMISSIONS QUANTIFICATION

When entering the proposed land uses into the Land Use Module, URBEMIS estimates the number of Acres for each Land Use Type assuming that each land use type would be constructed on separate lots. Using default values URBEMIS would assume Example Project A is 4.56 total acres (i.e. 0.65 acres for Apartment High Rise, 2.30 acres for General Office Building, and 1.61 acres for Strip Mall). For mixed-use and/or multi-level developments, the user should adjust the Acres for each of the proposed land uses such that the combined total acreage of all land use types is equal to the actual combined total size of the proposed project site (i.e., 4.0 acres, in this example) prior to running the model.

URBEMIS estimates the Trip Rate differently for residential land use types than for non-residential land use types. For residential land use types, URBEMIS adjusts the default Trip Rate based on residential density (i.e., dwelling units/residential acre). Therefore, overriding the default value for the number of Acres assumed by URBEMIS for a residential land use type would automatically result in a change to the value assumed in the Trip Rate data field. If both the number of Acres and the

**Trip Rate** for a residential development are known, the user should adjust the **Acres** field first, and then adjust the **Trip Rate** field. For nonresidential **Land Use Types**, URBEMIS uses a default value for the **Trip Rate** data field that is directly based on the **Unit Amt** entered into the Land Use Module. The trip rates used by URBEMIS are based on standard rates from the ITE Trip Generation Manual. URBEMIS also assumes a Floor Area Ratio (FAR) of 0.5 for all nonresidential land use types. The FAR is the ratio of the total floor area of a building to the size of the parcel on which it is located. The user should override the value in the **Acres** data field based on the actual FAR for the development, as appropriate.

In accordance with District guidance regarding **Natural Gas Fuel Combustion Category** in the Area Source Module, the user should change the default **Percent Using Natural Gas** values to 100 percent for **Residential** and 100 percent for **NonResidential** land use types. In the **Hearth Fuel Combustion** category of the same module the user should change the data fields for **Wood Stoves**, **Wood Fireplaces**, **Natural Gas Fireplaces**, and **None (% w/o any hearth option)** on the **Hearth Percentages** tab to 0, 0, 50, and 50, respectively to match the project description. In the **Landscape Fuel Combustion** source category the **Year being Analyzed** data field should be changed to 2013.

In the Operational Module the **year** data field in the **Year & Vehicle Fleet** category page should also be changed to 2013.

Lastly, the estimated maximum daily emissions of ROG and NO<sub>x</sub> should be compared to the District's [thresholds of significance](#). If the maximum daily ROG or NO<sub>x</sub> emissions would exceed the thresholds of significance, operational emissions would be considered significant and all feasible mitigation measures should be implemented to reduce these emissions. For disclosure purposes, the District also recommends reporting the maximum daily emission levels of PM<sub>10</sub> and PM<sub>2.5</sub>.

## EXAMPLE PROJECT B

### DESCRIPTION

Example Project B would replace an existing inhabited housing development consisting of 35 single family residential units on an 11.5-acre site with a 250,000 square feet (250 ksf) shopping mall. The shopping mall would use natural gas for space and water heating. All existing residential units are equipped with wood-burning fireplaces and have natural gas connections. The earliest year when the project would become fully operational would be 2012.

### SCREENING ANALYSIS

In the Land Use Module of URBEMIS (**Step 2: Enter Land Use Data**) the corresponding **Land Use Type** of the proposed development would be **Regional Shopping Center**. The size of the proposed shopping mall would be greater than the level in the [Operational CAP Screening Levels](#) table for a **Regional Shopping**

**Center.** The lead agency would therefore be required to perform a detailed estimation of operational emissions using URBEMIS.

## EMISSIONS QUANTIFICATION

The size and type of land use proposed (i.e., **Regional Shopping Center**) should be entered into the Land Use Module in URBEMIS. In this case, the project's total acres are equal to the default URBEMIS assumption; therefore, no override is necessary in the **Acres** data field. Because this is a nonresidential land use, URBEMIS uses a default value in the **Trip Rate** data field that is directly based on the **Unit Amt** entered into the Land Use Module. The trip rates used by URBEMIS are based on standard rates from the [ITE Trip Generation Manual](#). The user should override the value in the **Trip Rate** data field if project-specific trip generation rates are available from a traffic study or defensible assumptions can support the change.

Data fields in the Area Source Module should be also modified for the proposed project. Because the mall would utilize natural gas for space and water heating, the user should change the default **Percent Using Natural Gas** value to 100 percent for **NonResidential** land use types in the **Natural Gas Fuel Combustion Category**. In the **Landscape Fuel Combustion** source category the **Year being Analyzed** data field should be changed to 2012.

In the Operational Module the year data field in the Year & Vehicle Fleet category page should also be changed to 2012.

If a proposed project involves the removal of existing emission sources on the same site as the proposed project, then the District recommends subtracting the existing emissions levels from the emissions levels estimated for the new proposed land use. This "net calculation" is permissible only if the existing emission sources were operational at the time that the Notice of Preparation (NOP) for the CEQA project was circulated, and the project description in the CEQA documents states that the existing emission sources would be terminated (or the existing land uses would be vacated and demolished or removed). This "net calculation" is not permitted for emission sources that ceased to operate (or the land uses were vacated and/or demolished) prior to circulation of the NOP. Lead agencies should consult the District if it is unclear whether the net calculation applies.

Operational emissions for the existing on-site housing development should be estimated in a separate URBEMIS run. The operational year should be same as the year the NOP for the proposed project was circulated. The default value in the **Trip Rate** data field of the Land Use Module may be used if trip generation rates for the existing development are not known and only if project-specific trip generation rates were used to estimate mobile-source emission levels for the proposed shopping mall (in the other URBEMIS model run).

In the Area Source Module, the user should not change the default **Percent Using Natural Gas** values for **Residential** or **NonResidential** land use types in the **Natural**

**Gas Fuel Combustion** category unless project specific information is available to support the changes. The existing development represents a situation when the **Wood Fireplaces** tab in the **Hearth Fuel Combustion** category should be used to calculate existing hearth emissions. The user should change the values in the data fields for **Wood Stoves**, **Wood Fireplaces**, **Natural Gas Fireplaces**, and **None** on the **Hearth Percentages** tab to 0, 100, 0, and 0, respectively since all existing residential units are equipped with wood fireplaces. In the **Landscape Fuel Combustion** source category the **Year being Analyzed** data field should be changed to 2012.

In the Operational Module the **year** data field in the **Year & Vehicle Fleet** category page should also be changed to 2012.

The operational emissions for the existing residential units on the project site should be subtracted from the total operational emissions for the proposed shopping mall to estimate the net change in emissions.

In order to be conservative, the District recommends that Lead Agencies present this calculation for both the summer and winter season. The estimated maximum net daily emissions of ROG and NO<sub>x</sub> should be compared to the District's [thresholds of significance](#). If the maximum daily ROG or NO<sub>x</sub> emissions would exceed the thresholds of significance, in either season, then operational emissions would be considered significant, and mitigation measures would be required. For disclosure purposes, the District also recommends reporting the net change in maximum daily emission levels of PM<sub>10</sub> and PM<sub>2.5</sub> for both seasons.

## EXAMPLE PROJECT C

### DESCRIPTION

Example Project C would widen a 3-mile segment of an existing two-lane road to four lanes. The road currently accommodates an average daily traffic (ADT) of 47,000 and experiences congestion during peak hours. The posted speed limit on the roadway is 55 miles per hour (mph) but, due to congestion, the current average speed of vehicle travel on the road segment is 40 mph. When widened to four lanes, the travel speed is anticipated to increase to 55 mph and a traffic study for the project indicates that the traffic volume on the widened road segment would increase to 50,000 ADT. In addition, the traffic study determined that the net vehicle miles traveled (VMT) on other roads in the local transportation network would increase by 3,000 VMT per day.

### SCREENING ANALYSIS

The [Operational CAP Screening Levels](#) table cannot be used to evaluate transportation infrastructure projects. Therefore, the lead agency would be required to perform a detailed estimation of operational emissions for the proposed project.

## EMISSIONS QUANTIFICATION

The proposed roadway widening would result in an increase in motor vehicle activity and associated mobile-source emissions of criteria air pollutants and precursors. The increase in mobile-source emissions can be estimated using three separate model runs in URBEMIS: one to estimate the mass emissions associated with the VMT on the existing two-lane road segment, one to estimate the mass emissions generated by the projected VMT on the widened road segment, and one to estimate the mass emissions associated with the net increase in VMT on other roads in the affected roadway network.

In the opening module of the program (**Step 1: Open a New or Existing Project**) the user should select the “**Sacramento County AQMD**” geographical area. The user should uncheck the **Construction** and **Area Source** check boxes under **Project Emission Sources** in the **New Project** screen. A “dummy” land use type should be entered on the **Blank** tab of the Land Use Module. The **Unit Amt** and **Trip Rate** data fields should be adjusted to reflect the ADT on the existing roadway. For this example, one possible way to reflect the 47,000 existing ADT is to enter 1000.00 in the **Unit Amt** data field and 47.00 in the **Trip Rate** data field, using any of the three Unit Types (1000 sq. ft., acres, and other) in the **Blank** land use type. The VMT for the existing roadway segment would be the product of ADT and length of the segment (i.e., 47,000 X 3 in this case). This can be achieved by changing the **Trip Length** data fields in the **Trip Characteristics** category in the Operational Module to 3 miles. Note that URBEMIS does not use the home-based **Trip Types** for the **Blank** land use types. In the Land Use Module the **Worker Commute Trip %** data field is used to apportion the trips into the three commercial-based trip types. The user should change the **Worker Commute Trip %** data field to 100 to simplify the VMT estimation in URBEMIS. Changing this field to 100 would force URBEMIS to treat all trips as the **Commercial-based Commute** trip type, and the user can then modify the applicable **Trip Length** data field to 3 to reflect the length of the roadway segment. Alternatively, the user can change the value in the **Worker Commute Trip %** to 0 and adjust the corresponding **Trip Length** data field, in which case URBEMIS would treat all trips as the **Commercial-based Customer** trip type. The **Avg Speed** data field for the applicable trip type should be changed to correspond with the existing speed on the roadway segment, which is 40 mph. In order to be safe, the user should change the **Trip Length** for all other Trip Types to zero to ensure that they are not used by URBEMIS in the VMT and emissions estimation. After completing a model run the user can check for discrepancies in the input parameters by checking the VMT level reported by URBEMIS. In a separate URBEMIS run, the above steps should also be followed to estimate the emissions associated with the projected 50,000 ADT on the widened road segment that would travel at a speed of 55 mph.

A third URBEMIS run should be performed to estimate the mobile-source emissions associated with the net increase in VMT that would occur on other road in the local roadway network. The user should adjust the **Unit Amt**, **Trip Rate**, **Worker Commute Trip %**, and **Trip Length** data fields to reflect the VMT change. For example, assigning “1” for the **Unit Amt**, “60” for the **Trip Rate**, “100” for the

Worker Commute Trip %, and "50" for the Commercial-based Commute Trip Length would result in a VMT of 3,000. The user can use any combination of data inputs as long as the resultant VMT corresponds to the desired value. In addition, the URBEMIS default value for the Avg Speed data field should be used for the roadway network unless otherwise known.

To estimate the net increase in mobile-source emissions associated with the project, the emissions for the existing roadway segment should be subtracted from the total operational emissions for the widened roadway segment and this value should be added to the emission levels that would be generated by the net increase in VMT that would occur on other roads in the local network.

[EMFAC](#) may also be used to estimate operational emissions for transportation infrastructure projects if a more refined emissions estimate is desired and more detailed information about changes to the roadway and surrounding network are known. An analysis that uses EMFAC would be able to account for potential changes in the fleet mix, change in vehicle speeds, and changes in vehicle starts if details about these parameters are known.

In order to be conservative, the District recommends that Lead Agencies present this calculation for both the summer and winter season. The estimated net increase in maximum daily emissions of ROG and NO<sub>x</sub> should be compared to the District's [thresholds of significance](#). If the net increase in daily ROG or NO<sub>x</sub> emissions would exceed the thresholds of significance, in either season, then operational emissions would be considered significant, and mitigation measures would be required. For disclosure purposes, the District also recommends reporting the net change in maximum daily emission levels of PM<sub>10</sub> and PM<sub>2.5</sub> for both seasons.