

APPENDIX D

AIR QUALITY METHODOLOGY AND ASSUMPTIONS

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A. CALINE-4 MODELING

The CALINE-4 model is a fourth-generation line source air quality model that is based on the Gaussian diffusion equation and employs a mixing zone concept to characterize pollutant dispersion over the roadway. Given source strength, meteorology, site geometry and site characteristics, the model predicts pollutant concentrations for receptors located within 150 meters of the roadway. The CALINE-4 model allows roadways to be broken into multiple links that can vary in traffic volume, emission rates, height, width, etc..

A screening-level form of the CALINE-4 program was used to predict concentrations.¹ Normalized concentrations for each roadway size (2 lanes, 4 lanes, etc.) are adjusted for the two-way traffic volume and emission factor. Calculations were made for a receptor at a corner of the intersection, 25 feet equidistant from the two roadways.

Emission factors were derived from the California Air Resources Board EMFAC7-F computer program. An average vehicle speed of 5 MPH was used to represent conditions at an intersection. The calculation was based on peak traffic equivalent to 10% of the Average Daily Traffic (ADT).

The screening form of the CALINE-4 model calculates the local contribution of nearby roads to the total concentration. The other contribution is the background level attributed to more distant traffic. The 1-hour background level in 2015 was taken as 2.8 PPM, while the 8-hour background concentration was taken as 1.6 PPM. These backgrounds were estimated by linear rollback utilizing maximum concentrations measured in 1993 at the Woodland monitoring site and multiplying by the ratio of Yolo County CO emissions in 2010 as calculated by the BURDEN7F program to 1993 CO emissions as calculated by BURDEN7F.

Eight-hour concentrations were obtained from the 1-hour output of the CALINE-4 model using a persistence factor of 0.7.

B. AUTOMOBILE EMISSIONS CALCULATION

Estimates of regional emissions generated by project traffic were made using daily trip generation data and trip length information for the project area. The daily increase in Vehicle Miles Travelled (VMT) and daily vehicle trips resulting from the new land uses accommodated by the project was calculated as input to the emissions calculation procedure.

Daily VMT and vehicle trips were processed using a spreadsheet program and EMFAC7F² emission factors to estimate emissions from the following sources:

¹ Bay Area Air Quality Management District, Air Quality and Urban Development-Guidelines, November 1985, Revised 1991.

² California Air Resources Board, Methodology for Estimating Emissions From On-Road Vehicles Vol. 1: EMFAC7E, June 1993.