

3.8 Noise

The following section summarizes information from the Noise Technical Report for the Winchester to Temecula (WT) Corridor (LSA, 2002). Please refer to the technical report for more detailed information regarding noise in the study area.

3.8.1 Fundamentals of Noise

As transportation systems develop in an area such as the WT Corridor, the general level of noise in our day-to-day living environment rises. Sound refers to anything that is or may be perceived by the ear. Noise is usually defined as unwanted sound. Noise consists of any sound that may produce physiological or psychological damage and/or interfere with communication, work, rest, recreation, and sleep. Since the human ear is not equally sensitive to sound at all frequencies, a special frequency dependent rating scale is usually used to relate noise to human sensitivity. The A-weighted decibel scale (dBA) performs this compensation by discriminating among frequencies in a manner approximating the sensitivity of the human ear. Ambient sounds generally range from 30 dBA (very quiet) to 100 dBA (very loud).

Sound levels are generated from a source, and their decibel level decreases as the distance from that source increases. Sound dissipates exponentially with distance from the noise source. If noise is produced by a line source such as highway traffic or railroad operations, the sound decreases three decibels for each doubling of distance in a hard site environment. Line source noise in a relatively flat environment with absorptive vegetation decreases four and one-half decibels for each doubling of distance.

The predominant rating scales for human communities in the State of California are the equivalent continuous noise level (L_{eq}) and Community noise equivalent level (CNEL) based on A-weighted decibels (dBA). L_{eq} is the total sound energy of time-varying noise over a sample period and is a measurement of the sound energy averaged over a specified time period (usually one hour). L_{eq} is a one number representation of the amount of fluctuating sound level received by a receptor averaged over a specified time interval. For example, a one hour L_{eq} noise level represents the average amount of acoustic energy that occurred in that hour. Both the Federal Highway Administration (FHWA) and California Department of Transportation (Caltrans) use the hourly L_{eq} for noise impact evaluation.

CNEL is the time-varying noise over a 24 hour period, with a weighting factor applied to the hourly L_{eq} for noises occurring from 10:00 p.m. to 7:00 a.m. (defined as sleeping hours) with a weighting factor of 10 dBA, and a 5 dBA weighting factor on events occurring in the evening hours between 7 p.m. and 10 p.m. (defined as relaxation hours). Day-night average noise level (Ldn) is another 24 hour averaged noise scale. Similar to the CNEL scale, the Ldn scale has a weighting factor of 10 dBA on events occurring during the nighttime hours between 10 p.m. and 7 a.m. However, the Ldn scale does not have the adjustment for the evening hours. The CNEL and Ldn noise scales are within one dBA of each other and are usually interchangeable. The County of Riverside and cities within the County use the CNEL or Ldn noise scales for land use and noise compatibility criteria from transportation sources.

Noise impacts can be described in three categories. The first is audible impacts that refer to increases in noise levels noticeable to humans. Audible increases in noise levels generally refer to a change of 3.0 decibels (dB) or greater since this level has been found to be barely perceptible in exterior environments. The second category, potentially audible, refers to a change in the noise level between 1.0 and 3.0 dB. This range of noise levels has been found to be noticeable only in laboratory environments. The last category is changes in noise level of less than 1.0 dB that are inaudible to the human ear.

3.8.2 Federal, State, and County Policies and Procedures

3.8.2.1 Federal Standards and Guidelines

Federal Highway Administration (FHWA). The Code of Federal Regulations identifies noise standards, items to be addressed in noise analyses, noise abatement policies, use of federal funds for noise abatement, methods of traffic noise prediction, and construction noise analysis requirements.

The FHWA regulations for mitigation of highway traffic noise in the planning and design of federally aided highways are contained in 23 CFR 772. The regulations require the following during the planning and design of a highway project: (1) identification of traffic noise impacts; (2) examination of potential mitigation measures; (3) the incorporation of reasonable and feasible noise mitigation measures into the highway project; and (4) coordination with local officials to provide helpful information on compatible land use planning and control. The regulations contain noise abatement criteria which represent the upper limit of acceptable highway traffic noise for different types of land uses and human activities. The regulations do not require that the abatement criteria be met in every instance. Rather, they require that every reasonable and feasible effort be made to provide noise mitigation when the criteria are approached or exceeded. Compliance with the noise regulations is a prerequisite for the granting of Federal-aid highway funds for construction or reconstruction of a highway. Based on Highway Traffic Noise Analysis and Abatement Policy and Guidance (FHWA, 1995), traffic noise impacts and measures to mitigate adverse impacts must be identified when: 1) the predicted noise levels "approach or exceed" the Noise Abatement Criteria (NAC, see Table 3.8.A); or 2) when the predicted noise levels substantially exceed predicted noise levels without the project, and it is reasonable and feasible to mitigate.

3.8.2.2 State Standards and Guidelines

Caltrans utilizes the "Traffic Noise Analysis Protocol" and "Technical Noise Supplement" to determine noise thresholds and standards.

California Streets and Highways Code, Section 216. Section 216 of the California Streets and Highways Code relates to the noise level produced by the traffic on, or by the construction of, a state freeway measured in the classrooms, libraries, multi-purpose rooms, and spaces used for pupil personnel services of a public or private elementary or secondary school. The code states that if the interior noise level produced by freeway traffic or the construction of a freeway exceeds 52 dBA- L_{eq} , Caltrans shall undertake a noise abatement program in any such classroom, library, multi-purpose room, or space used for pupil personnel services to reduce the freeway traffic noise level therein to 52