14. Noise

This chapter describes noise in the proposed project area and evaluates the potential impacts from noise sources associated with implementing Plan Concept 1 and Plan Concept 2 of the Renewable Placer: Waste Action Plan. These two plan concepts include similar design elements, but the locations and characteristics of the elements vary between the two plans.

14.1 Environmental Setting

14.1.1 Fundamentals of Noise

Noise is generally defined as sound that is loud, disagreeable, unexpected, or unwanted. Airborne sound results from small fluctuations of air pressure above and below atmospheric pressure as perceived by the ear.

Sound and the Human Ear

Because of the ability of the human ear to detect a wide range of sound-pressure fluctuations, sound-pressure levels (SPL) are expressed in logarithmic units called decibels (dB) to avoid a very large and awkward range in numbers. The sound-pressure level in decibels is calculated by taking the log of the ratio between the actual sound pressure and the reference sound pressure (20 microPascals) squared.

Because decibels are logarithmic units, ordinary arithmetic cannot be used. Caltrans (2015) explains "a doubling of sound energy corresponds to a 3-dB increase. In other words, when two identical sources are each producing sound of the same loudness, the resulting sound level at a given distance would be 3 dB higher than one source under the same conditions. For example, if one automobile produces an SPL of 70 dB when it passes an observer, two cars passing simultaneously would not produce 140 dB—rather, they would combine to produce 73 dB. Under the decibel scale, three sources of equal loudness together produce a sound level 5 dB louder than one source." The Minnesota Pollution Control Agency's *A Guide to Noise Control in Minnesota* (2015) similarly notes that "a doubling in sound energy yields an increase of three decibels" as depicted on Figure 14-1.

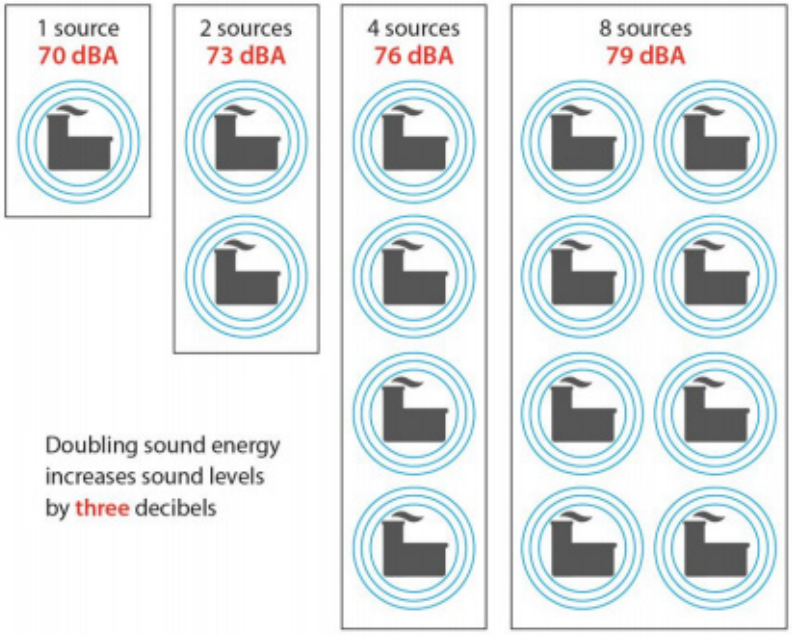


Figure 14-1. Effects of Doubling Sound Level Energy
Source: Minnesota Pollution Control Agency 2015.

The A-weighting network measures sound in a similar fashion to how a person perceives or hears typical environmental sounds, as the A-weighting approximates the frequency response of the average young ear when listening to typical community sounds. For general environmental or community sounds (for example, traffic), A-weighted decibels (dBA) yield a strong correlation with how people perceive acceptable and unacceptable sound levels. Table 14-1 presents typical A-weighted sound levels from common activities.

Table 14-1. Typical A-Weighted Noise Levels

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	— 110 —	Rock band
Jet fly-over at 1,000 feet		
	— 100 —	
Gas lawn mower at 3 feet		
	— 90 —	
Diesel truck at 50 feet at 50 mph		Food blender at 3 feet
	— 80 —	Garbage disposal at 3 feet
Noisy urban area, daytime		
Gas lawn mower, 100 feet	**— 70 —**	Vacuum cleaner at 10 feet
Commercial area		Normal speech at 3 feet
Heavy traffic at 300 feet	**— 60 —**	
		Large business office
Quiet urban daytime	**— 50 —**	Dishwasher next room
Quiet urban nighttime	**— 40 —**	Theater, large conference room (background)
Quiet suburban nighttime		
	— 30 —	Library
Quiet rural nighttime		Bedroom at night, concert hall (background)
	— 20 —	
		Broadcast or recording studio
	— 10 —	
Lowest threshold of human hearing	**— 0 —**	Lowest threshold of human hearing

Source: Caltrans 2013.
Note:
mph = mile(s) per hour

Caltrans (2015) notes,

> [U]nder controlled conditions in an acoustical laboratory, the trained, healthy human ear is able to discern 1-dB changes in sound levels, when exposed to steady, single-frequency ("pure-tone") signals in the midfrequency (1,000 Hz–8,000 Hz) range. In typical noisy environments, changes in noise of 1 to 2 dB are generally not perceptible. However, it is widely accepted that people are able to begin to detect sound level increases of 3 dB in typical noisy environments. Further, a 5-dB increase is generally perceived as a distinctly noticeable increase, and a 10-dB increase is generally perceived as a doubling of loudness. Therefore, a doubling of sound energy (e.g., doubling the volume of traffic on a highway) that would result in a 3-dB increase in sound, would generally be perceived as barely detectable.

Sound Propagation

Caltrans (2015) identifies that

> [S]ound from a localized source (i.e., a point source) propagates uniformly outward in a spherical pattern. The sound level attenuates (or decreases) at a rate of 6 decibels for each doubling of distance from a point source. Highways consist of several localized noise sources on a defined path, and hence can be treated as a line source, which approximates the effect of several point sources. Noise from a line source propagates outward in a cylindrical pattern, often referred to as cylindrical spreading. Sound levels attenuate at a rate of 3 decibels for each doubling of distance from a line source.

The surface characteristics between the source and the receptor may result in additional sound absorption or reflection. Atmospheric conditions, such as wind speed, temperature, and humidity, may affect noise levels. Furthermore, the presence of a barrier between the source and the receptor may also attenuate noise levels. Caltrans (2015) notes that "a barrier that breaks the line of sight between a source and a receptor will typically result in at least 5 dB of noise reduction. Taller barriers provide increased noise reduction."

All buildings provide some exterior-to-interior noise reduction even if the windows are open, when a 10-dBA reduction is expected. A typical light-frame building provides is noted to provide an exterior-to-interior noise reduction of 20 dBA with closed-sash windows or 25 dBA with storm windows. A masonry building with single-glazed closed windows provides a reduction of 25 dBA, whereas double-glazed provides 30 dBA (FHWA 2011, referenced in Caltrans 2013).

Noise Descriptors

The noise descriptors most often encountered when dealing with traffic, community, and environmental noise are defined as follows (Caltrans 2015):

- L_{max} (Maximum Noise Level): Lmax is the highest instantaneous sound level measured during a specified period.
- L_{eq} (Equivalent Noise Level): Leq represents an average of the sound energy occurring over a specified period. In effect, Leq is the steady-state sound level containing the same acoustical energy as the time-varying sound that actually occurs during the same period. The 1-hour A-weighted equivalent sound level (Leq[h]) is the energy average of A-weighted sound levels occurring during a 1-hour period and is the basis for noise abatement criteria used by Caltrans and Federal Highway Administration (FHWA).
- L_{dn} (Day-Night Noise Level): Ldn is the energy average of A-weighted sound levels occurring over a 24-hour period, with a 10-dB penalty applied to A-weighted sound levels occurring during nighttime hours between 10 p.m. and 7 a.m.

Effects of Noise on Humans

The effects of noise on people can be listed in three general categories:

- Subjective effects of annoyance, nuisance, and dissatisfaction
- Interference with activities such as speech, sleep, and learning
- Physiological effects such as startling and hearing loss

In most cases, environmental noise produces effects in the first two categories only. However, workers in industrial plants may experience noise effects in the third category. No completely satisfactory way exists to measure the subjective effects of noise, or to measure the corresponding reactions of annoyance and dissatisfaction. This lack of a common standard results from the wide variation in individual thresholds of annoyance and habituation to noise.

Vibration.

Vibration is the periodic oscillation of a medium or object, which may be directly felt or in some cases heard if the vibration induces rattling. Sources of ground-borne vibrations (include natural phenomena (such as earthquakes, volcanic eruptions, sea waves, landslides) or human-made causes (such as explosions, machinery, traffic, trains, construction equipment).

Figure 14-2 illustrates common ground-borne vibration sources and the human and structural response ranging from approximately 50 vibration decibels (VdB) (typical background vibration) to 100 VdB (threshold of risk of minor potential cosmetic damage for fragile buildings). Difficulty completing tasks, noted as reading on a computer screen, occurs at 90 VdB (FTA 2018).

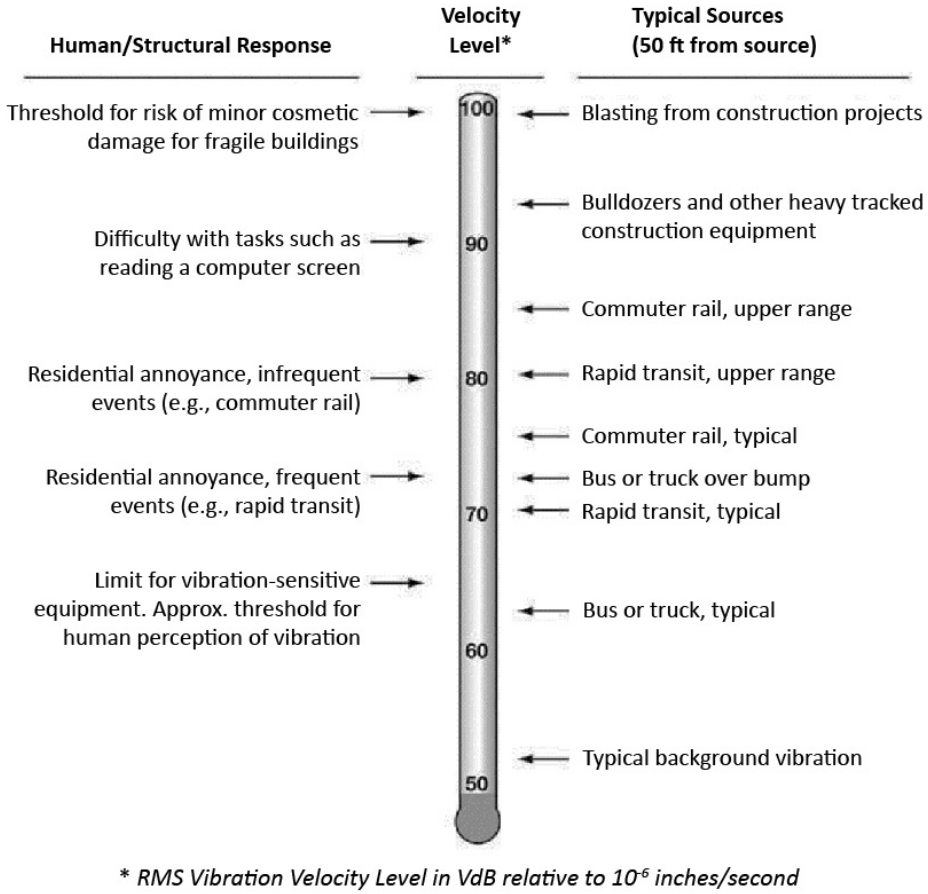


Figure 14-2. Typical Levels of Ground-Borne Vibration
Source: FTA 2018.

For most projects, the highest levels of vibration occur during construction and assessment to evaluate the potential damage to nearby buildings. The California Department of Transportation's recent *Transportation and Construction Vibration Guidance Manual* (2020) notes, "There are no Caltrans or Federal Highway Administration standards for vibration and it is not the purpose of this manual to set standards." Rather, agencies such as Caltrans provide "a synthesis of these criteria that can be used to evaluate the potential for damage and annoyance from vibration-generating activities." The Federal Transit Administration's *Transit Noise and Vibration Impact Assessment Manual* (2018) establishes construction damage criteria in terms of peak particle velocity (PPV). These criteria are presented in Table 14-2 and range from a threshold 0.12 inch per second (in/sec) for "buildings extremely susceptible to vibration damage" to 0.5 in/sec for "reinforced concrete, steel or timber (no plaster)" (FTA 2018). These limits and building categories align with Caltrans' (2020) summary of the Swiss Association of Standardization Vibration Damage Criteria for continuous sources. The Swiss criteria provide additional details regarding the building category and provide a single event limit. These additions are noted in italics in Table 14-2.

Table 14-2. FTA Construction Vibration Damage Criteria

Building Category	PPV (in/sec)	*Single Event PPV (in/sec)*
1. Reinforced concrete, steel, or timber (no plaster) *(buildings in steel or reinforced concrete, such as factories, retaining walls, bridges, steel towers, open channels, underground chambers and tunnels with and without concrete alignment)*	0.5	*1.2*
2. Engineered concrete and masonry (no plaster) *(buildings with foundation walls and floors in concrete, walls in concrete or masonry, stone masonry retaining walls, underground chambers and tunnels with masonry alignments, conduits in loose material)*	0.3	*0.7*
3. Nonengineered timber and masonry buildings *(buildings as mentioned previously but with wooden ceilings and walls in masonry)*	0.2	*0.5*
4. Buildings extremely susceptible to vibration damage *(construction very sensitive to vibration; objects of historic interest)*	0.12	*0.3*

Note: *Italics* are from Caltrans (2020) summary of Swiss Vibration Damage Criteria.

Caltrans (2020) also notes that "in most cases, vibration induced by typical construction equipment does not result in adverse effects on people or structures. Noise from the equipment typically overshadows any meaningful ground vibration effects on people."

The criteria given in Section 6.2 of the FTA Manual for general vibration assessment may be used to assess annoyance or interference with vibration-sensitive activities caused by vibration. Sensitive land use categories for vibration assessment are presented in Table 14-3 (adapted from FTA Manual Table 6-1).

Table 14-3. Land Use Categories for Vibration Assessment

Land Use Category	Land Use Type	Description of Land Use Category
-	Special Buildings	This category includes special-use facilities that are very sensitive to vibration and noise that are not included in the other categories listed in this table and require special consideration. However, if the building will rarely be occupied when the source of the vibration (for example, a train) is operating, there is no need to evaluate for impact. Examples of these facilities include concert halls, TV and recording studios, and theaters.
1	High Sensitivity	This category includes buildings where vibration levels, including those below the threshold of human annoyance, would interfere with operations within the building. Examples include buildings where vibration-sensitive research and manufacturing[a] is conducted, hospitals with vibration-sensitive equipment, and universities conducting physical research operations. The building's degree of sensitivity to vibration is dependent on the specific equipment that will be affected by the vibration. Equipment moderately sensitive to vibration, such as high-resolution lithographic equipment, optical microscopes, and electron microscopes with vibration isolation systems, are included in this category.[b] For equipment that is more sensitive, a Detailed Vibration Analysis must be conducted.
2	Residential	This category includes all residential land use and buildings where people normally sleep, such as hotels and hospitals. Transit-generated ground-borne vibration and noise from subways or surface-running trains are considered to have a similar effect on receivers.[c]
3	Institutional	This category includes institutions and offices that have vibration-sensitive equipment and have the potential for activity interference such as schools, churches, doctors' offices. Commercial or industrial locations, including office buildings, are not included in this category unless there is vibration-sensitive activity or equipment within the building. As with noise, the use of the building determines the vibration sensitivity.

[a] Manufacturing of computer chips is an example of a vibration-sensitive process.

[b] Standard optical microscopes can be affected at vibration levels below the threshold of human annoyance.

[c] Even in noisy urban areas, the bedrooms will often be in quiet buildings with effective noise insulation. However, ground-borne vibration and noise are experienced indoors, and building occupants have practically no means of reducing their exposure. Therefore, occupants in noisy urban areas are just as likely to be exposed to ground-borne vibration and noise as those in quiet suburban areas.

Indoor ground-borne vibration impact criteria are provided for each land use category according to the frequency of the event as provided in Table 14-4. Ground-borne vibration impact criteria range from 65 VdB for any event adjacent to buildings where vibration would interfere with interior operations, which, based on the FTA Manual Table 5-5, is also the approximate threshold of perception for many humans, to 83 VdB for infrequent events occurring adjacent to institutional land uses with primarily daytime use.

Table 14-4. Indoor Ground-Borne Vibration Impact Criteria for General Vibration Assessment

Land Use Category	Ground-Borne Vibration Impact Levels (VdB re 1 µin/sec)		
	Frequent Events[a]	Occasional Events[b]	Infrequent Events[c]
Category 1: Buildings where vibration would interfere with interior operations	65 VdB[d]	65 VdB[d]	65 VdB[d]
Category 2: Residences and buildings where people normally sleep	72 VdB	75 VdB	80 VdB
Category 3: Institutional land uses with primarily daytime use	75 VdB	78 VdB	83 VdB

Source: FTA Manual Tables 6-2 and 6-3.

[a] Frequent events are defined as more than 70 events per day.

[b] Occasional events are defined as between 30 and 70 events per day.

[c] Infrequent events are defined as fewer than 30 events per day.

[d] This criterion limit is based on levels that are acceptable for most moderately sensitive equipment, such as optical microscopes. Vibration-sensitive manufacturing or research will require detailed evaluation to define the acceptable vibration levels. Limiting vibration levels in a building often requires special design of the heating, ventilation, and air conditioning (HVAC) systems and stiffened floors.

Notes:

FTA does not establish criteria that consider the number of days events occur.

µin/sec = microinch(es) per second

14.1.2 Local and Regional Noise Setting

As depicted on Figure 14-3, the project site is surrounded by agricultural lands. These surrounding lands are primarily used for cattle grazing and dry farming (fodder). Industrial uses (for example, batch plant, trucking facility, aggregate facilities, wood pallet reclamation) are approximately 1,200 feet to the east of center property and immediately to the east of the eastern property on Athens Avenue. Other than the WRSL, the project site and surrounding lands are relatively flat.

An existing caretaker residence is located on the project site directly west of the intersection of Athens Avenue and Fiddyment Road within the western property. The caretaker within this residence is responsible for the leased agricultural lands on the western property south of Athens Avenue owned by the Western Placer Waste Management Authority (WPWMA).

The closest existing offsite residence is located over 5,000 feet northwest of the existing Material Recovery Facility (MRF) and 1,300 feet west of the western property (as shown on Figure 14-3). Additional isolated residences (shown on Figure 14-3) are located farther to the west on lands designated in the Sunset Area Plan (SAP) as Urban Reserve. Existing residential neighborhoods are located 1.5 miles and 1 mile to the west and south, respectively, of the project site. No other sensitive noise receptors are located within 1 mile of the project site. The Thunder Valley Casino Resort is located approximately 2 miles to the east of the project site, and the nearest airport, the Lincoln Regional Airport, is located approximately 4.5 miles to the north.

The existing noise environment within the project vicinity is influenced by surface transportation noise emanating from vehicular traffic on Fiddyment Road and Athens Avenue. Traffic on these roadways is generated from the industrial uses within the project vicinity, including the WPWMA's facility as well as local traffic traveling between Roseville, Lincoln, and State Route 65.

14.1.3 Local Noise Sources

The WPWMA uses the 314-acre center property for solid waste management activities. The WPWMA facility is open 365 days per year to receive waste materials. Waste Recovery includes MRF operations, compost operations, construction and demolition (C&D) waste operations, public waste drop-off area operations, and household hazardous waste facility operations. Waste Recovery operations are permitted to receive waste and recyclable materials from 6:00 a.m. to 7:30 p.m., Monday through Saturday, and from 6:00 a.m. to 5:00 p.m. on Sundays and designated holidays. Permitted material processing hours are from 6:00 a.m. to 11:30 p.m., Monday through Sunday. Additional facility maintenance and cleanup work may take place from 4:00 p.m. to 6:00 a.m., Monday through Sunday.

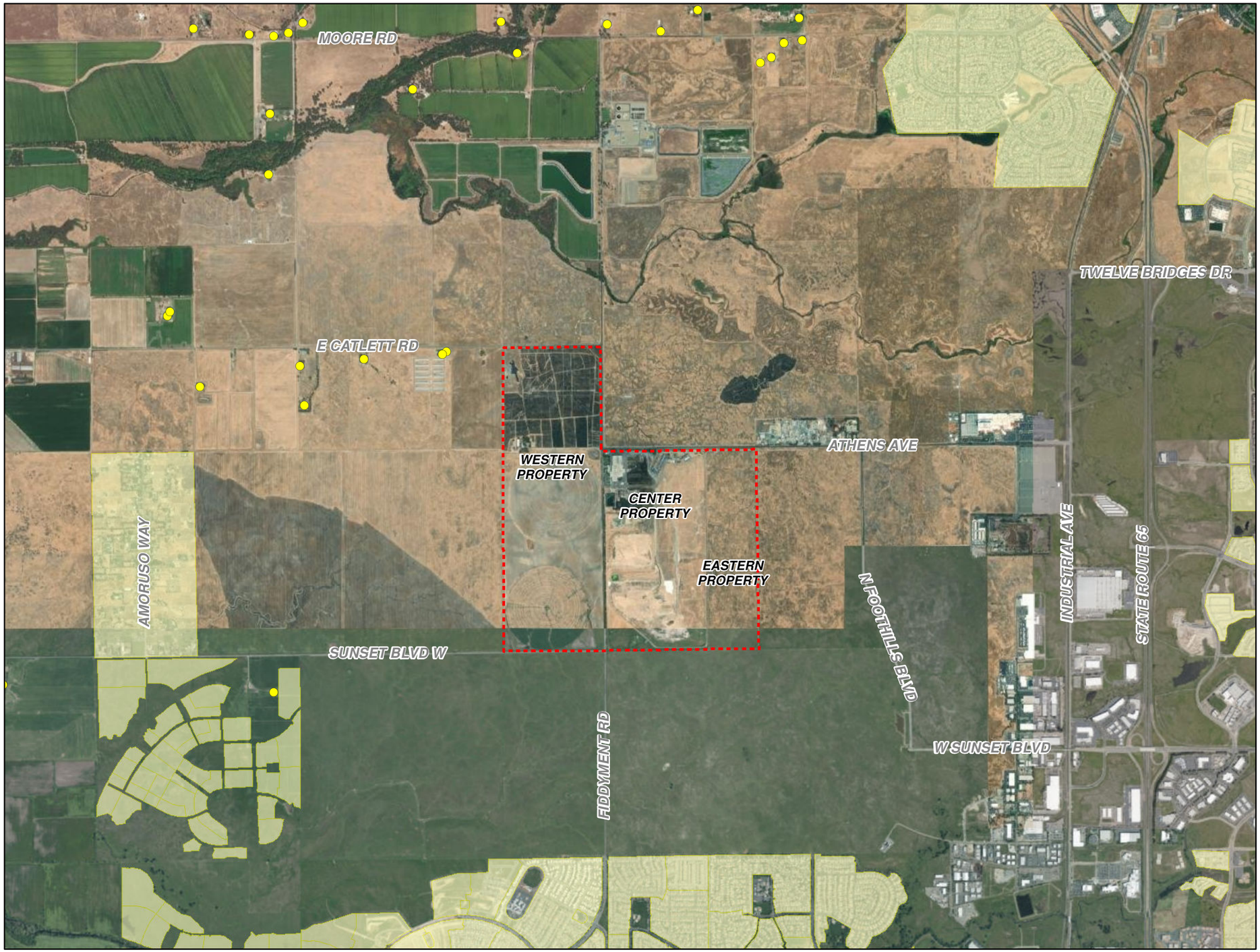
Waste Disposal operations comprise operation of the Western Regional Sanitary Landfill (WRSL) and receipt of inert materials. The WRSL is permitted to receive and dispose of materials from Monday through Saturday, 7:00 a.m. to 7:30 p.m., and Sunday from 8:00 a.m. to 5:00 p.m. Ancillary operations, including equipment servicing and startup, removal of temporary daily cover material, and preparation of the daily cell to receive waste, are allowed to occur between 6:00 a.m. and 7:00 a.m., Monday through Saturday, and between 7:00 a.m. and 8:00 a.m. on Sunday. Other onsite operations, such as application of daily cover and landfill-related construction, may extend to 8:30 p.m.

Primary noise-producing activities on the center property are summarized as follows:

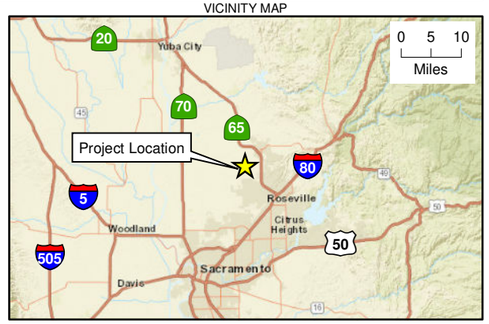
Material Recovery Facility Building Operation – The majority of the residential and commercial solid waste received at the WPWMA facility is sent directly to the MRF building for processing. Noise is produced by equipment operation, including front-end loaders, walking floor pit conveyors, material bailers, and from waste processing equipment. Noise is also generated from vehicles delivering materials to the MRF, backing up (that is, backup alarms), tipping waste, and exiting the MRF building and site. Although the MRF has open doors for vehicle access, the majority of the building is enclosed, which minimizes offsite noise propagation.

Organics Management Operation – The organics management operation consists of composting green waste from commercial and residential haulers (with a small amount of food waste received as part of a pilot-level study). Noise is produced from the vehicles delivering and tipping materials at the site; by chipping and grinding operations, using mobile equipment located on concrete pads; and by operation of a diesel-powered windrow turner or loader.

Construction and Demolition Materials Processing Operation – C&D materials processing operations include two distinct areas: the C&D operation area (that includes a covered receiving area and a C&D materials processing line) and the inerts area. At the C&D materials processing area, material is delivered and sorted to recover salvageable items, and non-recovered materials and fines are transported to the WRSL for disposal and use as alternative daily cover. Noise is produced by trucks delivering material and transporting materials to the WRSL, and by equipment such as front-end loaders, the walking floor pit conveyor, and the process line. Noise may also result from crushing or grinding of various inert materials for reuse onsite.



VICINITY MAP



LEGEND

- Project Boundary
- Residence
- Residentially Zoned

N

0 0.5 1
Miles

Figure 14-3. Location of Existing Residences
Draft Environmental Impact Report
Renewable Placer: Waste Action Plan
Placer County, California

Jacobs

Public Waste Drop-off Area – The public waste drop-off area currently accepts municipal solid waste, C&D, electronic wastes, household hazardous waste, tires, and appliances. Noise is produced from the vehicles delivering and tipping materials within the drop-off area and transporting these materials to other areas of the site for processing.

WRSL Operation – Of the tonnage delivered to the WRSL for disposal, a significant portion first goes through the MRF building, with some tonnage that is direct haul to the landfill. Noise is produced by trucks carrying waste material to the landfill working face and equipment used to spread and compact the waste and place daily cover.

The western and eastern properties are generally not sources of noise other than the noise generated by model airplanes flown by a model airplane club that leases space within the northern portion of the western property from the WPWMA.

14.2 Regulatory Setting

14.2.1 Federal

While there are no federal regulations that limit overall environmental noise levels, federal guidance documents address environmental noise and regulations for specific sources (for example, aircraft or federally funded highways). No federal noise limits are applicable to this project.

14.2.2 State

The California Division of Occupational Safety and Health, better known as Cal/OSHA, has established standards that address occupational noise exposure. The State of California has not established community or environmental noise limits. Instead, *California Government Code* Section 65302 requires that each county and city prepare and adopt a comprehensive long-range general plan; Section 65302(f) requires a noise element to be included in the general plan.

14.2.3 Local

The WPWMA is a Joint Powers Authority (JPA) composed of Placer County and the cities of Lincoln, Rocklin, and Roseville to own and operate a regional recycling facility and sanitary landfill. As a JPA, the WPWMA considers local regulations and consults with local agencies, but the County and city regulations are not applicable, because the County and cities do not have jurisdiction over the proposed project. Accordingly, the following discussion of local goals and policies associated with noise is provided for informational purposes only. Although the WPWMA is an independent government agency that is not required to comply with the County's policies, the WPWMA intends to implement a proposed project that is generally consistent with these policies.

Placer County General Plan

The Noise Element of the Placer County General Plan (Placer County 2013) establishes noise goals and policies for land uses within the County. The relevant portions of goals 9.B, 1.E, 1.N, and 9.A and the associated policies are summarized in the following sections with portions particularly relevant to the WPWMA's establishment of noise impact significance thresholds included in **bold**.

Goal 9.B: To ensure that areas designated for industrial uses pursuant to Goal 1.E. and Policy 1.E.1. are protected from encroachment by noise-sensitive land uses.

Policies:

9.B.1. The County shall require that new noise-sensitive land uses established next to existing industrial areas be responsible for self-mitigating noise impacts from industrial activities.

9.B.2. The County shall apply noise standards in a manner consistent with encouraging the retention, expansion, and development of new businesses pursuant to Goal 1.N. and Policy 1.N.2.

9.B.3. Because many industrial activities and processes necessarily produce noise which will likely be objectionable to nearby non-industrial land uses, existing and potential future industrial noise emissions shall be accommodated in all land use decisions.

Goal 1.E: To designate adequate land for and promote development of industrial uses to meet the present and future needs of Placer County residents for jobs and maintain economic vitality.

Policy 1.E.1. The County shall only approve new industrial development that has the following characteristics:

- Sufficient buffering from residential areas to avoid impacts associated with noise, odors and the potential release of hazardous materials
- Minimal significant adverse environmental impacts

Goal 1.N: To maintain a healthy and diverse local economy that meets the present and future employment, shopping, recreational, public safety, and service needs of Placer County residents and to expand the economic base to better serve the needs of residents.

Policy 1.N.2. The County shall encourage the retention, expansion and development of new businesses, especially those that provide primary wage-earner jobs, by designating adequate land and providing infrastructure in areas where resources and public facilities and services can accommodate employment generators.

Goal 9.A identifies the following goal: "To protect County residents from the harmful and annoying effects of exposure to excessive noise" and establishes additional policies, including the following:

9.A.1. New development of noise-sensitive uses shall not be permitted where the noise level due to non-transportation noise sources will exceed the noise level standards of Table 9-1 as measured immediately within the property line of the new development, unless effective noise mitigation measures have been incorporated into the development design to achieve the standards specified in Table 9-1 [reproduced in this document as Table 14-5].

9.A.2. Noise created by new proposed non-transportation noise sources shall be mitigated so as not to exceed the noise level standards of Table 9-1 [reproduced in this document as Table 14-5] as measured immediately within the property line of lands designated for noise-sensitive uses, provided, however, the noise created by occasional events occurring within a stadium on land zoned for university purposes may temporarily exceed these standards as provided in an approved Specific Plan.

9.A.3. The County shall continue to enforce the State Noise Insulation Standards (*California Code of Regulations*, Title 24) of the *California Building Code* and *Placer County Code* Article 9.36, Noise.

Table 14-5. Allowable Ldn Noise Levels within Specified Zone Districts[a]

Zone District of Receptor	Property Line of Receiving Use	Interior Spaces[b]
Residential Adjacent to Industrial[c]	60	45
Other Residential[d]	50	45
Office or Professional	70	45
Transient Lodging	65	45
Neighborhood Commercial	70	45
General Commercial	70	45
Heavy Commercial	75	45
Limited Industrial	75	45
Highway Service	75	45
Shopping Center	70	45
Industrial	--	45
Industrial Park	75	45
Industrial Reserve	--	--
Airport	--	45
Unclassified	--	--
Farm	(see footnote e)	--
Agriculture Exclusive	(see footnote e)	--
Forestry	--	--
Timberland Preserve	--	--
Recreation & Forestry	70	--
Open Space	--	--
Mineral Reserve	--	--

[a] Overriding policy on interpretation of allowable noise levels: Industrial-zoned properties are confined to unique areas of the County and are irreplaceable. Industries which provide primary wage-earner jobs in the County, if forced to relocate, will likely be forced to leave the County. For this reason, industries operating upon industrial zoned properties must be afforded reasonable opportunity to exercise the rights/privileges conferred upon them [by] their zoning. Whenever the allowable noise levels herein fall subject to interpretation relative to industrial activities, the benefit of the doubt shall be afforded to the industrial use.

Where an industrial use is subject to infrequent and unplanned upset or breakdown of operations resulting in increased noise emissions, where such upsets and breakdowns are reasonable considering the type of industry, and where the industrial use exercises due diligence in preventing as well as correcting such upsets and breakdowns, noise generated during such upsets and breakdowns shall not be included in calculations to determine conformance with allowable noise levels.

[b] Interior spaces are defined as any locations where some degree of noise-sensitivity exists. Examples include all habitable rooms of residences, and areas where communication and speech intelligibility are essential, such as classrooms and offices.

[c] Noise from industrial operations may be difficult to mitigate in a cost-effective manner. In recognition of this fact, the exterior noise standards for residential zone districts immediately adjacent to industrial, limited industrial, industrial park, and industrial reserve zone districts have been increased by 10 dB as compared to residential districts adjacent to other land uses.

For purposes of the Noise Element, residential zone districts are defined to include the following zoning classifications: AR, R-1, R-2, R-3, FR, RP, TR-1, TR-2, TR-3, and TR-4.

[d] Where a residential zone district is located within an [Special Purpose] (-SP) combining district, the exterior noise level standards are applied at the outer boundary of the -SP district. If an existing industrial operation within an -SP district is expanded or modified, the noise level standards at the outer boundary of the -SP district may be increased as described above in these standards.

Where a new residential use is proposed in an -SP zone, an Administrative Review Permit is required, which may require mitigation measures at the residence for noise levels existing and/or allowed by use permit as described under "Notes" above, in these standards.

[e] Normally, agricultural uses are noise insensitive and will be treated in this way. However, conflicts with agricultural noise emissions can occur where single-family residences exist within agricultural zone districts. Therefore, where effects of agricultural noise upon residences located in these agricultural zones is a concern, an Ldn of 70 dBA will be considered acceptable outdoor exposure at a residence.

Applicable to new projects affected by or including nontransportation noise sources.

- Except where noted otherwise, noise exposures will be those which occur at the property line of the receiving use.
- Where existing transportation noise levels exceed the standards of this table, the allowable Ldn shall be raised to the same level as that of the ambient level.
- If the noise source generated by, or affecting, the uses shown above consists primarily of speech or music, of if the noise source is impulsive in nature, the noise standards shown above shall be decreased by 5 dB.
- Where a use permit has established noise level standards for an existing use, those standards shall supersede the levels specified in Table 9-1 [reproduced here as Table 14-5] and Table 9-3 [not included in this section]. **Similarly, where an existing use that is not subject to a use permit causes noise in excess of the allowable levels in Table 9-1 [reproduced here as Table 14-5] and Table 9-3 [not included in this section], said excess noise shall be considered the allowable level.** If a new development is proposed which will be affected by noise from such an existing use, it will ordinarily be assumed that the noise levels already existing or those levels allowed by the existing use permit, whichever are greater, are those levels actually produced by the existing use.
- **Existing industry located in industrial zones will be given the benefit of the doubt in being allowed to emit increased noise consistent with the state of the art[40] at the time of expansion. In no case will expansion of an existing industrial operation because to decrease allowable noise emission limits. Increased emissions above those normally allowable should be limited to a one-time 5-dB increase at the discretion of the decision-making body.**
- **The noise level standards applicable to land uses containing incidental residential uses, such as caretaker dwellings at industrial facilities and homes on agriculturally zoned land, shall be the standards applicable to the zone district, not those applicable to residential uses.**
- Where no noise level standards have been provided for a specific zone district, it is assumed that the interior and/or exterior spaces of these uses are effectively insensitive to noise.

Placer County Noise Ordinance

Section 9.36 of the *Placer County Code* establishes a noise ordinance; Section 9.36.60 (A) states that "It is unlawful for any person at any location to create any sound, or to allow the creation of any sound, on property owned, leased, occupied or otherwise controlled by such person that:

1) Causes the exterior sound level when measured at the property line of any affected sensitive receptor to exceed the ambient sound level by five dBA; or
2) Exceeds the sound level standards as set forth in Table 1 [reproduced here as Table 14-6], whichever is the greater."

[40] *State of the art* should include the use of modern equipment with lower noise emissions, site design, and plant orientation to mitigate offsite noise impacts, and similar methodology.

Table 14-6. Sound Level Standards (Onsite)

Sound Level Descriptor	Daytime (7 a.m. to 10 p.m.)	Nighttime (10 p.m. to 7 a.m.)
Hourly Leq, dB	55	45
Maximum level, (Lmax) dB	70	65

Source: Placer County 2013.

Section 9.36.60 B states that "[e]ach of the sound level standards specified in [Table 14-7] shall be reduced by five dB for simple tone noises, consisting of speech and music." **However, in no case shall the sound level standard be lower than the ambient sound level plus 5 dB.**

Sensitive receptors are defined as "a land use in which there is a reasonable degree of sensitivity to noise. Such uses include single-family and multi-family residential uses, frequently used outbuildings, schools, hospitals, churches, rest homes, cemeteries, public libraries and other sensitive uses as determined by the enforcement officer."

Exemptions are provided in Section 9.36.030, which exempt construction as noted:

> Construction (e.g., construction, alteration or repair activities) between the hours of six a.m. and eight p.m. Monday through Friday, and between the hours of eight a.m. and eight p.m. Saturday and Sunday, [p]rovided, however, that all construction equipment shall be fitted with factory installed muffling devices and that all construction equipment shall be maintained in good working order.

Sunset Area Plan

The SAP contains the following specific goals and policies related to noise:

GOAL N-1: To protect County residents, employees, and visitors from the harmful and annoying effects of exposure to excessive noise.

> Policy N-1.1: Noise-Sensitive Uses. The County shall require discretionary development that includes noise-sensitive uses to incorporate effective noise mitigation measures into the development design to achieve the standards specified in Table 6-1 [reproduced here as Table 14-7].
>
> Policy N-1.2: Industrial Noise Considerations. Because many industrial activities and processes necessarily produce noise which could be objectionable to nearby non-industrial land uses, existing and potential future industrial noise shall be considered in all land use decisions in the Sunset Area and in the unincorporated areas outside of the Plan Area.
>
> Policy N-1.3: Non-Residential Noise Levels. Where proposed new, non-residential discretionary development has the potential to produce noise levels exceeding the performance standards of Table 6-1 [reproduced here as Table 14-6] for existing or planned noise-sensitive uses, the County shall require submission of an acoustical analysis as part of the environmental review process so that noise mitigation may be included in the project design. The requirements for the content of an acoustical analysis are listed in Table 6-2 [see Policy N-1.6, Acoustical Analysis].

Policy N-1.4: Acoustical Analysis. Where noise-sensitive land uses are proposed in areas exposed to existing or projected exterior noise levels exceeding levels specified in Table 6-3 or the performance standards of Table 6-1 [reproduced here as Table 14-7], the County shall require submission of an acoustical analysis consistent with requirements of this policy (included below) as part of the environmental review process so that noise mitigation may be included in the project design. At the discretion of the County, the requirement for an acoustical analysis may be waived provided that all of the following conditions are satisfied:

a) The development is for less than 10,000 square feet of total gross floor area;

The noise source in question consists of a single roadway or railroad for which up-to-date noise exposure information is available. An acoustical analysis will be required when the noise sources in question is a stationary noise source, or when the noise source consists of multiple transportation noise sources;

The existing or projected future noise exposure at the exterior of buildings which will contain noise-sensitive uses or within proposed outdoor activity areas does not exceed 65 dB Ldn/[Community Noise Equivalent Level] CNEL prior to mitigation;

The topography in the project area is essentially flat (i.e., noise source and receiving land use are the same grade); and

Effective noise mitigation, as determined by the County, is incorporated into the project design to reduce noise exposure levels specified in Table 6-1 [reproduced here as Table 14-7] or Table 6-3. Such measures may include the use of building setbacks, building orientation, noise barriers, and the standard noise mitigations contained in the Placer County Acoustical Design Manual. If closed windows are required for compliance with interior noise level standards, air conditioning or mechanical ventilations systems will be required.

Table 14-7. Allowable Noise Levels within Specified Zone Districts

Receptor Zone District	Noise Level (Ldn) at the Property Line of Receiving Use	Interior Spaces[a]
Farm (F) with a residence	70[b]	45
Farm (F) without a residence	Footnote c	Footnote c
Open Space (O)	Footnote c	Footnote c
General Commercial (C)	70	45
Highway Services (HS)	75	45
Office and Professional (OP)	70	45
Industrial Park (IP)	75	45
Industrial (I)	Footnote c	Footnote c
Business Park (BP)	70	45

Policy N-1.5: Noise Barriers. Where noise mitigation measures are required to achieve the standards of Table 6-1 reproduced here as Table 14-7] and 6-3, such measures shall focus on site planning and project

design. The use of noise barriers shall be considered as a means for achieving the noise standards only after all other practical design-related noise mitigation measures have been integrated into the project.

Policy N-1.6: Noise Exposure to Existing Sensitive Receptors. The County shall require proposed new stationary noise sources to be located a sufficient distance from sensitive receptors, such as residential uses, schools, parks, hospitals, and day care facilities. Minimum siting distance from sensitive receptors shall be as follows:

a) New loading dock or commercial delivery sources: 1,836 feet
b) New HVAC units: 440 feet
c) New mechanical generators: 500 feet
d) New parking lots: 50 feet
e) New overhead transmission lines and substations: 35 feet

If the above siting requirements cannot be achieved because of specific building locations or other site-specific constraints, the project applicant shall conform to the County's Noise Mitigation Guidelines.

14.3 Impact Analysis and Mitigation Measures

14.3.1 Thresholds of Significance

The thresholds of significance for assessing noise impacts originate from the California Environmental Quality Act Environmental Checklist but are more specifically defined based on local noise policies and regulations.

- Generation of a substantial temporary increase in ambient noise levels near the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies. The applicable standard for temporary, construction-related noise is established in the *Placer County Noise Ordinance*, which exempts construction noise that occurs outside of the hours of 6:00 a.m. to 8:00 p.m., Monday through Friday, and 8:00 a.m. to 8:00 p.m., Saturday and Sunday (Section 9.36.030).
- Generation of a substantial permanent increase in ambient noise levels near the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies. The applicable standards for a permanent increase in ambient noise levels are established in the Noise Element of the *Placer County General Plan*, the *Placer County Noise Ordinance*, and the noise policies of the SAP. For existing residences located on lands designated as Urban Reserve, the threshold is the greater of 70 L_{dn} at the property line of the receiving use, as specified for Farms with a residence in the SAP EIR (Table 14-7), or 5 dB above the existing ambient noise level, according to the Placer County General Plan and *Placer County Noise Ordinance* Section 9.36.60 (B). For existing residences located within residential-zoned areas, the threshold is the greater of 50 L_{dn} at the property line of the receiving use, according to the Placer County General Plan, or 5 dB above the existing ambient noise level, according to the Placer County General Plan and *Placer County Noise Ordinance* Section 9.36.60 (B).
- Generation of excessive ground-borne vibration or ground-borne noise levels in excess of 0.2 in/sec PPV or 80 VdB consistent with the residential criteria established by FTA (2018).

14.3.2 Impacts

This section describes the noise impacts associated with the two plan concepts, mitigation measures for identified significant impacts, and the level of impact significance following implementation of the identified mitigation measures.

IMPACT 14-1	**Construction Activity Noise Impacts**. Construction activities would result in temporary increases in ambient noise levels within the project vicinity. As specified in the *Placer County Noise Ordinance*, construction noise impacts that occur during acceptable hours are exempt from the Ordinance's noise level limits. Therefore, noise generated from construction activities would result in a **less-than-significant** impact on adjacent land uses.

Plan Concept 1

Construction activities associated with project implementation would result in temporary increases in ambient noise levels within the project vicinity. Construction of the following facilities would be expected to generate temporary construction noise impacts:

- Expanded and redesigned organics management operation
- Expanded and redesigned C&D materials processing operation
- Expanded and redesigned public waste drop-off area
- Additional landfill modules, including environmental monitoring and control systems
- Excavation of existing solid waste
- Stormwater ponds
- Road crossings
- Maintenance facility
- Administration building with education center and parking
- Upgraded entrance facilities, including site access and scale house
- Paved site entrance to western property
- Wastewater and fire protection lines
- Landscaping and fencing
- 300,000 square feet of building plus exterior infrastructure for industrial uses associated with complementary project elements

In addition, up to an additional 1.6 million square feet of industrial uses associated with the complementary and programmatic elements are considered programmatically.

Construction activities would occur over the life of the project as individual components are needed. Because of the WPWMA's resource and management constraints, the construction of multiple large-scale facility components would not typically occur in a single year.

Construction for buildings and the majority of the solid waste management and support facilities would include grading, clearing, and excavation associated with the site preparation phase; demolition of existing

concrete pads; pouring foundations and paving; building erection; infrastructure construction; and the application of architectural coatings, in addition to other miscellaneous activities. For the landfill modules and closure activities, construction would include excavating native soil, stockpiling excavated soil, installing a composite liner, installing a leachate collection and removal system prior to the modules use for waste disposal, and eventually placing final soil cover. The onsite equipment necessary for construction is anticipated to include scrapers, excavators, loaders, backhoes, haul trucks, and other miscellaneous construction equipment. Typical operating cycles may involve 2 minutes of full power followed by 3 to 4 minutes at lower settings. Construction associated with the complementary elements (considered both project and programmatically) would be similar in scope to those required for the solid waste and support facilities.

Noise would also be generated during the construction phase by increased truck traffic on the site. This would include onsite truck traffic associated with the transport of heavy materials and equipment to and from internal construction sites and the movement of heavy equipment within the construction site.

Noise levels from heavy equipment operations are provided in FHWA's *Roadway Construction Noise Model* (FHWA 2006) and the FTA's *Transit Noise and Vibration Impact Assessment Manual* (FTA 2018). The data represent the most recent and comprehensive tabulation of noise from common pieces of heavy equipment. Construction equipment noise levels are presented in Table 14-8.

Table 14-8. Construction Equipment Noise Levels

Equipment	Typical Noise Level 50 feet from Source, dBA	Equipment	Typical Noise Level 50 feet from Source, dBA
Air Compressor	80	Loader	80
Backhoe	80	Paver	85
Ballast Equalizer	82	Pneumatic Tool	85
Ballast Tamper	83	Pump	77
Compactor	82	Rail Saw	90
Concrete Mixer	85	Roller	85
Concrete Pump	82	Saw	76
Concrete Vibrator	76	Scarifier	83
Crane, Derrick	88	Scraper	85
Crane, Mobile	83	Shovel	82
Dozer	85	Truck	84
Generator	82	Impact Wrench	85
Grader	85	Jack Hammer	88

Source: FTA 2018.

During the project construction phases, noise from construction activities would contribute to the noise environment in the immediate project vicinity. Construction activities would be of short duration but would occur intermittently throughout the life of the facility operations.

The equipment noise levels presented in Table 14-8 indicate that the loudest construction equipment generally emits noise in the range of 80 dBA to 90 dBA at 50 feet. Noise at any specific receptor is dominated by the closest and loudest equipment. The types, numbers, and duration of equipment anticipated to be used near any specific receptor location will vary over time. A typical noise estimate was developed based on the general assumption of multiple pieces of loud equipment operating near each other. Specifically, the scenario evaluated uses five pieces of general construction equipment working near each other, as follows:

- One piece of equipment generating a reference noise level of 85 dBA at 50 feet at the edge of the construction or work area.
- Two pieces of equipment generating reference noise levels of 85 dBA located 50 feet farther away from the edge of construction or work area.
- Two more pieces of equipment generating reference noise levels of 85 dBA located 100 feet farther away from the edge of construction or work area.
- Usage factor (Adj_{usage}) is 1 (that is, equipment is operating continuously).
- Ground effect factor (G) is 0, representing hard ground (that is, a ground condition that does not result in additional attenuation).

Expected average construction noise levels at various distances, based on this conservative scenario, are presented in Table 14-9. Figure 14-4 includes a graphic representation of how these noise levels decrease with distance.

Table 14-9. Average Construction Noise Levels versus Distance

Distance from Activity (feet)	Average Noise Level (dBA)
50	87
100	83
200	78
400	73
800	67
1,600	62
3,200	56

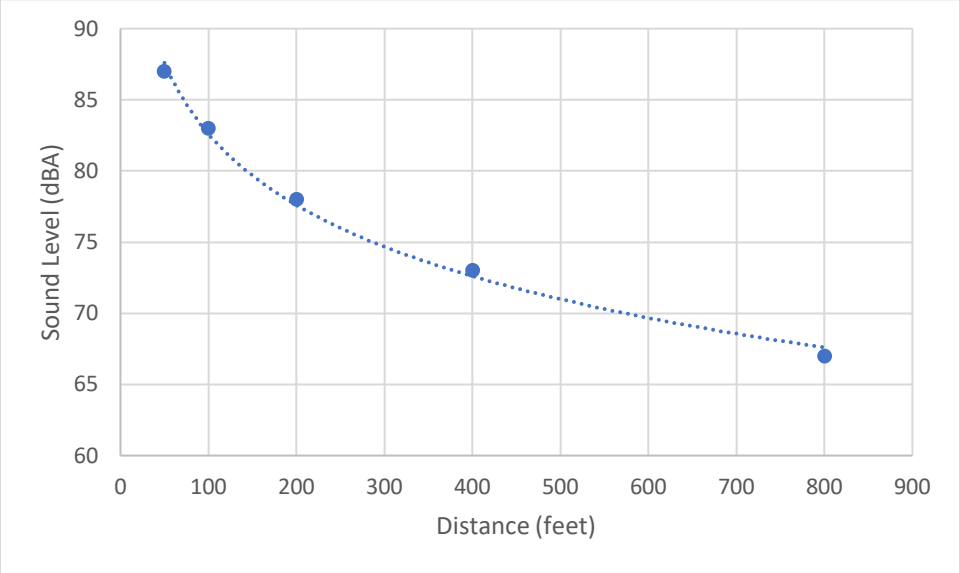


Figure 14-4. Plot of Sound Level versus Distance

For the nearest residence located approximately 1,300 feet west of the western site boundary within the area zoned for Urban Reserve, intermittent construction noise levels could be as high as 64 dBA when activities are located near the western site boundary and multiple pieces of construction equipment are operating at the same time. However, during most periods, construction activities would occur much farther away from the nearest residence, and noise levels would be substantially lower because of the attenuation with distance.

The *Placer County Noise Ordinance* exempts construction activities from the specified noise ordinance standards during the hours of 6:00 a.m. to 8:00 p.m., Monday through Friday, and 8:00 a.m. to 8:00 p.m., Saturday and Sunday (Section 9.36.030). Generally, if a construction project adheres to the construction times identified in the Noise Ordinance, construction noise is exempt. Because construction activities would not be expected to occur outside of these hours, construction noise associated with implementation of Plan Concept 1 on adjacent land uses would be considered less than significant.

The additional programmatic elements (1.6 million square feet) would use the similar construction equipment, and construction is similarly not expected to occur outside of the previously noted hours; thus, construction noise associated with the additional programmatic elements on adjacent land uses would be considered less than significant.

Plan Concept 2

As described in Chapter 3, Project Description, the primary differences between Plan Concept 1 and Plan Concept 2 are related to where various facilities would be located on the WPWMA's property and when various facilities would be developed. These differences do not change the conclusions identified for Plan Concept 1. As such, impacts related to construction noise associated with implementation of Plan Concept 2 would be the same as described for Plan Concept 1.

IMPACT 14-2	Increase in Operational Noise Levels. The expansion of the waste management operations would not be expected to generate noise levels above the established noise threshold. However, the development of the complementary and programmatic elements could include manufacturing or industrial uses that would exceed the established noise threshold. This operational noise impact would be considered **significant**.

Plan Concept 1

Solid waste management activities at the WPWMA facility would continue and expand under Plan Concept 1. Noise-generating activities would expand from the center property to the western and eastern properties, while the increase in activity level at the site would increase incrementally over the 30-year buildout of the project. These project elements include the expanded organics management operations, C&D processing operations, public waste drop-off operations, and the operation of supporting facilities such as the expanded administration building and parking, upgraded entrance and associated facilities, expanded stormwater ponds, upgraded maintenance facilities, and a new road crossing. In addition, the hours per day of MRF building operations would be expected to increase as material processing volumes increase, potentially up to 24 hours per day. However, in the event of nighttime operations, the MRF would not be receiving materials during these hours, the MRF building doors would be closed, and all MRF-related activities would be conducted inside this enclosed building.

Many of these solid waste elements would be operated on the western property with implementation of Plan Concept 1. For the landfill, the operation of the modules and associated environmental monitoring and control systems would continue on the center property and would extend onto the eastern property until final capacity is reached. The excavation of previously buried waste would occur as dictated by site operational requirements.

The Waste Recovery operations at the site would be expected to nearly double in response to the estimated doubling in the material quantities and vehicle volumes received at the facility at the end of the 30 years. Within this same time period, the Waste Disposal operations at the landfill would be expected to increase by approximately 50 percent. Overall operational changes from the solid waste project elements of the proposed project were estimated by scaling up 2018 operations consistent with the assumed 2 percent annual population and tonnage increase. Onsite equipment use at each of the major proposed solid waste project elements were estimated by scaling up 2018 equipment quantities based on the anticipated tonnage factor increase that the specific facility would process, not to exceed a factor increase of 2 because of assumed space constraints. The tonnage factor increases range from 1.55 to 2 times, depending on the facility. The potential 24-hour MRF building operations have been accounted for in the 2 percent per year growth. For complementary and programmatic elements, it is uncertain exactly what type of operations will be included in these activities.

Assuming a worst-case doubling of operating equipment and vehicle activity from existing operations at the site, the existing ambient noise levels would be expected to increase by approximately 3 dB. The noise levels associated with site operations experienced at existing residences in the project vicinity would increase from current conditions; however, the offsite noise levels associated with onsite operational activities would not increase greater than 3 dB. Because this increase would be less than the 5-dB increase in ambient noise levels established as the permanent noise level threshold, the solid waste management activities associated with Plan Concept 1 would result in a less-than-significant permanent noise impact.

Because the MRF operations occur within an existing building, noise generated from these operations are substantially attenuated. In addition, the MRF building's location at the northwestern corner of the center property is a substantial distance from the closest existing residences, located over 5,000 feet away, from which there have been no noise complaints. Therefore, MRF operations are not a currently a dominant source of sound at the residences, and the potential change in the hours of interior operations is not expected to alter the overall facility's sound profile at the residences.

In addition to solid waste management activities, up to 300,000 square feet of building plus exterior infrastructure are reserved in the northern part of the western property for the complementary elements. Under the programmatic level, for Plan Concept 1, up to 1.9 million square feet have been reserved for these elements primarily within the northern and southern extents of the western property, and on the center property. However, opportunities may arise that would support locating some of these complementary and programmatic elements nearer to the solid waste project elements or within areas not yet developed with solid waste project elements.

The development of these complementary and programmatic elements would increase offsite noise, depending on where the uses are located on the site. At the project level, complementary elements are initially anticipated to be located within the northern part of the western property, but because the complementary elements could include a wide variety of potential manufacturing and industrial uses, it cannot be determined in advance whether the ultimate uses would include activities that generate noise levels substantially higher than for typical manufacturing and industrial uses, although the uses are anticipated to occur within 300,000 square feet of building space. Therefore, development of the complementary elements could generate noise levels at receiving land uses that could exceed the established noise threshold, and this impact would be significant.

The additional programmatic elements (1.6 million square feet) could be located anywhere on the site, and it cannot be determined whether the noise levels at offsite sensitive receptors would exceed the established threshold. Programmatic elements also include a wide variety of potential manufacturing and industrial uses as described previously for the project level, and the level of noise generation associated with the uses is not yet defined. Therefore, development of the programmatic elements could generate noise levels at receiving land uses that could exceed the established noise threshold, and this impact would be significant.

Plan Concept 2

As described in Chapter 3, Project Description, the primary differences between Plan Concept 1 and Plan Concept 2 are related to where various facilities would be located on the WPWMA's property and when various facilities would be developed. These differences do not change the conclusions identified for Plan Concept 1.

Mitigation Measure 14-2. Increase in Operational Noise Levels.

The WPWMA shall conduct an acoustical evaluation of any facility proposed as part of the complementary and programmatic elements prior to issuance of building permits. The acoustical evaluation will document that either the proposed uses shall not generate noise levels greater than 5 dB above the existing ambient noise level generated from industrial facilities at the site or will be redesigned such that this threshold is not exceeded at existing receiving property boundaries.

Level of Significance after Mitigation.

Implementation of Mitigation Measure 14-2 requires that an acoustical evaluation be conducted prior to the issuance of building permits so that the established noise threshold is not exceeded. Because this mitigation would prevent the complementary and programmatic elements from exceeding noise levels above the establish threshold, the impact would be reduced to **less than significant** after mitigation.

IMPACT 14-3	**Exposure of Sensitive Uses to Vibrations.** The vibration levels generated by the construction and operation of the proposed solid waste management elements and the complementary and programmatic project elements would not expose residences within the project vicinity to excessive vibration levels. Therefore, this impact is considered **less than significant**.

Plan Concept 1

Construction activities and landfill operations have the potential to result in varying degrees of temporary ground-borne vibration, depending on the specific equipment used and operations involved. Vibration generated by construction equipment spreads through the ground and diminishes in magnitude with increases in distance. Table 14-10 displays vibration levels for typical construction equipment.

Table 14-10. Typical Construction Equipment Vibration Levels

Equipment	PPV at 25 feet (in/sec)	Approximate VdB at 25 feet[a]
Pile Driver (Impact – Upper Range)	1.518	112
Pile Driver (Impact – Typical)	0.644	104
Large Bulldozer	0.089	87
Caisson Drilling	0.089	87
Trucks	0.076	86
Jackhammer	0.035	79
Small Bulldozer	0.003	58

Source: FTA 2018

[a] VdB referenced to 1 μin/sec and based on the root mean square (RMS) velocity amplitude.

Bulldozers and other construction equipment would regularly be used in the construction of solid waste facilities at the site, including the construction of new landfill modules, compost pads, buildings, detention basins, and utility infrastructure. Onsite equipment would include the regular use of bulldozers to compact waste received at the landfill working face. Bulldozers and other heavy equipment would be used to excavate and relocate previously buried waste. Heavy equipment would also be used in the management of compost and C&D materials on the site. In addition, heavy trucks would be used to deliver waste material to the site and to move waste material around the site.

As referenced in Table 14-10, the largest vibration source is an impact pile driver. According to FTA, vibration levels associated with the upper range of an impact pile driver is 1.518 in/sec PPV and 112 VdB (referenced to 1 μin/sec) at 25 feet. Trucks generate lower vibration levels of 0.076 in/sec PPV and 86 VdB.

While impact pile driving is not anticipated, the risk of construction vibration damage from a pile driver is assessed by adjusting the PPV from the reference PPV of 1.581 at 25 feet to the actual distance from the equipment to the receiver by the application of Equation 7-2 in the FTA Manual, provided in Figure 14-5.

$$PPV_{equip} = PPV_{ref} \times (\frac{25}{D})^{1.5}$$ **Eq. 7-2**

where:

PPV_{equip} = the peak particle velocity of the equipment adjusted for distance, in/sec
PPV_{ref} = the source reference vibration level at 25 ft, in/sec
D = distance from the equipment to the receiver, ft

Figure 14-5. Propagation Adjustment for Peak Particle Velocity
Source: FTA 2018.

At the nearest sensitive receptor, approximately 1,300 feet from the western site boundary, the predicted PPV is 0.004 in/sec, which is less than the criteria of 0.12 for "Buildings extremely susceptible to vibration damage (construction very sensitive to vibration; objects of historic interest)".

To assess the risk of vibration annoyance from a pile driver, the RMS velocity (Lv, VdB) is adjusted from the Lv of 112 at 25 feet to the actual distance between the equipment and receiver by the application of Equation 7-3 in the FTA Manual, provided in Figure 14-6.

$$L_{v.distance} = L_{vref} - 30log(\frac{D}{25})$$ **Eq. 7-3**

where:

$L_{v.distance}$ = the rms velocity level adjusted for distance, VdB
L_{vref} = the source reference vibration level at 25 ft, VdB
D = distance from the equipment to the receiver, ft

Figure 14-6. Propagation Adjustment for Root Mean Squared Velocity

At the nearest sensitive receptor, approximately 1,300 feet from the western site boundary the predicted Lv is 61 VdB, which is less than the most restrictive residential criteria of 72 VdB.

Therefore, construction and operation of the solid waste facilities and waste management operations would not be expected to expose offsite sensitive receptors to excessive vibration levels even in the unlikely event that impact pile drivers are used.

In addition to solid waste management activities, complementary and programmatic elements may be developed on the WPWMA's properties. Under the project level, for Plan Concept 1, up to 300,000 square feet of building plus exterior infrastructure are reserved in the northern part of the western property for the complementary elements. Under the programmatic level, for Plan Concept 1, up to 1.6 million square feet have been reserved for these elements primarily within the northern and southern extents of the western property, and on the center property. However, opportunities may arise that would support

locating some of these complementary and programmatic elements nearer to the solid waste project elements or within areas not yet developed with solid waste project elements. The additional programmatic elements (1.6 million square feet) could be located anywhere on the site.

Construction vibration levels generated from the complementary and programmatic project elements would be similar to those associated with the construction of solid waste facilities at the site. Given the distance from the nearest residence, the anticipated industrial uses within the complementary and programmatic project elements would not be expected to generate vibration levels that would exceed the established vibration threshold. As a result, this impact is considered less than significant.

Plan Concept 2

As described in Chapter 3, Project Description, the primary differences between Plan Concept 1 and Plan Concept 2 are related to where various facilities would be located on the WPWMA's property and when various facilities would be developed. These differences do not change the conclusions identified for Plan Concept 1.

IMPACT 14-4	**Traffic-Generated Permanent Increases in Ambient Noise Levels.** The proposed project would not result in a noticeable increase in traffic noise levels at offsite sensitive receptors. Therefore, this impact is considered **less than significant**.

Plan Concept 1

The increase in daily traffic volumes resulting from implementation of the proposed project could generate increased noise levels along nearby roadway segments. To assess noise impacts caused by project-related traffic increases on the existing local roadway network, the increase in the number of vehicle trips generated by the proposed project was estimated.

Existing traffic noise levels for the primary roads used by vehicles delivering waste to the site were estimated in the SAP EIR (Placer County 2019) as summarized in Table 14-11.

Table 14-11. Modeled Existing Roadway Noise Levels Near the WPWMA Facility

Roadway Segment	From	To	Ldn/CNEL (dBA) at 100 feet from Roadway Centerline	Distance (feet) from Roadway Centerline to Ldn/CNEL Contour			
				70 dBA	65 dBA	60 dBA	55 dBA
State Route 65	Blue Oaks Boulevard	Sunset Boulevard	78.7	257	554	1,193	2,570
Athens Avenue	Fiddyment Road	Industrial Avenue	65.8	31	67	144	310
Industrial Avenue	Twelve Bridges Drive	Athens Avenue	64.6	26	55	119	257
Fiddyment Road	Placer Parkway	Athens Avenue	63.5	25	54	117	253
Sunset Boulevard	Foothills Boulevard	Industrial Avenue	65.0	28	59	128	275

Source: Placer County 2019.

Plan Concept 1 would increase traffic noise along local roadways used by project traffic. However, no sensitive land uses are located along Athens Avenue, Industrial Avenue, or Sunset Boulevard. Therefore, increases in traffic noise associated with implementing the proposed project on these roadways would not affect sensitive land uses, and this impact would be less than significant. Also, because of the high traffic volumes on State Route 65, the project's contribution of additional vehicles to this roadway would be relatively negligible. Therefore, the proposed project would not noticeably increase traffic noise along this State highway.

As identified in Table 14-11, for the segment of Fiddyment Road between Athens Avenue and the future alignment of Placer Parkway, existing noise levels were estimated to be between 60 and 65 dBA at distances between 54 and 117 feet from the roadway centerline. Similar noise levels would be expected for the segment of Fiddyment Road extending south from the future alignment of Placer Parkway through the Blue Oaks residential area. For this segment of Fiddyment Road, existing residences are located within 80 feet of the roadway centerline. However, masonry sound walls are currently in place parallel to Fiddyment Road that substantially attenuate traffic noise levels. Sound walls that block the line of site between the source and receiver would be expected to result in a minimum reduction of 5 dB (Caltrans 2015).

Plan Concept 1 is projected to increase the current average daily vehicle trips on Fiddyment Road by approximately 8 percent, from approximately 7,920 to a total of 8,530 average daily vehicle trips. A doubling of the number of daily vehicle trips is typically required to increase noise levels by 3 dBA (Caltrans 2015). Because the project would not be expected to double the traffic volumes on Fiddyment Road and because existing masonry sound walls are in place adjacent to the existing residences, the increase in traffic volumes associated with the proposed project would not be expected to substantially increase traffic noise levels experienced by residences adjacent to Fiddyment Road south of the project site. Therefore, traffic noise impacts would be considered less than significant.

Plan Concept 2

As described in Chapter 3, Project Description, the primary differences between Plan Concept 1 and Plan Concept 2 are related to where various facilities would be located on the WPWMA's property and when various facilities would be developed. These differences do not change the conclusions identified for Plan Concept 1.

14.4 References

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