KPC EHS Consultants, LLC

Technical Memorandum

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Date: September 5, 2022

Re: Adelanto TTM 20549: SFR Development Project – Noise Assessment

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1.0 Purpose

The purpose of this memorandum is to document the impacts of construction, mobile, and operational noise as it relates to the potential environmental impacts associated with the construction and operation of the proposed 98 lot residential project on 30.15 acres.

2.0 Project Location & Description

2.1 **Project Location:** The proposed project site is located in the City of Adelanto, San Bernardino, California on the west side of Aster Road, north of Cabrillo Street, and south of Villa Street, and is referred to as APNs: 3132-081-02, 07, and 08.

2.2 **Description:** The Applicant is proposing a tentative tract map to subdivide approximately 30.15 acres into 98 single-family residential lots with an average lot size of 7,656 square feet.

3.0 Methodology

3.1 **Ambient Noise:** The Project site is in partially developed area of the City and currently does not generate noise. The existing noise environment in the Project area is characterized by the area's general level of development. The Project is located in an area developed with residential uses. Ambient noise levels are therefore increased as a result of roadway traffic, industrial activities, and other human activities. Table 3.1, *Population Density and Associated Ambient Noise Levels,* summarizes typical ambient noise levels based on level of development. Given the rural nature of the proposed Project area, baseline ambient noise levels are assumed to be approximately 50 – 55 dBA, Ldn.

Table 3.1. Population Density and Associated Ambient Noise Levels

Population Density	dBA, Ldn
Rural 40-50	40-50
Small town or quite suburban residential	50
Normal suburban residential	55
Urban residential	60
Noisy urban residential	65
Very noisy urban residential	70
Downtown, major metropolis	75-80
Area adjoining freeway or near major airport	80–90
Notes: dBA = A-weighed decibels Ldn = day-night level	

Source: Draft Initial Study / Mitigated Negative Declaration Silver Peak Solar Project, February 24, 2022

3.2 Construction Noise:

Construction activities that would create noise include: site preparation, grading, building construction, paving, and architectural coating. Noise levels associated with the construction will vary with the different types of construction equipment, the duration of the activity, and distance from the source. Construction noise will have a temporary or periodic increase in the ambient noise level above the existing levels within the Project vicinity. The nearest sensitive receptors to the Project site are the single-family residential developments located adjacent to the north, east, and south with the closest residence approximately 25 feet south from Project boundary and approximately 575 feet to the nearest residence from the Project's center. The Columbia Middle School the closest non-residential receptor is located approximately 800 feet southeast from the southeast corner of the Project site.

To estimate the potential impact of construction noise at the residences and school, equipment that is expected to be used during construction was input into the Federal Highway Administration Roadway Construction Noise Model (RCNM) to generate anticipated noise levels. The RCNM generates the maximum noise levels (Lmax) and the equivalent continuous sound level (Leq). The Leq is a calculation of the anticipated steady sound pressure level which, over a given time period (day, evening, night) has the same total energy as the actual fluctuating noise. The RCNM also uses an acoustical use factor in the noise calculations. The acoustical use factor is the percentage of time each piece of construction equipment is assumed to be operating at the full power level and is used to estimate the Leq values from the Lmax values. For example, typical operating cycles for these types of construction equipment may involve one or two minutes of full power operation followed by three to four minutes at lower power settings. Noise levels will be loudest during the site preparation and grading phases.

3.3 Traffic Noise Calculations

Traffic noise modeling for existing peak hour traffic, existing plus project traffic, and future plus project was performed using FHWA TNM 3.1. Existing traffic counts for Aster Road were obtained from the City of Adelanto TTM 20398 Single Family Residential Project Traffic Impact Study, conducted by RK Engineering Group, Inc. dated July 7, 2021.

The FHWA TNM 3.1 peak hour traffic numbers were calculated from the ADT at a factor of 7 percent for morning peak hour and 10 percent for afternoon peak hour. The calculated peak hour traffic for the Project's AM Peak Hour was 218 and the PM Peak Hour of 361 VPH, which represents the highest of the AM and PM Peak Hours. The Project peak hour Traffic was calculated using the same AM and PM factors for the 925 ADT for peak hour traffic of 65 for AM Peak Hour and 93 for PM Peak Hour. To provide for a worse-case noise evaluation the PM peak was selected and the Project's PM peak hour was added to the Peak Hour values for the Aster Road Existing PM peak hour traffic calculations.

The traffic vehicle mix provides the hourly distribution of automobiles, medium trucks, and heavy trucks and was calculated using a mix of 97 percent automobiles, 2 percent medium trucks, and 1 percent heavy trucks.

Receptor (receiver) locations for the TNM calculations were select to represent noise levels at 4 distances from the center of Aster Road. Four (4) receptor locations modeled were 50, 100, 150, and 200 feet from roadway center line. No barriers or structures were modeled and therefore no

attenuation was calculated. The calculated noise levels represent the noise levels at those same distances on the existing single family residential developments to the east and south of the Project site.

3.4 Stationary Noise:

The primary source of stationary noise from residential uses if from air conditioning units. For this analysis reference levels were used to determine air condition unit noise levels and the inverse square law of sound noise equation to calculate attenuation over distance. The inverse square law states that with every doubling of distance away from the sound source, the sound will be four times less intense. For example, a source of 65 dBA measured at 5 feet would be attenuated to 59 dBA at 10 feet.

The reference level for the project is using the Trane XL 16I one-stage compressor with an average decibel level of 69 dBA measured at 1 foot from the unit.

4.0 Project Noise Impacts

4.1 Construction Noise Impacts

Modeling was completed for distances of 25-feet, 575-feet, and 800-feet from the source to receptor. Table 4.1, *Construction Equipment Noise Levels at the Nearest Receptor,* identifies the level of noise generated by construction equipment.

Table 4.1.2 Construction Equipment Noise Levels at the Nearest Receptor

Source	Approximate Distance to Nearest Receptor [1] (Property Line to Construction Site) (feet)	Sound Level at Nearest Receptor		
		Lmax	Acoustical Use Factor (%)	Leq
Backhoe	25	83.6	40	79.6
Compactor (ground)	25	89.3	20	82.3
Compressor (air)	25	83.7	40	79.7
Crane	25	86.6	16	78.6
Concrete Mixer Truck	25	84.8	40	80.8
Dozer	25	87.7	40	83.7
Dump Truck	25	82.5	40	78.5
Excavator	25	86.7	40	82.8
Front End Loader	25	85.1	40	81.2
Generator	25	86.7	50	83.6
Grader	25	91.0	40	87.0
Offroad Forklift	25	89.4	40	85.4
Paver	25	83.2	50	80.2
Pickup Truck	25	81.0	40	77.0
Roller	25	86.0	20	79.0
Scraper	25	89.6	40	85.6

Welder Torch	25	80.0	40	76.0

1. Nearest Receptor – Residences at 25 feet from boundary. Source: FHWA – RCNM Version 1.1

The properties immediately around are all residential uses and the Project would be compatible with surrounding land uses and would not adversely impact sensitive receptors.

The City of Adelanto has set restrictions to control noise impacts from construction activities. Section 17.90.020(d)(1) of the Adelanto Municipal Code restricts construction activities between the hours of 7:00 AM to dusk on weekdays, and construction will not occur on weekends or state holidays.

Noise generation related to construction activities is addressed in §17.90.020(d) of the Zoning Ordinance which requires construction projects to list general noise reduction practices as "General Notes" on the construction drawings as part of the Project's conditions of approval (COA). These mandatory conditions are described as follows:

17.90.020 (d) Construction Practices

To reduce potential noise and air quality nuisances, the following items shall be listed as "General Notes" on the construction drawings:

(1) Construction activity and equipment maintenance is limited to the hours between 7:00 a.m. to dusk on weekdays. Construction may not occur on weekends or State holidays, without prior consent of the Building Official. Non-noise generating activities (e.g., interior painting) are not subject to these restrictions. City and State construction projects, such as road re-building or resurfacing, and any construction activity that is in response to an emergency, shall be exempt from this requirement.

(2) Stationary construction equipment that generates noise in excess of sixty-five (65) dBA at the project boundaries must be acoustically shielded and located at least one hundred feet (100') from occupied residences. The equipment area with appropriate acoustic shielding shall be designated on building and grading plans. Equipment and shielding shall remain in the designated location throughout construction activities.

(3) Construction routes are limited to City of Adelanto designated truck routes.

(4) Water trucks or sprinkler systems shall be used during clearing, grading, earth moving, excavation, or transportation of cut or fill materials to prevent dust from leaving the site and to create a crust after each day's activities cease. At a minimum, this would include wetting down such areas in the later morning and after work is completed for the day and whenever wind exceeds fifteen (15) miles per hour.

(5) A person or persons shall be designated to monitor the dust control program and to order increased watering as necessary to prevent transport of dust off-site. The name and telephone number of such person(s) shall be provided to the City.

(6) All grading equipment shall be kept in good working order per factory specifications.

With implementation of the above standard conditions of approval, construction noise impacts would be less than significant.

While the City establishes limits to the hours during which construction activity may take place, it does not identify specific noise level limits for construction noise levels. Therefore, to evaluate whether the Project will generate a substantial increase in the short-term noise levels at the offsite sensitive receptors (residences), the construction-related noise level threshold is based on the National Institute for Occupational Safety and Health (NIOSH) recommended exposure limit (REL) for occupation noise exposure at 85 dBA, as an 8-hour time-weighted average (85 dBA – 8-hr TWA).

The highest equipment noise level at the nearest sensitive receptor as indicated in Table 3.2 will be a grader at 91.0 dBA (Lmax) and 87.0 dBA (Leq). The same piece of equipment operating from the center of the site at 575-feet from the nearest receptor would generate noise levels of 65.0 dBA (Lmax) and 61.0 dBA (Leq). The highest noise levels from construction equipment operation at the Columbia Middle School would be 60.9 dBA (Lmax) and 56.9 dBA (Leq). During the construction phase the noise levels will be the highest as heavy equipment pass along the Project site boundaries. During the site preparation and grading phases equipment will not be stationary, rather equipment will be moving throughout the site and varying speeds and power levels and as a result not operating at the maximum noise level for the entire work day. The levels of noise at the nearest receptor as indicated in Table 3.2 are all below the NIOSH REL of 85 dBA 8-hour TWA, and would be less than significant. Construction noise is of short-term duration and will not present any long-term impacts on the project site or the surrounding area.

4.2 Offsite Traffic Noise Impacts.

Vehicle noise is a combination of the noises produced by the engine, exhaust, and tires. The primary source of noise generated by the Project will be from the vehicle traffic generated by the vehicle ingress and egress to the Project site. Under existing conditions, the site does not generate any traffic noise that impacts the surrounding area.

According to the Federal Highway Administration*, Highway Traffic Noise Analysis and Abatement Policy and Guidance.* the level of roadway traffic noise depends on three things: (l) the volume of the traffic, (2) the speed of the traffic, and (3) the number of trucks in the flow of the traffic. Generally, the loudness of traffic noise is increased by heavier traffic volumes, higher speeds, and greater numbers of trucks. These factors are discussed below.

- *The Volume of the Traffic*

  Upon buildout, the proposed Project is expected to generate approximately 925 average daily vehicle trips[1], which will increase the ambient traffic noise levels in the vicinity of the Project site in comparison to the existing site conditions.

  The primary transportation routes for the Project site will be Aster Road which provides access to both Mojave Drive and Palmdale Road (State Route 18). Traffic from the site would also utilize Seneca Road, which intersects with Bellflower Road and SR 395 to the east.

  Estimated traffic conditions for the area roadways are presented in Table 4.2.

[1] Institute of traffic Engineers (ITE) Code 210 Single Family Detached Housing 9.44 ADT/dwelling unit.

Table 4.2 Estimated Traffic Roadway Conditions

Roadway	Number of Lanes	ADT
SR 395 / Holly	4	15,000(1)
Mojave Drive	4	9,589 (2)
Palmdale (SR18)	4	22,939
Aster Road (at Project)	4	925 (3)

Sources: Environmental Impact Report Volume 1 Adelanto North 2035 Comprehensive Sustainable Plan, March 2014 Table 4.16-1.
Adelanto Switching Station Expansion Project Initial Study, Mitigated Negative Declaration, February 2021.

(1) Caltrans 2020 Traffic Census Program.
(2) Assumes ½ of traffic on Mojave Drive east of 395 travels west on Mojave Drive.
(3) TTM 20398 Single Family Residential Project Traffic Impact Study, conducted by RK Engineering Group, Inc. dated July 7, 2021.
(4) Table 4.16-2 Collector Daily Volume Threshold.

The Institute of Traffic Engineers (ITE) Land Use 210 designation was used for calculations to determine the average daily trips (ADT) generated by the Project. The ITE 210 Single-Family Housing Land Use designation estimates 9.44 daily trips per dwelling unit for a total of 925 trips per day (ADT).

The residential housing directly surrounding the Project site along Aster Road, north of Seneca Blvd currently generates approximately 454 PM Peak Hour Traffic. Although there are other residential communities in the area of the Project these homes have a direct impact on traffic along Aster Road and provide an overview of potential impacts from the proposed Project on traffic noise.

According to Caltrans, the human ear is able to begin to detect sound level increases of 3 decibels (dB) in typical noisy environments.[2] A doubling of sound energy (e.g., doubling the volume of traffic on a highway) that would result in a 3-dBA increase in sound, would generally be barely detectable. As indicated above implementation of the Project will increase traffic volumes in the area by approximately 925 ADT, but not to the extent that traffic volumes will be doubled creating a +3dBA noise increase or result in a perceivable noise increase. Therefore, operational noise impacts would be less than significant.

- *The Speed of Traffic*

The speed limit along Aster is posted at 30 mph, Hook at 35 mph, Mojave at 30 mph, and all other roadways around the project site are subject to a prima facie limit of 25 mph under the vehicle code. These low levels of speeds do not result in vehicles generating high levels of noise.

- *The Number of Trucks in the Flow of the Traffic*

The Project is a residential development and it will not routinely generate noise from large trucks.

[2] Caltrans, Traffic Noise Analysis Protocol, April 2020, p.7-1.

4.2.1 Traffic Noise Model Calculations:

Traffic noise analysis for the Project performed with the FHWA TNM 3.1 for Existing Plus Project with results presented in Table 4-3 for Existing Plus Project.

Table 4-3: Existing Plus Project Traffic Noise Comparison

dB LAeq				
Receiver From Aster Rd Centerline	Existing	Existing Plus Project	Project Contribution	Threshold
1 – 200 - Feet	49.1	50.1	1.0	3
2 – 50 - Feet	57.1	58.1	1.0	3
3 – 100 - Feet	53.5	54.4	0.9	3
4 – 150 - Feet	51.1	52.1	1.0	3

As presented in Table 4-3 with existing plus Project traffic noise will only create approximately 1.0 dB LAeq increase in noise levels and would be below the threshold for a permanent increase in ambient noise levels of 3.0 dB or greater as such increases in to the ambient noise level created by the project will be less than significant.

4.2.2 Traffic Noise Contours:

Figure 1 presents the traffic noise contours on the Project site from the existing plus project traffic scenario. The contours are based on the calculated traffic counts and no attenuation for fencing, walls, or attenuation from existing or future structures.

According to Caltrans a three (3) decibel attenuation factor is allowed when the first row of buildings block the line of sight by 40 to 65 percent to the noise source and three (3) to five (5) decibel attenuation when the ling of sight is obstructed by more than 65 percent.[3] The homes closest to Aster Road would be exposed to the highest levels of road noise, all other buildings in the Project would have an obstructed line of sight of greater than 65 percent they would receive a reduction in traffic noise levels by three (3) to five (5) decibels. Therefore, structures in the 50, 45, and 40 dB LAeq contours would have traffic noise attenuated to levels below 47, 42, and 37 dB LAeq respectively.

[3] Caltrans. (2006). Technical Noise Supplement Section N-5515.

Figure 1: Existing Plus Project Traffic Noise Contours

4.3 Residential Activities

Typical operational sound levels generated by single-family residential activities include normal outdoor conversations, air conditioner units, and lawn care equipment with levels as indicated below:

- Normal conversation - 60 dBA
- Air conditioner outdoor compressor - 69 dBA
- Gas-powered lawnmowers and leaf blowers – 80 to 85 dBA.[4]
- Electric leaf blowers – 70 dBA.[5]

Noise generated from air conditioners and lawn care equipment are not at constant and consistent levels throughout the day. Lawn care is performed during daylight hours for short durations and although air conditioners are operating both day and night they are cycling on/off with windows closed conditions. Noise levels would be attenuated with standard building construction and windows closed by approximately 25 dBA.

[4] Center for Disease Control, "*Loud Noised Can Cause Hearing Loss*". ,https://www.cdc.gov/nceh/hearing_loss/default.html, accessed on August 19, 2022.

[5] Center for Disease Control, "*Loud Noised Can Cause Hearing Loss*". ,https://www.cdc.gov/nceh/hearing_loss/default.html, accessed on November 11, 2021.

Table 4-4: Operational Noise Levels

Source	Reference Level at 1 foot	20 Foot from Source	Interior Noise Level
Normal Conversation	60	34	9
Air Conditioner	69	43	18
Gas Powered Landscape Equipment	80 - 85	54 - 59	29 - 34
Electric Landscape Equipment	70	44	19

The USEPA identifies noise levels affecting health and welfare as exposure levels over 70 dBA over a 24-hour period. Noise levels for various levels are identified according to the use of the area. Levels of 45 dbA are associated with indoor residential areas, hospitals, and schools, whereas 55 dBA is identified for outdoor areas where typical residential human activity takes place. According to the USEPA levels of 55 dbA outdoors and 45 dbA indoors are identified as levels of noise considered to permit spoken conversation and other activities such as sleeping, working, and recreation, which are part of the daily human condition.[6] Levels exceeding 55 dbA in a residential setting are normally short in duration and not significant in affecting health and welfare of residents.

4.4 Vibration

During construction the operation and movement of heavy equipment create seismic waves that radiate along the ground-surface in all directions. These waves are felt as ground vibrations. Vibrations from construction can result in effects ranging from annoyance to people to structure damage. Vibration levels are impacted by geology, distance, and frequencies. According to the Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual*, September 2018[37], while ground vibrations from construction activities do not often reach the levels that can damage structures, construction vibration may result in building damage or prolonged annoyance from activities such as blasting, piledriving, vibratory compaction, demolition, and drilling or excavation near sensitive structures. The Project does not require these types of construction activities.

Vibration amplitude and impact decreases with distance and perceptible goundborne vibration is generally limited to areas within one to two hundred feet of the construction activity.

The vibration standard used for the City is that no ground vibration shall be allowed that can be felt without the aid of instruments at or beyond the subject property line, nor will any vibration be permitted that produces a particle velocity greater than or equal to two-tenths of an inch per second measured at or beyond the lot line.

[6] USEPA "EPA Identifies Noise Levels Affecting Health and Welfare" https://archive.epa.gov/epa/aboutepa/epa-identifies-noise-levels-affecting-health-and-welfare.html accessed August 17, 2022.

[37] https://www.transit.dot.gov/research-innovation/transit-noise-and-vibration-impact-assessment-manual-report-0123.

Table 4-5 Vibration Source Levels for Construction Equipment

Equipment	PPV (in/sec) at 25 feet
Small bulldozer	0.003
Jackhammer	0.035
Loaded Trucks	0.076
Large bulldozer	0.089

Source: Federal Transit Administration, Transit Noise and Vibration Impact Assessment, September 2018.

The closest sensitive receptor to the Project property line is minimally 25 feet from the property line. The estimated construction vibration level from a large bulldozer (worst case scenario) measured at 15-feet would create a vibration level of 0.191 in/sec which does not exceed the 0.2 in/sec threshold. Therefore, the vibrations at the nearest sensitive receptor will remain well below the strongly perceptible annoyance criteria and potential residential vibration damage criteria thresholds listed in the City of Adelanto Municipal Code Section 17.90.030 (vibration). This threshold requires that no vibration greater than 0.2 PPV be felt at or beyond the lot line. The proposed Project therefore is not considered to result in exposure of people to excessive ground vibration.

During operations of the Project following construction the primary source of vibration would be from vehicle traffic. Ground-borne vibration levels from automobile traffic are generally overshadowed by vibration generated by heavy trucks that roll over the same uneven roadway surfaces. However, due to the rapid drop-off rate of ground-borne vibration and the short duration of the associated events, vehicular traffic-induced ground-borne vibration is rarely perceptible beyond the roadway right-of-way, and rarely results in vibration levels that would cause annoyance to people or damage to buildings in the vicinity.

5.0 Conclusion

Based on the assessment in Section 5.0 through compliance with mandatory City requirements and ordinances to reduce noise during construction, the Project's construction noise impacts will not result in the generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project. In addition, the Project's operational noise would be less than significant for mobile and operational noise and as such impacts to the environment for Noise are less than significant.

Modeling Data Sheets

Roadway Construction Noise Model

Federal Highway Traffic Noise Model 3.1

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 09/05/2022
Case Description: TTM20549

**** Receptor #1 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Columbia Middle School	Commercial	60.0	60.0	50.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Backhoe	No	40		77.6	800.0	0.0
Dozer	No	40		81.7	800.0	0.0
Scraper	No	40		83.6	800.0	0.0
Excavator	No	40		80.7	800.0	0.0
Grader	No	40	85.0		800.0	0.0
Scraper	No	40		83.6	800.0	0.0
Crane	No	16		80.6	800.0	0.0
Gradall	No	40		83.4	800.0	0.0
Generator	No	50		80.6	800.0	0.0
Welder / Torch	No	40		74.0	800.0	0.0
Compressor (air)	No	40		77.7	800.0	0.0
Paver	No	50		77.2	800.0	0.0
Roller	No	20		80.0	800.0	0.0
Pickup Truck	No	40		75.0	800.0	0.0
Compactor (ground)	No	20		83.2	800.0	0.0
Concrete Mixer Truck	No	40		78.8	800.0	0.0
Dump Truck	No	40		76.5	800.0	0.0
Front End Loader	No	40		79.1	800.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Backhoe	53.5	49.5	N/A	65.0	N/A	65.0	N/A	N/A	N/A	None	N/A	None	N/A	N/A
Dozer	57.6	53.6	N/A	65.0	N/A	65.0	N/A	N/A	N/A	None	N/A	None	N/A	N/A
Scraper	59.5	55.5	N/A	65.0	N/A	65.0	N/A	N/A	N/A	None	N/A	None	N/A	N/A
Excavator	56.6	52.6	N/A	65.0	N/A	65.0	N/A	N/A	N/A	None	N/A	None	N/A	N/A
Grader	60.9	56.9	N/A	65.0	N/A	65.0	N/A	N/A	N/A	None	N/A	None	N/A	N/A
Scraper	59.5	55.5	N/A	65.0	N/A	65.0	N/A	N/A	N/A	None	N/A	None	N/A	N/A
Crane	56.5	48.5	N/A	65.0	N/A	65.0	N/A	N/A	N/A	None	N/A	None	N/A	N/A
Gradall	59.3	55.3	N/A	65.0	N/A	65.0	N/A	N/A	N/A	None	N/A	None	N/A	N/A
Generator	56.5	53.5	N/A	65.0	N/A	65.0	N/A	N/A	N/A	None	N/A	None	N/A	N/A
Welder / Torch	49.9	45.9	N/A	65.0	N/A	65.0	N/A	N/A	N/A	None	N/A	None	N/A	N/A
Compressor (air)	53.6	49.6	N/A	65.0	N/A	65.0	N/A	N/A	N/A	None	N/A	None	N/A	N/A
Paver	53.1	50.1	N/A	65.0	N/A	65.0	N/A	N/A	N/A	None	N/A	None	N/A	N/A
Roller	55.9	48.9	N/A	65.0	N/A	65.0	N/A	N/A	N/A	None	N/A	None	N/A	N/A
Pickup Truck	50.9	46.9	N/A	65.0	N/A	65.0	N/A	N/A	N/A	None	N/A	None	N/A	N/A
Compactor (ground)	59.1	52.2	N/A	65.0	N/A	65.0	N/A	N/A	N/A	None	N/A	None	N/A	N/A
Concrete Mixer Truck	54.7	50.7	N/A	65.0	N/A	65.0	N/A	N/A	N/A	None	N/A	None	N/A	N/A
Dump Truck	52.4	48.4	N/A	65.0	N/A	65.0	N/A	N/A	N/A	None	N/A	None	N/A	N/A
Front End Loader	55.0	51.0	N/A	65.0	N/A	65.0	N/A	N/A	N/A	None	N/A	None	N/A	N/A
Total	60.9	65.0	N/A	65.0	N/A	65.0	N/A	N/A	N/A	0.0	N/A	0.0	N/A	N/A

**** Receptor #2 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
South Residential Boundary	Residential	60.0	60.0	50.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Backhoe	No	40		77.6	25.0	0.0
Dozer	No	40		81.7	25.0	0.0
Scraper	No	40		83.6	25.0	0.0
Excavator	No	40		80.7	25.0	0.0
Grader	No	40	85.0		25.0	0.0
Scraper	No	40		83.6	25.0	0.0
Crane	No	16		80.6	25.0	0.0
Gradall	No	40		83.4	25.0	0.0
Generator	No	50		80.6	25.0	0.0
Welder / Torch	No	40		74.0	25.0	0.0
Compressor (air)	No	40		77.7	25.0	0.0
Paver	No	50		77.2	25.0	0.0
Roller	No	20		80.0	25.0	0.0
Pickup Truck	No	40		75.0	25.0	0.0
Compactor (ground)	No	20		83.2	25.0	0.0
Concrete Mixer Truck	No	40		78.8	25.0	0.0
Dump Truck	No	40		76.5	25.0	0.0
Front End Loader	No	40		79.1	25.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Backhoe	83.6	79.6	N/A	65.0	N/A	65.0	N/A	N/A	N/A	14.6	N/A	14.6	N/A	N/A
Dozer	87.7	83.7	N/A	65.0	N/A	65.0	N/A	N/A	N/A	18.7	N/A	18.7	N/A	N/A
Scraper	89.6	85.6	N/A	65.0	N/A	65.0	N/A	N/A	N/A	20.6	N/A	20.6	N/A	N/A
Excavator	86.7	82.8	N/A	65.0	N/A	65.0	N/A	N/A	N/A	17.8	N/A	17.8	N/A	N/A
Grader	91.0	87.0	N/A	65.0	N/A	65.0	N/A	N/A	N/A	22.0	N/A	22.0	N/A	N/A
Scraper	89.6	85.6	N/A	65.0	N/A	65.0	N/A	N/A	N/A	20.6	N/A	20.6	N/A	N/A
Crane	86.6	78.6	N/A	65.0	N/A	65.0	N/A	N/A	N/A	13.6	N/A	13.6	N/A	N/A
Gradall	89.4	85.4	N/A	65.0	N/A	65.0	N/A	N/A	N/A	20.4	N/A	20.4	N/A	N/A
Generator	86.7	83.6	N/A	65.0	N/A	65.0	N/A	N/A	N/A	18.6	N/A	18.6	N/A	N/A
Welder / Torch	80.0	76.0	N/A	65.0	N/A	65.0	N/A	N/A	N/A	11.0	N/A	11.0	N/A	N/A
Compressor (air)	83.7	79.7	N/A	65.0	N/A	65.0	N/A	N/A	N/A	14.7	N/A	14.7	N/A	N/A
Paver	83.2	80.2	N/A	65.0	N/A	65.0	N/A	N/A	N/A	15.2	N/A	15.2	N/A	N/A
Roller	86.0	79.0	N/A	65.0	N/A	65.0	N/A	N/A	N/A	14.0	N/A	14.0	N/A	N/A
Pickup Truck	81.0	77.0	N/A	65.0	N/A	65.0	N/A	N/A	N/A	12.0	N/A	12.0	N/A	N/A
Compactor (ground)	89.3	82.3	N/A	65.0	N/A	65.0	N/A	N/A	N/A	17.3	N/A	17.3	N/A	N/A
Concrete Mixer Truck	84.8	80.8	N/A	65.0	N/A	65.0	N/A	N/A	N/A	15.8	N/A	15.8	N/A	N/A
Dump Truck	82.5	78.5	N/A	65.0	N/A	65.0	N/A	N/A	N/A	13.5	N/A	13.5	N/A	N/A
Front End Loader	85.1	81.2	N/A	65.0	N/A	65.0	N/A	N/A	N/A	16.2	N/A	16.2	N/A	N/A
Total	91.0	95.1	N/A	65.0	N/A	65.0	N/A	N/A	N/A	30.1	N/A	30.1	N/A	N/A

**** Receptor #3 ****

Baselines (dBA)

Description	Land Use	Daytime	Evening	Night
South Residential Center	Residential	60.0	60.0	50.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Backhoe	No	40		77.6	575.0	0.0
Dozer	No	40		81.7	575.0	0.0
Scraper	No	40		83.6	575.0	0.0
Excavator	No	40		80.7	575.0	0.0
Grader	No	40	85.0		575.0	0.0
Scraper	No	40		83.6	575.0	0.0
Crane	No	16		80.6	575.0	0.0
Gradall	No	40		83.4	575.0	0.0
Generator	No	50		80.6	575.0	0.0
Welder / Torch	No	40		74.0	575.0	0.0
Compressor (air)	No	40		77.7	575.0	0.0
Paver	No	50		77.2	575.0	0.0
Roller	No	20		80.0	575.0	0.0
Pickup Truck	No	40		75.0	575.0	0.0
Compactor (ground)	No	20		83.2	575.0	0.0
Concrete Mixer Truck	No	40		78.8	575.0	0.0
Dump Truck	No	40		76.5	575.0	0.0
Front End Loader	No	40		79.1	575.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Backhoe	57.6	53.6	N/A	65.0	N/A	65.0	N/A	N/A	N/A	None	N/A	None	N/A	N/A
Dozer	61.7	57.7	N/A	65.0	N/A	65.0	N/A	N/A	N/A	None	N/A	None	N/A	N/A
Scraper	63.6	59.6	N/A	65.0	N/A	65.0	N/A	N/A	N/A	None	N/A	None	N/A	N/A
Excavator	60.7	56.7	N/A	65.0	N/A	65.0	N/A	N/A	N/A	None	N/A	None	N/A	N/A
Grader	65.0	61.0	N/A	65.0	N/A	65.0	N/A	N/A	N/A	None	N/A	None	N/A	N/A
Scraper	63.6	59.6	N/A	65.0	N/A	65.0	N/A	N/A	N/A	None	N/A	None	N/A	N/A
Crane	60.6	52.6	N/A	65.0	N/A	65.0	N/A	N/A	N/A	None	N/A	None	N/A	N/A
Gradall	63.4	59.4	N/A	65.0	N/A	65.0	N/A	N/A	N/A	None	N/A	None	N/A	N/A
Generator	60.6	57.6	N/A	65.0	N/A	65.0	N/A	N/A	N/A	None	N/A	None	N/A	N/A
Welder / Torch	54.0	50.0	N/A	65.0	N/A	65.0	N/A	N/A	N/A	None	N/A	None	N/A	N/A
Compressor (air)	57.7	53.7	N/A	65.0	N/A	65.0	N/A	N/A	N/A	None	N/A	None	N/A	N/A
Paver	57.2	54.2	N/A	65.0	N/A	65.0	N/A	N/A	N/A	None	N/A	None	N/A	N/A
Roller	60.0	53.0	N/A	65.0	N/A	65.0	N/A	N/A	N/A	None	N/A	None	N/A	N/A
Pickup Truck	53.8	49.8	N/A	65.0	N/A	65.0	N/A	N/A	N/A	None	N/A	None	N/A	N/A
Compactor (ground)	62.0	55.0	N/A	65.0	N/A	65.0	N/A	N/A	N/A	None	N/A	None	N/A	N/A
Concrete Mixer Truck	57.6	53.6	N/A	65.0	N/A	65.0	N/A	N/A	N/A	None	N/A	None	N/A	N/A
Dump Truck	55.2	51.3	N/A	65.0	N/A	65.0	N/A	N/A	N/A	None	N/A	None	N/A	N/A
Front End Loader	57.9	53.9	N/A	65.0	N/A	65.0	N/A	N/A	N/A	None	N/A	None	N/A	N/A
Total	65.0	68.9	N/A	65.0	N/A	65.0	N/A	N/A	N/A	3.9	N/A	3.9	N/A	N/A

REPORT:	**Results: Sound Levels - No Barrier Objects**		
TNM VERSION	3.1.7970.37608	REPORT DATE:	5 September 2022
CALCULATED WITH:	3.1.7970.37608	CALCULATION DATE:	9/5/2022 8:56:59 PM
CASE:	Adelanto TTM 20549 SFR 98	ORGANIZATION:	KPC EHS Consultants
UNITS:	English	ANALYSIS BY:	kpcarr
DEFAULT GROUND TYPE:	HardSoil	PROJECT/CONTRACT	
ATMOSPHERICS:	80°F, 50%	Average pavement type shall be used unless a state highway agency substantiates the use of a different type with approval FHWA.	
PAVEMENT TYPE(S) USED:	Average		

Receiver				Modeled Traffic Noise Levels				
				LAeq		Increase over Existing		
Name	No.	Nb. R.R.	Existing LAeq	Calc.	Absolute Criterion	Calc.	Relative Criterion	Type of Impact
			dBA	dBA	dBA	dBA	dBA	
Receiver-1	1	4	---	49.1	0.0	---	---	Sound Level
Receiver-2	2	4	---	57.1	0.0	---	---	Sound Level
Receiver-3	3	4	---	53.5	0.0	---	---	Sound Level
Receiver-4	4	4	---	51.1	0.0	---	---	Sound Level

REPORT:	**Results: Sound Levels - No Barrier Objects**		
TNM VERSION	3.1.7970.37608	REPORT DATE:	4 September 2022
CALCULATED WITH:	3.1.7970.37608	CALCULATION DATE:	9/4/2022 10:33:36 PM
CASE:	Adelanto TTM 20549 SFR 98	ORGANIZATION:	KPC EHS Consultants
UNITS:	English	ANALYSIS BY:	kpcarr
DEFAULT GROUND TYPE:	HardSoil	PROJECT/CONTRACT	
ATMOSPHERICS:	80°F, 50%	Average pavement type shall be used unless a state highway agency substantiates the use of a different type with approval FHWA.	
PAVEMENT TYPE(S) USED:	Average		

Receiver				Modeled Traffic Noise Levels				
				LAeq		Increase over Existing		
Name	No.	Nb. R.R.	Existing LAeq	Calc.	Absolute Criterion	Calc.	Relative Criterion	Type of Impact
			dBA	dBA	dBA	dBA	dBA	
Receiver-1	1	4	---	50.1	0.0	---	---	Sound Level
Receiver-2	2	4	---	58.1	0.0	---	---	Sound Level
Receiver-3	3	4	---	54.5	0.0	---	---	Sound Level
Receiver-4	4	4	---	52.1	0.0	---	---	Sound Level