Appendix H

Updated Environmental Noise & Vibration Assessment

Environmental Noise & Vibration Assessment

Skyline Aggregates Project

Lassen County, California

BAC Job # 2023-074

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Executive Summary

Bollard Acoustical Consultants, Inc. (BAC) was retained by VESTRA Resources, Inc., to evaluate potential noise and vibration impacts related to the proposed Skyline Aggregates project in Lassen County, California. This report contains BAC's evaluation.

Specific noise and vibration sources evaluated included the proposed asphalt plant, ready-mix plant, aggregate processing operations (excavation, including blasting, crushing, screening, conveying), and on-site and off-site heavy truck traffic related to these operations (load-out).

Noise and vibration measurements were conducted in the project site vicinity to establish baseline conditions. Measured ambient noise levels were used to develop the project standards of significance in conjunction with California Environmental Quality Act (CEQA) guidelines.

The SoundPLAN noise prediction model was used to predict noise exposure at the nearest residences from on-site noise sources, and the FHWA traffic noise prediction model was used to predict increases in off-site noise levels due to project-generated heavy truck traffic on the local roadway network.

This evaluation concludes that noise and vibration generated by the project would be satisfactory relative to Lassen County noise standards, the City of Susanville noise standards, and CEQA Guidelines. However, there are many variables which affect the noise generation of the proposed facility and, despite extensive analysis, it is difficult to precisely account for all variables in the noise modelling process. Given the sensitivity of receptors in the project vicinity and the proposed periodic nighttime operation of the facility, this analysis recommends that appropriate noise control procedures, such as limitations on hours of operations for aggregate loadout operations, ensuring that all processing area conveyors are properly lubricated at all times, utilizing electric line power rather than generators for on-site power where feasible, equipping all mobile plant area equipment with acoustic "growler-type" backup warning systems, rather than conventional "beepers", etc.

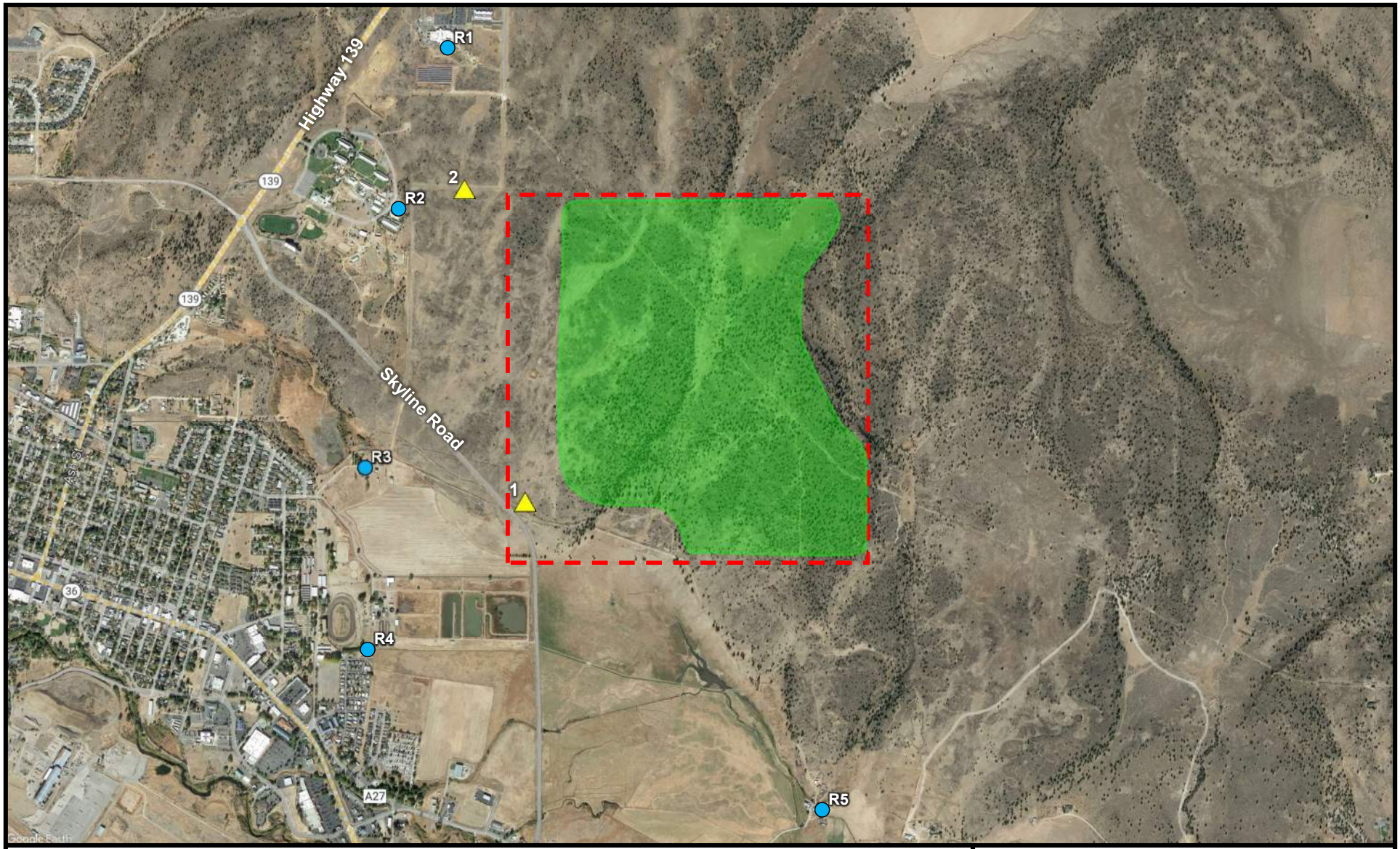
Introduction & Project Description

The proposed project is the Skyline Aggregates facility (project). The 460-acre mining site is Northeast of Skyline Road, East of Highway 139, and North of Johnstonville Road (Assessor's Parcel Numbers 101-110-024), in Lassen County, California. Access to the Project Site is via Skyline Road. Figures 1 and 2 show the project area and proposed site plan.

The project proposes to develop the site into an aggregate mining and processing facility capable of removing 450,000 tons of aggregate per year and 10,000 tons per day. The project is proposing the ability to operate 24 hours a day, 7 days per week during peak construction season to support public paving and infrastructure projects.

The project area is currently zoned as Upland Conservation Agriculture Preserve Combining District (U-C-A-P) by Lassen County. The Lassen County General Plan land use is Urban Reserve/Intensive Agriculture. It is bordered to the north by vacant land zoned as Open Space and Planned Development, and Banner Lassen Medical Center; to the south by agricultural land use, and further south with a residence; to the west land zoned as U-C-A-P and Agricultural District (A-3) that includes a residence, and Lassen Community College; and to the east by vacant land zoned as U-C-A-P.

The project applicant has retained Bollard Acoustical Consultants, Inc. (BAC) to prepare this assessment of potential project-related noise and vibration impacts at nearby existing sensitive receptor locations, including existing residences, the medical center, and school. In addition, pursuant to local regulation, noise impacts are also assessed at the property boundaries of the project site.



Legend

- Parcel Boundary (Approximate)
- Long-Term Noise Measurement Locations
- Sensitive Noise Receptors
- Proposed Mining Area (Approximate)

N

Scale (Feet)

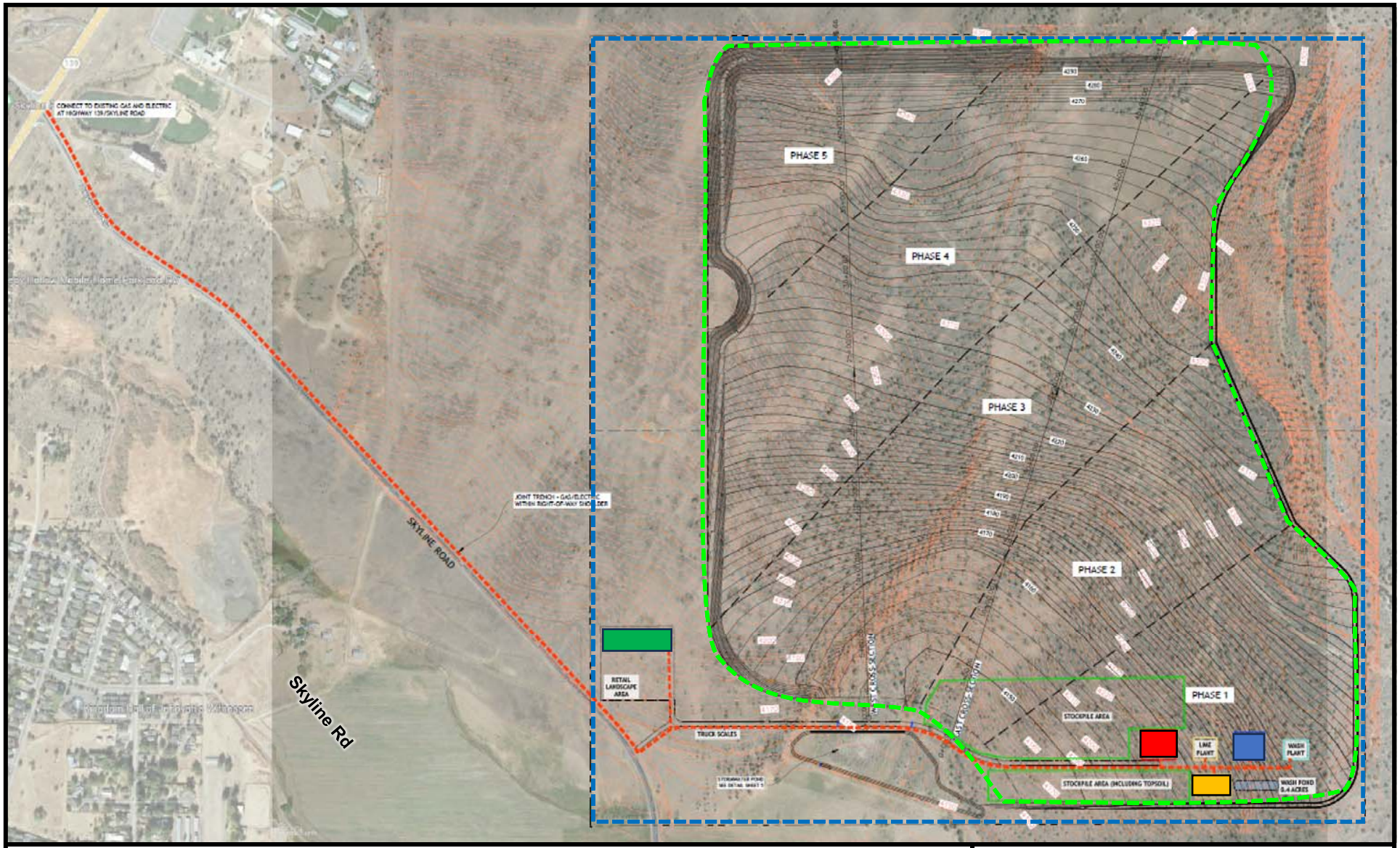
0 1,000 2,000

Project Area

Skyline Aggregates
Lassen County, California

Figure 1

BOLLARD Acoustical Consultants



Legend

- Shop Building and Equipment Storage
- Asphalt Plant (Hot Mix Asphalt)
- Concrete Plant (Ready Mix Concrete)
- Processing Area
- Utility Routing (Gas/Electric)
- Parcel Boundary (Approximate)
- Proposed Mining Area

N

Scale (Feet)

0 500 1,000

Site Plan

Skyline Aggregates
Lassen County, California

Figure 2

BOLLARD Acoustical Consultants

Analysis Objectives

The objectives of this analysis are as follows:

- To provide information pertaining to noise and vibration fundamentals and terminology.
- To identify existing sensitive land uses in the immediate project vicinity.
- To describe existing ambient noise and vibration levels in the immediate project vicinity.
- To describe applicable thresholds of significance by using the California Environmental Quality Act (CEQA) Guidelines in concert with Lassen County/City of Susanville noise standards.
- To predict project-related noise and vibration levels at the nearest noise-sensitive receptor areas.
- To compare predicted noise and vibration levels against the applicable thresholds of significance.
- To evaluate noise and vibration mitigation options where significant project-related impacts are identified.

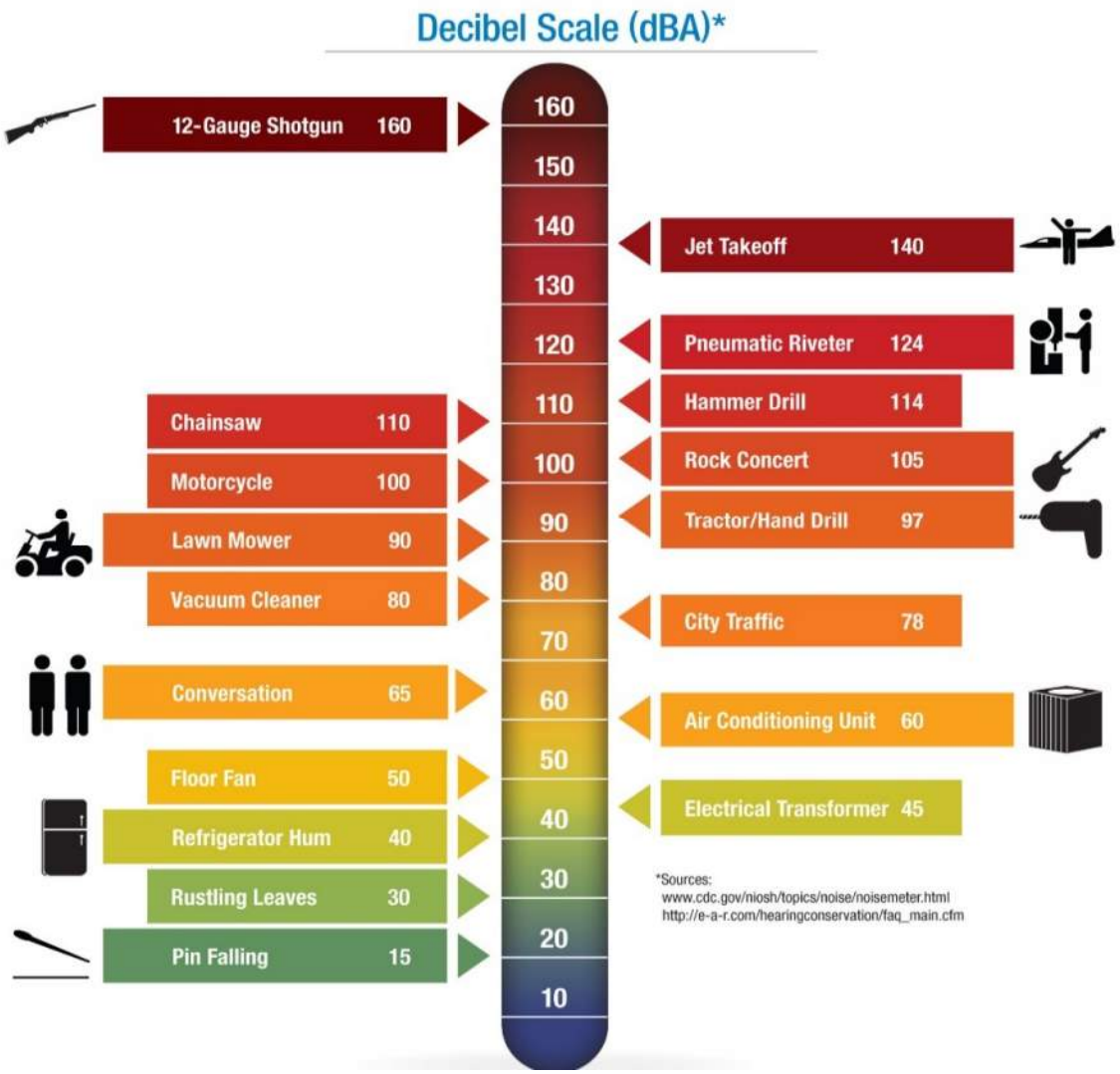
Noise and Vibration Fundamentals and Terminology

Noise

Noise is often described as unwanted sound. Sound is defined as any pressure variation in air that human hearing can detect. If the pressure variations occur frequently enough (i.e., at least 20 times per second) they can be identified as sound. The number of pressure variations per second is called the frequency of sound, and is expressed as cycles per second or Hertz (Hz). Please see Appendix A for definitions of terminology used in this report.

Measuring sound directly in terms of pressure would require a very large and awkward range of numbers. To avoid this, the decibel scale was devised. The decibel scale utilizes the hearing threshold (20 Micropascals of pressure) as a point of reference, defined as 0 dB. Other sound pressures are then compared to the reference pressure, and the logarithm is taken to keep the numbers within a practical range. The decibel scale allows a million-fold increase in pressure to be expressed as 120 dB. Another useful aspect of the decibel scale is that changes in decibel levels correspond closely to human perception of relative loudness. Figure 3 illustrates common noise levels associated with various sources.

Figure 3
Typical A-Weighted Sound Levels of Common Noise Sources



Community noise is commonly described in terms of the ambient noise level, which is defined as the all-encompassing noise level associated with a given noise environment. A common statistical tool to measure the ambient noise level is the average, or equivalent, sound level (L_{eq}) over a given time period (usually one hour). The L_{eq} is the foundation of the Day-Night Average Level noise descriptor, L_{dn}, and shows very good correlation with community response to noise.

The Day-Night Average Level (L_{dn}) is based upon the average noise level over a 24-hour day, with a +10-decibel weighing applied to noise occurring during nighttime (10:00 p.m. to 7:00 a.m.) hours. The nighttime penalty is based upon the assumption that people react to nighttime noise exposures as though they were twice as loud as daytime exposures. Because L_{dn} represents a 24-hour average, it tends to disguise short-term variations in the noise environment. L_{dn} based noise standards are commonly used to assess noise impacts associated with traffic, railroad and aircraft noise sources.

Effects of Noise on People

The effects of noise on people can be divided into three categories:

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

Environmental noise typically produces effects in the first two categories. Workers in industrial plants can experience noise in the third category. There is no completely satisfactory way to measure the subjective effects of noise or the corresponding reactions of annoyance and dissatisfaction. A wide variation in individual thresholds of annoyance exists, and different tolerances to noise tend to develop based on an individual's past experiences with noise.

The perceived loudness of sound is dependent upon many factors, including sound pressure level and frequency content. However, within the usual range of environmental noise levels, perception of loudness is relatively predictable, and can be approximated by weighting the frequency response of a sound level meter by means of the standardized A-weighting network. There is a strong correlation between A-weighted sound levels (expressed as dBA) and community response to noise. All noise levels reported in this section are A-weighted.

An important way of predicting a human reaction to a new noise environment is the way it compares to the existing environment (or ambient noise) to which one has adapted. In general, the more a new noise exceeds the previously existing ambient noise level, the less acceptable the new noise will be judged by those hearing it. With regard to increases in A-weighted noise level, the following relationships occur (Caltrans, 2013):

- It is widely accepted that the average healthy ear can barely perceive noise level changes of 3 dBA;
- A change in level of 5 dBA is a readily perceptible increase in noise level; and
- A 10 dBA change is recognized as twice as loud as the original source.

These relationships occur in part because of the logarithmic nature of sound and the decibel system. Noise levels are measured on a logarithmic scale, instead of a linear scale. On a logarithmic scale, the sum of two noise sources of equal loudness is 3 dBA greater than the noise generated by only one of the noise sources (e.g., a noise source of 60 dBA plus another noise source of 60 dBA generate a composite noise level of 63 dBA). To apply this formula to a specific noise source, in areas where existing levels are dominated by traffic, a doubling in traffic volume will increase ambient noise levels by 3 dBA. Similarly, a doubling in heavy equipment use, such as the use of two pieces of equipment where one formerly was used, would also increase ambient noise levels by 3 dBA.

Single-Event Noise & Sleep Disturbance

A single event is an individual distinct loud activity, such as a blasting event, an aircraft overflight, a train or truck passage, or any other brief and discrete noise-generating activity. Noise exposure quantified in terms of 24-hour-averaged descriptors, such as L_{dn} or CNEL, can mask the potential for annoyance or sleep disturbance associated with individual loud events due to the averaging process.

Extensive studies have been conducted regarding the effects of single-event noise on sleep disturbance, with the Sound Exposure Level (SEL) metric being a common metric used for such assessments. SEL represents the entire sound energy of a given single-event normalized into a one-second period regardless of event duration. As a result, the single-number SEL metric contains information pertaining to both event duration and intensity. Another descriptor utilized to assess single-event noise is the maximum, or L_{max}, noise level associated with the event. A problem with utilizing L_{max} to assess single events is that the duration of the event is not considered.

Due to the wide variation in test subjects' reactions to noises of various levels (some test subjects were awakened by indoor SEL values of 50 dB, whereas others slept through indoor SEL values exceeding 80 dB), no definitive consensus has been reached with respect to a universal criterion to apply to environmental noise assessments. The Federal Interagency Committee on Aviation Noise (FICAN) has provided estimates of the percentage of people expected to be awakened when exposed to specific SEL inside a home (FICAN 1997). According to the FICAN study, an estimated 5 to 10% of the population is affected when interior SEL noise levels are between 65 and 81 dB, and few sleep awakenings (less than 5%) are predicted if the interior SEL is less than 65 dB.

Noise Attenuation with Distance

Stationary "point" sources of noise, attenuate (lessen) at a rate of approximately 6 dBA per doubling of distance from the source, not accounting for environmental conditions (i.e., atmospheric conditions, noise barriers, ground type, vegetation, topography, etc.). Surface traffic (a "moving point" source), would typically attenuate at a lower rate, approximately 4.5 dBA per doubling distance from the source (also dependent upon environmental conditions).

Noise from aggregate processing sites (with heavy mobile and stationary equipment and trucks entering and exiting the site daily) would have characteristics of both "point" and "line" sources, so attenuation would generally range between 4.5 and 6 dBA per doubling of distance. Atmospheric absorption of sound varies depending on temperature and relative humidity, as well as the frequency content of the noise source. In general, "average day" atmospheric conditions result in attenuation at a rate of approximately 1.5 dB per thousand feet of distance in the 1,000 hertz frequency band (SAE ARP 866A, 1975).

Atmospheric (Molecular) Absorption and Anomalous Excess Attenuation

Air absorbs sound energy. The amount of absorption is dependent on the temperature and humidity of the air, as well as the frequency of the sound. Families of curves have been developed which relate these variables to molecular absorption coefficients, frequently expressed in terms of dB per thousand feet. For standard day atmospheric conditions, defined as 59 degrees Fahrenheit and 70% relative humidity, the molecular absorption coefficient at 1000 hertz is 1.5 dB per thousand feet. Molecular absorption is greater at higher frequencies, and reduced at lower frequencies. In addition, for drier conditions, the molecular absorption coefficients generally increase. Similarly, as temperature increases, molecular absorption coefficients typically increase as well.

Anomalous excess attenuation caused by variations in wind speed, wind direction, and thermal gradients in the air can typically be estimated using an attenuation rate of 1.5 dB per thousand feet for a noise source generating a 1000 hertz signal. As with molecular absorption, anomalous excess attenuation typically decreases with lower frequencies and increases with higher frequencies.

For this analysis, the SoundPLAN Version 9.0 noise prediction model was used to project noise generated at the project site to the nearest residences. International Standards Organization (ISO) 9613-2 was employed as the sound propagation methodology within SoundPLAN. ISO 9613-2 applies appropriate octave-band offsets for atmospheric absorption for various combinations of temperature and relative humidity for each noise source associated with the project.

Effects of Topographic Shielding

A noise barrier is any impediment which intercepts the path of sound as it travels from source to receiver. Such impediments can be natural, such as a hill or other naturally occurring topographic feature which blocks the receiver's view of the source. Impediments can also be vegetative, such as heavy tree cover which similarly blocks the source from view of the receiver. In addition, impediments can be man-made, such as an aggregate stockpile, solid wall, earthen berm, or structure constructed between the noise source and receiver. Regardless of the type of impediment, the physical properties of sound are such that, at the point where the line-of-sight between the source and receiver is interrupted by a barrier, a 5 dB reduction in sound occurs.

The effectiveness of a barrier is a function of the difference in distance sound travels on a straight-line path from source to receiver versus the distance it must travel from source to barrier, then barrier to receiver. This difference is referred to as the "path length difference", and is used to calculate the Fresnel Number. A barrier's effectiveness is a function of the Fresnel number and frequency content of the source. In general, the more acute the angle of the sound path created by the introduction of a barrier, the greater the noise reduction provided by the barrier.

For this project, where shielding by would occur, the level of noise reaching the receiver would be lower than at unshielded receivers located the same distances from the source. To account for shielding of project noise sources by intervening structures, elevation data for the entire study area was input to the SoundPLAN model to create a 3-dimensional base map. Noise source and receptor heights were input within the base map and the noise prediction model automatically computed the degree of acoustic shielding between each source and receptor.

Effects of Ground Cover

Ground cover also affects sound propagation. For example, soft ground is more acoustically absorptive than paved surfaces and vegetated ground is more absorptive still. For this analysis, it was assumed that the project site would essentially consist of acoustically hard surfaces (paved roads and compacted dirt), with little sound absorption. Conversely, the area surrounding the project site is primarily juniper woodlands and agriculture to the south. Using aerial imagery and project site plans, the SoundPLAN model inputs for both hard surfaces, soft surfaces, and vegetated areas were applied. The degree of sound absorption applied to each noise source at each receptor varies depending on the type of ground cover and distance between the noise sources and receptors. The greater the distance between the project site and the sensitive receptors, the greater the amount of intervening vegetation and the higher the degree of sound absorption. Where the ground between the noise source and receptor consists primarily of hardscape, the model applied positive offsets to account for reflections of sound from those surfaces.

Vibration

Vibration is like noise in that it involves a source, a transmission path, and a receiver. While vibration is related to noise, it differs in that noise is generally considered to be pressure waves transmitted through air, while vibration is usually associated with transmission through the ground or structures. As with noise, vibration consists of an amplitude and frequency. A person's response to vibration will depend on their individual sensitivity as well as the amplitude and frequency of the source.

Vibration can be described in terms of acceleration, velocity, or displacement. A common practice is to monitor vibration in terms of peak particle velocities (inches/second) or rms velocities (VdB). Standards pertaining to perception as well as damage to structures have been developed for vibration in terms of peak particle velocity.

As vibrations travel outward from the source, they excite the particles of rock and soil through which they pass and cause them to oscillate. Differences in subsurface geologic conditions and distance from the source of vibration will result in different vibration levels characterized by different frequencies and intensities. In all cases, vibration amplitudes will decrease with increasing distance. The maximum rate, or velocity of particle movement, is the commonly accepted descriptor of the vibration "strength".

According to the Transportation and Construction-Induced Vibration Guidance Manual (Caltrans, June 2004), operation of construction equipment and construction techniques generate ground vibration. Traffic traveling on roadways can also be a source of such vibration. At high enough amplitudes, ground vibration has the potential to damage structures and/or cause cosmetic damage (e.g., crack plaster). Ground vibration can also be a source of annoyance to individuals who live or work close to vibration-generating activities. However, traffic, including heavy trucks traveling on a highway, rarely generates vibration amplitudes high enough to cause structural or cosmetic damage.

Baseline Noise Environment

Identification of Existing Sensitive Receivers

BAC utilized aerial imagery and site inspections to identify the nearest potentially affected sensitive receptors to the project site. Although the site is immediately bordered by mostly vacant land, existing noise-sensitive land uses are present in the project vicinity to the northwest, west, and south of the project site. Figure 1 identifies the locations of the 5 nearest sensitive receptors to the project site which were analyzed for this study. It is important to note that it is not necessary to model noise and vibration levels at every sensitive receptor provided the selected receptors are reasonably representative of worst-case impacted locations. In addition to the noise-sensitive receptors in the general vicinity of the project area, there are also sensitive receptors located adjacent to the roadways which will be utilized by project traffic. The primary roadways which will be utilized by project traffic include the following:

- Skyline Road (site access is from this roadway)
- Highway 139
- Johnstonville Road

Existing Ambient Noise Environment

The existing ambient noise environment in the immediate project vicinity is defined primarily by local and distant traffic. To quantify baseline ambient noise levels, BAC utilized a long-term noise survey and traffic noise modelling using the Federal Highway Administration Highway Traffic Noise Prediction Model (FHWA-RD-77-108).

Long-Term Ambient Noise Survey

The existing ambient noise environment at the project site is defined primarily by traffic on Highway 139 and Skyline Road. To quantify the existing ambient noise level environment at the project site, BAC conducted a long-term (5-day) noise level survey from June 28th through July 2nd, 2023 at the locations shown in Figure 1.

Long-term noise measurement site LT-1 is located approximately 550 feet from the west project parcel boundary and 1,000 feet from Lassen Community College. LT-1 was selected to quantify ambient noise levels between Lassen Community College and the northwest project parcel boundary. LT-2 is located at the proposed project driveway at approximately 120 feet from the centerline of Skyline Road. Photographs of the noise survey locations are provided in Appendix B.

Larson-Davis Laboratories (LDL) Model 820 precision integrating sound level meters were used to complete the ambient noise level survey. The meters were calibrated immediately before and after use with an LDL Model CAL200 acoustical calibrator to ensure the accuracy of the measurements. The equipment used meets all pertinent specifications of the American National Standards Institute for Type 1 sound level meters (ANSI S1.4).

The long-term ambient noise level survey results are summarized in Table 1. The detailed results of the ambient noise survey are contained in Appendix C in tabular format and graphically in Appendix D.

Table 1
Summary of Long-Term Noise Survey Measurement Results[1]

				Average Hourly Noise Levels [dBA]			
				Daytime[3]		Nighttime[4]	
Site[2]	Description	Date	DNL [dBA]	Leq	Lmax	Leq	Lmax
LT-1	Between Lassen Community College and Project Parcel Boundary	6/28/2023	52	47	61	46	56
		6/29/2023	51	44	59	44	56
		6/30/2023	55	44	55	49	60
		7/1/2023	52	42	55	46	54
		7/2/2023	49	41	53	43	52
		Average	**52**	**44**	**57**	**46**	**56**
LT-2	Near Skyline Road at proposed project driveway	6/28/2023	59	51	67	52	68
		6/29/2023	59	53	69	52	68
		6/30/2023	59	55	69	52	67
		7/1/2023	58	54	68	51	68
		7/2/2023	57	54	70	50	66
		Average	**58**	**53**	**68**	**52**	**67**

Notes
1. Detailed summaries of the noise monitoring results are provided in Appendices C and D.
2. Long-term noise survey locations are identified on Figure 1.
3. Daytime hours: 7:00 a.m. to 10:00 p.m.
4. Nighttime hours: 10:00 p.m. to 7:00 a.m.

Source: Bollard Acoustical Consultants, Inc. (2023)

Table 1 indicates at average hourly noise levels ranged from 41 – 49 Leq dBA at site LT-1 and 51 – 55 Leq dBA at site LT-2. Daytime and nighttime average Leq levels were typically within 4 dB in either direction. The hourly maximum noise level ranged from 52 – 61 Lmax dBA at site LT-1 and 66 – 70 Lmax dBA at site LT-2. In general, ambient noise levels at site LT-1 were about 7 dB lower than at site LT-2. This is expected as site LT-2 is considerably closer to a roadway. The significance of the ambient noise measurement results is discussed in greater detail in the noise impact evaluation section of this report.

Baseline Traffic Noise Levels

To describe existing noise levels due to traffic, the Federal Highway Administration Highway Traffic Noise Prediction Model (FHWA RD-77-108) was used. The Model is based on the Calveno reference noise factors for automobiles, medium trucks, and heavy trucks with consideration given to vehicle volume, speed, roadway configuration, distance to the receiver, and the acoustical characteristics of the area. The Model was developed to predict hourly L_{eq} values for free-flowing traffic conditions. The day/night distribution of traffic is factored into the Model calculations to assess noise exposure in terms of L_{dn}.

Traffic volumes for existing conditions were obtained from the Transportation Technical Study prepared for this project by Headway Transportation. The percentages of truck usage on the area roadways were obtained from Caltrans truck counts and BAC observations and experience for similar roadways. Vehicle speeds were based on posted speed limits with adjustments for BAC field observations.

Table 2 shows the predicted existing traffic noise levels in terms of L_{dn} at the approximate distance from the identified segment to the nearest noise-sensitive receiver. The FHWA Model input data for existing conditions is provided in Appendix E-1.

Table 2
Summary of Existing Traffic Noise Exposure for Local Area Roadways

Roadway	Segment	Distance [ft][1]	Ldn [dBA]	Distance to Ldn Contours [ft]		
				65 dBA	60 dBA	55 dBA
Highway 139	North of Skyline Rd	500	52	71	152	328
Highway 139	South of Skyline Rd	110	62	70	152	327
Skyline Rd	West of Highway 139	45	62	30	64	137
Skyline Rd	Highway 139 to Project Dwy	600	51	75	161	348
Skyline Rd	Project Dwy to Johnstonville Rd	1700	45	74	159	343
Skyline Rd	South of Johnstonville Rd	100	57	31	67	145
Johnstonville Rd	East of Skyline Rd	60	63	41	89	192
Johnstonville Rd	West of Skyline Rd	220	51	27	57	123

Notes
1. This column represents the approximate distance from the roadway centerline to the nearest noise-sensitive receptor to the roadway segment.

Sources: FHWA-RD-77-108 with inputs from BAC, Headway Transportation, and Caltrans.

The Table 2 data indicate that existing traffic noise levels at the nearest noise-sensitive receptors range from 45 – 63 L_{dn} dBA. Three (3) of the eight (8) identified receptors are above 60 L_{dn} dBA which is approaching typical residential exterior noise standards ranging from 60 – 70 L_{dn} dBA.

Baseline Vibration Environment

The existing ambient vibration environment at the eastern portion of the project site was subjectively evaluated by BAC staff as being imperceptible during field surveys. As a result, baseline vibration levels at the nearest sensitive receptors to the project site are considered to be negligible.

Criteria for Acceptable Noise Exposure

The California Environmental Quality Act (CEQA) contains noise and vibration impact assessment guidelines. In addition, California cities and counties are required to adopt a Noise Element as part of the General Plan. Cities and counties typically also adopt a noise ordinance. The Project site is located in Lassen County, California, which has both a General Plan Noise Element and a Municipal Code Noise Ordinance. The Susanville Vicinity Area Plan also contains noise policies which may be applicable to this project. Surrounding land uses are also located within the jurisdiction of the City of Susanville.

Federal recommendations, CEQA Guidelines, Lassen County and City of Susanville noise-level criteria, and appropriate criteria of other jurisdictions which are considered to be applicable to this project are discussed below.

Federal Criteria for Determination of Significant Noise Increases

The Federal Interagency Commission on Noise (FICON) has developed a graduated scale for use in the assessment of project-related noise level increases. The criteria shown in Table 4 was developed by FICON as a means of developing thresholds for impact identification for project-related noise level increases. The FICON standards have been used extensively in recent years by the authors of this section in the preparation of the noise sections of Environmental Impact Reports that have been certified in many California cities and counties.

The use of the FICON standards is considered conservative relative to thresholds used by other agencies in the State of California. For example, the California Department of Transportation (Caltrans) requires a project-related traffic noise level increase of 12 dB for a finding of significance, and the California Energy Commission (CEC) considers project-related noise level increases between 5 to 10 dB significant, depending on local factors. Therefore, the use of the FICON standards, which set the threshold for finding of significant noise impacts as low as 1.5 dB, provides a very conservative approach to impact assessment for this project.

Table 3
Significance of Changes in Cumulative Noise Exposure

Ambient Noise Level Without Project (DNL)	Change in Ambient Noise Level Due to Project
<60 dB	+5.0 dB or more
60 to 65 dB	+3.0 dB or more
>65 dB	+1.5 dB or more

Source: Federal Interagency Committee on Noise (FICON)

Based on the FICON research, as shown in Table 3, a 5 dB increase in noise levels due to a project is required for a finding of significant noise impact where ambient noise levels without the project are less than 60 dB. Where pre-project ambient conditions are between 60 and 65 dB, a 3 dB increase is applied as the standard of significance. Finally, in areas already exposed to higher noise levels, specifically pre-project noise levels in excess of 65 dB, a 1.5 dB increase is considered by FICON as the threshold of significance.

As noted previously, audibility is not a test of significance according to CEQA. If this were the case, any project which added any audible amount of noise to the environment would be considered significant according to CEQA. Because every physical process creates noise, whether by the addition of a single vehicle on a roadway, or a tractor in an agricultural field, the use of audibility alone as significance criteria would be unworkable. CEQA requires a substantial increase in ambient noise levels before noise impacts are identified, not simply an audible change.

California Environmental Quality Act (CEQA) Guidelines

The State of California has established regulatory criteria that are applicable to this assessment. Specifically, Appendix G of the CEQA Guidelines are used to assess the potential significance of impacts pursuant to local General Plan policies, Municipal Code standards, or the applicable standards of other agencies. According to the CEQA guidelines, the project would result in a significant noise or vibration impact if the following occur:

A. Generation of substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or in other applicable standards of other agencies?

B. Generation of excessive groundborne vibration or groundborne noise levels?

C. For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?

As noted in CEQA Criteria “A” above, a project’s noise impacts must be evaluated relative to both the ***increase*** in noise level which would result from the project as well as compliance with standards established in the local general plan or noise ordinance.

The Lassen County 1General Plan Noise Element and Noise Ordinance do not have a specific policy or standard for assessing noise impacts associated with ***increases*** in off-site ambient noise levels resulting from project-generated traffic on public roadways.

Because CEQA requires that the significance of noise impacts be evaluated relative to the ***increase*** in noise resulting from a project, where the local jurisdiction does not have such adopted thresholds, reasonable thresholds from other jurisdictions must be considered. As a result, the following section describes Federal thresholds for assessing the significance of project-related increases in off-site heavy truck traffic using federal research conducted by the Federal Interagency Commission on Noise (FICON).

Lassen County General Plan Noise Element

The Lassen County Noise Element of the General Plan (December 2021), establishes acceptable noise level limits for new developments based on land use. Figure 4 contains the County's General Plan Land Use Noise Compatibility Standards for new development projects. The Figure 4 land use category which is most applicable to the proposed project is "Resource Extraction", and the normally acceptable noise environment for such uses is up to 95 dB DNL. This high standard is applied due to the fact that resource extraction operations are not considered to be noise sensitive. As such, they can be located in high noise environments within Lassen County.

Figure 4 – Land use Compatibility Standards

Clearly Acceptable	Normally Acceptable	Normally Unacceptable	Clearly Unacceptable
Noise levels that are common and regular and do not disturb regular life. Examples of such noises are children playing in the distance, conversations, and light roadway traffic.	Noise levels that can disturb or annoy people, but are common parts of everyday life, and do not pose a nuisance unless they occur over long periods of time. Activities that would produce noise levels in the "normally acceptable range" may require a ministerial permit from the County. This could include construction noises or dogs barking.	Noise levels that are unusual and generally require special permits from the County which outline the length of the nuisance and special regulations that the activity must comply with. Often normally unacceptable noises require on-site monitoring. Community concerts are normally unacceptable events.	Noise levels that are clearly unacceptable are loud and continuous noises. Unacceptable noises are most often the result of placing homes or parks too close to highways or industrial facilities.

Land Use Category	Maximum Interior Noise Levels	Land Use Interpretation for CNEL (or Ldn) value				
		50 - 60	61 - 70	71 - 80	81 - 90	91+
Residential	45					
Recreational/Open Space						
Institutional*	45					
Commercial/Retail	50					
Industrial						
Agriculture						
Resource Extraction						
Public Right-of-Way						

*This includes uses such as: schools, libraries, nursing homes, etc.

For existing and proposed sensitive receptors which would be potentially affected by noise generated by the project, the Noise Element also presents goals, polices, and implementation measures to limit negative effects of noise. The following polices and actions are considered to be applicable to this project:

Policy 1.1 **Noise Generation Standards:** Minimize the impact of noise generators by applying clear and appropriate standards during permit review and subsequent monitoring.

Action 1.1a Enforce Stationary Noise Source Levels.
Enforce maximum and average noise level limits on permitted stationary sources based on their impact on the property line ***of the nearest noise-sensitive receptor*** (emphasis added by BAC) as outlined in the Lassen County Noise Ordinance (Lassen County Code, Section 9.65.040). Where the ***noise-sensitive receptor*** (emphasis added by BAC), involves a residence on a parcel with zoning or land use designation of "agriculture," the noise impact shall be evaluated at the boundary of the yard area or property line of the residence, whichever is closer to the residence.

Action 1.1c: Noise Monitoring.
Noise monitoring may be required if determined to be necessary by the Director of Lassen County Department of Planning and Building Services or his/her designee, or if determined to be necessary by the Planning Commission or Board of Supervisors through the use permit process.

Action 1.1d: Ensure Construction Occurs During Accepted Times of Day.
Ensure that noise-generating construction work occurs during the accepted times of day, not between the hours of 7 p.m. and 7 a.m., pursuant to Standard N-4. Lassen County Noise Ordinance Section 9.65.070(a)(9) exempts construction work from noise regulation between 7 a.m. and 7 p.m.

Policy 1.2 **Noise Mitigation and Attenuation**. Mitigate the effect of noise from new industrial or commercial uses, project-generated traffic, and short-term/ temporary events on residential and other noise-sensitive land uses by applying feasible noise mitigation measures.

Action 1.2a Attenuate Project-Related Stationary Source Noise Impacts.
As part of the environmental review process, the County shall work with project applicants to attenuate stationary-source noise impacts. Projects shall be designed to avoid long-term noise impacts or reduce those impacts to meet the applicable CNEL limits presented in Standard N-1.1 Noise impacts can be reduced using the following methods, or similar methods, as appropriate:

- Create a distance buffer between stationary mechanical equipment and noise-sensitive receivers by placing parking lots, storm drain facilities, and landscaping between major stationary equipment and adjacent receivers.
- Provide sound barriers or enclosures for equipment with significant sound-generation.
- Where possible, place on-site buildings between major noise-generating equipment and the location of the closest adjacent noise-sensitive land use.
- Where possible, locate/orient/direct/face/position noise-generating uses in such a way that minimizes noise for noise-sensitive receivers.
- Use facility perimeter sound barriers (e.g., solid walls) or landscaped berms to reduce noise levels at immediately adjacent noise-sensitive uses.

Action 1.2b Require Noise Studies for Discretionary Projects.
When a discretionary project has the potential to generate noise levels that exceed the standards presented in Standard N-11 (as identified through the California Environmental Quality Act [CEQA] process), a noise study and acceptable noise attenuation techniques to ensure compliance with Standard N-1 shall be required. For such discretionary projects, the environmental review process required by CEQA shall be employed to identify the required analysis and determine appropriate mitigation, as described in Standard N-2. The noise study shall be prepared in accordance with the requirements set forth in Standard N-3.

Action 1.2c Attenuate Project-Related Traffic Noise Impacts Near Sensitive Uses. Proposed discretionary developments that may result in an increase in traffic on roadways near existing noise-sensitive uses above levels allowed in the General Plan should include, as appropriate and feasible, traffic-calming design, low-noise pavement surfaces, sound barriers, or vegetated berms to minimize motor vehicle traffic noise.

Standard N-1. CNEL/DNL Standards by Land Use Category

New noise-generating land uses may not exceed the following standards presented in Table 4 at the property line for the parcel containing said noise-generating use. ***For noise-sensitive uses in a project's vicinity, exterior noise standards shall be measured at the property line of the receiving noise-sensitive use*** (emphasis added by BAC), or at the yard boundary for residences on agriculture land. Interior noise standards shall be measured with all doors and windows closed.

Table 4
Community Noise Equivalent Level (CNEL) Standards for Receiving Land Uses

Land Use Category	Interior Noise Standard [dBA]	Exterior Noise Standard [dBA][a]
Residential	45	65
Recreational/Open Space	N/A	65
Institutional	45	65
Commercial/Retail	50	75[b]
Industrial	N/A	90[b]
Agriculture	N/A	90
Resource Extraction	N/A	90[b]
Public Right-of-Way	N/A	90

Notes

a. These noise generation limits are translated into hourly average (Leq) limits in Lassen County Code, Section 9.65.040. Proposed new stationary noise sources must comply with both Standard N-1 and Section 9.65.040

b. Noise levels generated from these sources are also subject to the land use noise standard of the receiving properties, where such a standard imposes a lower noise limit. For instance, while commercial noise levels of up to 75 dBA CNEL are allowed within a commercially zoned property, this commercial noise source must not exceed 65 dBA CNEL at any residential property boundary in the vicinity. The limit is applied at the receiving land use property line or (for residences in agriculture zones) at the boundary of the yard area.

Source: Lassen County Noise Element

Standard N-2. Environmental/Development Review Process

When noise-sensitive or noise-generating land uses, as defined in the Noise Ordinance (Lassen County Code, Chapter 9.65), are proposed and require a discretionary permit, the environmental review process required by CEQA shall be used to generate the required analysis and determine the appropriate mitigation per General Plan and state standards. For the purpose of completing CEQA review, future noise levels shall be predicted for a period of at least 10 years from the beginning of the environmental document review process. Adherence to mitigation required to address significant noise impacts (as identified in the CEQA review document) shall be ensured via incorporation of mitigation measures in a required Mitigation Monitoring and Reporting Program (MMRP), to be adopted concurrent with approval of discretionary permits for the project. Adherence to mitigation shall also be ensured through conditions of approval.

Standard N-3. Noise Study Requirements

When a discretionary project has the potential to generate noise levels in excess of N-1 standards, a noise study and acceptable plans to ensure compliance with the standards shall be required. The noise study shall measure or model the following, as appropriate: CNEL, Leq, and Lmax levels at property lines and, if feasible, receptor locations. Noise studies shall be prepared by qualified individuals using calibrated equipment under currently accepted professional standards, and include an analysis of the characteristics of the project in relation to noise levels, all feasible mitigations, and projected noise impacts. Noise studies shall do the following:

- Be the responsibility of the applicant, but accepted by the Department of Planning and Building Services.
- Include representative noise level measurements with sufficient sampling periods and locations to adequately describe local conditions.
- Estimate existing and projected (10 years) noise levels in terms of CNEL standards in Table 7 [Table 5 in this report] or the standards found in Lassen County Noise Ordinance Section 96.040, and compare predicted noise levels against such standards.
- Recommend appropriate mitigation to achieve compliance with the adopted policies and standards of the Noise Element and Noise Ordinance.
- Predict noise exposure at the property line after the prescribed mitigation measures have been implemented (quantify the noise reduction achieved by the mitigations). If the project does not comply with the adopted standards of the Noise Element and Noise Ordinance, the analysis must provide acoustical information for a statement of overriding considerations for the project.

Lassen County Noise Ordinance

Section 9.65 of the Lassen County Code contains the County's Noise Ordinance. The purposed of the Noise Ordinance is to regulate noise in the unincorporated area of the County to promote the public health, comfort and convenience of the County's inhabitants and its visitors. Section 9.65.040 of the Noise Ordinance dictates average hourly noise level standards not to be exceeded when measured at the property line of the property that is receiving the noise. The specific policy language and corresponding noise standards are reproduced below:

9.65.040 General Sound Level Limits

(a) Except as provided in sections 050, 060 and 070 of this chapter, it shall be deemed a Public Nuisance (Lassen County Code Chapter 1.18) for any person to cause or allow the creation of any noise, which exceeds the one-hour average sound level limits in Table 1 [Table 5 of this report], when the one-hour average sound level is measured at ***the property line of the property on which the noise is produced*** or at ***any location on a property that is receiving the noise*** (emphasis added by BAC). Any person violating any provision of the Lassen County Code, including the generation of noise in excess of the following sound level limits, may be issued an administrative citation by an enforcement officer as provided in this chapter, pursuant to Lassen County Code Chapter 1.20.

Table 5
Lassen County General Sound Level Limits

Zone	Time	One-Hour Average Sound Level Limits [dBA]
(1) R-1, R-2, R-3, PUD, P-C, R-S, M-R, F-R, I-1, O-C-B,	7 a.m. – 7 p.m.	65
O-D, O-H, E-A, O-S, A-1, A-2, A-3, U-C, U-C-2, A-F[1,2]	7 p.m. – 10 p.m.	60
Also any future established residential or agricultural zones.	10 p.m. – 7 a.m.	55
(2) B-P, C-H, C-L, C-G, C-R, C-T, C-1, C-2, Y-C[2]	7 a.m. – 7 p.m.	75
Also any future established commercial zones.	7 p.m. – 10 p.m.	70
	10 p.m. – 7 a.m.	65
(3) M-L, M-1, M-2, M, H-R, T-P-Z	7 a.m. – 7 p.m.	90
Also any future established industrial zones	7 p.m. – 7 a.m.	80

Notes
1. Within agriculture zones, noise exposure limit is applicable only to residences, at the residential yard boundary.
2. These limits also govern the noise exposure level for a legal residence in any zone, applied at the residential yard boundary

Source: Lassen County Code

(b) Where a noise study has been conducted and the noise mitigation measures recommended by that study have been made conditions of approval of a Use Permit, which authorizes the noise-generating use or activity and the decision-making body approving the Use Permit determined that those mitigation measures reduce potential noise impacts to a level below significance, implementation and compliance with those noise mitigation measures shall constitute compliance with subsection (a) above.

(c) If the measured ambient noise level exceeds the applicable limit in Table 5, the allowable one-hour average sound level shall be the one-hour average ambient noise level, plus three decibels. The ambient noise level shall be measured when the alleged noise violation source is not operating.

(d) The sound level limit at a location on a boundary between two zones is the lower of the respective limits for the two zones.

(e) A fixed-location public utility distribution or transmission facility located on or adjacent to a property line shall be subject to the sound level limits of this section measured at or beyond six feet from the boundary of the easement upon which the facility is located, subject to the jurisdictional authority of the County.Susanville Vicinity Area Plan (Applicable within Unincorporated Lassen County)

The Susanville Vicinity Area Plan was prepared in 1984. As such, it is unclear if the policies of the Lassen County General Plan Noise Element, which was adopted in 2021, would supersede the policies of the Susanville Vicinity Plan. Nonetheless, the policies and implementation measures of Susanville Vicinity Plan which pertain to noise are reproduced below:

Policy

3.1 The County shall protect noise sensitive land uses from existing or future noise generators by locating them within compatible noise environments or by requiring noise mitigation measures.

Implementation

3.11 County planning staff will evaluate the noise potential of proposed projects and their effect on surrounding uses. If the project is incompatible with the surrounding area, it should be directed (generally) to a more compatible area. Conversely, planning staff should encourage noise sensitive uses to locate away from existing noise generators.

3.12 When new streets are planned, measures such as sound walls or berms should be included to mitigate significant noise impacts.

3.13 New developments shall not exceed the noise standards of the Lassen County General Plan.

3.14 New development locating near noise generators should incorporate design features which will reduce the noise impacts.

3.15 New noise generators shall incorporate design features or devices to reduce the amount of noise which they will emit.

Summary of Lassen County Noise Standards Applicable to this Project:

As indicated above, different noise standards are applied to different land uses located within the County. Figure 4 indicates that the proposed use is considered acceptable in noise environments up to 90 dBA DNL. However, Figure 4 is not included or referenced within the Goals and Policies section of the Lassen County General Plan. Although CEQA does not require assessment of the impacts of the environment upon a project, the project site would nonetheless be considered acceptable for the proposed mineral extraction use provided the noise environment within the project site does not exceed 95 dBA DNL.

The noise standards contained within the Goals and Policies section of the Lassen County General Plan are described as being applicable at the property line of a noise-sensitive receptor (see emphasis added to GP Action 1.1a above). Because there are no existing noise-sensitive receptors located on the parcels to the immediate east, south, or west of the project site, the County General Plan Noise Element standards would not be applicable at those property lines. Rather, the County GP standards would be applicable at the property lines of the parcels containing the sensitive receptors identified on Figure 1. As indicated in Table 5, the specific General Plan exterior noise standards applicable to those nearest receptor locations identified on Figure 1 would be 65 dB DNL for residences (R3, R4 & R5), and 65 dB DNL for institutional uses (hospital use represented by R1 and community college use represented by R2). It should be noted that receptors R1 and R2 (hospital and community college) and R4 (residence), are located within the Susanville City limits, not within unincorporated Lassen County, so the County GP noise standards are not technically applicable at those two sensitive receptor locations. However, because the County noise standards are more restrictive than the City's noise standards, and for a conservative assessment of noise impact evaluation, the project's noise impacts are evaluated relative to the County's noise standards even at locations located within the City of Susanville.

Table 5 of the Lassen County Noise Ordinance indicates that that noise generated by the project shall not exceed 90 dBA Leq during daytime hours, and 80 dBA Leq during nighttime hours, at the project site boundaries (property lines). At the property lines of the nearest sensitive residential receptors (R3-R5 on Figure 1), Table 5 of the ordinance indicates that noise levels shall not exceed 65, 60 and 55 dBA Leq during daytime, evening and nighttime periods, respectively, at the property lines of the parcels containing those residences. Recognizing Receptors R1 and R2 are located within the Susanville City limits, the County noise ordinance standards which would be applicable at the property lines of those uses would be 75, 70 and 65 dBA Leq during daytime, evening and nighttime periods, respectively.

Finally, the noise-related policy and implementation measures of the Susanville Vicinity Area Plan do not contain specific numeric noise standards. Rather, that Plan requires compliance with the noise standards of the Lassen County General Plan. Therefore, compliance with the County's General Plan noise standards would ensure satisfaction with the policies and implementation measures of the Susanville Vicinity Area Plan

City of Susanville General Plan

The City of Susanville General Plan was adopted in 1991. Chapter 9 of the General Plan contains the Community Health, Safety, and Conservation Element. Background on noise exposure within Susanville and the City's policies with respect to noise are contained within that element.

Although other sections of the General Plan have been updated at various times since the 1991 Adoption of the City's General Plan, the section within Chapter 9 containing the City's noise policies have has not changed since 1991. As such it is somewhat outdated. Nonetheless, because a portion of the project site borders parcels located within the Susanville City limits, the noise policies and standards contained within the Susanville Noise Element which would be applicable to this project are presented below.

Policy bk: The City shall require landscaped sound buffers, open space, or other mitigation between ***residential areas*** (emphasis added by BAC), and facilities or areas that produce higher noise levels, such as freeways, commercial sites, and industrial developments. The buffers will be designed to achieve sound level reductions necessary to meet the land use compatibility criteria shown on Figure 9-7 of the General Plan. The criteria contained within this figure have been reproduced below in Table 6.

Policy bl: It shall be City policy to minimize the volume of traffic that passes residences.

Policy bm: The City shall limit the introduction or expansion of noise sources that exceed the desired noise levels established in the Susanville General Plan.

Policy bn: The City shall establish local noise standards and enforce them. The recommended noise standards shown in Table 6 define acceptable conditions for the arrangement and juxtaposition of different categories of land use. The intent is that outdoor and indoor noise standards will be used to review proposals for new development, especially those which either are noise generators or sensitive receptors (***residences, schools, churches, hospitals, etc.***). Interior noise levels for single and multi-family residential buildings should be mitigated to provide a level of 45 DNL. DNL 60 should be established as the reasonable noise level for outdoor use areas. Areas along major trafficways should especially be checked to ensure satisfactory sound levels.

Table 6
Land Use Compatibility Standards

Land Use Category	Noise Level (DNL or CNEL) [dBA]	
	Normally Acceptable[1]	Conditionally Acceptable[2]
Residential –Single Family, Duplex, Mobile Home	Up to 60	55 – 70
Residential – Multi-family	Up to 65	60 - 70
Transient Lodging – Motel, Hotels	Up to 65	60 - 70
School, Library, Church, Hospital, Nursing Home	Up to 70	60 - 70
Auditorium, Concert Hall, Amphitheater	N/A	Up to 70
Sports Arena, Outdoor Spectator Sports	N/A	Up to 75
Playground, Neighborhood Park	Up to 70	N/A
Golf Course, Stable, Water Recreation, Cemetery	Up to 75	N/A
Office Building, Business, Commercial & Professional	Up to 70	67 - 77
Industrial, Manufacturing, Utilities, Agriculture	Up to 75	70 - 80

Notes

1. "Normally Acceptable" means that the "specified land use is satisfactory, based upon the assumption that any building involved is of normal conventional construction, without any special noise insulation requirements."
2. "Conditionally Acceptable" means that "new construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice.

Source: City of Susanville General Plan; State of California

Policy bo: The City shall require new commercial and industrial development to contribute financially to sound buffers where required.

Policy bp: Adopt the State of California noise compatibility standards for various land uses as shown in General Plan Figure 9-7, page 218 (reproduced above as Table 6 of this report).

Policy bq: Require acoustical studies for any new development in areas having an Ldn greater than acceptable for the land use proposed.

Policy bs: Stipulate use of the current standard A-weighted sound levels for measuring noise.

Policy bt: Require setbacks, walls, or other mitigation between noise-generating and noise-sensitive uses.

Policy bu: Allow construction activities at normal activity levels, but limit them to times of the day or week when the number of persons occupying the potential noise impact zone is lowest.

Policy bv: Utilize the natural shielding effects offered by topography to determine the phasing of construction.

Policy bw: Require use of mufflers and require muffler maintenance on construction vehicles to meet EPA standards established under the Federal Noise Control Act of 1972 for new equipment.

Policy bx: Require the placement of stationary construction equipment, such as compressors, as far as possible from developed areas, and require that acoustic shielding be used with such equipment.

Policy cc: Enact a noise ordinance or add noise standards to the City's Zoning Ordinance to cover industrial and commercial operations.

Action program 99: Adopt the State of California land use/noise compatibility standards shown on Figure 9-7, page 218 (reproduced herein in Table 6).

Action program 100: Enact a noise ordinance to include the above policies for new and, where applicable, existing-development.

Summary of City of Susanville Noise Standards Applicable to this Project:

The noise standards contained within the City of Susanville General Plan are described as being applicable sensitive receptor locations (see policies **bk** and **bn**). As such, project noise exposure would be considered "normally acceptable" at existing and proposed residential land uses located within the Susanville City limits provided it does not exceed 60 dBA DNL. Project noise exposure at Hospital and School uses (Receptors R1 and R1 on Figure 1), would be acceptable provided it does not exceed 70 dBA DNL.

Sleep Disturbance Evaluation Criteria

Since a court case in Berkeley, California (*Berkeley Keep Jets Over the Bay Committee v. Board of Port Commissioners of the City of Oakland* (2001) 91 Cal.App.4th 1344), which pertained to increased aircraft overflights of the City of Berkeley, there has been increased attention to the evaluation of single-event noise levels during the preparation of noise analyses. The Berkeley case ruling required that single-event noise be considered, but it did not recommend an appropriate single event noise level standard.

The Federal Interagency Committee on Aviation Noise (FICAN) has provided estimates of the percentage of people expected to be awakened when exposed to specific SELs inside a home (FICAN 1997). However, FICAN did not recommend a threshold of significance based on the percent of people awakened. According to the FICAN study, 10% of the population is estimated to be awakened when the SEL interior noise level exceeds 81 dBA. An estimated 5 to 10 percent of the population is affected when the SEL interior noise level is between 65 and 81 dBA, and few sleep awakenings (less than 5 percent) are predicted if the interior SEL is less than 65 dBA.

The threshold for sleep disturbance is not absolute because there is a high degree of variability from one person to another. Thus, the means of applying such research to land use decisions is not clear. As a result, there is no consensus on what frequencies of awakenings are acceptable (California Division of Aeronautics 2002). For these reasons, the Federal Interagency Committee on Noise (FICON) and the California Airport and Land Use Planning Handbook continue to use CNEL as the primary tool for the purpose of land use compatibility planning (California Division of Aeronautics 2002). Note that CNEL and L_{dn} are often used interchangeably, as there is only a subtle difference in noise level penalties between the two metrics during evening hours. In fact, CNEL/L_{dn} represents the cumulative exposure to all single events; that is, the exposure of all SELs taken together, weighed to add penalties for nighttime occurrences, and averaged over a 24-hour period. Thus, it can be argued that the L_{dn}-based standards already account for the individual impacts associated with the SELs.

This analysis conservatively utilizes a criterion of 65 dB SEL within residences as the threshold at which sleep disturbance impacts could occur. Based on the FICAN test results on aviation noise, less than 5% of the population experiences sleep disturbance if interior noise is less than 65 dB SEL. Thus, for the purposes of this analysis, single-event levels resulting from the project would be considered less than significant if single-event noise levels would not exceed 65 dB SEL within interior areas of residences located in the immediate project vicinity.

Criteria for Acceptable Vibration Exposure

Federal Transit Administration (FTA)

Lassen County does not currently have adopted standards for groundborne vibration. As a result, vibration impact assessment criteria established by the U.S. Department of Transportation's Federal Transit Administration (FTA) was applied to the project. The FTA's publication, Transit Noise and Vibration Impact Assessment Manual (FTA Report No. 0123 dated September 2018), includes criteria for assessing potential impacts related to groundborne vibration in terms of both annoyance and damage to structures. The FTA vibration impact criteria are based on maximum overall levels for a single event. The FTA vibration impact criteria for interference with human activity and annoyance are shown below in Table 7.

Table 7
Groundborne Vibration Impact Criteria for Annoyance Determinations

Land Use Category	Groundborne Vibration Impact Levels (VdB re 1 µinch/sec, RMS)		
	Frequent Events[1]	Occasional Events[2]	Infrequent Events[3]
Buildings where vibration would interfere with interior operations	65[4]	65[4]	65[4]
Residences and buildings where people normally sleep	72	75	80
Institutional land uses with primarily daytime use	75	78	83

Notes:
1 "Frequent Events" is defined as more than 70 vibration events of the same source per day.
2 "Occasional Events" is defined as between 30 and 70 vibration events of the same source per day.
3 "Infrequent Events" is defined as fewer than 30 vibration events of the same kind per day.
4 This criterion limit is based on levels that are acceptable for most moderately sensitive equipment such as optical microscopes. For equipment that is more sensitive, a Detailed Vibration Analysis must be performed.
Source: Federal Transit Administration (FTA), Transit Noise and Vibration Impact Assessment Manual (Sep. 2018), Table 6-3

Table 7-5 of the Federal Transit Administration's publication, *Transit Noise and Vibration Impact Assessment Manual*, contains criteria for assessing damage to structures from vibration. That table is reproduced below as Table 8.

Table 8
FTA Vibration Damage Criteria

Building/ Structural Category	PPV, in/sec	Approximate Lv*
I. Reinforced-concrete, steel or timber (no plaster)	0.5	102
II. Engineered concrete and masonry (no plaster)	0.3	98
III. Non-engineered timber and masonry buildings	0.2	94
IV. Buildings extremely susceptible to vibration damage	0.12	90
*RMS velocity in decibels, VdB re I micro-in/sec		

Assessment of Project Noise Impacts

The proposed project would generate noise through the following components: aggregate mining (including blasting), aggregate processing (crushing, screening, conveying), ready-mix concrete (RMC) plant operations, and a hot mix asphalt (HMA) plant. In addition to the noise generation of these plants, noise would also be generated by Project heavy truck traffic related to these Project components. The noise generation of the project's on-site noise sources was evaluated using the SoundPLAN noise prediction program (V8.2) using ISO standard 9613-2. The assessment of increases in off-site traffic noise levels resulting from the project was completed using the Federal Highway Administration Highway Traffic Noise Prediction Model (FHWA-RD-77-108). Noise would also be generated during project site construction but construction activities would be short-term in nature and limited to daytime hours. Finally, HMA and RMC plant operations would periodically occur during nighttime hours as required to satisfy night paving projects but project construction would be limited to daytime hours.

Impact 1: Project Construction Noise

The primary construction noise generation at the project site will be the grading and paving of onsite circulation routes and assembly of the processing, RMC, and HMA plants. Offsite construction will consist of gas/electric utility installation within the Skyline Road right of way between SR 139 and the project site. The location of the off-site utility improvements are indicated on Figure 2. The Federal Highway Administration (FHWA) Roadway Construction Noise Model (RCNM) was used to quantify worst-case construction noise levels for the project. For this assessment, it was assumed that graders, front-end loaders, compactors, paving machines, pneumatic tools, etc., would be used for the various stages of on-site preparation. This includes construction of the shop building, paving of the access road, retail landscape area, and the heavy equipment parking areas near the shop building. For off-site utility installation it was assumed that backhoes, pavers, forklifts and compactors would be utilized.

Table 9 provides the maximum noise levels reported by the RCNM for equipment commonly used in general construction projects at full-power operation at a distance of 50 feet. Not all of these construction activities would be required of this project.

Assuming a bulldozer, grader, excavator, front-end loader and compactor were operating concurrently one the project site during site-preparation activities, the combined noise exposure from the effective noise center of those operations would be 85 dBA L_{eq} at a distance of 50 feet from the operations. For the less equipment-intensive off-site utility installation, the combined noise exposure from the effective noise center of those construction activities is expected to be approximately 75 dBA L_{eq} at a distance of 50 feet from the operations.

The reference construction noise levels cited above were projected to the representative receptor locations shown on Figure 1 assuming standard spherical spreading of sound (- 6 dB per doubling of distance from the source), and standard day atmospheric absorption (1.5 dB per thousand feet). The results of the on-site construction noise projections are presented in Table 10. Table 10 data indicates that predicted noise levels would range from 32-48 dBA Leq at the nearest sensitive receptors and approximately 73 dBA at the nearest property line. The nearest residences to the utility improvements which will occur within the Skyline Road ROW are approximately 600 feet from those construction activities. At that distance, average noise levels would be approximately 53 dBA Leq.

Because the construction noise levels are predicted to be satisfactory relative to the most applicable noise standards (65 dBA Leq daytime noise standard of Lassen County), noise impacts related to both on-site and off-site project construction would be ***less than significant***.

Mitigation for Impact 1: ***None Required***

Table 9
Typical Construction Equipment Noise Levels

Equipment Description	Maximum Noise Level at 50 Feet, dBA
Auger drill rig	85
Backhoe	80
Compactor (ground)	80
Compressor (air)	80
Concrete batch plant	83
Concrete mixer truck	85
Concrete pump truck	82
Concrete saw	90
Crane (mobile or stationary)	85
Dozer	85
Dump truck	84
Excavator	85
Front end loader	80
Generator (more than 25 kVA)	82
Grader	85
Jackhammer	85
Mounted impact hammer	90
Paver	85
Pumps	77
Rock drill	85
Scraper	85

Source: Federal Highway Administration (FHWA) Roadway Construction Noise Model (RCNM)

Table 10
Predicted On-Site Construction Noise Levels at Nearest Receptors

Receptor[1]	Predicted Noise Level (Leq, dBA)	County Daytime Noise Standard (Leq/DNL, dBA)[2]	Noise Standard Exceeded?	Mitigation Required?
1	32	75	No	No
2	38	75	No	No
3	48	65	No	No
4	45	65	No	No
5	42	65	No	No
Nearest Property line	73	90	No	No

1. Receptor locations are shown on Figure 1.
2. Project construction activities would be limited to daytime hours. As a result, only the daytime criteria are utilized for the assessment of potential noise impacts for this activity. Based on 8 daytime hours of construction, DNL values would be

Source: FHWA Roadway Construction Noise Model (RCNM) reference noise levels.

Impact 2: Off-Site Traffic Noise Level Increases

To quantitatively assess traffic noise levels associated with the Project, the Federal Highway Administration Highway Traffic Noise Prediction Model (FHWA RD-77-108) was used. The Model is based on the Calveno reference noise factors for automobiles, medium trucks, and heavy trucks, with consideration given to vehicle volume, speed, roadway configuration, distance to the receiver, and the acoustical characteristics of the site. The FHWA Model was used with inputs obtained from the project transportation impact analysis, prepared by Headway Transportation, to predict existing and future (cumulative), project and no-project traffic noise levels at the nearest identified sensitive receptors to each of the roadway segments described above. Table 11 shows existing and existing plus project traffic noise levels, the increase in traffic noise levels related to the project, the significance criteria, and a determination as to whether the increase is considered substantial. Table 12 presents the same information for cumulative conditions. Cumulative conditions represent future conditions including traffic generated by buildout of the region as defined in the traffic impact analysis report. Appendix E contains the FHWA noise model inputs.

The Table 11 and 12 data indicate that the Project-related traffic noise level increases on each roadway segment would be below the applicable threshold for a finding of a significant noise impact at the nearest potentially affected sensitive receptor locations. As a result, off-site traffic noise increases resulting from project heavy truck and employee traffic are predicted to be ***less than significant***.

Mitigation for Impact 2: ***None Required***

Table 11
Predicted Traffic Noise Level Increases at Existing Sensitive Receptors – Existing vs. Existing Plus Project Conditions

#	Roadway	Segment Description	Predicted DNL [dBA]				Significance Threshold[1]	Threshold Exceeded?	Sensitive Receptors Present?[2]	Significant Impact Identified?[3]
			Existing	Project	Existing + Project	Increase				
1	Highway 139	North of Skyline Rd	52.3	48.5	53.8	1.5	5.0	No	**Yes**	No
2	Highway 139	South of Skyline Rd	62.1	55.8	63.0	0.9	3.0	No	**Yes**	No
3	Skyline Rd	West of Highway 139	62.3	0.0	62.3	0.0	3.0	No	**Yes**	No
4	Skyline Rd	Highway 139 to Project Dwy	51.5	49.2	53.5	2.0	5.0	No	**Yes**	No
5	Skyline Rd	Project Dwy to Johnstonville Rd	44.6	44.3	47.5	2.9	5.0	No	**Yes**	No
6	Skyline Rd	South of Johnstonville Rd	57.4	59.8	61.8	4.4	5.0	No	**Yes**	No
7	Johnstonville Rd	East of Skyline Rd	62.6	60.5	64.7	2.1	3.0	No	**Yes**	No
8	Johnstonville Rd	West of Skyline Rd	51.2	44.8	52.1	0.9	5.0	No	**Yes**	No

Notes:

1. Significance threshold derived from Table 3.
2. Sensitive receptors include residences of all densities, schools, churches, & RV parks.
3. A significant impact is identified only along segments where the project-related traffic noise level increase would exceed the significance threshold AND where sensitive receptors are present along the roadway segment.

Source: FHWA-RD-77-108 with inputs from project traffic impact study. Appendix E contains FHWA Model inputs.

Table 12
Predicted Traffic Noise Level Increases at Existing Sensitive Receptors – Future vs. Future Plus Project Conditions

#	Roadway	Segment Description	Predicted DNL [dBA]				Significance Threshold[1]	Threshold Exceeded?	Sensitive Receptors Present?[2]	Significant Impact Identified?[3]
			Future	Project	Future + Project	Increase				
1	Highway 139	North of Skyline Rd	53.0	52.3	55.7	2.7	5.0	No	Yes	No
2	Highway 139	South of Skyline Rd	62.9	62.1	65.5	2.6	3.0	No	Yes	No
3	Skyline Rd	West of Highway 139	63.0	62.3	65.7	2.7	3.0	No	Yes	No
4	Skyline Rd	Highway 139 to Project Dwy	52.2	51.5	54.9	2.7	5.0	No	Yes	No
5	Skyline Rd	Project Dwy to Johnstonville Rd	45.4	44.6	48.0	2.6	5.0	No	Yes	No
6	Skyline Rd	South of Johnstonville Rd	58.2	57.4	60.8	2.6	5.0	No	Yes	No
7	Johnstonville Rd	East of Skyline Rd	63.4	62.6	66.0	2.6	3.0	No	Yes	No
8	Johnstonville Rd	West of Skyline Rd	52.0	51.2	54.6	2.6	5.0	No	Yes	No

Notes:

1. Significance threshold derived from Table 3.
2. Sensitive receptors include residences of all densities, schools, churches, & RV parks.
3. A significant impact is identified only along segments where the project-related traffic noise level increase would exceed the significance threshold AND where sensitive receptors are present along the roadway segment.

Source: FHWA-RD-77-108 with inputs from project traffic impact study. Appendix E contains FHWA Model inputs.

Impact 3: Noise Generated by On-Site Operations

As noted in the project introduction, on-site activities at the Project site will consist of aggregate mining & processing, asphalt and ready-mix production, and sales (load-out). The project also proposes the construction of a mobile equipment parking area and shop building north of the retail landscape area by the project site entrance. Figure 2 shows the proposed site configuration. Figure 1 shows the locations of the nearest potentially affected sensitive receptors to the project site.

Noise sources associated with the shop building for routine equipment maintenance would consist of air compressors, pneumatic wrenches, hydraulic lifts, etc. The noise generation of this equipment is predicted to be effectively contained within the shop building. The nearest residence to the shop building (R3 on Figure 1), is approximately 2,000 feet from the shop building. Mobile equipment moving in and out of the parking area (dump trucks, transfer trucks, loaders, dozers, excavators, etc.), is expected to generate average noise levels of 85 dBA Leq at a reference distance of 50 feet. At the nearest residence, that noise level would be reduced to approximately 50 dBA Leq, which would be satisfactory with the County's most restrictive 55 dBA Leq nighttime noise level standard. As a result, no adverse noise impacts are identified for the shop building operations and mobile equipment parking area.

To quantify the noise generation of the proposed on-site mining and processing equipment, noise level data contained within the j.c. brennan & associates environmental noise analysis prepared for the *Hat Creek Facility Expansion* (Lassen County, February 2019), and BAC reference noise level data were utilized. The reference levels were projected to the nearest receptors in the Project vicinity using the SoundPLAN model with standard atmospheric conditions. The predicted noise levels from processing, haul trucks, and mining at the nearest receptors to the Project Site are provided in Tables 13 & 14 in terms of hourly average (Leq), and day-night average (DNL), noise levels for on-site noise sources, respectively. Figures 5-7 show the predicted noise contours for the on-site noise sources in terms of hourly average (Leq), maximum (Lmax), and day-night average (DNL), noise levels for on-site noise sources, respectively.

Table 13
Predicted Hourly Average Noise Levels at Nearest Receptors from On-Site Project Operations

	Predicted Noise Level, Leq [dBA]						
Receiver	Processing Equipment	On-Site Haul Trucks	Mining	Combined	Jurisdiction	Most Restrictive County Standard[1] Leq [dBA]	Exceeds Standard?
R1	48	25	43	**49**	Susanville	65	No
R2	44	26	45	**48**	Susanville	65	No
R3	51	24	44	**51**	Lassen Co	55	No
R4	48	25	41	**49**	Susanville	55	No
R5	55	23	41	**55**	Lassen Co	55	No
Project P/L[2]	73	42	57	**73**	Lassen Co	80	No

Receiver	Predicted Noise Level, Leq [dBA]				Jurisdiction	Most Restrictive County Standard[1] Leq [dBA]	Exceeds Standard?
	Processing Equipment	On-Site Haul Trucks	Mining	Combined			

Notes

1. The City of Susanville does not have applicable hourly average noise standards. Receptors R1, R2, and R4 are within the Susanville City limits. Because the City's 24-hour average noise standards (DNL) are considerably less restrictive than the County's hourly noise standards, the County standards were applied to provide a conservative assessment of potential noise impacts. This table shows the most restrictive noise level standards for Lassen County.
2. The hourly average noise level standard applies to the property line of the noise-generating land use.

Source: BAC (2023)

Table 14
Predicted Day-Night Average Noise Levels at Nearest Receptors from On-Site Project Operations

Receiver	Predicted Noise Level, DNL [dBA]				Jurisdiction[1]	County Exterior Standard[2] DNL [dBA]	Exceeds Standard?
	Processing Plant	On-Site Haul Trucks	Mining	Combined			
R1	54	32	50	56	Susanville	65	No
R2	51	32	51	54	Susanville	60	No
R3	57	31	50	58	Lassen Co	65	No
R4	54	32	47	55	Susanville	55	No
R5	62	29	48	62	Lassen Co	65	No
Project P/L	79	47	63	80	Lassen Co	80	No

Notes

1. For a more conservative approach, Lassen County noise standards applied. The City of Susanville noise standard would be 70 dBA DNL.
2. There are no day-night level applicable noise-source property line standards.

Source: BAC (2023)

The Table 12 data and noise contours presented in Figures 7 & 8 indicate that the project is not expected to result in exceedance of the project standards of significance at the noise-sensitive areas of the nearest receptors to the project site, including nighttime operations. In addition, due to the considerable distances between the noisiest components of the project and nearest sensitive receptors, noise generated during daytime operations at the project site is not expected to substantially exceed baseline ambient conditions at those nearest sensitive receptors. As a result, noise impacts associated with daytime excavation, processing and load-out operations at the project site are considered to be ***less than significant at the nearest sensitive receptors***.

Due to the proximity of on-site noise sources to the south of the project property line, operational noise levels generated by the project would be greatest near that property line. However, there are no sensitive receivers located on the parcels immediately adjacent to the project boundaries. In addition, project noise levels are not expected to exceed the County's noise standards for industrial uses at the project site boundaries. As a result, ***noise impacts related to project operations are considered less than significant at the project property lines***.

Although no noise impacts are identified at the nearest existing sensitive receptors for daytime hours, there are many variables which will affect the noise generation of the facility and, despite extensive analysis, it is difficult to precisely account for all variables in the noise modelling process. Given the sensitivity of the nearby residential receptors and the proposed periodic nighttime operation of the asphalt and ready-mix plants, it is possible that periodic nighttime operations could substantially exceed baseline noise conditions during those nighttime periods. As a result, ***noise impacts related to nighttime operations are considered potentially significant***.

Mitigation for Impact 3:

The following specific noise control procedures should be implemented to to reduce the potential for adverse noise impacts associated with periodic nighttime operations.

1. Ensure that all processing area conveyors are properly lubricated at all times.
2. Utilize electric power rather than generators for on-site power.
3. Equip all mobile plant area equipment with acoustic “growler-type” backup warning systems, rather than conventional “beepers”.
4. Limit asphalt and ready-mix operations to daytime hours unless construction contracts specifically require the delivery of materials during nighttime hours.
5. Suspend acoustic curtains as close as possible to the asphalt plant burner and ready-mix plant in the direction of the nearest residences to the south and west.
6. Install an acoustic silencer on the asphalt plant bag house exhaust fan outlet.
7. Pre-load asphalt plant and ready-mix feed hoppers prior to nighttime operations to reduce the degree of nighttime loading required.

Significance of Impact 3 after mitigation:

Following implementation of these noise mitigation measures, nighttime project noise generation is predicted to be ***less than significant*** relative to Lassen County noise standards and CEQA guidelines.

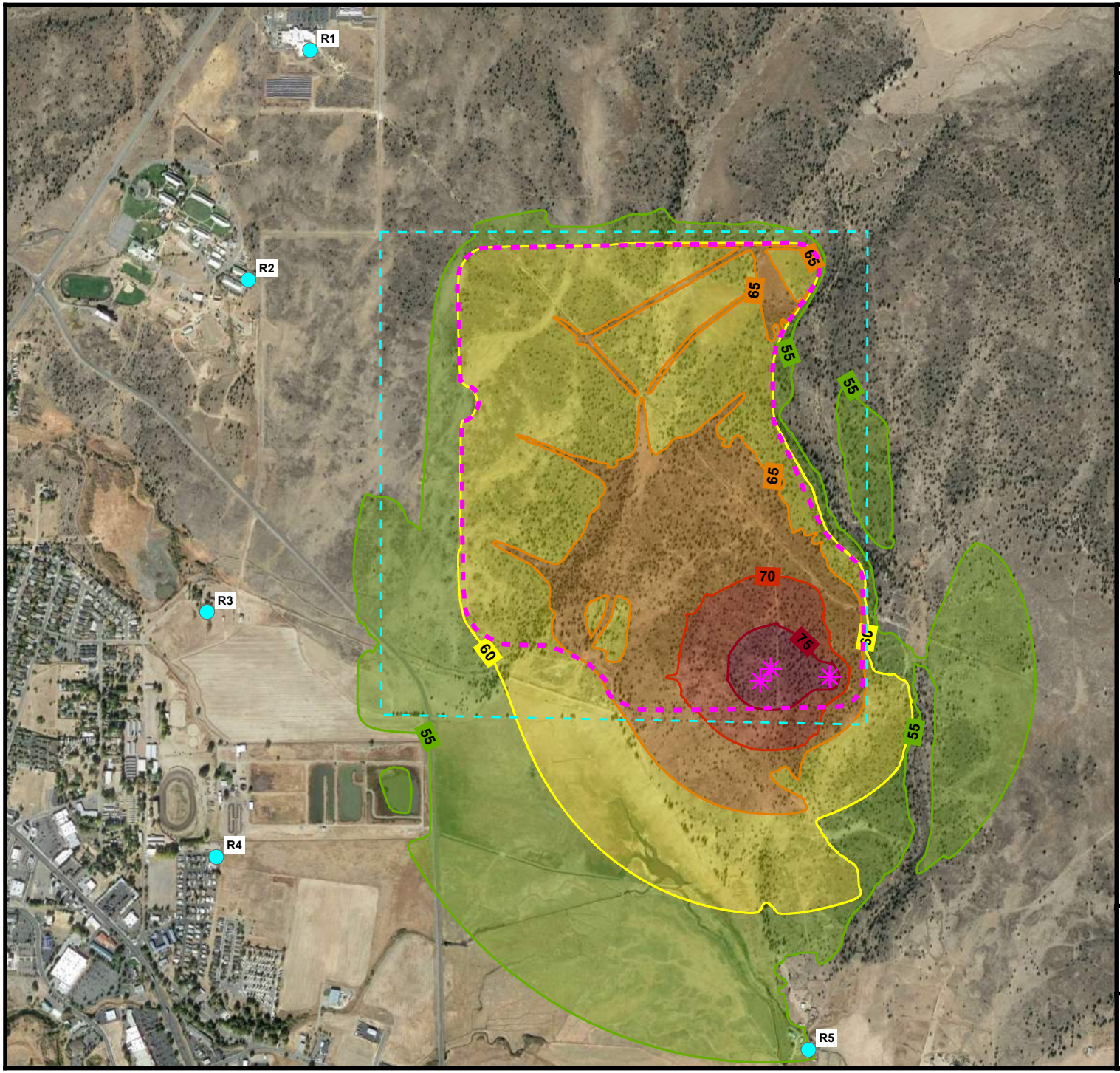


Figure 5

Operations Avg Noise Level Contour Map

Skyline Aggregates
Lassen County, California

Legend

Contour Scale, Leq [dBA]

>=	75
70 -	75
65 -	70
60 -	65
55 -	60

Objects

- Noise-Sensitive Receiver
- Excavation Area
- Processing Plant Components
- Project Parcel Boundary

Scale

N

0 500 1000 2000 feet

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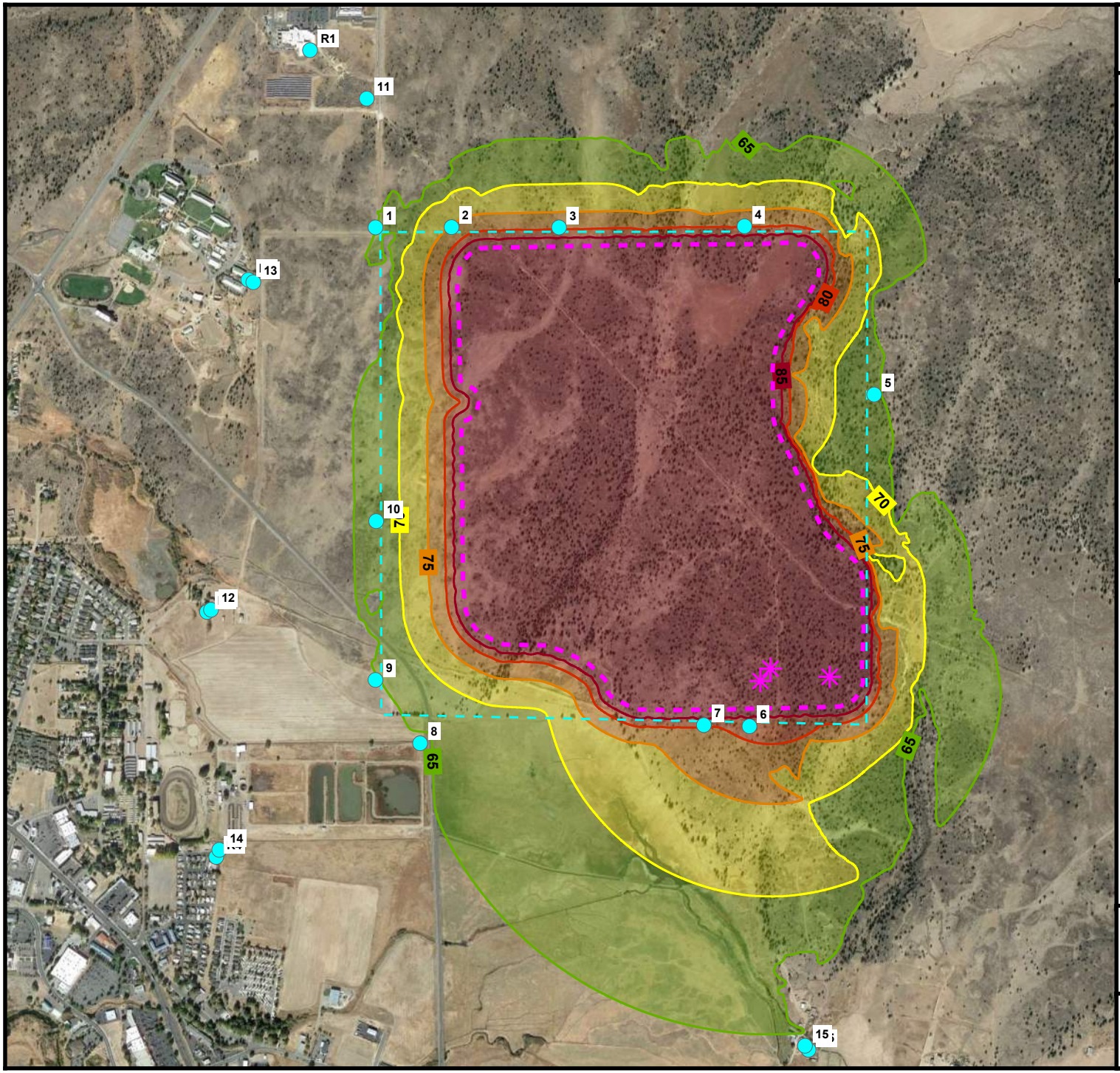

Figure 6

Operations Max Noise Level Contour Map

Skyline Aggregates
Lassen County, California

Legend

Contour Scale, Lmax [dBA]

>=	85
80 -	85
75 -	80
70 -	75
65 -	70

Objects

- Noise-Sensitive Receiver
- Excavation Area
- Processing Plant Components
- Project Parcel Boundary

Scale

N

0 500 1000 2000 feet

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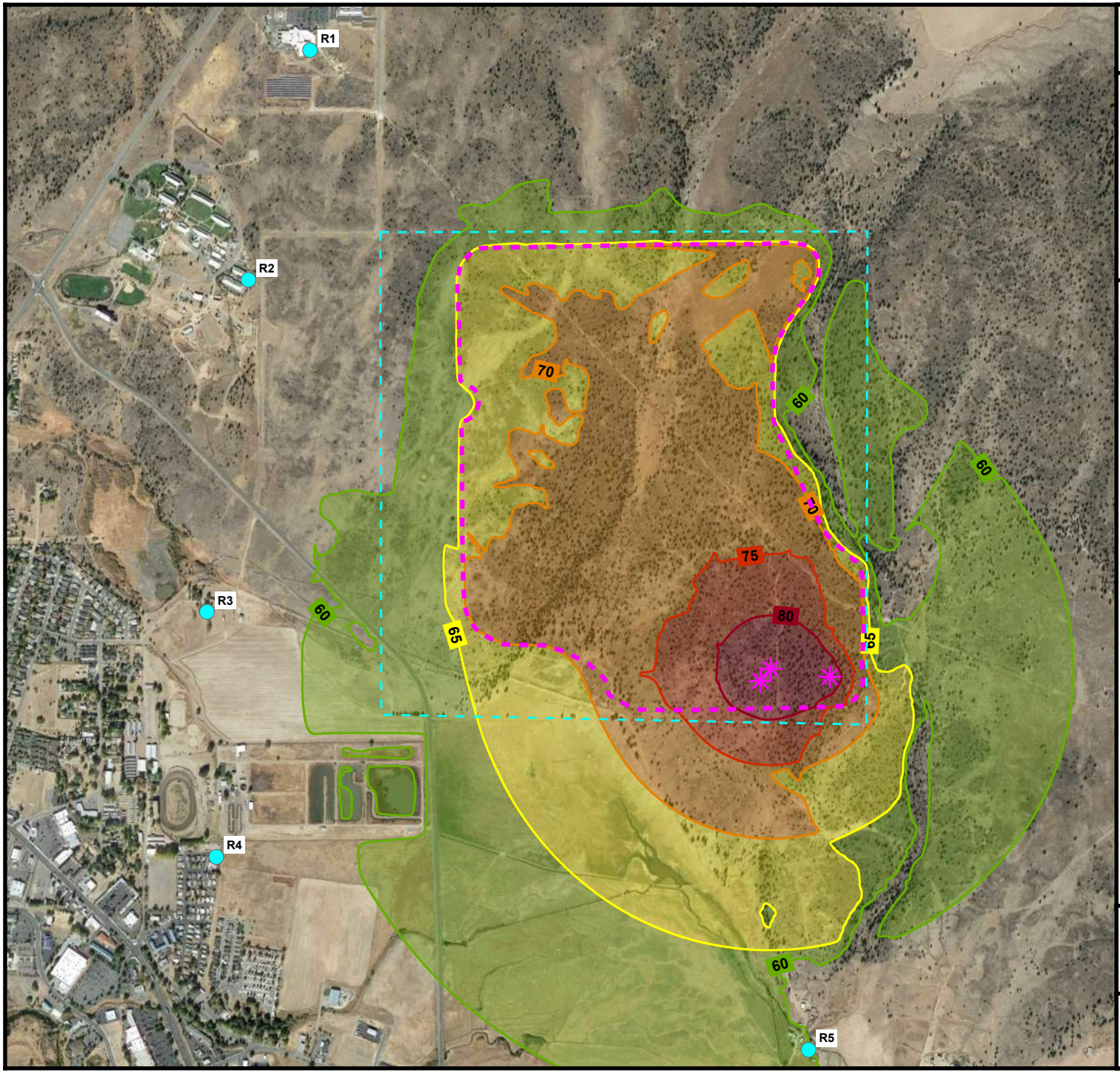

Figure 7

Operations Day-Night Average Noise Level Contour Map

Skyline Aggregates
Lassen County, California

Legend

Contour Scale, DNL [dBA]

>=	80
75 -	80
70 -	75
65 -	70
60 -	65

Objects

- Noise-Sensitive Receiver
- Excavation Area
- Processing Plant Components
- Project Parcel Boundary

Scale

N

0 500 1000 2000 feet

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Impact 4: Evaluation of Potential Sleep Disturbance Impacts

As noted in the criteria section of this report, sleep disturbance impacts would be considered potentially significant if the single-event noise level resulting from the project would exceed 65 dB SEL within interior areas of residences not currently exposed to appreciable nighttime single-event noise. Sleep disturbance impacts at the nearest residences were evaluated for nighttime asphalt plant operations, nighttime ready-mix concrete plant operations, and nighttime heavy truck passbys. The results of that evaluation for each noise source are described below.

Nighttime Asphalt Plant Operations:

Asphalt plants typically generate steady-state noise levels due to the continuous operation of the asphalt burner, drum, and baghouses. As a result, single-event noise is generally not a substantial component of overall asphalt plant operational noise. For this assessment, the maximum noise levels generated by a front-loader feeding the asphalt plant hoppers were used to evaluate single-event noise levels at the nearest noise-sensitive receptors. Specifically, a maximum noise level of 80 dBA Lmax at a reference of 50 feet from the loader feeding the hoppers was utilized for the impact evaluation. Given this maximum noise level, the estimated Sound Exposure Level (SEL) for loader operations would be approximately 90 dBA SEL at a reference distance of 50 feet from the loader.

The nearest residence (R5 – See Figure 1), is located approximately 4,000 feet south of the asphalt plant operations area. At that distance, the single event noise from nighttime front-loader operations would be reduced to less than 50 dB SEL due to the effects of distance and atmospheric absorption. Within that nearest residence, SEL values would be approximately 25 to 35 dBA SEL, depending on whether windows were in the open or closed positions. Regardless of the window position, interior SEL values associated with nighttime asphalt plant operations are predicted to be well below the 65 dB SEL threshold for a finding of noise impact. Therefore, sleep disturbance impacts related to nighttime operation of the asphalt plant are predicted to be ***less than significant***.

Nighttime Ready-Mix Plant Operations:

Like asphalt plants, ready-mix concrete plants typically generate fairly steady-state noise levels while in operation. As a result, single-event noise is generally not a substantial component of overall ready-mix plant operational noise. For this assessment, the maximum noise generation of the ready-mix plant is identified as being 80 dBA at a reference distance of 50 feet from the plant (a sound power level of 114 dBA). Given this maximum noise level, the estimated Sound Exposure Level (SEL) for typical concrete batch operations would be approximately 90 dBA SEL at a reference distance of 50 feet from the plant, similar to single-event levels generated by the asphalt plant.

The nearest residence (R5 – See Figure 1), is located approximately 4,000 feet from the ready-mix plant. At that distance, the single event noise from nighttime ready-mix plant operations would be reduced to less than 50 dB SEL due to the effects of distance and atmospheric absorption. Within that nearest residence, SEL values would be approximately 25 to 35 dBA SEL, depending on whether windows were in the open or closed positions. Regardless of the window position, interior SEL values associated with nighttime ready-mix plant operations are predicted to be well below the 65 dB SEL threshold for a finding of noise impact. Therefore, sleep disturbance impacts related to nighttime operation of the ready-mix plant are predicted to be ***less than significant***.

Nighttime Heavy-Truck Passbys:

During nighttime operations of the asphalt and ready-mix concrete plants, heavy truck traffic would be higher than normal on the local roadway network utilized by project traffic. More specifically, Skyline Road between the project site access and Highway 139 would experience higher than normal numbers of nighttime truck trips. The nearest residences on the corner of Skyline Road and Highway 139 are approximately 600 feet from Skyline Road but as close as 120 feet to Highway 139. Since truck traffic on Highway 139 already exists and because of the relative distance to Highway 139, these residences are not considered noise-sensitive to this segment of Skyline Road. Therefore, the nearest existing noise-sensitive receptor to this segment of Skyline Road and further removed from Highway 139 is a residence located west of Skyline Road (same as R3 from on-site operations analysis), located approximately 1,000 feet from the roadway.

The FHWA Model reports that a heavy-truck travelling 60 mph generates a sound exposure level of approximately 56 dBA SEL at a distance of 1,000 feet from the roadway centerline. Given an SEL of 56 dBA at the exterior building façade of the nearest residence to Skyline Road during heavy truck passbys, SEL values within that residence would be approximately 31 to 41 dBA SEL, depending on whether windows were in the open or closed positions. The predicted interior SEL values associated with nighttime heavy truck passbys at the nearest residences to the intersection of Skyline and Highway 139 are predicted to be well below the 65 dB SEL threshold for a finding of noise impact.

For nighttime trucks departing to the south on skyline road, the nearest residences to that roadway are located near the intersection of Johnstonville Road and Skyline Road. Those residences were scaled to be approximately 100-150 feet from the roadway centerline. The exterior sound exposure level at the building facades of these residences would be of approximately 71 dBA SEL at a distance of 100 feet from the roadway centerline. Given an SEL of 71 dBA at the exterior building façade of the nearest residences to Skyline Road at Johnstonville Road during heavy truck passbys, SEL values within that residence would be approximately 46 to 56 dBA SEL, depending on whether windows were in the open or closed positions. The predicted interior SEL values associated with nighttime heavy truck passbys at the nearest residences to the intersection of Skyline Road and Johnstonville Road are predicted to be well below the 65 dB SEL threshold for a finding of noise impact.

As project traffic moves off of Skyline Road it will be interspersed with existing traffic on Highway 36 and roadways beyond, including existing heavy truck traffic. Truck speeds through Susanville are also expected to be lower than on Skyline road. As a result, the project is not expected to result in new sleep disturbance impacts at residences within Susanville or points beyond during the periods when nighttime delivery of aggregate products is required to fulfill night paving contracts. Therefore, sleep disturbance impacts related to nighttime heavy truck operations on Skyline Road are predicted to be ***less than significant***.

Mitigation for Impact 4: ***None Required***

Impact 5: Evaluation of Blasting Impacts

It is anticipated that the materials within the quarry will be initially be excavated using a combination of conventional ripping and hauling methods and it is anticipated that overburden and highly weathered rock will be rippable using single- or double-shank rippers attached to bulldozers. With depth, as materials become harder and less weathered, it is anticipated that controlled blasting will be needed to excavate rock materials. However blasting would reportedly occur infrequently, estimated at only seven (7) blasting events per year. Blasting would occur between the hours of 9:30 am and 3:30 pm.

Noise sources associated with blasting consist of the use of rock drills to prepared the shot holes and the shot itself. The noise levels generated by the rock drills depend on drill type, but are predicted to be generally similar to the noise levels generated by excavation equipment, and are included in the levels described in the previous section pertaining to mining noise sources.

Noise generated by aggregate shots are variable, depending on the amount of charge-material used, the number of holes and the depth of those holes, timing delays, and other factors. There tends to be misconceptions regarding what an aggregate blast looks and sounds like, due in part to the types of explosions which are frequently seen in movies. In reality, aggregate shots are designed to transfer the energy of the shot into the ground, rather than have it vent into the atmosphere.

Based on Bollard Acoustical Consultants, Inc. observations of various aggregate shots, aggregate shots at distances exceeding 1,000 feet tend to be characteristic of muffled, distant thunder. Using noise level data collected during those blasts, blasting levels at the nearest receptors are predicted to be below existing ambient noise levels at the nearest residences due to the considerable distances between the blasting areas and those receptors.

As a representative example, BAC references noise and vibration monitoring conducted during a typical aggregate shot (blast) at a northern California Quarry. The monitoring was conducted from a distance of approximately 1500 feet with direct line of site to the shot area. Weather conditions present during the shot were as follows: 70 degrees Fahrenheit, clear sky, 5 -10mph north winds. The shot consisted of 36 holes fired with a total charge weight of 33,457 lbs of explosive material. The maximum A-weighted sound level generated by the shot was 67 dBA at the 1,500 foot monitoring site. In terms of vibration, the peak particle velocity of the shot was measured to be 0.13 inches/second at the measurement site. The measured maximum noise level was projected to the nearest sensitive receptor locations identified on Figure 1 using standard sound propagation algorithms. The results of those projections are provided in Table 15.

As indicated in Table 15, noise predictions based on a typical blasting event measured by BAC indicate average noise levels at the nearest sensitive receptors and property lines would be well below the Lassen County noise standards, which are more restrictive than the Susanville City noise standards. In addition, maximum noise levels during the infrequent blasting events are predicted to be in the same range as maximum noise levels currently experienced in the area due to other sources such as local traffic, aircraft overflights, etc. (see Appendix D). As a result, ***noise impacts related to blasting events are predicted to be less than significant***.

Mitigation for Impact 5: ***None Required***

Table 15
Predicted Maximum Blasting Noise Levels at Nearest Receptors

Location	Distance from nearest excavation area	Predicted Maximum Lmax, dBA	Predicted Hourly Average Leq, dBA	Daytime Average Noise Standard, dBA[1]	Noise Standard Exceeded?	Noise Mitigation Measures Required?
R1	2900	57	26	75	No	No
R2	2400	59	29	75	No	No
R3	2700	58	27	65	No	No
R4	3800	53	22	65	No	No
R5	3700	54	23	65	No	No
Project P/L	200	84	53	90	No	No

Notes

1. Receptors R1, R2, and R4 are within the Susanville City limits. Because the City's 24-hour average noise standards (DNL) are considerably less restrictive than the County's hourly noise standards, the County standards were applied to provide a conservative assessment of potential noise impacts.

Source: BAC (2023)

Vibration Generation of the Proposed Project

Impact 6: Project Vibration at Nearest Sensitive Receptors

To quantify the vibration generation of the proposed operations, reference vibration level data collected by BAC at existing ready-mix, recycle and asphalt plant sites in recent years were utilized. Larson Davis Laboratories (LDL) Model 831 precision integrating sound level meter fitted with a PCB Electronics vibration transducer was used for the vibration surveys. The equipment was calibrated before use with a PCB Electronics vibration calibrator to ensure the accuracy of the measurements. The equipment used meets all pertinent specifications of the American National Standards Institute for precision vibration monitoring systems.

The results of the vibration surveys indicate that vibration levels below 60 VdB can be expected at locations beyond 100 feet from the operating equipment. The nearest sensitive receptors are located in excess of 1,000 feet from the proposed asphalt and ready-mix facilities proposed at the Project site. At that distance, vibration levels would be well below the thresholds for annoyance or damage to residential structures identified in Tables 7 and 8.
At the nearest sensitive areas, peak particle velocity vibration levels due to blasting are predicted to be below 0.1 inches per second, which is well below thresholds at which damage to structures would occur. In addition, because blasting events would occur infrequently, they are not expected to result in adverse public reaction or annoyance despite vibration generated by the blasting being potentially perceptible.

Because vibration levels generated by blasting, excavation, and processing operations are predicted to be below thresholds for annoyance and damage to structures, vibration impacts of the project are expected to be ***less-than-significant***.

Mitigation for Impact 6: ***None Required***

Appendix A
Acoustical Terminology

Acoustics The science of sound.

Ambient Noise The distinctive acoustical characteristics of a given space consisting of all noise sources audible at that location. In many cases, the term ambient is used to describe an existing or pre-project condition such as the setting in an environmental noise study.

Attenuation The reduction of an acoustic signal.

A-Weighting A frequency-response adjustment of a sound level meter that conditions the output signal to approximate human response.

Decibel or dB Fundamental unit of sound. A Bell is defined as the logarithm of the ratio of the sound pressure squared over the reference pressure squared. A Decibel is one-tenth of a Bell.

CNEL Community Noise Equivalent Level. Defined as the 24-hour average noise level with noise occurring during evening hours (7 - 10 p.m.) weighted by a factor of three and nighttime hours weighted by a factor of 10 prior to averaging.

Frequency The measure of the rapidity of alterations of a periodic signal, expressed in cycles per second or hertz.

IIC Impact Insulation Class (IIC): A single-number representation of a floor/ceiling partition's impact generated noise insulation performance. The field-measured version of this number is the FIIC.

L_{dn} Day/Night Average Sound Level. Similar to CNEL but with no evening weighting.

L_{eq} Equivalent or energy-averaged sound level.

L_{max} The highest root-mean-square (RMS) sound level measured over a given period of time.

Loudness A subjective term for the sensation of the magnitude of sound.

Masking The amount (or the process) by which the threshold of audibility is for one sound is raised by the presence of another (masking) sound.

Noise Unwanted sound.

Peak Noise The level corresponding to the highest (not RMS) sound pressure measured over a given period of time. This term is often confused with the "Maximum" level, which is the highest RMS level.

RT_{60} The time it takes reverberant sound to decay by 60 dB once the source has been removed.

STC Sound Transmission Class (STC): A single-number representation of a partition's noise insulation performance. This number is based on laboratory-measured, 16-band (1/3-octave) transmission loss (TL) data of the subject partition. The field-measured version of this number is the FSTC.

Legend

- A — Site LT-1 facing South
- B — Site LT-1 facing North
- C — Site LT-2 facing South
- Noise measurement microphone

Noise Survey Photographs

Skyline Aggregates
Lassen County, California

Appendix B

BOLLARD Acoustical Consultants

Appendix C-1
Long-Term Ambient Noise Monitoring Results, LT-1
Skyline Aggregates - Lassen County, California
Wednesday, June 28, 2023

Hour	Leq	Lmax	L50	L90
12:00 AM	38	49	36	33
1:00 AM	37	48	37	35
2:00 AM	35	50	33	30
3:00 AM	35	48	32	30
4:00 AM	35	45	34	31
5:00 AM	42	65	41	36
6:00 AM	48	77	43	39
7:00 AM	40	59	36	33
8:00 AM	37	61	30	28
9:00 AM	56	79	31	28
10:00 AM	34	56	30	28
11:00 AM	38	52	34	30
12:00 PM	47	65	35	31
1:00 PM	34	50	32	28
2:00 PM	36	48	30	27
3:00 PM	45	73	30	27
4:00 PM	42	69	30	27
5:00 PM	43	66	30	26
6:00 PM	50	76	27	23
7:00 PM	39	53	34	25
8:00 PM	39	55	36	31
9:00 PM	47	53	47	43
10:00 PM	53	74	46	44
11:00 PM	46	50	46	43

	Statistical Summary					
	Daytime (7 a.m. - 10 p.m.)			Nighttime (10 p.m. - 7 a.m.)		
	High	Low	Average	High	Low	Average
Leq (Average)	56	34	47	53	35	46
Lmax (Maximum)	79	48	61	77	45	56
L50 (Median)	47	27	33	46	32	39
L90 (Background)	43	23	29	44	30	36

Computed DNL, dB	52
% Daytime Energy	68%
% Nighttime Energy	32%

GPS Coordinates
40°25'50.58"N
120°37'36.69"W

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Appendix C-2
Long-Term Ambient Noise Monitoring Results, LT-1
Skyline Aggregates - Lassen County, California
Thursday, June 29, 2023

Hour	Leq	Lmax	L50	L90
12:00 AM	44	54	43	42
1:00 AM	39	52	38	35
2:00 AM	40	52	40	37
3:00 AM	41	59	40	38
4:00 AM	41	49	40	37
5:00 AM	42	55	41	37
6:00 AM	43	65	41	37
7:00 AM	39	52	36	33
8:00 AM	38	57	31	27
9:00 AM	39	56	32	29
10:00 AM	33	50	31	28
11:00 AM	45	62	33	30
12:00 PM	49	73	35	30
1:00 PM	39	55	35	30
2:00 PM	42	64	33	30
3:00 PM	48	65	33	28
4:00 PM	36	51	33	29
5:00 PM	33	50	31	28
6:00 PM	33	49	31	26
7:00 PM	50	79	31	27
8:00 PM	37	50	36	32
9:00 PM	49	68	50	42
10:00 PM	50	63	49	48
11:00 PM	48	53	48	44

	Statistical Summary					
	Daytime (7 a.m. - 10 p.m.)			Nighttime (10 p.m. - 7 a.m.)		
	High	Low	Average	High	Low	Average
Leq (Average)	50	33	44	50	39	44
Lmax (Maximum)	79	49	59	65	49	56
L50 (Median)	50	31	34	49	38	42
L90 (Background)	42	26	30	48	35	40

Computed DNL, dB	51
% Daytime Energy	63%
% Nighttime Energy	37%

GPS Coordinates
40°25'50.58"N
120°37'36.69"W

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Appendix C-3
Long-Term Ambient Noise Monitoring Results, LT-1
Skyline Aggregates - Lassen County, California
Friday, June 30, 2023

Hour	Leq	Lmax	L50	L90
12:00 AM	57	82	44	43
1:00 AM	46	57	46	45
2:00 AM	44	49	44	42
3:00 AM	42	49	41	38
4:00 AM	44	52	43	40
5:00 AM	46	66	41	38
6:00 AM	41	53	40	37
7:00 AM	38	54	35	33
8:00 AM	37	65	30	29
9:00 AM	37	57	29	27
10:00 AM	35	53	30	28
11:00 AM	51	65	31	28
12:00 PM	34	48	32	28
1:00 PM	52	69	33	29
2:00 PM	36	51	32	28
3:00 PM	35	52	32	28
4:00 PM	33	44	31	27
5:00 PM	42	54	31	28
6:00 PM	36	56	29	25
7:00 PM	35	54	32	26
8:00 PM	40	53	38	34
9:00 PM	45	52	45	39
10:00 PM	49	72	46	43
11:00 PM	45	57	43	40

	Statistical Summary					
	Daytime (7 a.m. - 10 p.m.)			Nighttime (10 p.m. - 7 a.m.)		
	High	Low	Average	High	Low	Average
Leq (Average)	52	33	44	57	41	49
Lmax (Maximum)	69	44	55	82	49	60
L50 (Median)	45	29	33	46	40	43
L90 (Background)	39	25	29	45	37	41

Computed DNL, dB	55
% Daytime Energy	32%
% Nighttime Energy	68%

GPS Coordinates
40°25'50.58"N
120°37'36.69"W

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Appendix C-4
Long-Term Ambient Noise Monitoring Results, LT-1
Skyline Aggregates - Lassen County, California
Saturday, July 1, 2023

Hour	Leq	Lmax	L50	L90
12:00 AM	44	49	44	42
1:00 AM	44	49	44	41
2:00 AM	49	52	50	42
3:00 AM	45	53	42	39
4:00 AM	52	77	42	38
5:00 AM	38	51	36	33
6:00 AM	42	59	39	35
7:00 AM	36	53	31	25
8:00 AM	39	57	27	25
9:00 AM	34	51	29	26
10:00 AM	37	52	32	28
11:00 AM	34	49	32	28
12:00 PM	43	61	32	27
1:00 PM	48	63	30	27
2:00 PM	47	61	31	26
3:00 PM	40	56	35	30
4:00 PM	39	51	38	33
5:00 PM	41	53	40	35
6:00 PM	41	53	40	36
7:00 PM	38	55	37	34
8:00 PM	37	50	36	33
9:00 PM	43	56	41	36
10:00 PM	44	50	43	40
11:00 PM	44	49	44	43

	Statistical Summary					
	Daytime (7 a.m. - 10 p.m.)			Nighttime (10 p.m. - 7 a.m.)		
	High	Low	Average	High	Low	Average
Leq (Average)	48	34	42	52	38	46
Lmax (Maximum)	63	49	55	77	49	54
L50 (Median)	41	27	34	50	36	43
L90 (Background)	36	25	30	43	33	39

Computed DNL, dB	52
% Daytime Energy	37%
% Nighttime Energy	63%

GPS Coordinates
40°25'50.58"N
120°37'36.69"W

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Appendix C-5
Long-Term Ambient Noise Monitoring Results, LT-1
Skyline Aggregates - Lassen County, California
Sunday, July 2, 2023

Hour	Leq	Lmax	L50	L90
12:00 AM	44	48	44	41
1:00 AM	41	48	41	38
2:00 AM	44	50	44	39
3:00 AM	43	48	42	38
4:00 AM	40	52	38	35
5:00 AM	40	67	37	35
6:00 AM	41	57	38	33
7:00 AM	35	59	32	28
8:00 AM	29	39	28	26
9:00 AM	28	41	27	25
10:00 AM	41	58	28	25
11:00 AM	40	65	30	27
12:00 PM	34	48	31	27
1:00 PM	40	53	38	35
2:00 PM	43	60	40	35
3:00 PM	43	57	41	36
4:00 PM	44	58	42	37
5:00 PM	42	54	40	35
6:00 PM	41	53	39	35
7:00 PM	40	55	38	35
8:00 PM	39	47	38	35
9:00 PM	45	52	42	38
10:00 PM	47	51	47	40
11:00 PM	44	49	44	41

	Statistical Summary					
	Daytime (7 a.m. - 10 p.m.)			Nighttime (10 p.m. - 7 a.m.)		
	High	Low	Average	High	Low	Average
Leq (Average)	45	28	41	47	40	43
Lmax (Maximum)	65	39	53	67	48	52
L50 (Median)	42	27	36	47	37	42
L90 (Background)	38	25	32	41	33	38

Computed DNL, dB	49
% Daytime Energy	49%
% Nighttime Energy	51%

GPS Coordinates
40°25'50.58"N
120°37'36.69"W

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Appendix C-6
Long-Term Ambient Noise Monitoring Results, LT-2
Skyline Aggregates - Lassen County, California
Wednesday, June 28, 2023

Hour	Leq	Lmax	L50	L90
12:00 AM	48	68	32	28
1:00 AM	47	69	32	28
2:00 AM	46	67	30	28
3:00 AM	46	62	34	29
4:00 AM	47	64	36	31
5:00 AM	58	70	52	41
6:00 AM	56	68	53	43
7:00 AM	53	65	50	39
8:00 AM	51	64	47	34
9:00 AM	51	66	45	34
10:00 AM	51	66	46	34
11:00 AM	51	68	47	36
12:00 PM	51	66	47	34
1:00 PM	50	65	45	32
2:00 PM	50	68	45	35
3:00 PM	51	66	47	36
4:00 PM	52	67	48	35
5:00 PM	50	64	45	34
6:00 PM	49	72	40	27
7:00 PM	52	71	43	31
8:00 PM	51	66	42	28
9:00 PM	53	68	48	32
10:00 PM	54	74	44	34
11:00 PM	48	68	34	31

	Statistical Summary					
	Daytime (7 a.m. - 10 p.m.)			Nighttime (10 p.m. - 7 a.m.)		
	High	Low	Average	High	Low	Average
Leq (Average)	53	49	51	58	46	52
Lmax (Maximum)	72	64	67	74	62	68
L50 (Median)	50	40	46	53	30	38
L90 (Background)	39	27	33	43	28	33

Computed DNL, dB	59
% Daytime Energy	56%
% Nighttime Energy	44%

GPS Coordinates
40°25'5.49"N
120°37'25.73"W

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Appendix C-7
Long-Term Ambient Noise Monitoring Results, LT-2
Skyline Aggregates - Lassen County, California
Thursday, June 29, 2023

Hour	Leq	Lmax	L50	L90
12:00 AM	50	72	34	30
1:00 AM	47	65	32	29
2:00 AM	47	73	32	29
3:00 AM	49	69	36	30
4:00 AM	49	67	37	32
5:00 AM	58	69	53	41
6:00 AM	56	71	53	42
7:00 AM	55	71	51	39
8:00 AM	57	84	47	32
9:00 AM	51	73	45	29
10:00 AM	51	71	44	31
11:00 AM	51	65	46	36
12:00 PM	51	63	47	36
1:00 PM	52	69	48	37
2:00 PM	50	65	46	37
3:00 PM	54	66	47	35
4:00 PM	52	69	48	38
5:00 PM	52	64	50	39
6:00 PM	53	67	48	33
7:00 PM	53	66	46	32
8:00 PM	54	76	48	36
9:00 PM	53	66	46	34
10:00 PM	51	65	41	33
11:00 PM	50	66	36	32

	Statistical Summary					
	Daytime (7 a.m. - 10 p.m.)			Nighttime (10 p.m. - 7 a.m.)		
	High	Low	Average	High	Low	Average
Leq (Average)	57	50	53	58	47	52
Lmax (Maximum)	84	63	69	73	65	68
L50 (Median)	51	44	47	53	32	39
L90 (Background)	39	29	35	42	29	33

Computed DNL, dB	59
% Daytime Energy	64%
% Nighttime Energy	36%

GPS Coordinates
40°25'5.49"N
120°37'25.73"W

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Appendix C-8
Long-Term Ambient Noise Monitoring Results, LT-2
Skyline Aggregates - Lassen County, California
Friday, June 30, 2023

Hour	Leq	Lmax	L50	L90
12:00 AM	47	66	34	30
1:00 AM	48	66	32	29
2:00 AM	47	68	32	29
3:00 AM	50	66	35	30
4:00 AM	50	69	36	33
5:00 AM	57	69	50	39
6:00 AM	55	67	51	42
7:00 AM	53	69	49	40
8:00 AM	52	65	46	35
9:00 AM	51	67	47	35
10:00 AM	52	67	48	35
11:00 AM	52	65	47	35
12:00 PM	51	64	48	37
1:00 PM	58	72	49	36
2:00 PM	52	70	47	36
3:00 PM	51	62	48	35
4:00 PM	62	75	48	36
5:00 PM	59	74	49	37
6:00 PM	53	71	50	36
7:00 PM	53	69	48	32
8:00 PM	55	69	51	36
9:00 PM	55	71	48	35
10:00 PM	55	68	46	34
11:00 PM	49	64	37	34

	Statistical Summary					
	Daytime (7 a.m. - 10 p.m.)			Nighttime (10 p.m. - 7 a.m.)		
	High	Low	Average	High	Low	Average
Leq (Average)	62	51	55	57	47	52
Lmax (Maximum)	75	62	69	69	64	67
L50 (Median)	51	46	48	51	32	39
L90 (Background)	40	32	36	42	29	33

Computed DNL, dB	59
% Daytime Energy	77%
% Nighttime Energy	23%

GPS Coordinates
40°25'5.49"N
120°37'25.73"W

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Appendix C-9
Long-Term Ambient Noise Monitoring Results, LT-2
Skyline Aggregates - Lassen County, California
Saturday, July 1, 2023

Hour	Leq	Lmax	L50	L90
12:00 AM	48	65	35	31
1:00 AM	48	69	33	30
2:00 AM	45	64	31	27
3:00 AM	48	65	30	27
4:00 AM	50	69	34	29
5:00 AM	55	71	43	32
6:00 AM	54	74	45	36
7:00 AM	49	64	40	33
8:00 AM	51	64	42	29
9:00 AM	50	63	43	31
10:00 AM	50	64	44	33
11:00 AM	56	72	44	34
12:00 PM	50	70	44	32
1:00 PM	50	66	43	29
2:00 PM	60	72	46	32
3:00 PM	53	73	47	36
4:00 PM	52	67	46	38
5:00 PM	54	66	49	40
6:00 PM	55	76	49	39
7:00 PM	54	70	48	38
8:00 PM	53	69	44	33
9:00 PM	56	68	50	35
10:00 PM	51	67	39	34
11:00 PM	50	66	38	34

	Statistical Summary					
	Daytime (7 a.m. - 10 p.m.)			Nighttime (10 p.m. - 7 a.m.)		
	High	Low	Average	High	Low	Average
Leq (Average)	60	49	54	55	45	51
Lmax (Maximum)	76	63	68	74	64	68
L50 (Median)	50	40	45	45	30	36
L90 (Background)	40	29	34	36	27	31

Computed DNL, dB	58
% Daytime Energy	77%
% Nighttime Energy	23%

GPS Coordinates
40°25'5.49"N
120°37'25.73"W

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Appendix C-10
Long-Term Ambient Noise Monitoring Results, LT-2
Skyline Aggregates - Lassen County, California
Sunday, July 2, 2023

Hour	Leq	Lmax	L50	L90
12:00 AM	49	65	34	31
1:00 AM	46	63	34	30
2:00 AM	47	64	32	28
3:00 AM	46	65	30	28
4:00 AM	47	68	34	29
5:00 AM	54	72	43	33
6:00 AM	52	66	43	35
7:00 AM	56	82	39	33
8:00 AM	48	63	37	29
9:00 AM	57	73	43	30
10:00 AM	49	65	42	30
11:00 AM	49	64	42	29
12:00 PM	47	62	41	29
1:00 PM	53	66	48	36
2:00 PM	52	69	47	37
3:00 PM	56	85	50	40
4:00 PM	55	67	50	42
5:00 PM	55	68	50	39
6:00 PM	54	70	48	39
7:00 PM	57	80	48	37
8:00 PM	55	67	47	37
9:00 PM	54	68	45	37
10:00 PM	53	67	43	34
11:00 PM	48	67	35	31

	Statistical Summary					
	Daytime (7 a.m. - 10 p.m.)			Nighttime (10 p.m. - 7 a.m.)		
	High	Low	Average	High	Low	Average
Leq (Average)	57	47	54	54	46	50
Lmax (Maximum)	85	62	70	72	63	66
L50 (Median)	50	37	45	43	30	36
L90 (Background)	42	29	35	35	28	31

Computed DNL, dB	57
% Daytime Energy	81%
% Nighttime Energy	19%

GPS Coordinates
40°25'5.49"N
120°37'25.73"W

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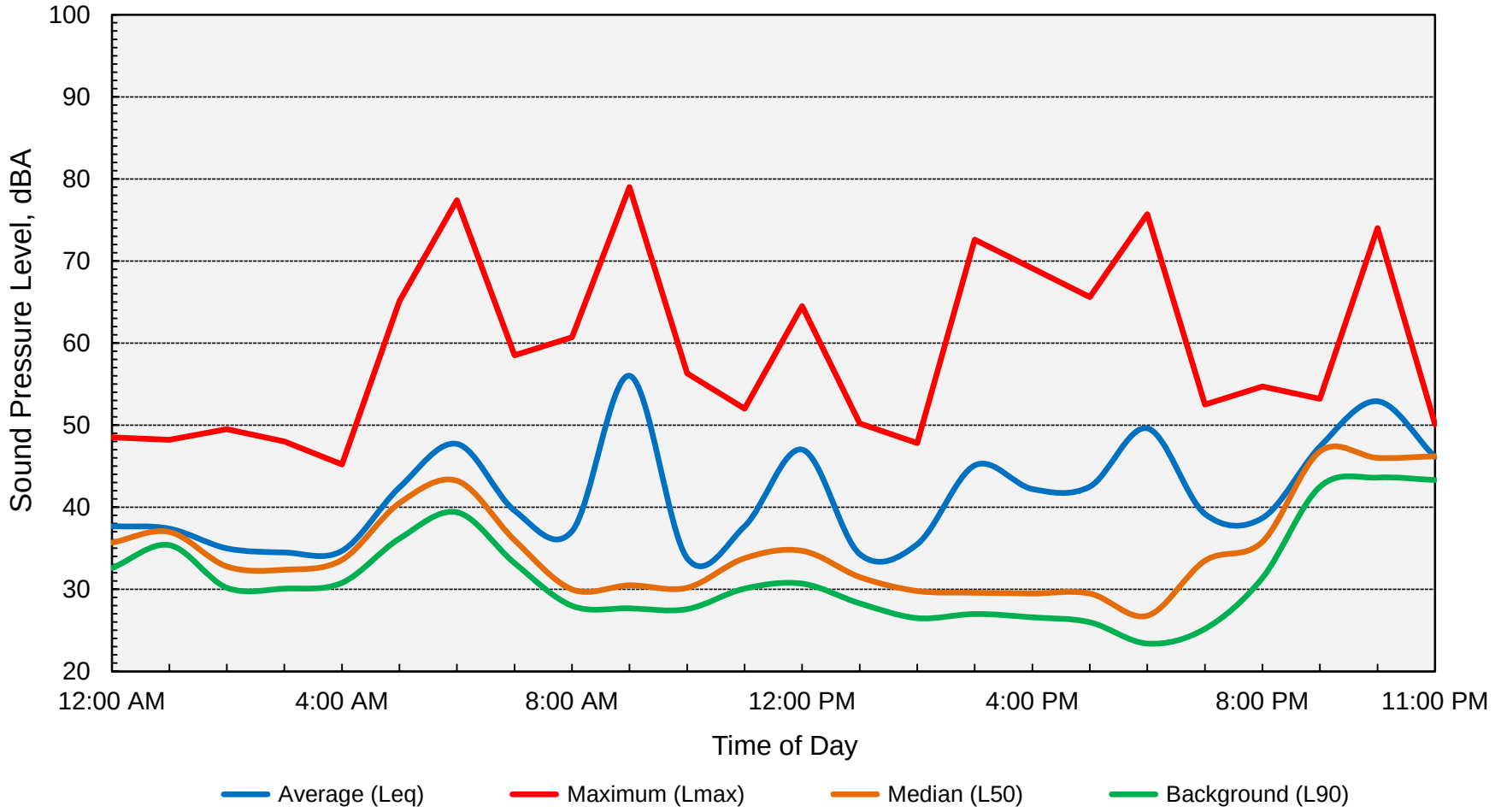
Appendix D-1
Long-Term Ambient Noise Monitoring Results, LT-1
Skyline Aggregates - Lassen County, California
Wednesday, June 28, 2023



Computed DNL = 52 dB

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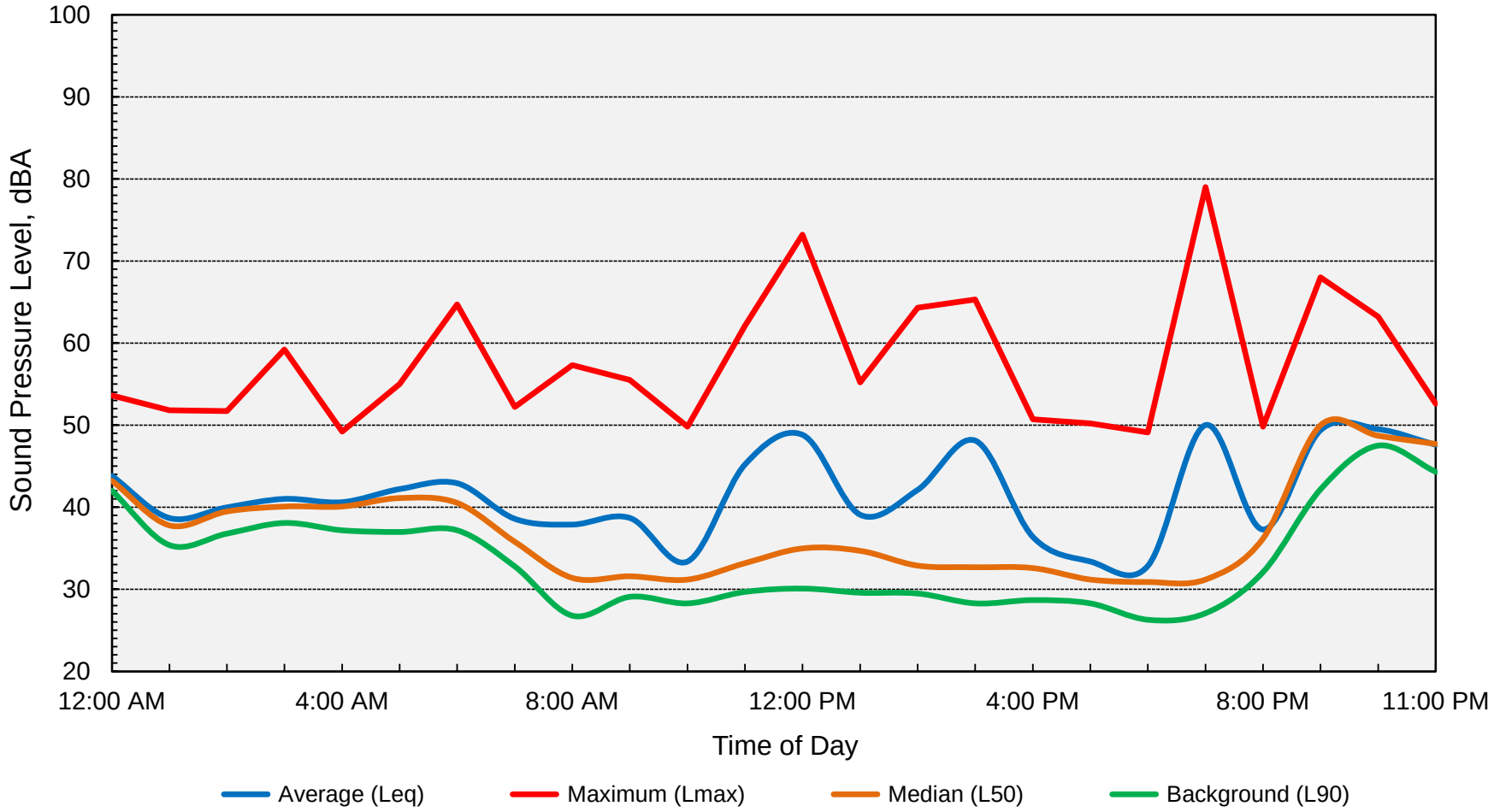
Appendix D-2
Long-Term Ambient Noise Monitoring Results, LT-1
Skyline Aggregates - Lassen County, California
Thursday, June 29, 2023



Computed DNL = 51 dB

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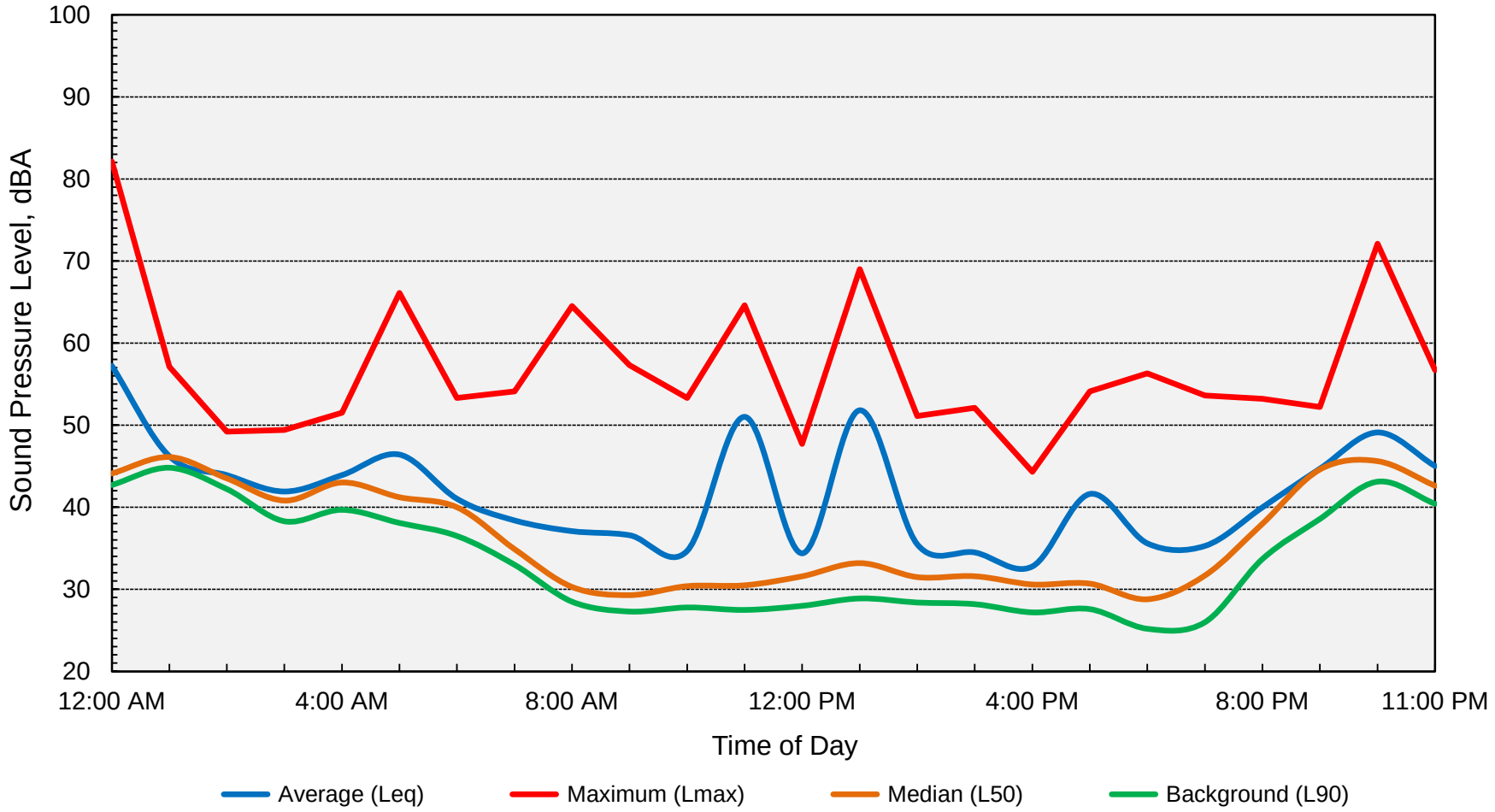
Appendix D-3
Long-Term Ambient Noise Monitoring Results, LT-1
Skyline Aggregates - Lassen County, California
Friday, June 30, 2023



Computed DNL = 55 dB

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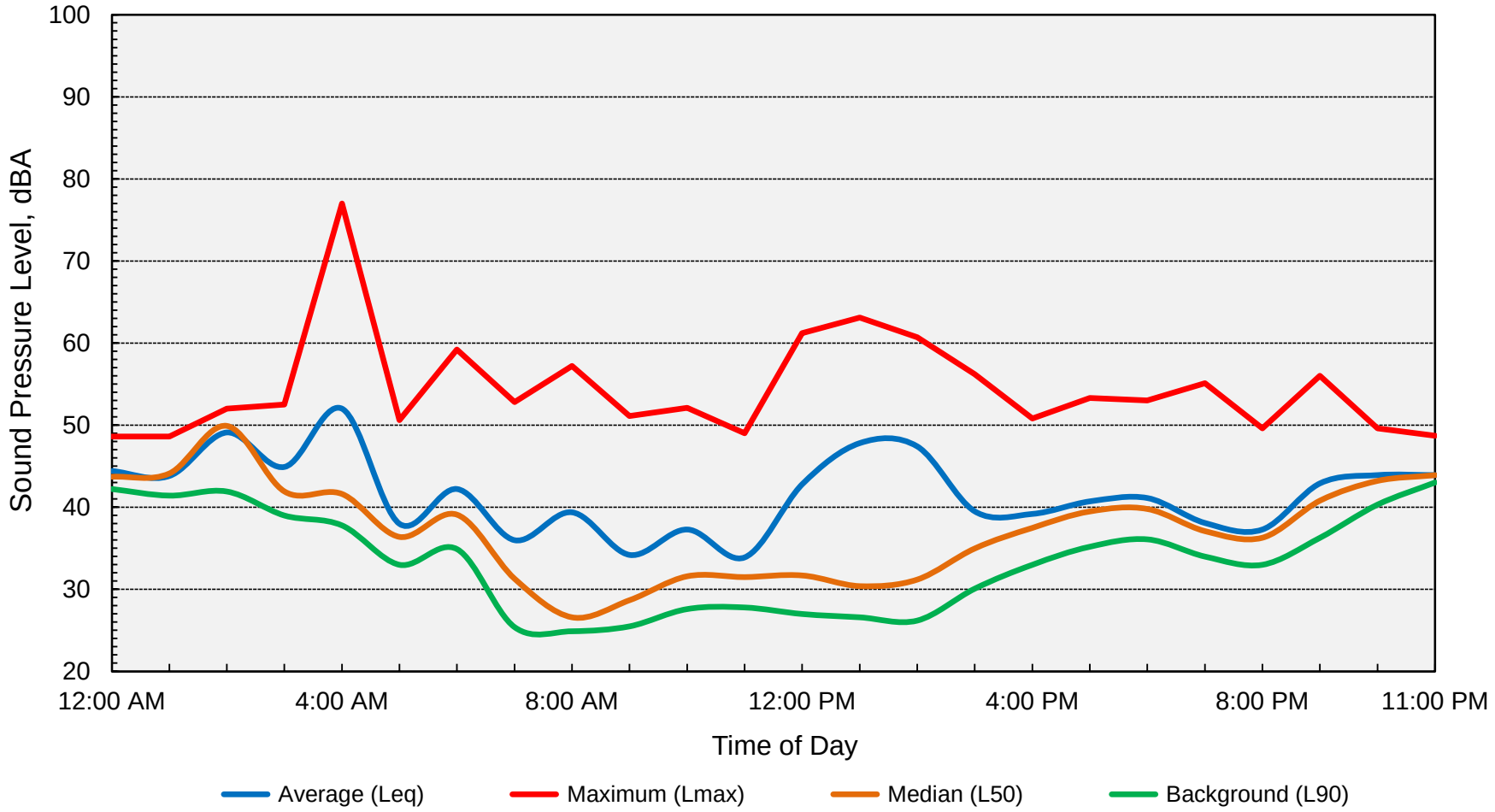
Appendix D-4
Long-Term Ambient Noise Monitoring Results, LT-1
Skyline Aggregates - Lassen County, California
Saturday, July 1, 2023



Computed DNL = 52 dB

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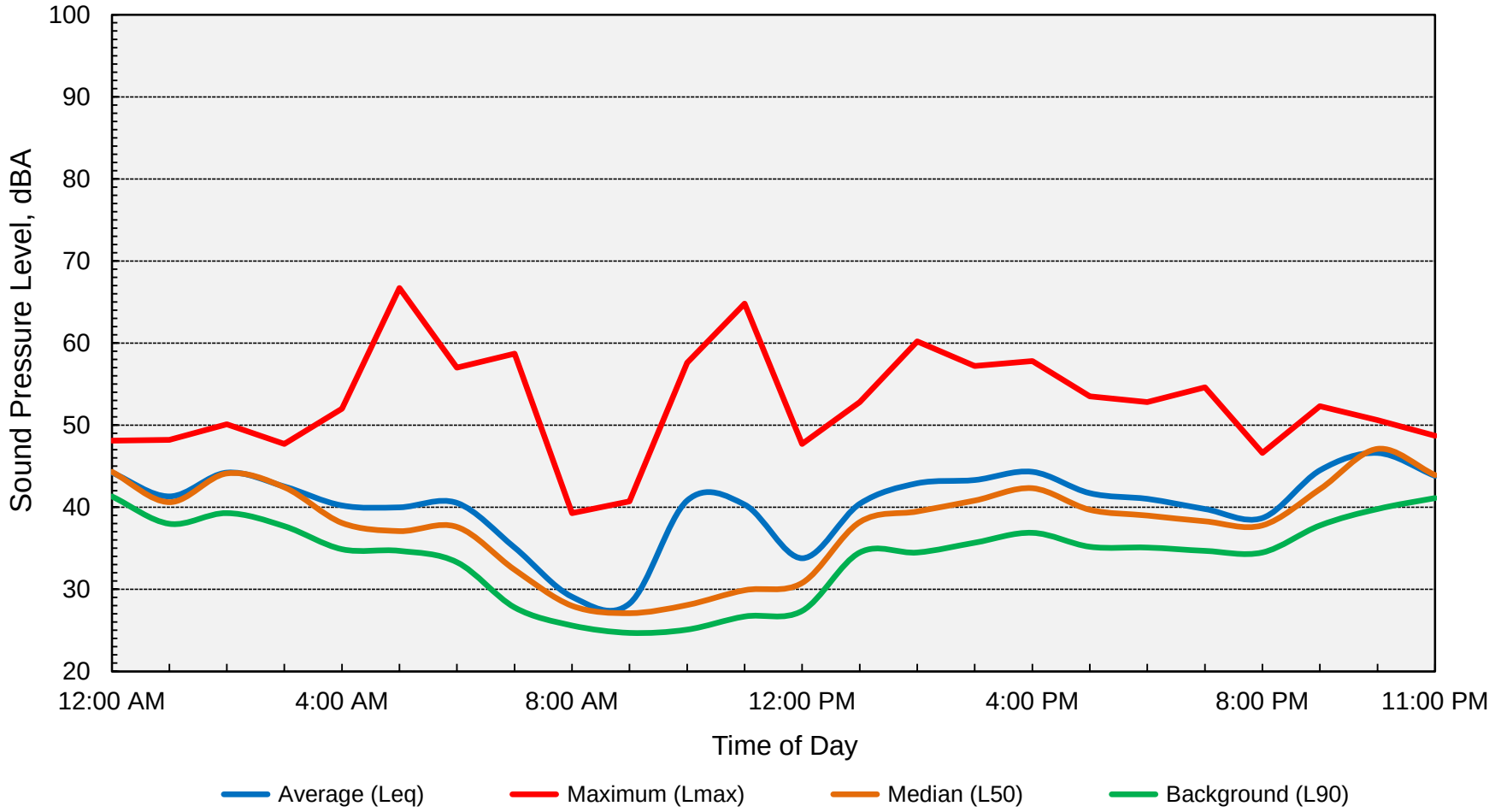
Appendix D-5
Long-Term Ambient Noise Monitoring Results, LT-1
Skyline Aggregates - Lassen County, California
Sunday, July 2, 2023



Computed DNL = 49 dB

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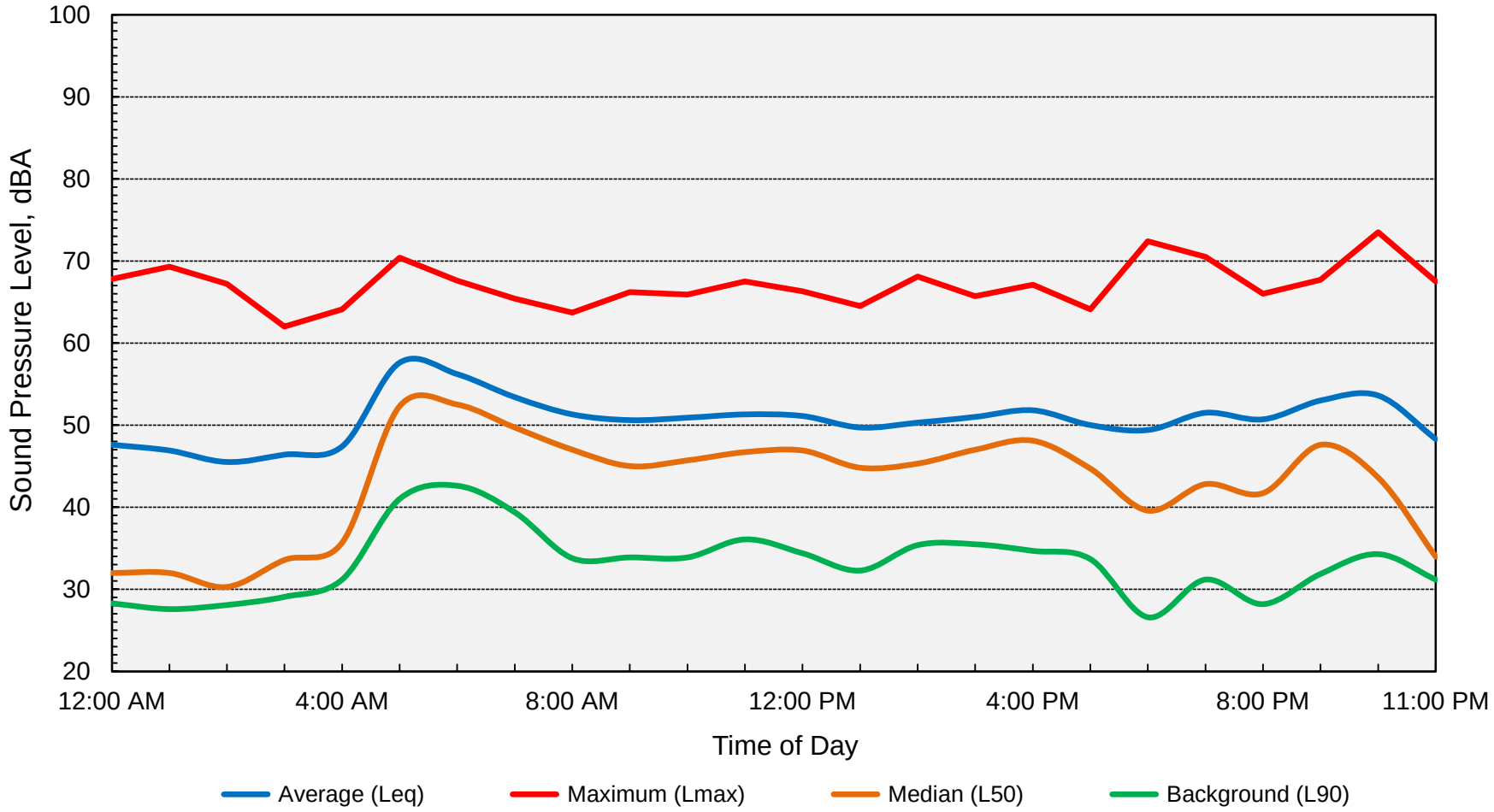
Appendix D-6
Long-Term Ambient Noise Monitoring Results, LT-2
Skyline Aggregates - Lassen County, California
Wednesday, June 28, 2023



Computed DNL = 59 dB

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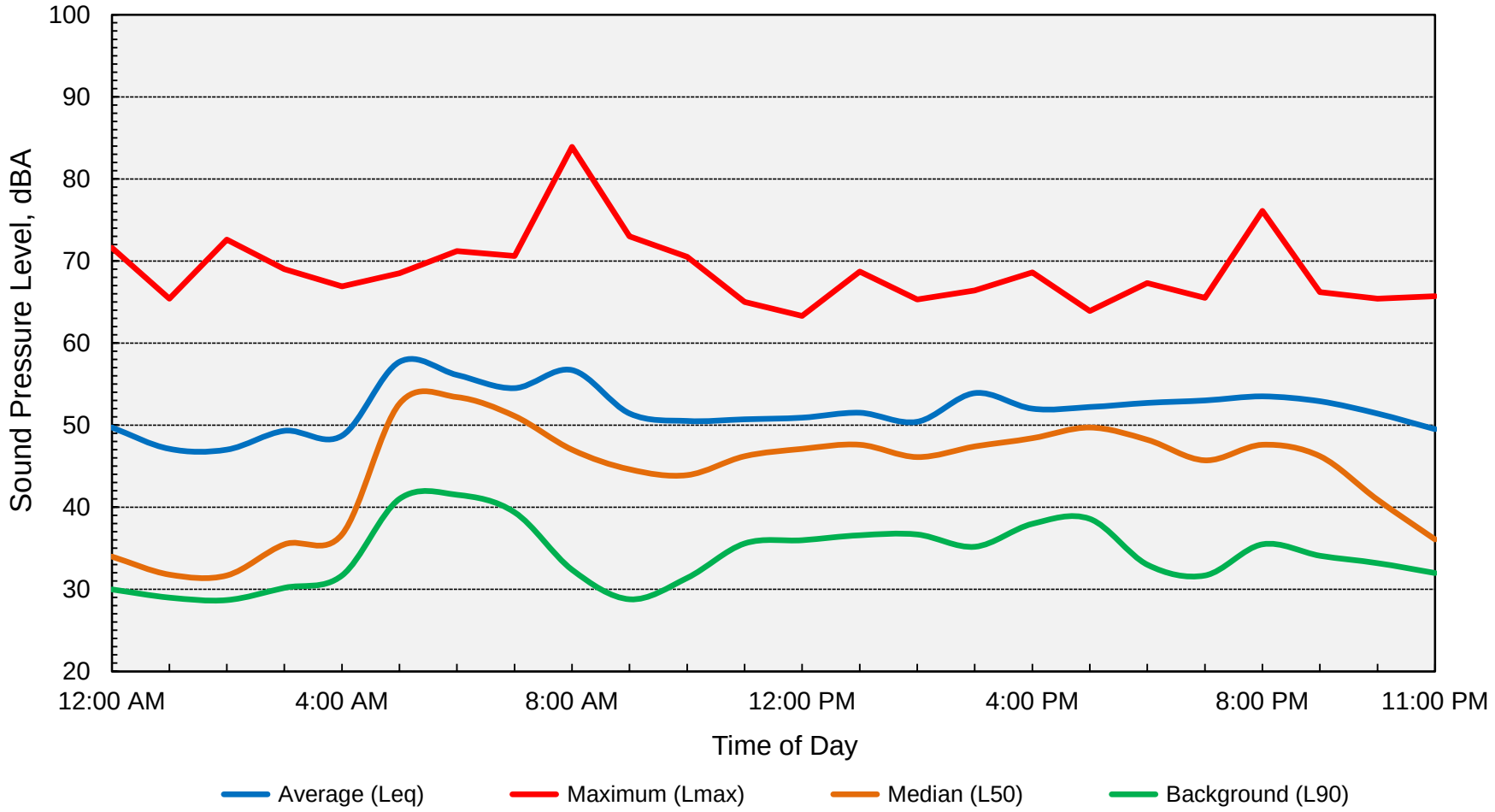
Appendix D-7
Long-Term Ambient Noise Monitoring Results, LT-2
Skyline Aggregates - Lassen County, California
Thursday, June 29, 2023



Computed DNL = 59 dB

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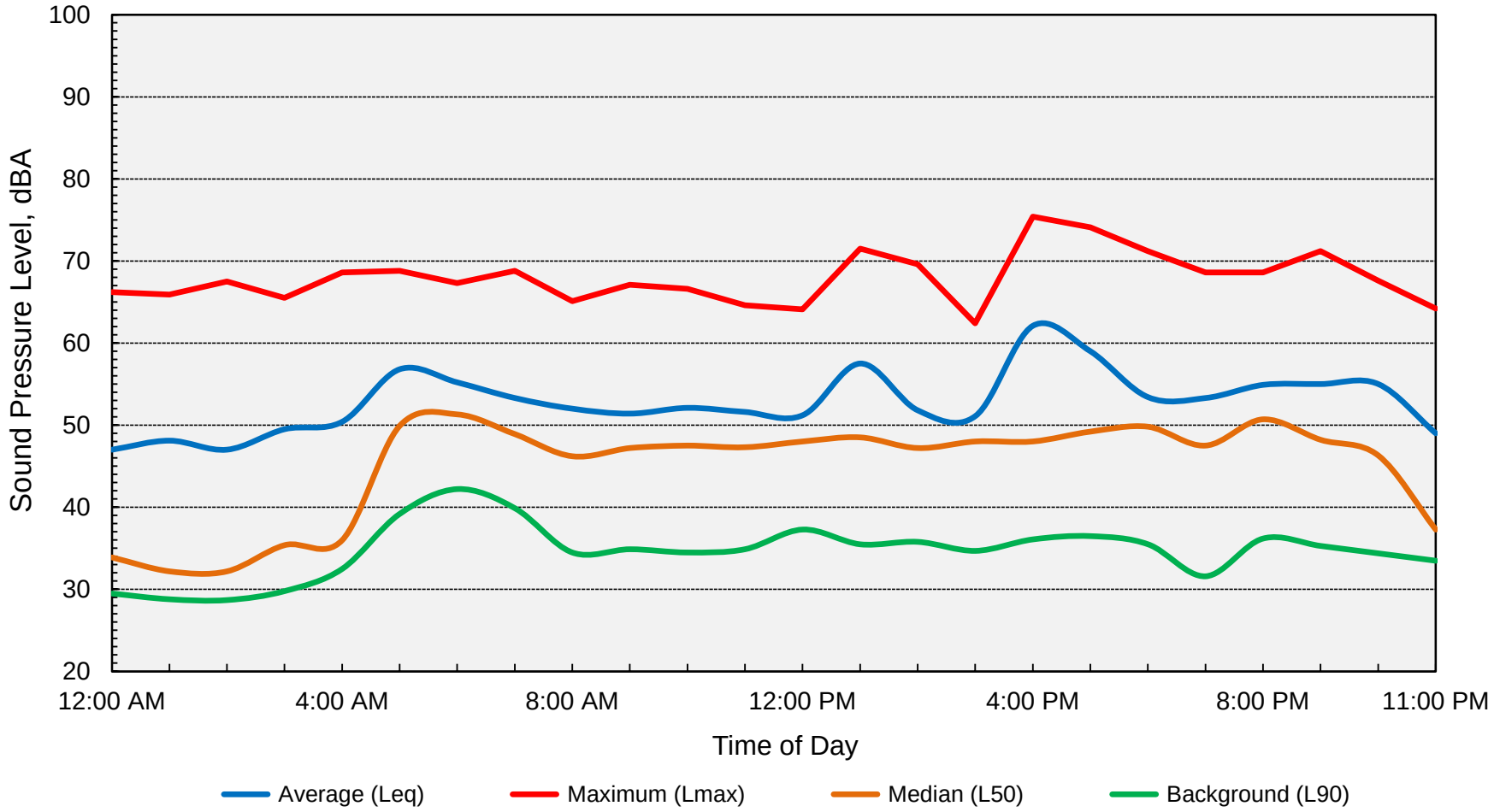
Appendix D-8
Long-Term Ambient Noise Monitoring Results, LT-2
Skyline Aggregates - Lassen County, California
Friday, June 30, 2023



Computed DNL = 59 dB

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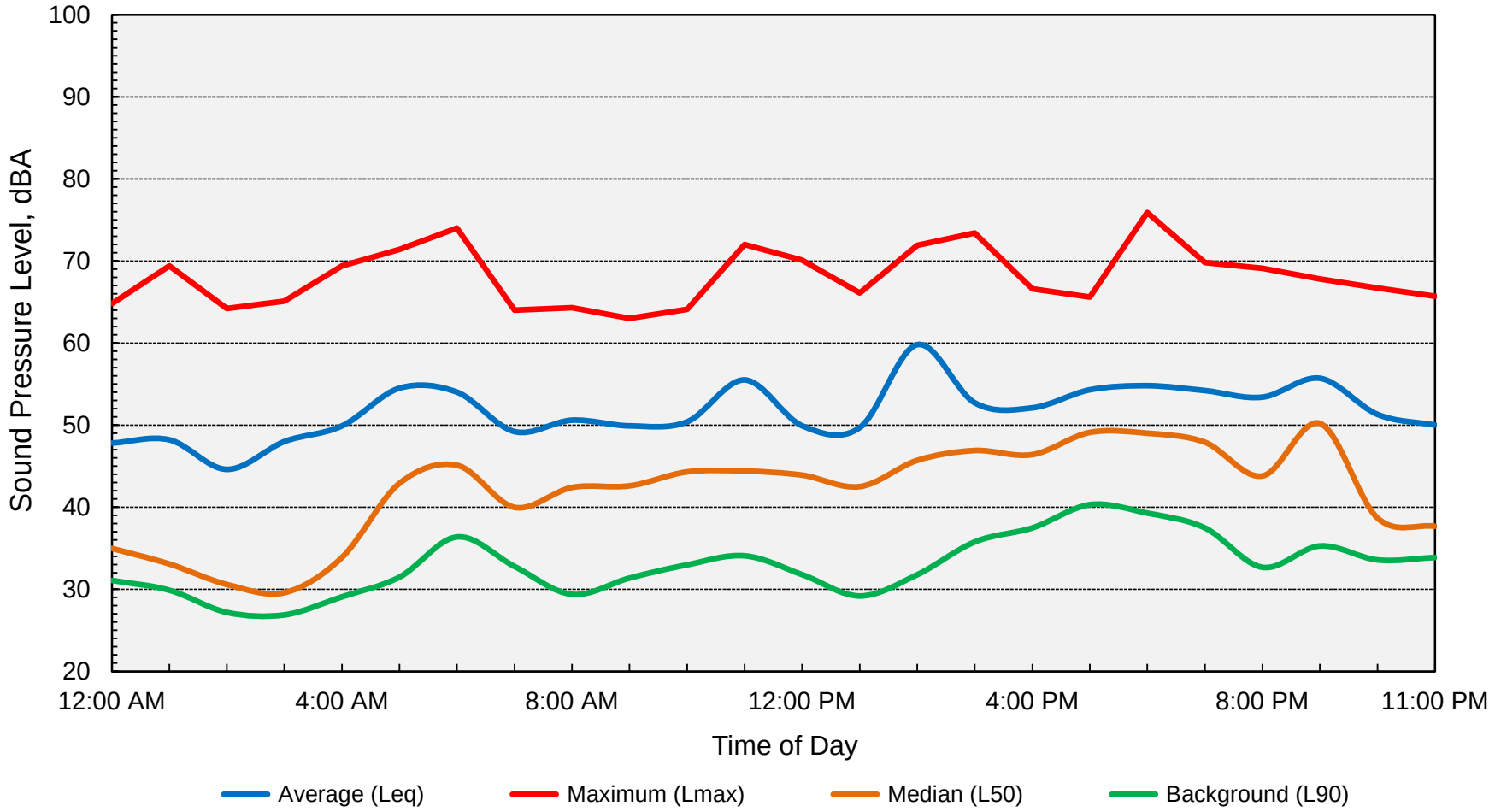
Appendix D-9
Long-Term Ambient Noise Monitoring Results, LT-2
Skyline Aggregates - Lassen County, California
Saturday, July 1, 2023



Computed DNL = 58 dB

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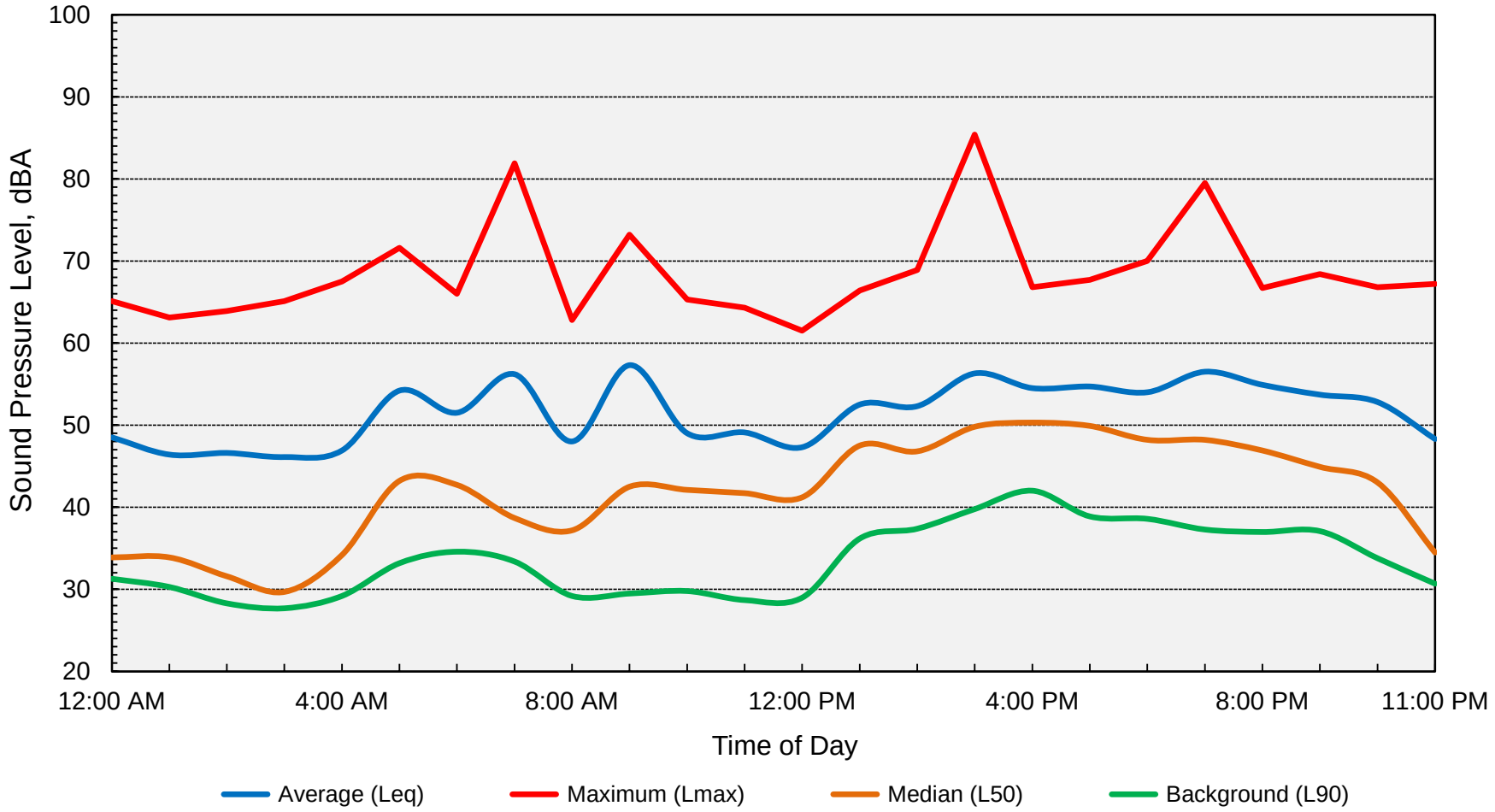
Appendix D-10
Long-Term Ambient Noise Monitoring Results, LT-2
Skyline Aggregates - Lassen County, California
Sunday, July 2, 2023



Computed DNL = 57 dB

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Appendix E-1
FHWA Highway Traffic Noise Prediction Model Inputs
Skyline Aggregates
File Name: FHWA Segments - Existing
Run Date: 8/2/2023

#	Roadway	Description	ADT	Day %	Night %	% Med. Trucks	% Hvy. Trucks	Speed [MPH]	Distance [ft]	Offset [dB]
1	Highway 139	North of Skyline Rd	3,520	80	20	0.6	3.4	60	500	0
2	Highway 139	South of Skyline Rd	3,495	80	20	0.6	3.4	60	110	0
3	Skyline Rd	West of Highway 139	2,595	80	20	2.0	2.0	40	45	0
4	Skyline Rd	Highway 139 to Project Dwy	3,180	71	29	2.0	2.0	60	600	0
5	Skyline Rd	Project Dwy to Johnstonville Rd	3,115	71	29	2.0	2.0	60	1700	0
6	Skyline Rd	South of Johnstonville Rd	1,105	80	20	2.0	2.0	60	100	0
7	Johnstonville Rd	East of Skyline Rd	4,295	80	20	2.0	2.0	40	60	0
8	Johnstonville Rd	West of Skyline Rd	3,415	80	20	2.0	2.0	30	220	0

Appendix E-2
FHWA Highway Traffic Noise Prediction Model Inputs
Skyline Aggregates
File Name: FHWA Segments - Project
Run Date: 8/17/2023

#	Roadway	Description	ADT	Day %	Night %	% Med. Trucks	% Hvy. Trucks	Speed [MPH]	Distance [ft]	Offset [dB]
1	Highway 139	North of Skyline Rd	220	80	20	1.0	92.0	55	500	0
2	Highway 139	South of Skyline Rd	120	80	20	1.0	92.0	55	110	0
3	Skyline Rd	West of Highway 139	0	80	20	1.0	92.0	35	45	0
4	Skyline Rd	Highway 139 to Project Dwy	340	80	20	1.0	92.0	55	600	0
5	Skyline Rd	Project Dwy to Johnstonville Rd	520	80	20	1.0	92.0	55	1700	0
6	Skyline Rd	South of Johnstonville Rd	260	80	20	1.0	92.0	55	100	0
7	Johnstonville Rd	East of Skyline Rd	220	80	20	1.0	92.0	35	60	0
8	Johnstonville Rd	West of Skyline Rd	40	80	20	1.0	92.0	25	220	0

Appendix E-3
FHWA Highway Traffic Noise Prediction Model Inputs
Skyline Aggregates
File Name: FHWA Segments - Future
Run Date: 8/17/2023

#	Roadway	Description	ADT	Day %	Night %	% Med. Trucks	% Hvy. Trucks	Speed [MPH]	Distance [ft]	Offset [dB]
1	Highway 139	North of Skyline Rd	4,215	80	20	0.6	3.4	60	500	0
2	Highway 139	South of Skyline Rd	4,185	80	20	0.6	3.4	60	110	0
3	Skyline Rd	West of Highway 139	3,105	80	20	2.0	2.0	40	45	0
4	Skyline Rd	Highway 139 to Project Dwy	3,805	71	29	2.0	2.0	60	600	0
5	Skyline Rd	Project Dwy to Johnstonville Rd	3,740	71	29	2.0	2.0	60	1700	0
6	Skyline Rd	South of Johnstonville Rd	1,325	80	20	2.0	2.0	60	100	0
7	Johnstonville Rd	East of Skyline Rd	5,160	80	20	2.0	2.0	40	60	0
8	Johnstonville Rd	West of Skyline Rd	4,105	80	20	2.0	2.0	30	220	0

Appendix F
Skyline Aggregates
On-Site Noise Sources - Reference Levels & Frequency Spectra

Source	SPL dB(A)	Lmax dB(A)	Emission spectrum	63Hz dB(A)	125Hz dB(A)	250Hz dB(A)	500Hz dB(A)	1kHz dB(A)	2kHz dB(A)	4kHz dB(A)	8kHz dB(A)	
Mining area, start elevation	118.2	123.0	Tracked excavator, ST Data, per m^2	90.0	109.1	110.6	112.0	111.2	110.4	106.2	101.1	
A/P	113.3	121.7	Asphalt Plant	80.3	90.3	97.4	103.4	106.3	107.3	107.4	105.3	
C/P	101.6	127.9	Cement Plant	76.9	82.0	89.5	96.9	97.1	94.3	88.1	80.0	
Crusher	126.2	135.7	Crusher	101.6	111.7	118.2	120.6	120.8	119.0	112.8	100.7	

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