Environmental Noise & Vibration Assessment

Centennial Industrial Site – Remedial Action Plan

Nevada County, California

BAC Job # 2020-108

Prepared For:

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Introduction

A Remedial Action Plan (RAP) was prepared pursuant to a Voluntary Cleanup Agreement (VCA; Docket No. HSA-FY18/19-014) between Rise Grass Valley Inc. (Rise) and the California Department of Toxic Substances Control (DTSC).

The purpose of the RAP is to describe procedures for conducting remedial activities related to soil contamination at the Centennial M-1 Property (the site). The RAP presents remedial action objectives, proposes remedial procedures for the recommended remedial action, and provides a verification sampling plan to document that the remedial action objectives are achieved.

The 56-acre site (the “Centennial Industrial Site”) is located at 10344 Centennial Drive near the city limits of Grass Valley in unincorporated Nevada County, California. The site is located immediately south of Centennial Drive and Idaho Maryland Road, and north of East Bennett Road.

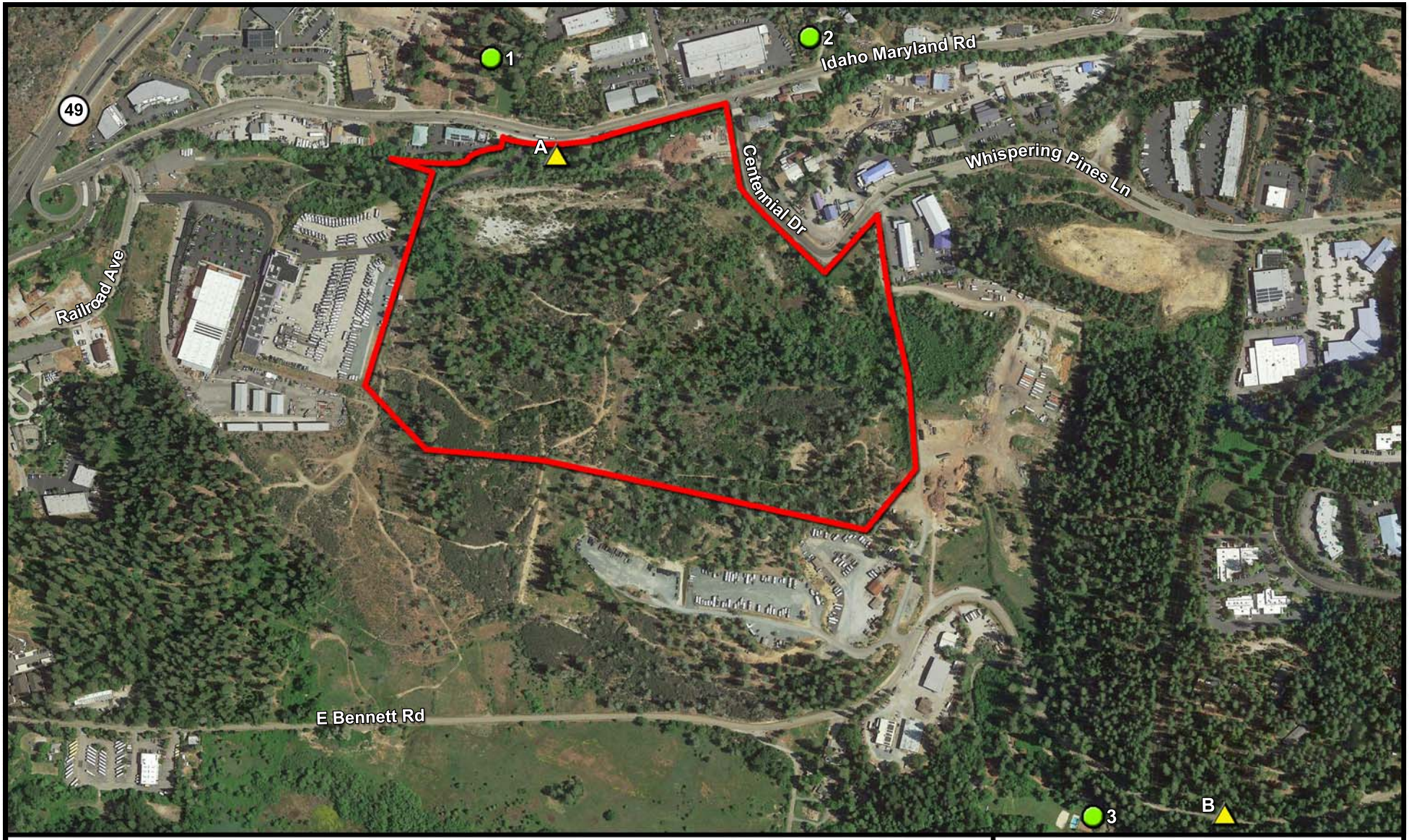
Figure 1 shows the project location.

Bollard Acoustical Consultants, Inc. (BAC) has been retained by Rise to prepare this evaluation of potential noise and vibration impacts related to the proposed project.

Objectives of this Analysis

The objectives of this analysis are as follows:

- To provide background information pertaining to the effects of noise and vibration.
- To identify existing sensitive land uses in the immediate project vicinity that may be affected by project related noise and vibration (referred to in this analysis as “receptors”).
- To quantify existing ambient noise and vibration levels at representative receptors nearest to the project site.
- To identify California Environmental Quality Act (CEQA) standards of significance for this project.
- To predict project-related noise and vibration levels at the nearest receptors and to compare those levels against the project standards of significance.
- To evaluate mitigation measures where significant project-related noise or vibration impacts are identified.



Legend

- Project Border (Approximate)
- Representative Sensitive Receptor Locations
- Ambient Noise and Vibration Monitoring Locations

N

Scale (feet)

0 250 500

Centennial Industrial Site
Nevada County, California

Project Area

Figure 1

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Fundamentals and Terminology

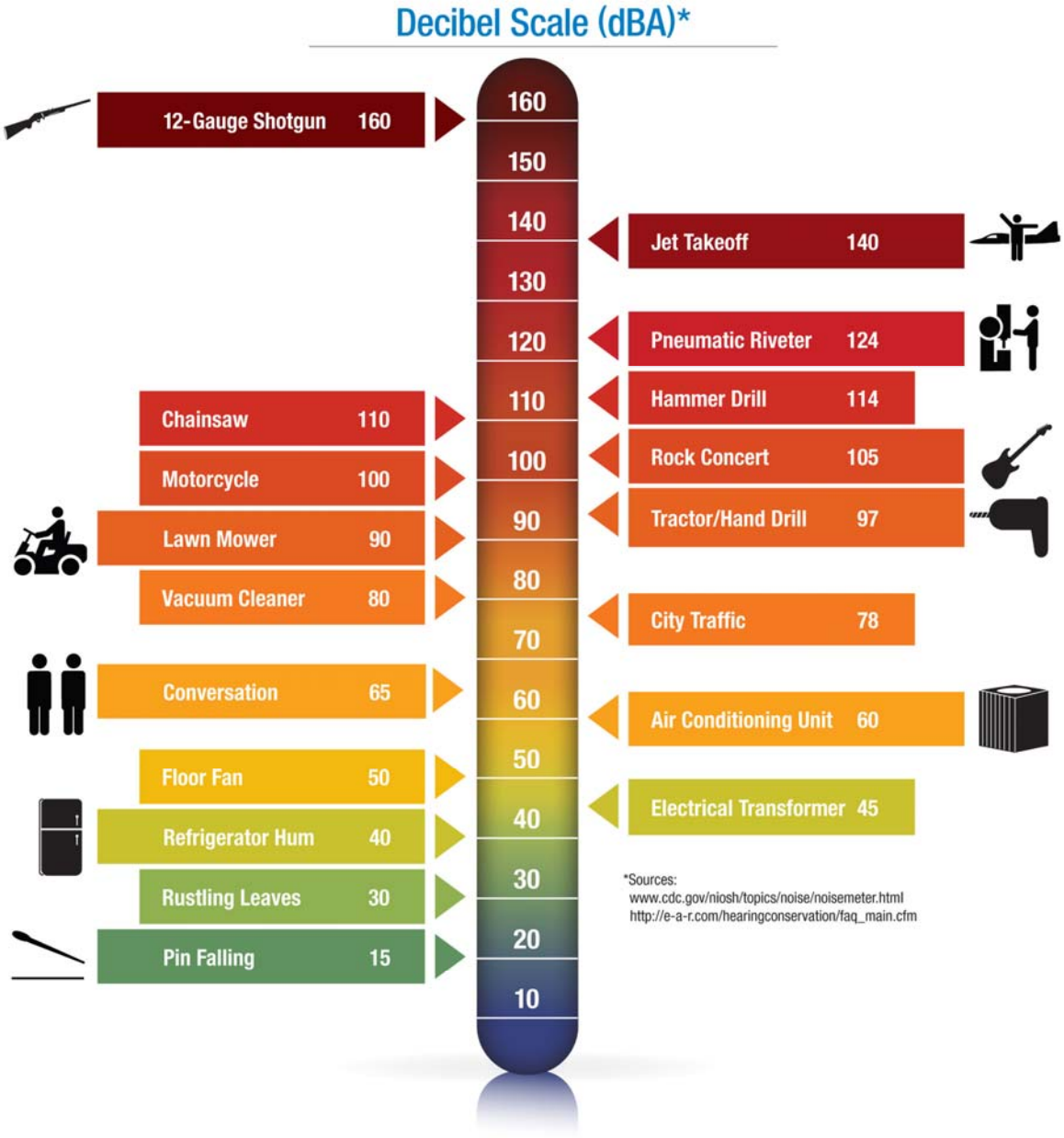
Noise Fundamentals

Noise is often described as unwanted sound. Sound is defined as any pressure variation in air that the human ear can detect. If the pressure variations occur frequently enough (at least 20 times per second), they can be heard and hence are called sound. The number of pressure variations per second is called the frequency of sound, and is expressed as cycles per second, called Hertz (Hz). See Appendix A for definitions of acoustical 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 uses the hearing threshold (20 micropascals), 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 in 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 levels (dB) correspond closely to human perception of relative loudness.

The perceived loudness of sounds 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 weighing the frequency response of a sound level meter by means of the standardized A-weighing network. There is a strong correlation between A-weighted sound levels (expressed as dBA) and community response to noise. For this reason, the A-weighted sound level has become the standard tool of environmental noise assessment. All noise levels reported in this section are in terms of A-weighted levels. Examples of common noise sources and corresponding noise levels are provided in Figure 2.

Figure 2
Noise Levels Associated with 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}), which corresponds to a steady-state A-weighted sound level containing the same total energy as a time-varying signal over a given time period (usually one hour). The Leq is the foundation of the composite noise descriptor, L_{dn}, and shows very good correlation with community response to noise.

The Day-night Average Level (Ldn) 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.

The Nevada County noise standards, which are discussed in detail later in this report, are expressed in terms of the hourly average and single-event maximum noise level performance standards. In addition to applying the County's noise standards to this Project, the California Environmental Quality Act (CEQA) requires that noise impacts be assessed relative to ambient noise levels that are present without the project. As a result, ambient noise surveys were conducted, and comparisons of Project to No-Project noise levels were used to assess noise impacts (in addition to comparison to Nevada County noise standards). Specifically, individual maximum (L_{max}) noise levels and hourly average (L_{eq}) noise levels, both with and without the project, were compared so that the assessment of noise impacts was not based solely on an assessment of project-generated noise in terms of 24-hour averages (L_{dn}), but also on short-term fluctuations in the ambient noise environment.

Audibility

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, and because audibility is variable, the use of audibility alone as significance criteria would be unworkable. CEQA requires a ***substantial*** increase in noise levels before noise impacts are identified, not simply an audible change. The discussion of what constitutes a substantial change in noise environments is provided in the Regulatory Setting section of this report.

Effects of Distance on Sound Propagation

As a general rule, sound from a localized source spreads out as it travels away from the source, and the sound pressure levels drop off with distance according to fundamental relationships. Sound from a localized source (i.e., point source) propagates uniformly outward in a spherical pattern. The sound level attenuates (i.e., decreases) at a rate of 6 dB for each doubling of distance from a point source. For this project, on-site activities and processing equipment are treated as a point source in the noise propagation calculations. Off-site truck traffic is treated as a moving point source in the propagation calculations, with a sound level decay rate of 4.5 dB per doubling of distance from the noise source.

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 decrease with lower frequencies and increases with higher frequencies.

For a conservative assessment of sound propagation for this evaluation, a single attenuation factor of 1.5 dB per thousand feet of distance was used. Because noise generated by the proposed project is anticipated to contain the majority of sound energy in frequencies above 500 hertz, the 1.5 dB per thousand feet attenuation rate is considered appropriate for this assessment.

Effects of Barriers and Ground Cover

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. Finally, impediments can be man-made, such as a 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, more distant receptors will be shielded from view of on-site activities, but closer receptors will not. Where such shielding would occur, the level of noise reaching the receiver would be lower than at unshielded receivers located the same distances from the source. Because shielding of the various components of the project varies both by source and receiver location, this analysis takes the conservative approach of not applying any downward adjustments to predicted noise levels generated by the project at any of the nearest receiver locations, regardless of whether or not those receivers would be shielded.

Attenuation by Buildings and Enclosures

When equipment or processes are located within a building or enclosure, the noise generation of that equipment and processes is attenuated by the building walls and ceiling. The specific degree of attenuation provided by a building will depend on the building materials and construction, as well as the number and size of openings in the building, such as may be required for ventilation. With the exception of on-site mobile equipment, the significant stationary noise sources associated with the project are proposed to be located within an insulated buildings. The noise attenuation provided by the proposed buildings will depend upon ultimate building design and construction, but is estimated to be a minimum of 20 dBA.

Vibration Fundamentals

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 measures in terms of peak particle velocities (PPV, inches/second), or Velocity Decibels in terms of root-mean-square levels (VdB RMS). Standards pertaining to perception as well as potential damage to structures have been developed for vibration in terms of peak particle velocity as well as root-mean-square.

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."

Human response to vibration is highly subjective and difficult to quantify. Vibration can be felt or heard well below the levels that produce any damage to structures. The duration of the event has an effect on human response, as does the frequency of occurrence of the vibration source. Generally, as the duration and vibration frequency of the events increase, the potential for adverse human response increases.

Blasting creates seismic waves that radiate along the surface of the earth and downward into the earth. If close enough to the blasting location, these surface waves can be felt as ground vibration. Ground vibration can result in effects ranging from annoyance of people to damage of structures. If a person is engaged in any type of physical activity, the vibration levels required for perception and annoyance is increased considerably.

Evaluation of Existing Ambient Noise Environment

Project Area Noise Environment

The existing ambient noise environment in the vicinity of the Centennial Site is defined primarily by local and distant traffic.

Project Area Sensitive Receptors

The nearest sensitive receptors to the Centennial site are residences. Residences in the vicinity of the Centennial site are very limited, and are located to the north and northeast of that site.

For this assessment, the 3 nearest representative sensitive receptors were selected for analysis. Those receptor locations are illustrated on Figure 1. Receptors 1 - 3 were selected since they represent the nearest residences to the Centennial Site.

Existing Ambient Noise Environment at Sensitive Receptors

The California Environmental Quality Act (CEQA) states that a project would result in a significant noise impact if it causes a substantial permanent or temporary increase in ambient noise levels. In order to determine the threshold at which a project would result in a substantial noise increase, the existing (pre-project) ambient conditions at potentially impacted noise-sensitive land uses must be established.

To quantify the existing ambient noise environment in the project vicinity continuous noise level measurements were conducted at the two locations indicated on Figure 1. The noise measurement locations were selected to be representative of ambient noise conditions at receptors 1-3.

Weather conditions present during the monitoring program were typical for the season during which they were conducted. There were no adverse or anomalous weather conditions which would have caused measured ambient noise levels to be atypical. Larson Davis Laboratories (LDL) Model 820, & LxT precision integrating sound level meters were used for the noise level measurement survey. The meters were calibrated before 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.

Numerical summaries of the ambient noise level measurements are provided in Table 1. Table 1 also contains the arithmetic mean of the data collected on each day of the survey. Graphs of the individual hourly average (L_{eq}) and maximum (L_{max}) noise levels for each site and each day are presented in Appendix B.

Table 1
Summary of Long-term Noise Monitoring Results
Centennial Remedial Action Work Plan – Nevada County

Site[1]	Date	Ldn (dBA)	Average Measured Hourly Noise Levels (dBA)					
			Daytime[2]		Evening[3]		Nighttime[4]	
			Leq	Lmax	Leq	Lmax	Leq	Lmax
A	Tuesday, October 01, 2019	66	65	80	60	76	59	73
	Wednesday, October 02, 2019	67	65	81	60	74	59	74
	Thursday, October 03, 2019	67	65	80	60	76	59	73
	Average	**67**	**65**	**80**	**60**	**75**	**59**	**73**
B	Friday, December 07, 2018	59	59	79	55	75	50	73
	Saturday, December 08, 2018	57	57	76	54	77	47	69
	Sunday, December 09, 2018	55	56	76	52	74	46	68
	Monday, December 10, 2018	57	58	77	53	74	48	69
	Average	**57**	**58**	**77**	**54**	**75**	**48**	**70**

1. Ambient noise monitoring locations are shown on Figure 1.
2. Daytime = 7 am – 7 pm
3. Evening = 7 pm – 10 pm
4. Nighttime = 10 pm – 7 am

The Table 1 data indicate that ambient conditions vary depending primarily on the distance between the monitoring site and nearby roadways, with existing L_{dn} levels as high as 67 dBA measured near Idaho Maryland Road and lower levels (55-59 dB L_{dn}) along East Bennet Road. The ambient noise level data were used to develop thresholds for determining significant project-generated noise level increases for on-site noise sources and activities. Those thresholds are discussed later in this report.

Evaluation of Existing Ambient Vibration Environment

As with the local noise environment, the ambient vibration environment is defined primarily by traffic on the local roadway network. No other appreciable sources of vibration were identified during BAC field surveys of the area. To quantify baseline vibration levels at representative locations in the project vicinity, BAC conducted short-term vibration measurements at the same locations as the ambient noise monitoring locations.

The vibration measurements were conducted using a Larson-Davis Laboratories Model LxT sound level meter fitted with a BRC SEN_VEL Vibration Transducer (500 mV/ips). The test system is a Type I instrument designed for use in assessing vibration as perceived by humans, and meets the full requirements of ISO 8041:1990(E). A summary of the vibration measurement results is provided in Table 2.

Table 2
Summary of Short-term Vibration Results
Centennial Remedial Action Work Plan – Nevada County

	Measured Vibration Levels, VdB rms		
Measurement Site[1]	**Min**	**Average**	**Max**
A	31	37	48
B	31	38	54

1. Vibration measurement locations are shown on Figure 1.

Evaluation of Existing Aircraft Noise Environment

The Nevada County Airport is located approximately 7,500 feet east of the Centennial site. Exhibit 3-5 of the Nevada County Airport Land Use Compatibility Plan shows the location of the airports 55, 60, and 65 dB CNEL contours. That Figure, which has been reproduced as Figure 3 of this report, indicates that the Brunswick Industrial and Centennial Sites are both located beyond the 55 dB CNEL contour for the airport.

Criteria for Acceptable Noise Exposure

The California Environmental Quality Act (CEQA) contains noise 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 Nevada County, which has both a General Plan Noise Element and a County Code Noise Ordinance. Applicable CEQA Guidelines, Nevada County noise-level criteria, and appropriate criteria of other jurisdictions are discussed below.

California Environmental Quality Act (CEQA) Guidelines

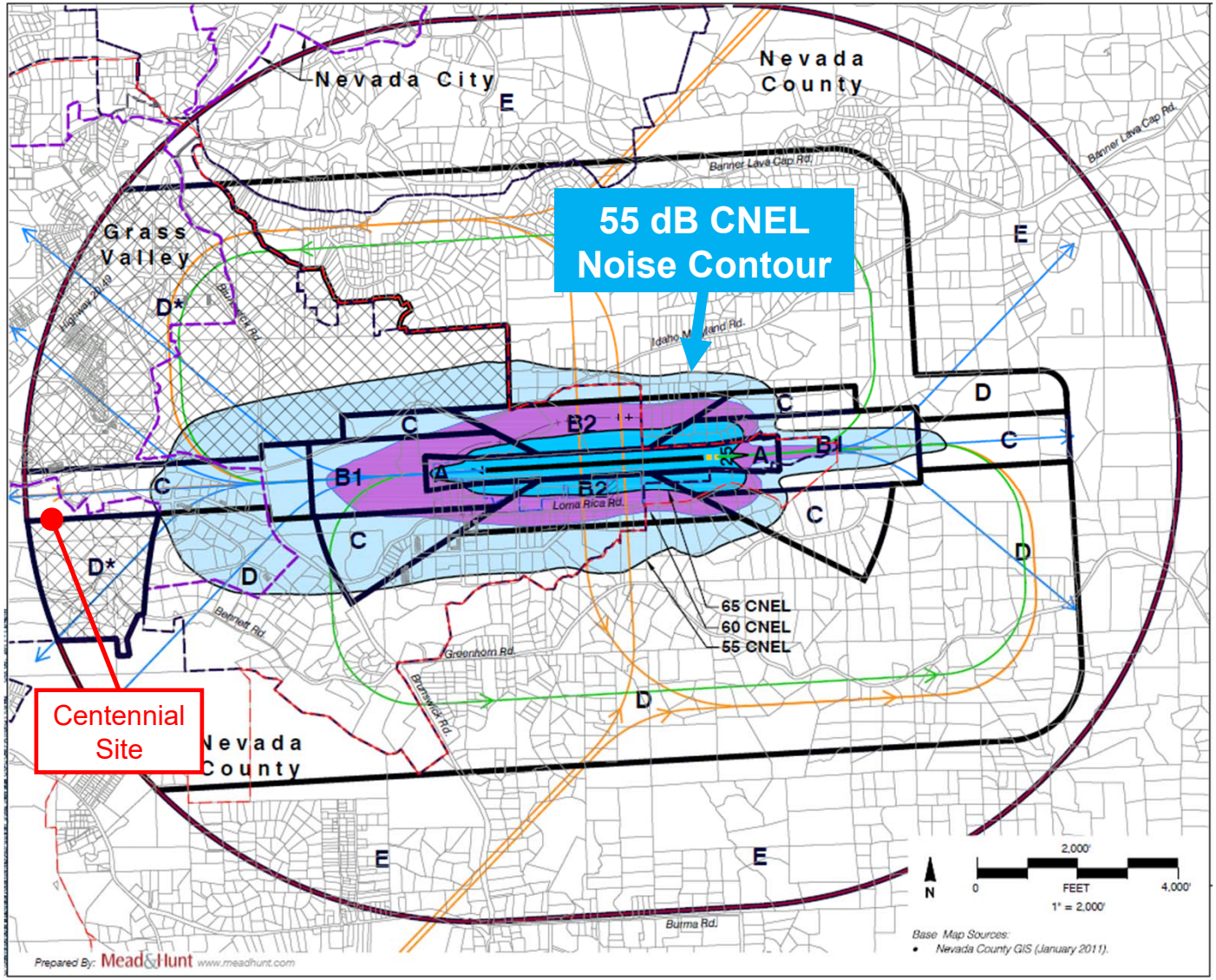
The State of California has established regulatory criteria that are applicable to this assessment. Specifically, Appendix G of the CEQA Guidelines are used to assess the potential significance of impacts pursuant to local General Plan policies, Municipal Code standards, or the applicable standards of 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?

Figure 3
Nevada County Airport Noise Contours
Nevada County, California



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Source: Nevada County Airport Land Use Compatibility Plan (2011)

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 Nevada County General 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. The County's General Plan and Ordinances do contain specific numeric standards for acceptable increases over ambient (5 dB per footnote D of Table 5 – discussed later in this section), but they do not contain numeric standards for ***increases*** in off-site traffic noise levels resulting from a project.

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).

Federal Criteria for Determination of a 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 3 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 are 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 (Ldn or CNEL)	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.

Nevada County Regulations

Nevada County Noise Element

Chapter 9 of the Nevada County General Plan contains the County's Noise Element. The Noise Element contains adopted Goals, Objectives and Policies pertaining to noise. The Noise Element Policies which are pertinent to this project are reproduced below.

Policy 9.1.1 Determine the existing noise environment and continue to reassess this environment so that a realistic set of noise standards can be developed reflecting the varying nature of different land uses.

Policy 9.1.2 The following noise standards, contained in Table 4 below (General Plan Noise Element Table 9.1), as performance standards and land use compatibility standards, shall apply to all discretionary and ministerial projects excluding permitted residential (including tentative maps) land uses.

Table 4
Nevada County General Plan Noise Element Exterior Noise Limits

Land Use Category	Zoning Districts	Time Period	Noise Level, dBA Leq	Lmax
Rural	"A1" "TPZ"	7 am - 7 pm	55	75
	"AE" "OS"	7 pm - 10 pm	50	65
	"FR" "IDR"	10 pm - 7 am	40	55
Residential and Public	"RA" "R2"	7 am - 7 pm	55	75
	"R1" "R3"	7 pm - 10 pm	50	65
	"P"	10 pm - 7 am	45	60
Commercial and Recreation	"C1" "CH" "CS"	7 am - 7 pm	70	90
	"C2" "C3" "OP" "REC"	7 pm - 7 am	65	75
Business Park	"BP"	7 am - 7 pm	65	85
		7 pm - 7 am	60	70
Industrial	"M1" "M2"	any time	80	90

A. Compliance with the above standards shall be determined by measuring the noise level based on the mean average of not less than three (3) 20 minute measurements for any given time period. Additional noise measurements may be necessary to ensure that the ambient noise level is adequately determined.

B. Where two different zoning districts abut, the standard applicable to the lower, or more restrictive, district plus 5 dBA shall apply.

C. The above standards shall be measured only on property containing a noise sensitive land use as defined in Policy 9.8 and may be measured anywhere on the property containing said land use. However, this measurement standard may be amended to provide for measurement at the boundary of a recorded noise easement or as determined in a recorded letter of agreement between all affected property owners and approved by the County.

D. If the measured ambient level exceeds that permitted, then the allowable noise exposure standard shall be set at 5 dBA above the ambient.

E. Because of the unique nature of sound, the County reserves the right to provide for a more restrictive standard than shown in the Exterior Noise Limits table contained in this policy. The maximum adjustment shall be limited to be not less than the current ambient noise levels and shall not exceed the standards of this policy or as they may be further adjusted by Policy 9.1.2.b. Imposition of a noise level adjustment shall only be considered if one or more of the following conditions are found to exist:

    1. Unique characteristics of the noise source:

        a. The noise contains a very high or low frequency, is of a pure tone (a steady, audible tone such as a whine, screech, or hum), or contains a wide divergence in frequency spectra between the noise source and ambient level.

        b. The noise is impulsive in nature (such as hammering, riveting, or explosions), or contains music or speech.

        c. The noise source is of a long duration.

2. Unique characteristics of the noise receptor when the ambient noise level is determined to be 5 dBA or more below the Policy 9.1.2 standard for those projects requiring a General Plan amendment, rezoning, and/or conditional use permit. In such instances, the new standard shall not exceed 10 dBA above the ambient or the Policy 9.1.2 standard, whichever is more restrictive.

F. The above standards shall not apply to those activities associated with the actual construction of a project or to those projects associated with the provision of emergency services or functions.

G. The standards of this policy shall be enforced through compliance inspections and/or complaints.

H. Recognizing that this chapter must work toward the solution to existing noise problems, those land uses that are inconsistent with the above standards and are therefore non-conforming in nature, shall comply with said standards as these land uses are upgraded or intensified or after abandonment through the use permit or site plan process. Said standards shall apply only to that portion of the land use requiring approval. In any event, the use or portion subject to a land use permit must meet the standards in the Exterior Noise Limits table in this policy and cumulatively the noise generated from the entire site must be equal to or less than the pre-land use permit ambient noise level. All such projects will require a comprehensive noise analysis per Policy 9.1.12 and the Nevada County Noise Element Manual.

Policy 9.1.3 The Nevada County Planning Department shall be the lead agency responsible for coordination of all local noise control activities and intergovernmental group activities and subsequent enforcement efforts.

Policy 9.1.4 The County will continue an ongoing County-wide noise monitoring program. The purpose of this program is to assess the changing noise environment in the County in terms of the existing ambient noise level for typical rural, residential, commercial and industrial areas and to ensure that the Policy 9.1.1 standards realistically reflect the current needs of the County.

Policy 9.1.5 This chapter of the General Plan shall be implemented, in part, through the incorporation of the Policy 9.1.1 noise standards within the Land Use and Development Code and the adoption of the Noise Element Manual providing detailed direction and implementation measures. This Manual is adopted as a part of the Plan and can be found in Volume 2, Section 3-Noise Analysis, Appendix A.

Policy 9.1.6 Encourage public awareness of noise and its hazards and means to minimize its existing and future impacts.

Policy 9.1.7 Encourage heavy truck traffic to those routes outside residential areas.

Policy 9.1.8 Encourage cities within Nevada County to adopt noise control programs compatible with County efforts.

Policy 9.1.9 Develop a realistic policy framework designed to function as a guide to planning for appropriate land uses in relation to hazardous and annoying noise.

Policy 9.1.10 Strongly discourage those General Plan amendments and zone changes that would likely create land use conflicts relative to noise.

Policy 9.1.11 Strongly encourage future noise sensitive land uses, including residences, schools, hospitals, nursing homes, churches, and libraries, to those location of the County where the impact of noise generators is limited so that compliance with standards found in Policy 9.1.2 will be maintained. This policy shall apply to the approval of all tentative maps for residentially zoned parcels.

Policy 9.1.12 Limit future noise generating land use to those location of the County where their impacts on noise sensitive land uses will be minimized, consistent with the standards found in Program 9.1.

Policy 9.1.13 Require the preparation of a comprehensive noise study for all land use projects determined to have a potential to create noise levels inconsistent with those standards found in Program 9.1, and in accordance with the methodology identified in the Noise Element Manual contained in General Plan Volume 2, Section 3 - Noise Analysis Appendix A.

Policy 9.1.14 Provide for adequate design controls to assist in mitigating on-site the significant adverse impacts of future noise generating land uses through increased setbacks, landscaping, earthen berms, and solid fencing.

Policy 9.1.15 Strictly enforce the noise insulation standards for new construction as required by Title 24 of the California Administrative Code.

Policy 9.1.16 Minimize the noise impact from automobiles, trucks, motorcycles, and off-road vehicles by continuing to request enforcement of those sections of the California Vehicle Code relative to vehicle exhaust system maintenance by the County Sheriff and State Highway Patrol.

Policy 9.1.17 Where realistically possible, encourage noise sensitive land uses away from railroad operations.

Policy 9.1.18 The routing and design of new or expanded transportation facilities by the County shall incorporate feasible measures necessary to mitigate increases in noise levels.

Policy 9.1.19 Encourage the minimization of noise emission from all County-controlled activities consistent with Policy 9.1.1 standards.

Policy 9.1.20 Protect the safety and general welfare of people in the vicinity of the Nevada County Airport and the Truckee Tahoe Airport port by implementing the appropriate noise compatibility policies to avoid the establishment of noise-sensitive land uses in the portion of the airport environs that are exposed to significant levels of aircraft noise.

Policy 9.1.21 Ensure the development of compatible land uses adjacent to the Nevada County Airport by enforcing the noise criteria as found in the Nevada County Airport Land Use Compatibility Plan as adopted by the Nevada County Airport Land Use Commission on September 21, 2011, as those standards are in effect and may be hereafter amended. (See Figure 9.1 of the General Plan Noise Element – Incorporated by reference).

Policy 9.1.22 Ensure the development of compatible land uses adjacent to the Truckee Tahoe Airport by implementing the noise criteria as found in the Truckee Tahoe Airport Land Use Compatibility Plan as adopted by the Truckee Tahoe Airport Land Use Commission on October 19, 2010, as those standards are in effect and may be hereafter amended.

Policy 9.1.23 The County shall continue to enforce noise criteria standards consistent with the airport noise policies adopted by the Nevada County Airport Land Use Commission and the Truckee Tahoe Airport Land use Commission based on the considerations of the following factors:

a. Established federal and state regulations and guidelines.
b. The ambient noise levels in the community. Ambient noise levels influence the potential intrusiveness of aircraft noise upon a particular land use and vary greatly between Community Regions and Rural Regions.
c. The extent to which noise would intrude upon and interrupt the activity associated with a particular use.
d. The extent to which the activity itself generates noise.
e. The extent which the activity itself generates itself generates noise.
f. The extent of outdoor activity associated with a particular land use.
e. The extent to which indoor uses associated with a particular land use may be made compatible with application of sound attenuation in accordance with the policies set forth for maximum acceptable interior noise levels.

Nevada County Zoning Ordinance

Section L-22 4.1.7 of the Nevada County Land Use and Development Code (LUDC) pertains to noise. The adopted noise standards contained in Table L-II 4.1.7 (Exterior Noise Limits) are identical to those contained in the General Plan Noise Element (reproduced above in Table 4). Because the specific noise standards are identical, the Zoning Ordinance standards are not reproduced below. However, Section L-II 4.1.7.D.8 of the County Zoning Ordinance States the following with respect to construction noise:

L-II 4.1.7.D.8 The above standards shall not apply to those activities associated with the actual construction of a project or to those projects associated with the provision of emergency services or functions.

The provision above exempts construction noise from the Table 5 noise standards. An evaluation of construction noise is provided later in this analysis despite this exemption.

Adjustments to Nevada County Noise Standards for On-Site Noise Sources

As noted above in the footnotes to Table 4, there are various adjustments to the County's noise limits which are to be applied if certain conditions are satisfied. The footnotes most applicable to this project are A, B, D and E. Adjustments to the County's noise standards shown in Table 4 for each of that table's footnotes are described below:

Footnote A Footnote A provides the methodology by which ambient conditions are established. Specifically, Footnote A states that compliance with the Table 4 standards shall be determined by measuring the noise level based on the ***mean average*** (emphasis added) of not less than three (3) 20 minute measurements for any given time period. Additional noise measurements may be necessary to ensure that the ambient noise level is adequately determined.

For this project, ambient noise monitoring periods ranged from 3-4 consecutive days. As a result, the requirements of Footnote A were satisfied.

Footnote B Footnote B states that where two different zoning districts abut, the standard applicable to the lower, or more restrictive, district plus 5 dBA shall apply.

At the Centennial site, the nearest residences (receptors 1, 2 & 3 on Figure 1) are located within an M1 zoning district. However, because these receptors are residences, this analysis conservatively applies the County's Residential district noise standards shown in Table 4 to these receptors. However, because the project site is located within the Nevada County M1 zoning district, which applies different standards than the Residential district, the residential standards of Table 4 are increased by 5 dB at receptors 1, 2 and 3, pursuant to Footnote "B".

Footnote D Footnote D of Table 4 states that if the measured ambient level exceeds that permitted in Table 4, then the allowable noise exposure standard shall be set at 5 dBA above the ambient. As a result, appropriate offsets were applied to Receptors 1-3 pursuant to the Footnote "D" requirements, and those offsets are described following the discussion of the Footnote "E" adjustments.

Footnote E Footnote E states that the County reserves the right to provide for a more restrictive standard under certain conditions. However, the standard cannot be set below current ambient noise levels. Imposition of a noise level adjustment is only considered if one or more of the following conditions are found to exist:

- *The noise source contains a very high or low frequency, is of a pure tone (a steady, audible tone such as a whine, screech, or hum), or contains a wide divergence in frequency spectra between the noise source and ambient level.*

  With the exception of warning devices on mobile equipment (back-up beepers), the project does not propose any sources of noise which contain pure tones. As a result, the noise standard applicable to emergency warning devices was

set 5 dB below applicable noise standard at each receptor after adjustment of that standard for ambient conditions pursuant to Footnote D. However, in no case was the standard for the warning devices set below existing ambient conditions.

- *The noise is impulsive in nature (such as hammering, riveting, or explosions), or contains music or speech.*
  The project does not propose any sources of noise which would be considered impulsive. In addition, no sources of noise containing speech or music are proposed.

- *The noise source is of a long duration.*

  At the Centennial site, operations will be fairly constant during the proposed hours of operations. As a result, the noise standard applicable to on-site activities is set at 5 dB below the Table 4 standards after adjustment of those standards for both differing zoning (Footnote B) and elevated ambient conditions (Footnote D), but not below baseline ambient conditions.

- *Unique characteristics of the noise receptor when the ambient noise level is determined to be 5 dBA or more below the Policy 9.1 standard for those projects requiring a General Plan amendment, rezoning, and/or conditional use permit. In such instances, the new standard shall not exceed 10 dBA above the ambient or the Policy 9.1 standard, whichever is more restrictive.*

  Because baseline ambient conditions were not 5 dB or more below the Table 4 standards, no adjustment to the standards would be warranted for this provision.

Summary of Footnote A, B, D & E Adjustments to the Table 4 Standards

As noted above, a +5 dB adjustment to the Table 4 standards would be applicable at the residential receptors due to the differing zoning districts per Footnote B. However, that +5 dB adjustment would be negated by a -5 dB adjustment to the Table 5 standards due to the project noise sources either consisting of tonal components (intermittent mobile equipment), or occurring for long durations. As a result, the only offsets applied to the Table 4 standards were based on ambient conditions.

Table 5 shows the baseline ambient conditions at the 3 nearest residences to the Centennial Site extrapolated from the ambient noise survey results and the corresponding maximum and average, daytime, evening, and nighttime noise level standards applicable at each representative receptor location after the appropriate adjustments to the Table 4 standards have been applied to account for the ambient conditions.

Table 5
Baseline Ambient Conditions and Adjusted Nevada County Noise Standards by Receptor
Centennial Remedial Action Work Plan – Nevada County

	Baseline Ambient Conditions[1]						Applicable Standards After Adjustment for Ambient					
	Daytime[3]		Evening[3]		Nighttime[3]		Daytime		Evening		Nighttime	
Receptor[2]	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax
1	58	76	51	68	50	66	63	81	56	73	55	71
2	63	81	56	73	55	71	68	86	61	78	60	76
3	54	72	49	69	45	65	55	75	50	74	45	70

1. Baseline ambient conditions at each representative receptor were established through extrapolating the Table 1 data closest to each receptor using a 4.5 dB per doubling of distance decay rate.
2. Receptor locations are indicated on Figure 1.
3. Daytime = 7 am – 7 pm. Evening = 7 pm – 10 pm. Nighttime = 10 pm – 7 am

City of Grass Valley

The project is located within Nevada County but the Centennial site borders the City of Grass Valley. The City of Grass Valley noise level standards are identical to the Nevada County noise standards during daytime hours, and are 5 dB less restrictive than the Nevada County General Plan noise standards during nighttime hours. Because operations at the Centennial site are proposed to occur during daytime hours, the City and County noise standards are identical.

Noise Standards of Other Jurisdictions

Appendix G of the CEQA Guidelines, Section XII (Noise) states that a project would result in a significant noise impact if it resulted in exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.

As noted previously, Nevada County has adopted both a Noise Element and Noise Ordinance. The Noise Element contains reasonable numeric standards for the assessment of noise impacts, and the Noise Ordinance standards are consistent with the Noise Element. Because the County's noise standards have been developed specifically for Nevada County, and because those standards provide thresholds in terms of hourly average, and single-event maximum noise levels, they are also comprehensive. As a result, the use of standards developed for other jurisdictions in lieu of the adopted Nevada County noise standards is unnecessary.

Criteria for Acceptable Vibration Exposure

The California Environmental Quality Act (CEQA) contains vibration impact assessment guidelines. The Nevada County Noise Element and Noise Ordinance do not contain criteria for acceptable vibration exposure applicable to this project. However, the Federal Transit Administration (FTA) and the California Department of Transportation (Caltrans) provide such criteria. Those criteria are discussed in the sections that follow.

Federal Transit Authority Criteria for Acceptable Vibration Levels

Table 12-3 of the Federal Transit Administration (FTA) Noise and Vibration Manual, reproduced as Table 6 below, provides vibration levels at which damage to structures could occur. As shown in Table 6, a vibration level of 90 VdB is the minimum at which the onset of damage to extremely susceptible buildings could occur. As a result, this level was considered to be a conservative benchmark against which project-generated vibration levels were evaluated in this analysis.

Table 6
FTA Criteria for Assessing Damage to Structures

Building Category	Level, VdB[1]
I. Reinforced-concrete, steel or timber (no plaster)	102
II. Engineered concrete and masonry (no plaster)	98
III. Non-engineered timber and masonry buildings	94
IV. Buildings extremely susceptible to vibration damage	90

1. RMS velocity in decibels (VdB) re 1 micro-inch/second

In addition to providing guidance with respect to vibration levels which would cause damage to structures, the FTA guidelines also provide criteria for assessing the potential for annoyance related to vibration. Table 8-1 of the FTA Noise and Vibration Manual, reproduced in Table 7 below, provides vibration criteria for general assessment of impacts.

Table 7
Groundborne Vibration Impact Criteria for General Assessment

	Impact Levels (VdB)		
Land Use Category	Frequent Events[a]	Occasional Events[b]	Infrequent Events[c]
Category 1: Buildings where vibration would interfere with interior ops.	65[d]	65[d]	65[d]
Category 2: Residences and buildings where people normally sleep	72	75	80
Category 3: Institutional land uses with primarily daytime uses	75	78	83

Source: Federal Transit Administration, Transit Noise Impact and Vibration Assessment, May 2006.
Vibration levels are measured in or near the vibration-sensitive use.

a. "Frequent Events" is defined as more than 70 vibration events of the same source per day.
b. "Occasional Events" is defined as between 30 and 70 vibration events of the same source per day.
c. "Infrequent Events" is defined as fewer than 30 vibration events of the same source per day.
d. This criterion limit is based on levels that are acceptable for most moderately-sensitive equipment such as optical microscopes. Vibration-sensitive manufacturing or research will require detailed evaluation to define the acceptable vibration levels.

According to Table 7, the general assessment impact level for frequent events applicable at residential uses is 72 VdB. Where vibration levels exceed this threshold, a detailed vibration assessment is recommended. Because project operations would essentially occur continuously during the proposed business hours, the FTA criteria applicable to "Frequent Events" is applied to this analysis of potential annoyance resulting from project activities. This analysis analyzes the potential vibration impacts associated with the use of mobile equipment.

Project Description

Overview

The proposed Remedial Action Plan proposes to allow the following:

- Clear vegetation from 28 acres at the Centennial Site
- Onsite cement stabilization of 4,200 yards of sand tailings
- Onsite excavation, transport, placement, and compaction of 241,000 yards of mine waste (sand tailings and rock)

Surrounding Land Uses

The Centennial site is surrounded by commercial and industrial uses, with few residences to the north and northeast of the site. Those residences are identified as receptors 1-3 on Figure 1.

Hours of Operation

Hours of operation will vary based on the project element. Table 8, "Hours of Operation," provides the hours of operation and approximate duration.

Table 8
Hours of Operation
Centennial Industrial Site – Remedial Action Plan – Nevada County

Project Element	Hours of Operation	Duration[1]
Placement, grading, and compaction of engineered fill at Centennial Industrial Site	7:00 a.m.–3:30 p.m., 7 days a week	1 year

Notes: [1] Durations are approximate and dependent on factors such as equipment and personnel availability, fluctuations in the economy, and technical details.

Equipment

Expected equipment associated with the project is provided in Table 9, "Typical Equipment." The type of vehicles used will vary somewhat over time depending on availability and the introduction of new models to suit different conditions.

Table 9
Typical Equipment
Centennial Remedial Action Work Plan – Nevada County

Equipment[1]	Uses
Dozer (CAT D8 or similar)	Move, grade, and compact engineered fill
Grader (CAT 140H or similar)	
Excavator (CAT 385 or similar)	
Roller compactor	
Haul trucks (20 ton)	Haul and dump mine waste
Water truck	Water haul roads and fill areas
Mobile auger blending plant	Mobile plant for blending rock and sand

Notes:
[1] Equipment will be purchased at the time it is needed and may differ from equipment listed.

Project Truck Trip Generation

Access to the Centennial Industrial Site is located at Centennial Drive. Only employees and equipment will use this entrance. Project truck trip generation is provided in Table 10.

Table 10
Project Truck Trip Generation Estimates
Centennial Remedial Action Work Plan – Nevada County

				Am Peak Hour Round Trips		Pm Peak Hour Round Trips	
Uses	**Axles**	**Average Daily Round Trips**	**Max Daily Round Trips**	**Entering**	**Exiting**	**Entering**	**Exiting**
Fuel trucks[1]	5	1	1	0	0	0	0
Freight Trucks	5	1	2	0	0	0	0
Outside services[2]	2	2	4	0	0	0	0

Notes:
[1] Fuel trucks will come to the site to refuel heavy equipment.
[2] Outside services includes vendors, deliveries, and other ancillary vehicle traffic to support operations
[3] Each round trip generates 2 one-way trips.

Evaluation of Project Noise Impacts

The major noise producing components of the project evaluated in this study are as follows:

- Construction of on-site facilities.
- Off-site haul truck traffic / engineered fill transport.
- Engineered fill placement and compaction.

The noise generation of each of these noise sources is evaluated in the following sections. Noise levels are predicted at the nearest representative receptors to each source and the resulting noise levels are compared against the appropriate project noise standards. In addition to evaluating the potential noise impacts of the project, this analysis also evaluates the potential impacts of the local aircraft noise environment upon the project site.

Impact Evaluation 1: Project Construction Noise

Activities at the Centennial site will include site clearing, excavation, grading, trucking, and compaction. Table 11 provides maximum noise levels 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.

Table 11
Typical Construction Equipment Noise

Equipment Description	Maximum Noise Level at 50 Feet, dBA
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
Soil mix rig	80

Source: Federal Highway Administration (FHWA)

As noted in the project criteria section, construction noise is exempt from the Nevada County noise standards. In addition, project construction activities are proposed only during daytime hours and construction in any given area would be temporary. As a result, no significant

construction noise impacts are identified for this project. Nonetheless, a comparison of predicted construction noise levels against the project standards of significance is provided in the following sections to determine if consideration of construction noise abatement measures may be warranted to reduce the potential for annoyance associated with project construction.

The nearest sensitive receptors (residences) to the Centennial site are receptors 1, 2 & 3. Those receptors are located approximately 500 to 1,000 feet from locations on the project site where project construction activities would take place. Based on maximum and average construction noise levels of 85 dBA L_{max} and 75 dBA L_{eq} at a reference distance of 50 feet, average and maximum noise levels were computed at the nearest receptors. Table 12 shows the predicted construction noise levels at each representative receptor.

Table 12
Predicted Construction Noise Levels at Nearest Receptors
Centennial Site Construction Activities

		Predicted Noise Level		Daytime[1] Noise Criteria		Criteria[2] Exceeded?		
Receptor	Distance	Leq	Lmax	Leq	Lmax	Leq	Lmax	Impact?
1	500	54	64	63	81	no	no	no
2	600	53	63	68	86	no	no	no
3	1000	47	57	55	75	no	no	no

1. As noted in Table 8 aboveground 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.
2. Because the Nevada County Zoning Ordinance exempts construction activities from the Table 4 noise standards, these criteria are not applicable to this component of the project. They are provided to give an indication as to whether or not construction noise would be substantial relative to existing ambient conditions at these nearest receptors.
Source: FHWA Roadway Construction Noise Model (RCNM) reference maximum levels.

As indicated in Table 12, Centennial site construction noise levels are predicted to be below the Nevada County noise criteria at each of the nearest receptors even though those criteria are not applicable to construction activities. As a result, consideration of additional construction noise abatement measures would not be warranted for this aspect of the project.

Evaluation of Aircraft Noise Impacts

Impact Evaluation 2: Aircraft Noise Impacts upon the Project

Because the project does not proposed the development of noise-sensitive land uses assessing aircraft noise impacts for this project may not be required. Nonetheless, Figure 3 shows that the Centennial site is located outside of the future 55 dB CNEL noise contour for the Nevada County Airport. This level is well below the County's 75 dB CNEL level considered normally acceptable for industrial uses. As a result, the project site and the proposed operations will not be adversely affected by aircraft noise and this impact is **considered less than significant.**

Evaluation of Project Vibration Impacts

Impact Evaluation 3: Construction Vibration Impacts

Table 13 shows reference peak particle velocity (PPV) and VdB (rms) vibration levels for the types of heavy earthmoving equipment which will be utilized for the project. The Table 13 data is provided in terms of both peak particle velocity and VdB at a reference distance of 25 feet.

Table 13
Vibration Levels of Heavy Earthmoving Equipment – 25 Foot Reference Distance

Source	Peak Particle Velocity (PPV) inches/second	RMS Velocity in Decibels (VdB)
Water Trucks	0.001	57
Scraper	0.002	58
Bulldozer - Small	0.003	58
Backhoe	0.051	82
Excavator	0.051	82
Grader	0.051	82
Loader	0.051	82
Loaded Trucks	0.076	86
Bulldozer - Large	0.089	87

Source: FTA and FHWA

The nearest receptor to either the Centennial or Brunswick site is approximately 350 feet from the locations where the most significant vibration would be generated. To project the vibration levels from the reference distance of 25 feet shown in Table 22 to the nearest receptor, the following formula is applied:

$$PPV = PPV_{ref} * (25 / D)^n \text{ (inches/second)}$$

Where:

PPV = Desired vibration level at receptor located D feet from the vibration source
D = Distance from vibration source to sensitive receptor (feet)
n = Vibration attenuation rate through ground.

According to Chapter 12 of the Federal Transit Administration (FTA) Transit Noise and Vibration Impact Assessment (Federal Transit Administration, 2006) manual, an “n” value of 1.5 is recommended to calculate vibration propagation through typical soil conditions.

Using the formula provided above, the vibration level at the nearest sensitive receptor located 350 feet from the project area vibration generation computes to 0.002 inches/second ppv, or approximately 58 VdB. Because this level is well below the threshold of perception, and below measured existing maximum vibration levels at several of the ambient vibration monitoring sites, this impact is considered ***less than significant***.

Cumulative Noise Impacts from all Sources

Impact Evaluation 4: Cumulative Noise From all Sources

The extent by which noise sources related to project operations will combine to result in higher noise levels than those predicted for the noise sources individually depends on the relative locations of the noise sources and their individual magnitude.

When 3 noise sources of equal magnitude are combined the resulting increase in noise levels is 5 dB (4.77 dB). Because all of the on-site noise sources generate differing noise levels from different locations, the combined noise exposure of all onsite noise sources would not likely reach 5 dBA. The cumulative noise generation of the on-site noise sources at the Centennial Site is predicted to remain within compliance with the applicable noise criteria and this impact would be ***less than significant***.

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.

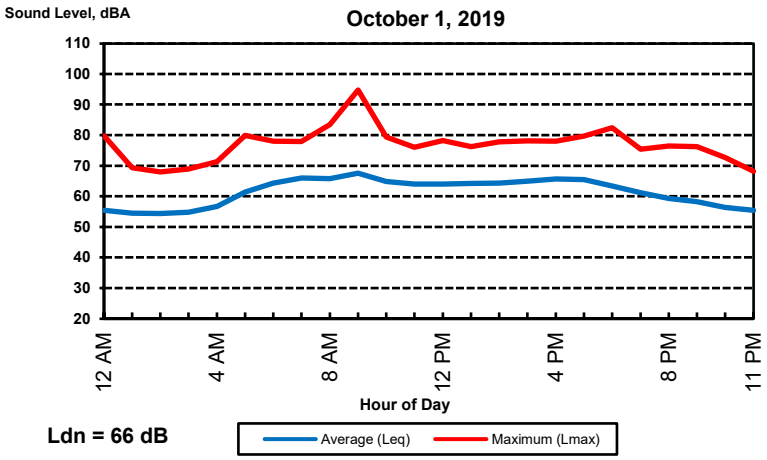
Noise Unwanted sound.

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.

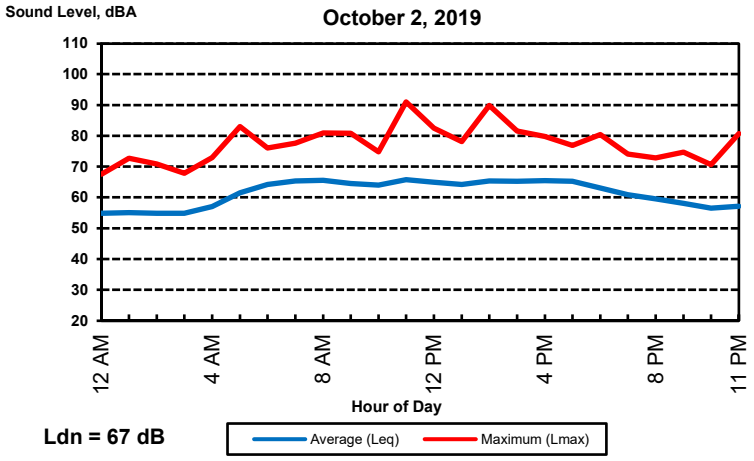
RT_{60} The time it takes reverberant sound to decay by 60 dB once the source has been removed.

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.

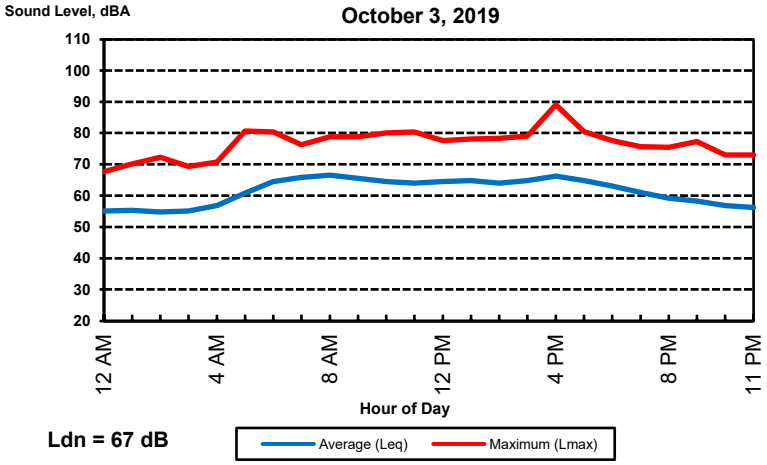
Appendix B-1
Ambient Noise Monitoring Results
Centennial Industrial Site
Site A: October 1, 2019 - October 3, 2019



Ldn = 66 dB



Ldn = 67 dB



Ldn = 67 dB

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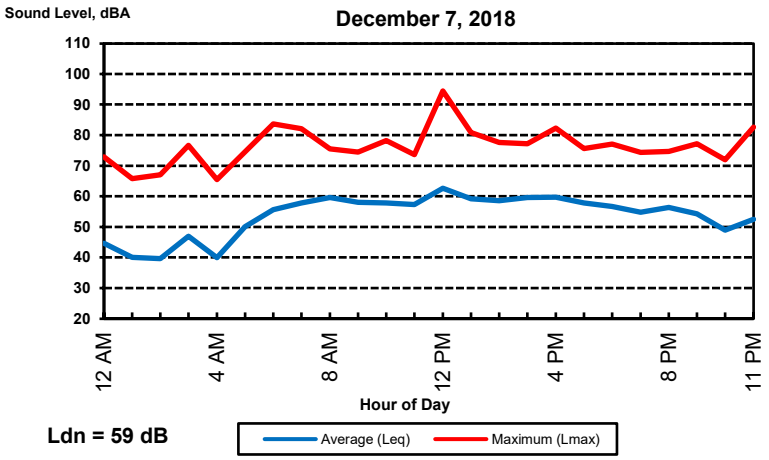
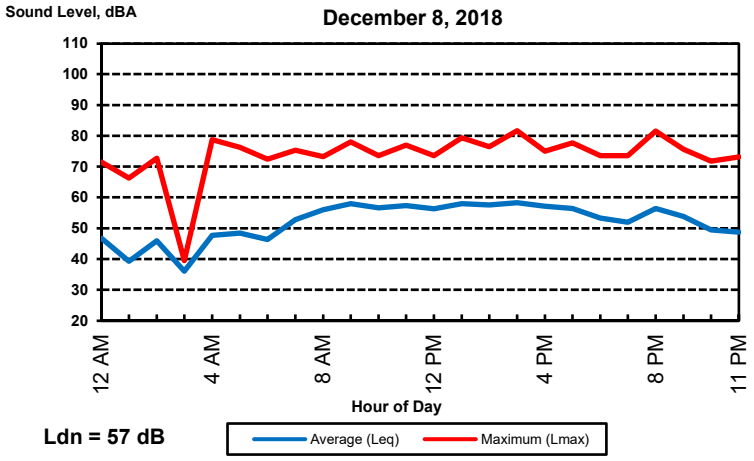
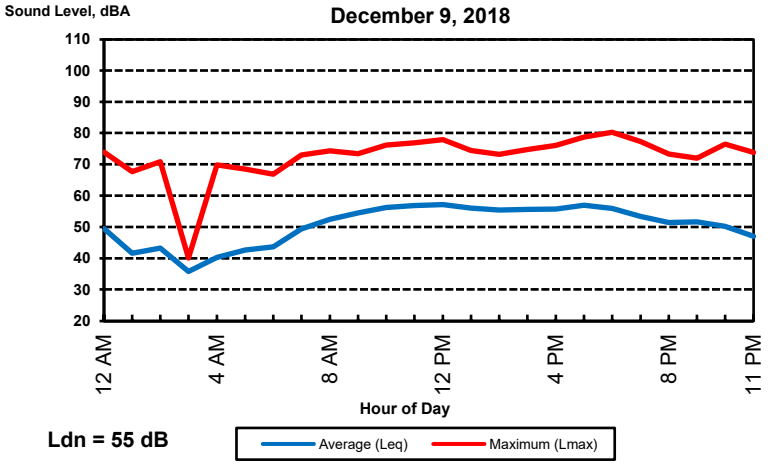
Appendix B-2
Ambient Noise Monitoring Results
Centennial Industrial Site
Site B: December 7, 2018 - December 10, 2018



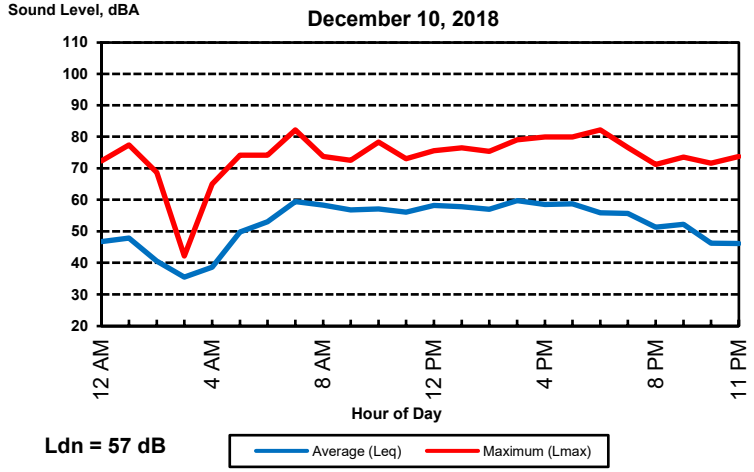
Ldn = 59 dB



Ldn = 57 dB



Ldn = 55 dB



Ldn = 57 dB

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