Appendix E

Noise Impact Analysis

ALCO IRON AND METAL COMPANY

1091 DOOLITTLE DRIVE, SAN LEANDRO

REVISED FACILITY EXPANSION NOISE ANALYSIS

PREPARED FOR: Alco Iron & Metal Company

October 17, 2024

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CSDA Project No. 1877.01

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1.0 Executive Summary

This report summarizes our analysis of the current and projected future noise levels for the proposed facility expansion at Alco Metal and Iron Company.

- Based on the City of San Leandro's Noise and Land Use Compatibility criteria, industrial zoned properties should have CNEL[1] noise levels of 75 dBA or less; the same applies to the neighboring golf course. We calculated that the expansion of the Alco facility will generate CNEL 59 to 67 dBA at the neighboring property lines.
- The City's Zoning Code also stipulates that industrial facilities should have noise levels of L_{eq}[2] 70 dBA or less. We calculated the expansion of the Alco facility will generate L_{eq} 60 to 69 dBA at the neighboring property lines.
- Based on our measurements and calculations, the expansion of the Alco facility will not result in significantly increased noise levels at the neighboring properties.

2.0 Project Description

Alco's owners have recently purchased additional property adjacent to, and west of, their current operations at the corner of Doolittle and Eden Road. The primary purpose of the application is to relocate the large scrap metal piles away from view from Doolittle, and allow for better traffic circulation on site, therefore reducing issues on Doolittle. The additional two acres will be used to store materials for processing and allow for better circulation of truck traffic and required storm water treatment measures. At the current scrap pile site, there will be construction of new in-bound and out-bound truck scales to facilitate more efficient truck circulation and help eliminate queuing.

The neighboring land uses consist of other industrial facilities and a golf course to the northwest. The closest residential (sensitive) use is to the northeast, approximately 2,000 feet away.

The current activities will continue and include the following:

1. Weighing of Incoming and Outgoing Loads of material on the new truck scales.
2. A dispatch and Weighmaster's Office.
3. Unloading of Steel from Alco and Customer Trucks.
4. Processing of steel to prepare for shipment including, cutting with large excavator mounted shears.
5. Loading of processed steel into either overseas export containers or large end dump trailers.
6. Storage of Ferrous Materials.
7. Maintenance of our fleet of excavators, forklifts, trucks, and other industrial equipment.
8. Repair and maintenance of our equipment, trucks, and boxes, including welding.
9. A Truck Wash Area.
10. A Purchasing Office where payments are made to customers for both Non-Ferrous and Ferrous Materials.

[1] Community Noise Equivalent Level (CNEL): A metric for the 24-hour A-weighted average noise level. The CNEL metric accounts for the increased sensitivity of people to noise during the evening and nighttime hours. From 7 pm to 10 pm, sound levels are penalized by 5 dB; from 10 pm to 7 am, sound levels are penalized by 10 dB. A 10 dB increase in sound level is perceived by people to be twice as loud.

[2] L_{eq}: The equivalent steady-state A-weighted sound level that, in a stated period of time, would contain the same acoustic energy as the time-varying sound level during the same time period.

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Alco operates between 4 am and 12 am on Monday through Friday, and between 5 am and 12 pm on Saturday. Additionally, the facility is open to the public from 7 am to 7 pm, Monday through Friday, and 6 am to 12 pm on Saturday. The facility does not operate on Sunday. The expansion does not propose a change in hours of operation.

We understand the facility does not have or plan to employ outdoor lighting, which limits their operation of most outdoor heavy machinery to daytime hours (7am to 7pm).

We understand Alco's site expansion will include construction activities. As described in the project description, the following activities/improvements are proposed for the new, two-acre site:

- Grading
- Catch basins and storm water system
- Impervious surface (concrete paving or steel plate)
- Frontage improvements including new fence, landscaping, and storm water treatment.

At the existing site, any broken pavement is planned to be repaired, and an additional truck scale will be added. The schedule indicates that all construction will be completed as part of a single Grading phase. Furthermore, the site expansion will not result in additional equipment being used in day-to-day operations.

The facility manager located at 1091 Doolittle Drive in San Leandro requested that CSDA Design Group analyze Alco Iron and Metal's Recycling Facility noise levels to determine whether their planned facility expansion will comply with the City of San Leandro's General Plan acoustical criteria. This report summarizes the results of our existing conditions measurements and analysis.

3.0 Acoustical Criteria

3.1 San Leandro General Plan:

Section 4.10 of the San Leandro General Plan stipulates the following acoustical criteria:

- **Policy EH-7.9: Vibration Impacts.** Limit the potential for vibration impacts from construction and ongoing operations to disturb sensitive uses such as housing and schools.
- **Noise and Land Use Compatibility:** The City has noise and land use compatibility guidelines in the General Plan. Table 4.10-5 from San Leandro's General Plan is reprinted below in Figure 1. As shown in Figure 1, Industrial Zone and Golf Course Noise Level zone allows a maximum CNEL of **75 dBA.**

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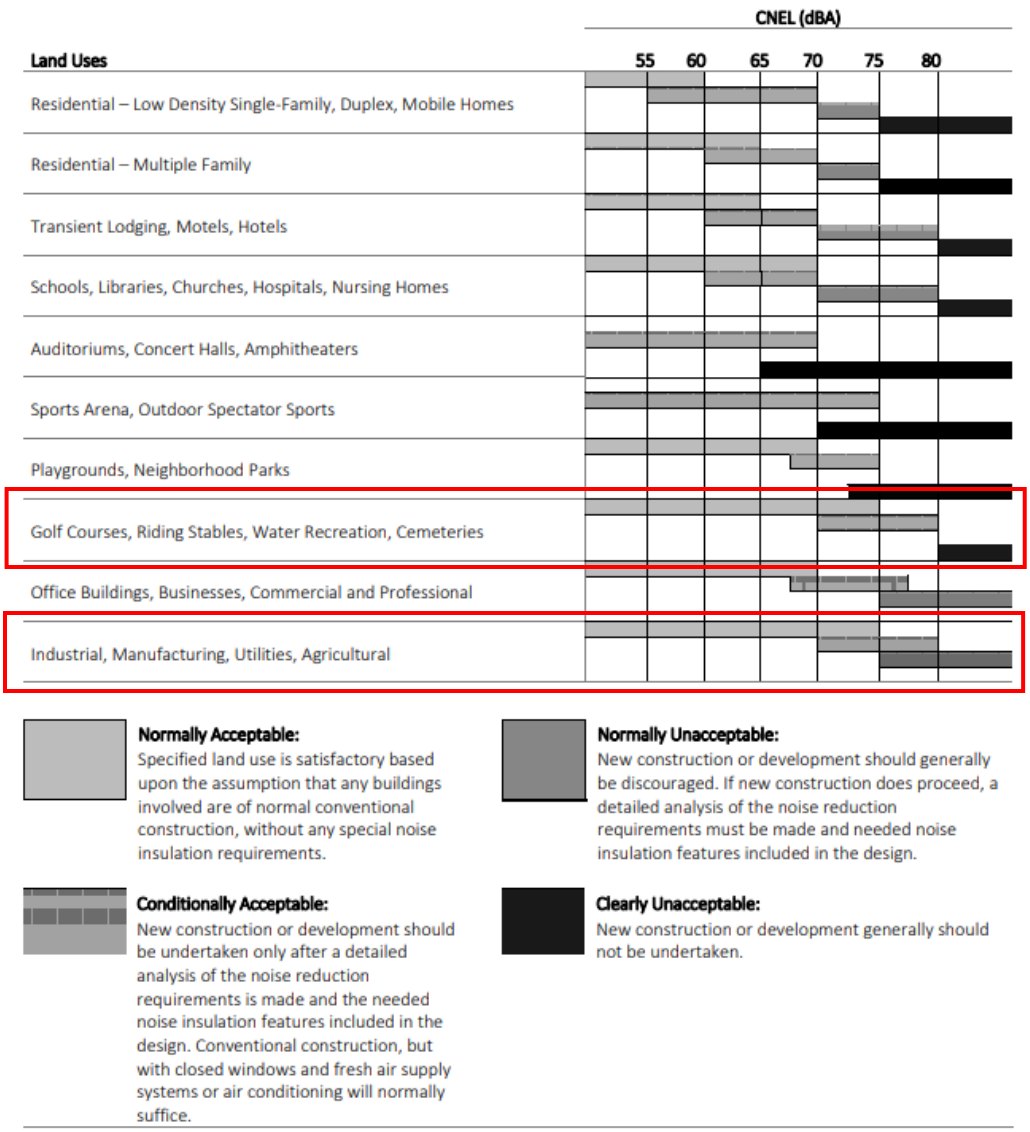

Figure 1: San Leandro Land Use Compatibility for Community Noise Environments

3.2 San Leandro Municipal Code:

Chapter 4-1 of the City's Municipal Code provides restrictions and regulations for noise within San Leandro. The noise-related code does not contain numerical noise level limits and is aimed more at prohibiting "disturbing, excessive and offensive noises" so as to abate nuisances relative to noise. As such, there are no quantitative noise limits to apply.

Additionally, Section 4-1-1115 Item B of the Municipal Code provides restrictions for allowable hours of construction:

- "Construction work or related activity which is adjacent to or across a street or right-of-way from a residential use, except between the hours of 7:00 a.m. and 7:00 p.m. on weekdays, or between 8:00 a.m. and 7:00 p.m. on Sunday and Saturday. No such construction is permitted on Federal holidays."

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3.3 Building Damage due to Construction Vibration – Federal Transit Administration

The Federal Transit Administration (FTA) has adopted vibration standards that are used to evaluate potential building damage impacts related to construction activities. The vibration damage criteria adopted by the FTA are shown in Table *1*.

Table 1: Construction Vibration – Damage Criteria

Building/Structural Category	Maximum Peak Particle Velocity (PPV), in/sec
I. Reinforced-concrete, steel or timber (no plaster)	0.5
II. Engineered concrete and masonry (no plaster)	0.3
III. Non-engineered timber and masonry buildings	0.2
IV. Buildings extremely susceptible to vibration damage	0.12
Federal Transit Administration, 2018. Transit Noise and Vibration Impact Assessment Manual (FTA Report No. 0123), Table 7-5	

3.4 San Leandro Zoning Code:

Per Section 4-1646 of the City's Zoning Code, under Section D-5: All city Collection and Processing facilities will be required to adhere to the following relevant policy.

- Noise levels shall not exceed sixty decibels (60 dBA) as measured at the property line of an R district or otherwise shall not exceed seventy decibels (70 dBA).

3.5 CEQA Thresholds of Significance:

Although San Leandro's General Plan does not provide thresholds of significance for project generated noise, typical California Environmental Quality Act (CEQA) thresholds of significance are as follows:

- A CNEL increase of 5 dBA when "future with project" CNEL levels are below the "Normally Acceptable" noise levels.
- A CNEL increase of 3 dBA when "future with project" CNEL levels are at or above the "Normally Acceptable" levels.

In addition, the City's Zoning Code property line limit applies:

- Noise levels shall not exceed sixty decibels (60 dBA) as measured at the property line of an R district or otherwise shall not exceed seventy decibels (70 dBA).

The thresholds above are utilized by many jurisdictions within California.

4.0 Ambient Measurements and Analysis

Both long-term and short-term measurements were conducted in and around the Alco facility. These measurements are discussed in the following sections.

4.1 Weather

During the measurement period, the average wind speed was 19 miles per hour (mph), reaching up to 22 mph on December 14th, which did not affect the overall measurements. The temperature ranged

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from a low of 41°F to a high of 65°F and averaged 53°F. The humidity level ranged from a low of 34% to a high of 100%, with no precipitation.

4.2 Long Term Measurement Results

To quantify and characterize the existing noise environment, three noise level measurements were conducted from December 12th to December 14th, 2018. The long-term measurements were taken in secured lock boxes 15 feet above the ground at various locations along Eden Road (i.e. at the northern property line of Alco and the proposed expansion area). The dominant sources of noise at the property line were nearby metal recycling equipment from Alco Iron and Metal Company and vehicular traffic on Doolittle Drive. The minor sources of noise were from overhead aircraft going to/coming from Oakland International Airport and the San Leandro Water Pollution and Water Treatment plant located east of the facility. Figure 2 shows the long-term (LT) measurement locations along the northern property line.

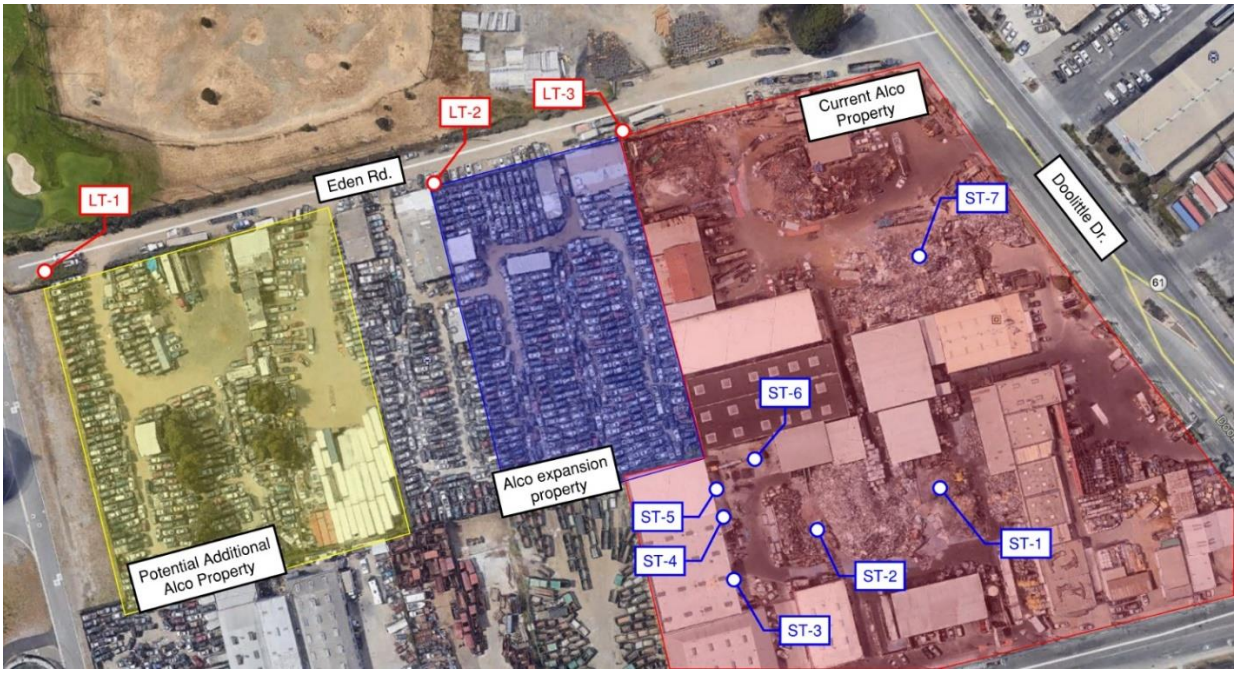

Figure 2: Short- and Long-Term Noise Level Monitoring Locations and Site Plan

Based on a review of the measurement data, the average CNEL for each measurement location is shown in Table 2.

Table 2: Long Term Measured Noise Levels

Location	CNEL [dBA]
LT-1	65
LT-2	69
LT-3	73

Figure 3 below provides a graphical representation of the ambient noise measurement results.

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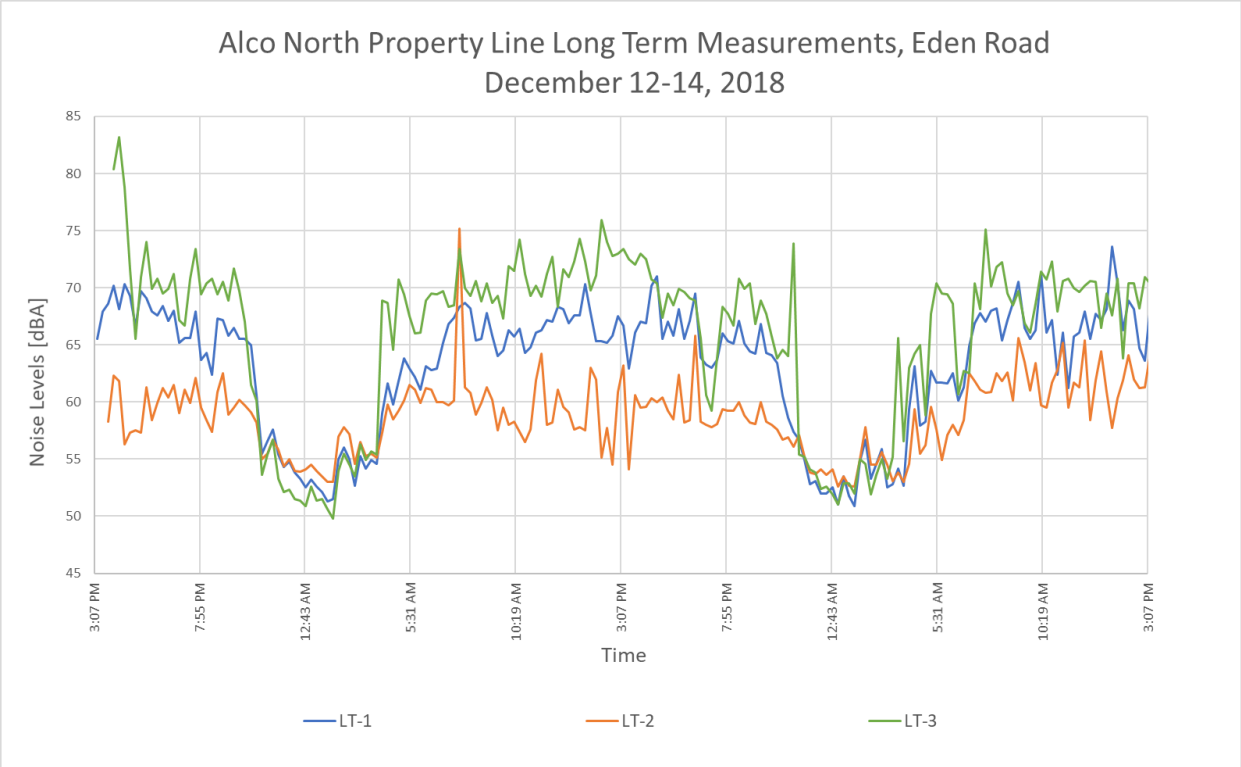

Figure 3: Measured Ambient Noise Levels along Eden Road

Based on our measurements and City of San Leandro's Noise and Land Use Compatibility chart re-printed in Figure 1, the noise levels along the northern property line are considered "Normally Acceptable."

4.3 Short Term Measurement Results

In addition to the long-term measurement locations along Eden Road, short-term (ST) measurements were taken on December 12th near various operating mechanical equipment in Alco's facility. The seven short term measurements allowed us to more accurately model the existing facility noise conditions using the CadnaA modeling software, further detailed in the next section. The measured noise levels from these locations are presented in Table 3 below.

Table 3: Short Term Measured Noise Levels of Facility Mechanical Equipment

Location	Mechanical Equipment	Average SPL [dBA]	Maximum SPL [dBA]
ST-1	Metal Sorting Crane	87	101
ST-2	Metal Baler	87	94
ST-3	Wire Processing Equip, Bldg. South Door	93	96
ST-4	Dust Extractor	91	92
ST-5	Wire Processing Equip, Bldg. North Door	100	103
ST-6	Wire Processing Equipment	93	94
ST-7	Loading Crane	82	94

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5.0 Facility Expansion Analysis

5.1 Noise Modeling

To calculate expected noise generated by the mechanical equipment to be placed on the Alco property expansion section, 3D computer modeling software, CadnaA, was used. CadnaA utilizes the ISO 9613-2 calculation methodology.[3] The computer model incorporates the shielding/blocking provided by the project buildings, perimeter noise barriers, and considers any noise reflected from the project buildings. Perimeter noise barriers are 12' tall and their locations are shown in Figures 4 through 7. The model also accounts for the facility's hours of operation (see Section 2.0). Based on discussions with the project consultant (Guy Houston) regarding the actual use of heavy equipment on site, our models evaluating future noise impacts make the following assumptions:

- The metal sorter, metal baler, loading crane, and truck routes operate for 6 hours (50% utilization) during daytime hours. They do not operate before 7am or after 7pm.
- Wire processing equipment and the dust extractor operate for ~8 hours during daytime hours (65% utilization), ~1 hour during evening hours (7pm to 10pm; 30% utilization), and 1.5 hours during nighttime hours (4am to 7am and 10pm to midnight; 30% utilization.

The proposed Alco facility expansion area, as indicated in Figure 2, will be primarily used for materials storage.

5.2 General Plan Criteria: CNEL Noise Levels

The existing conditions CNEL noise contours for the Alco facility can be seen in Table 4 and Figure 4 below.

[3] International Organization for Standardization, 9613-2:2024 "Acoustics – Attenuation of Sound during Propagation Outdoor-2."

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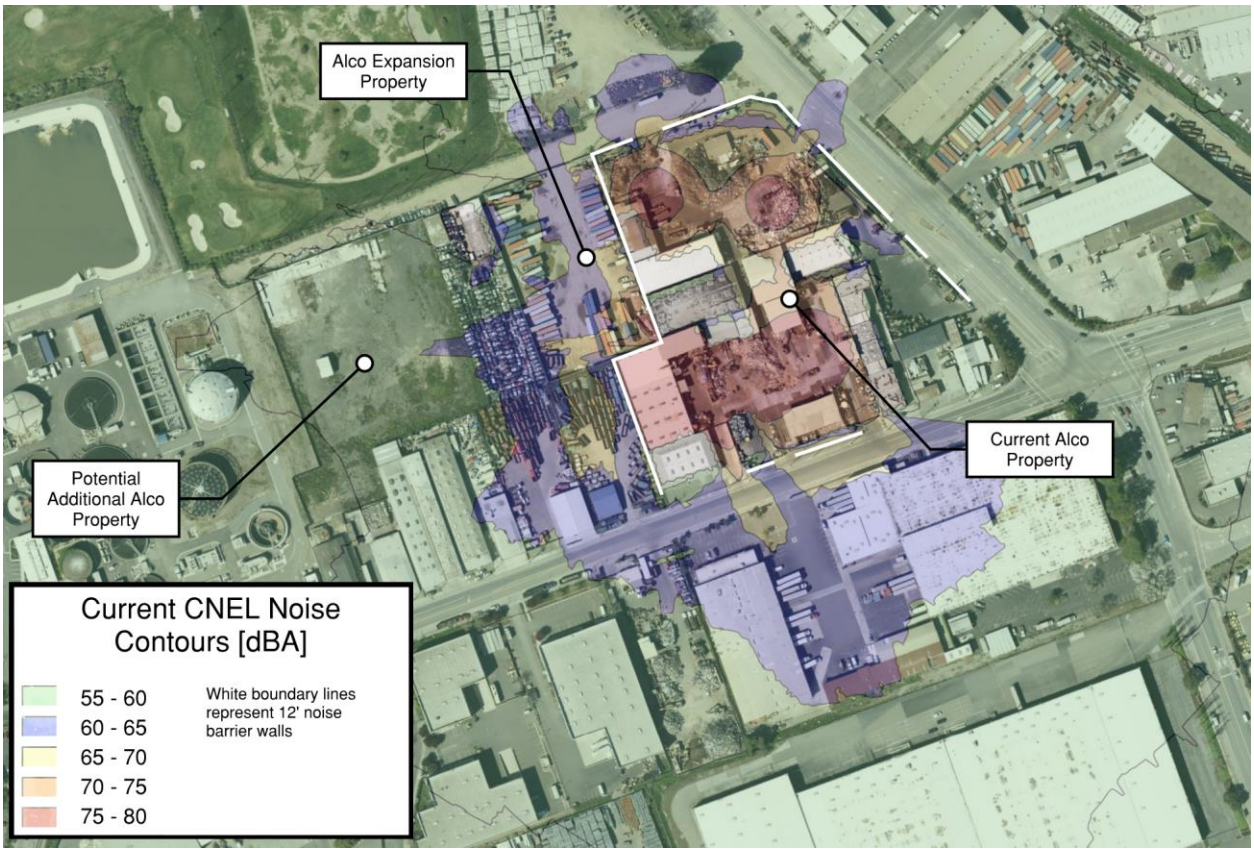

Figure 4: Alco Existing Conditions CNEL Noise Contours

Based on the proposed use of the expansion property, we developed a model of the existing and predicted property line CNEL noise levels, which can be seen numerically in Table 4 and graphically in Figure 5 below.

Table 4: Calculated Property Line CNEL Noise Levels

Location	Existing Alco Noise Level [dBA]	Future Alco Expected Noise Level [dBA]	Criteria [dBA]	Projected Noise Increase [dBA]	Threshold of Significance [dBA]
North Property Line	65	67	75	2	5
East Property Line	62	64	75	2	5
West Property Line	55	59	75	4	5

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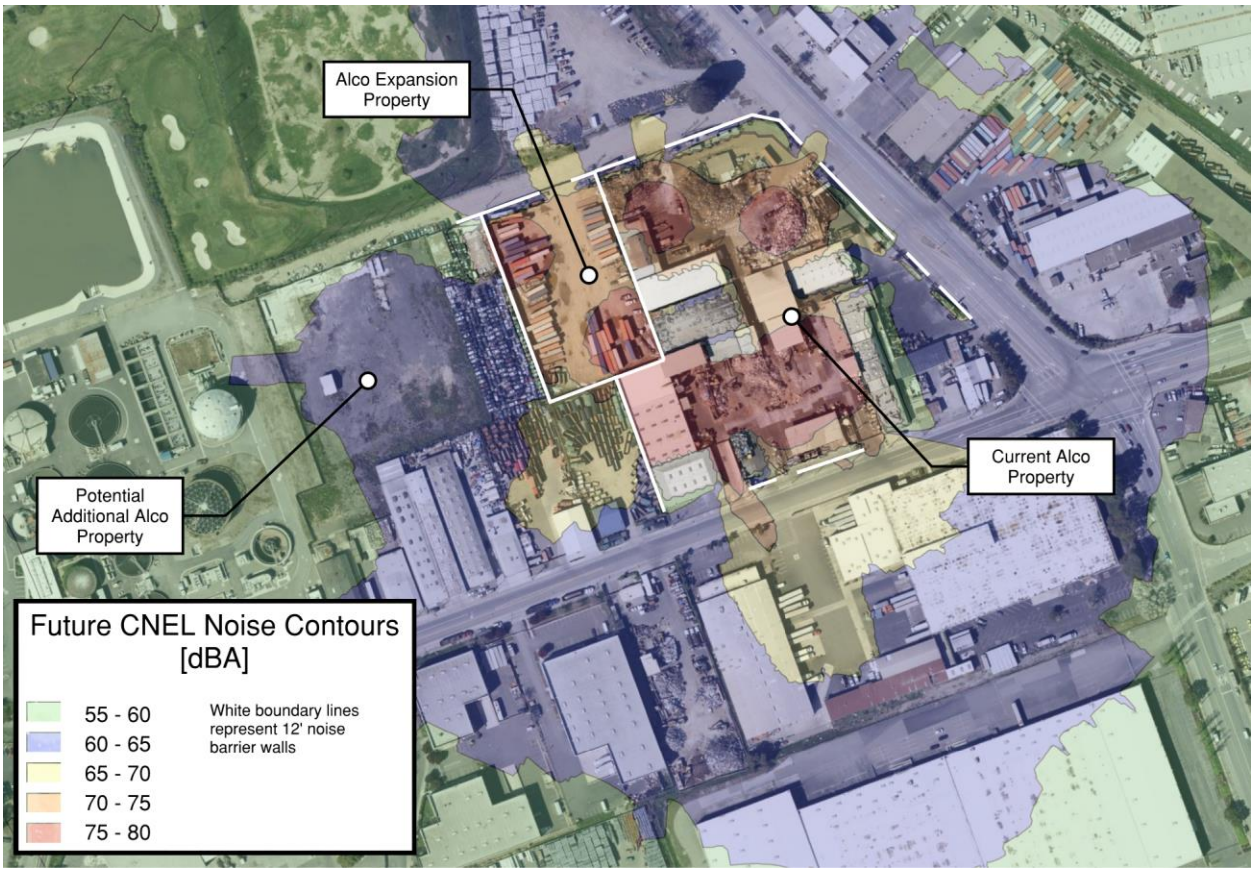

Figure 5: Future Alco (with Expansion Property) CNEL Noise Contours

5.3 Zoning Code Criteria: L_{eq} Noise Levels

The existing conditions L_{eq} operational noise contours for the Alco facility can be seen in Table 5 and Figure 6 below.

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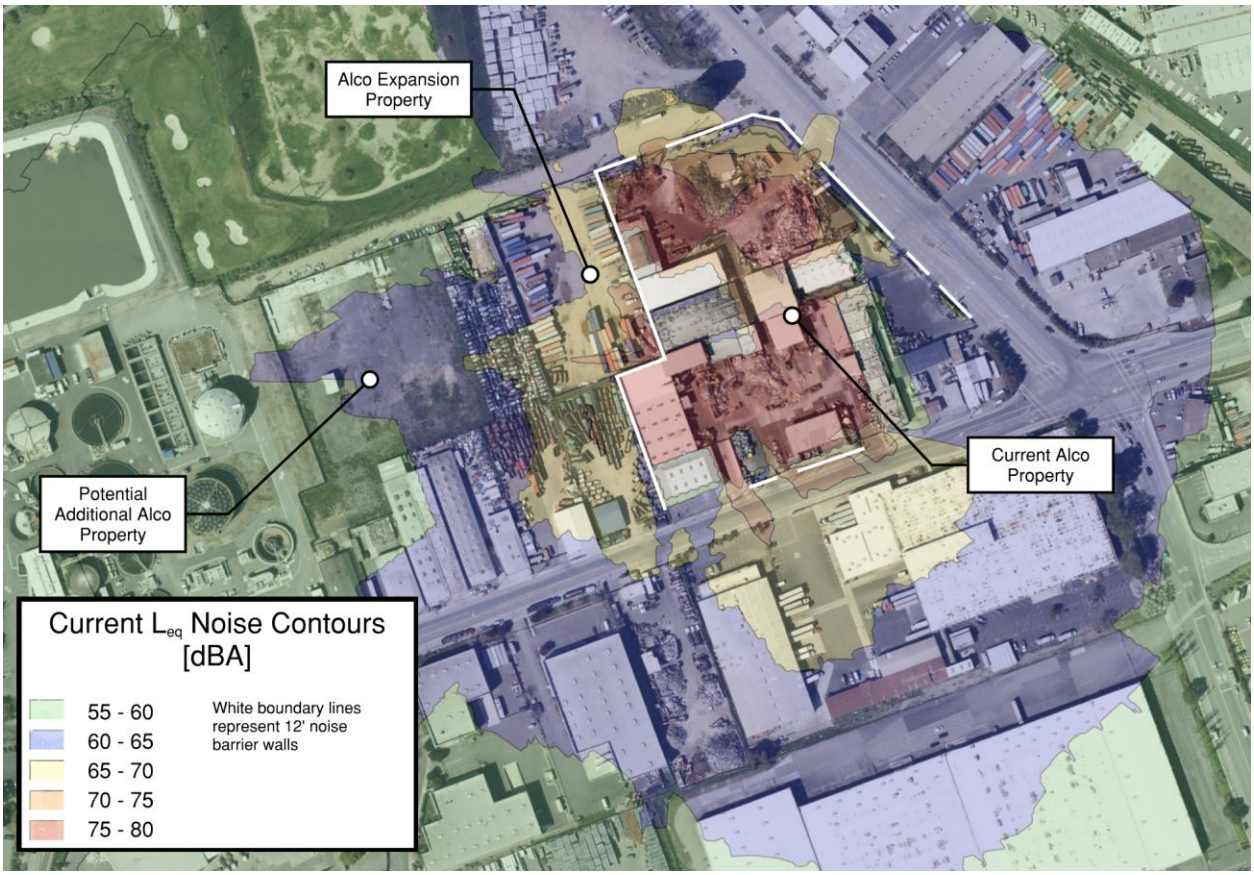

Figure 6: Alco Existing Conditions L_{eq} Noise Contours

Based on the proposed use of the expansion property, we developed a model of the existing and predicted property line L_{eq} noise levels, which can be seen numerically in Table 5 and graphically in Figure 7 below.

Table 5: Calculated Property Line L_{eq} Noise Levels

Location	Existing Alco Noise Level [dBA]	Future Alco Expected Noise Level [dBA]	Criteria [dBA]
North Property Line	70	69	70
East Property Line	66	66	70
West Property Line	59	60	70

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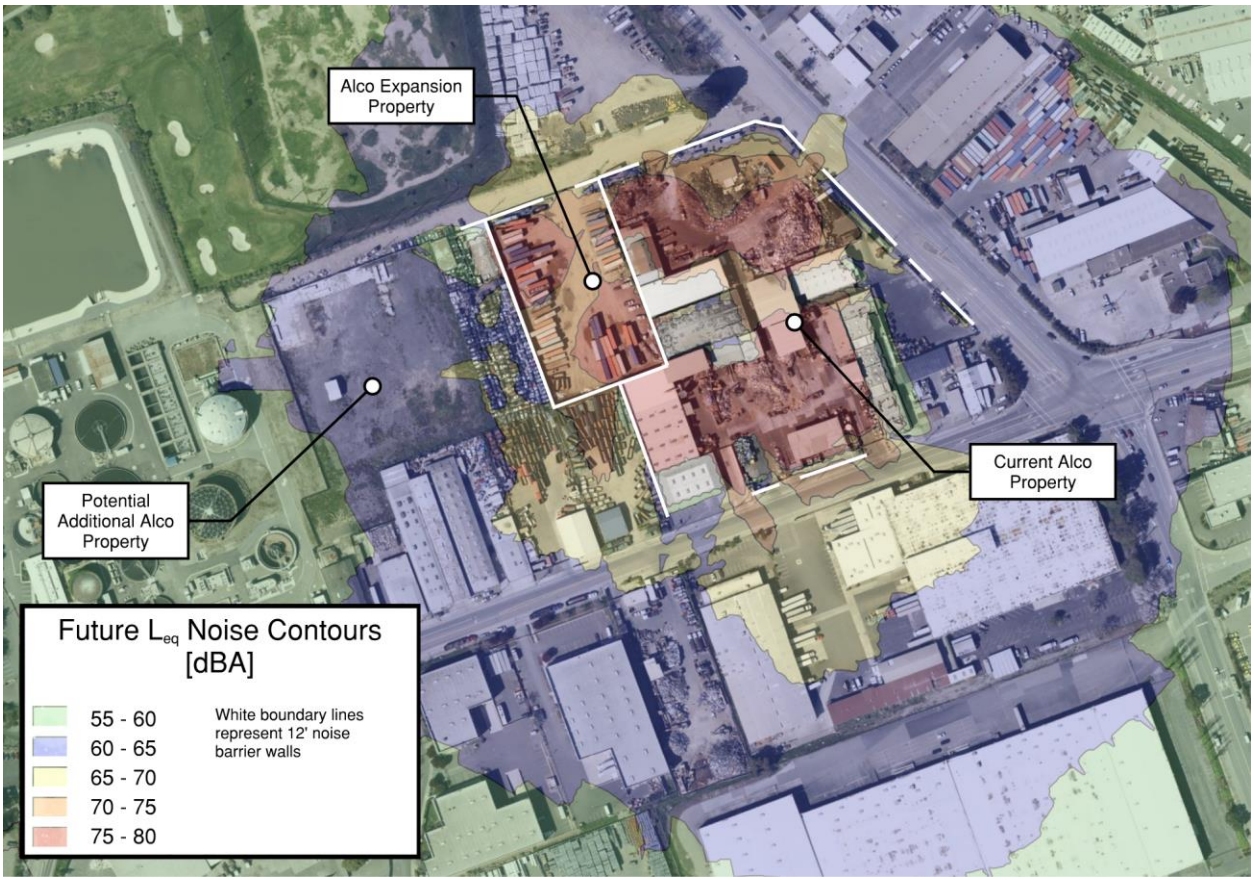

Figure 7: Future Alco (with Expansion Property) L_{eq} Noise Contours

5.4 *Construction Noise*

The primary source of construction noise will be the operation of heavy equipment on the project site. Intermittent noise impacts will also result from trucks arriving to and departing from the site. Construction activities associated with the project will be limited to grading/paving. Equipment typically used in these activities includes excavators, loaders, heavy-duty trucks, pavers, and other similarly sized equipment. Most of the heavy construction equipment will not be running at full capacity throughout each construction period. To account for this variation in usage, a usage factor (as assigned to each piece of equipment in the FHWA's "Roadway Construction Noise Model") has been incorporated to the reference noise levels presented in Table 6.[4]

While the project description does not provide the types of proposed equipment, duration, or time of day schedule, we have assumed the equipment presented in Table *6* will be used to complete the proposed construction tasks. We do not anticipate this equipment will result in a significant increase in noise levels from the Alco's facility's normal operations.

[4] Federal Highway Administration Roadway Construction Noise Model Noise Emission Reference Level Database, 2006

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Table 6: Typical Noise Levels from Construction Equipment

Phase	Anticipated Equipment (FHWA Reference)	Reference Noise Level at 50 feet (L_{EQ} dBA)[1]
Grading	Excavator	81
	Dump Truck	80
	Concrete Pump Truck	75
	Front End Loader	76
	Paver	85
Source: *Federal Highway Administration Roadway Construction Noise Model Noise Emission Reference Level Database* [1.] Includes standard usage factor provided by FHWA.		

We note that the City's Municipal Code does not specify allowable noise levels due to construction activities, but rather restricts the allowable hours of construction (7 am to 7 pm on weekdays, 8 am to 7 pm on weekends). In the absence of numerical criteria, we recommend Best Practice noise reduction measures be implemented to reduce the potential impact of construction activity on nearby properties:

- Construction equipment should be well maintained and used judiciously to be as quiet as practical.
- Equip all internal combustion engine-driven equipment with mufflers, which are in good condition and appropriate for the equipment.
- Utilize "quiet" models of stationary noise sources where technology exists. Select hydraulically or electrically powered equipment and avoid pneumatically powered equipment where feasible.
- Locate stationary noise-generating equipment as far as possible from sensitive receptors when adjoining construction sites. Construct temporary noise barriers or partial enclosures to acoustically shield such equipment where feasible.
- Prohibit unnecessary idling of internal combustion engines.
- Route construction related traffic along major roadways and away from sensitive receptors where feasible.

5.5 *Construction Vibration*

The primary construction vibration generation will occur from the operation of heavy equipment on the project site. Construction activities associated with the project will be limited to a grading/paving phase. The following construction vibration analysis for building damage is consistent with the methods presented in the Federal Transit Administration Transit Noise and Vibration Impact Assessment Manual (2018). The manual provides the following equation to apply when calculating vibration propagation to a receiver:

$$PPV_{equip} = PPV_{ref} \times \left(\frac{25}{D}\right)^{1.5} \quad (1)$$

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

Additionally, the equipment reference levels and the calculation procedures established by the FTA are utilized in this analysis and provide a reasonable estimate for a wide range of soil conditions. Table *7* presents the assumed equipment mix for the grading phase and reference vibration levels at 25 feet (from the Federal Transit Administration).

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Table 7: Typical Vibration Levels from Construction Equipment

Phase	Assumed Equipment	Equipment (Equivalent FHWA Reference)	Reference Vibration Level at 25 feet (PPV, inches/second)
Grading	Excavator	Large Bulldozer	0.089
	Dump Truck	Loaded Trucks	0.076
	Concrete Pump Truck	Loaded Trucks	0.076
	Front End Loader	Small Bulldozer	0.003
	Paver	Large Bulldozer	0.089
Source: *Federal Highway Administration Roadway Construction Noise Model Noise Emission Reference Level Database*			

The vibration-generating equipment shown in the table above is not anticipated to result in any damage to nearby buildings, given the criteria presented in Table *1*.

5.6 On-Going Vibration-Generating Operations

As stated by Policy EH 7.9 in the Criteria section, potential for ongoing vibration impacts should be limited to not disturb sensitive uses such as housing and schools. This will not affect the Alco expansion since there are no schools or housing developments in the immediate vicinity.

5.7 *Traffic Volume Impact*

The expansion of the Alco facility is not anticipated to add any additional traffic to the area, as the project will not add employees nor is it expected to increase customer traffic. Furthermore, the installation of an additional truck scale will facilitate the flow of existing traffic and the site expansion will result in a more efficient operation.

6.0 Conclusions

Based on the measurements and calculations included in this report, and the City of San Leandro's acoustical criteria, the expansion of the Alco facility will not result in significantly increased noise levels at the neighboring properties.

This concludes our analysis of the Alco Iron and Metal San Leandro facility expansion. Please do not hesitate to contact us with questions.

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