

3.7 NOISE

This section of the DEIS describes existing noise conditions on the site and in the site vicinity. Potential impacts associated with the EIS Alternatives are evaluated and mitigation measures are identified. This section is based on the *Noise Study* (September 2022) prepared by Ramboll U.S. and peer reviewed by BRC Acoustics (see **Appendix K**).

3.7.1 Affected Environment

Noise is sometimes defined as unwanted sound; the terms noise and sound are used more or less synonymously. The human ear responds to a very wide range of sound intensities. The decibel scale (dB) used to describe sound is a logarithmic rating system which accounts for the large differences in audible sound intensities. This scale accounts for the human perception of a doubling of loudness as an increase of 10 dB. Therefore, a 70-dB sound level will sound about twice as loud as a 60-dB sound level. People generally cannot detect differences of 1 dB; in ideal laboratory situations, differences of 2 or 3 dB can be detected by people, but such a change typically would not be detectable in an average outdoor environment. A 5-dB change would typically be perceived under normal listening conditions.

When addressing the effects of noise on people, it is useful to consider the frequency response of the human ear. Sound-measuring instruments are therefore often programmed to weight measured sounds based on the way people hear. The frequency-weighting most often used is A-weighting because it approximates the frequency response of human hearing and is highly correlated to the effects of noise on people. Measurements from instruments using this system are reported in "A-weighted decibels" or dBA. All sound levels in this evaluation are provided in A-weighted decibels.

Regulatory Context

Section 9.09.040 of the DuPont Municipal Code (DMC 9.09.040) specifies noise limits based on the limits set in the Washington Administrative Code (WAC 173-60). DMC 9.09.040 establishes limits on sounds crossing property boundaries based on the Environmental Designation for Noise Abatement (EDNA) of the sound source and the receiving properties. Section 9.09.040(b) of the DuPont City Code identifies Class A EDNAs as residential areas, Class B EDNAs as commercial areas, and Class C EDNAs as industrial areas. The allowable noise level limits are displayed in **Table 3.7-1**.

**Table 3.7-1
DUPONT MAXIMUM PERMISSIBLE SOUND LEVELS (DBA)**

EDNA of Source Property	EDNA of Receiving Property		
	Class A Day/Night ^a	Class B	Class C
Class A	55/45	57	60
Class B	57/47	60	65
Class C	60/50	65	70

Source: DMC 9.09.040.

^a The limits for noise received in Class A EDNAs are reduced by 10 dBA during nighttime hours (10 PM to 7 AM).

The city noise rule allows the limits presented in Table 3.7-1 to be exceeded for certain periods of time: 5 dBA for no more than 15 minutes in any hour, 10 dBA for no more than 5 minutes of any hour, or 15 dBA for no more than 1.5 minutes of any hour. These allowed increases can be described in terms of the percentage of time a certain level is exceeded, using statistical noise descriptors (Lns). For example, L25 represents a sound level that is exceeded 25% of the time, or 15 minutes in an hour. Similarly, L8.33 and L2.5 are the sound levels that are exceeded 8.33 and 2.5% of the time, or 5 and 1.5 minutes in an hour, respectively. At no time can the allowable sound level be exceeded by more than 15 dBA, represented by the Lmax.

DMC Section 9.09.040(c) provides a map that specifically designates the EDNA's for various properties within the City (Appendix A of Ordinance 208). The EDNA boundaries shown in this map identify a small Class A (Residential) EDNA on both sides of Barksdale Avenue in the historic village of DuPont, a small Class B (Commercial) EDNA between the historic village and I-5, and the remainder of the DuPont area as a Class C (Industrial) EDNA. DuPont Ordinance 208 and the associated map in Appendix A were adopted in 1978; they are no longer representative of current zoning and comprehensive land use plan designations. Furthermore, the 1978 map of EDNA designations does not adequately represent the basic uses identified in 9.09.040(b) that define EDNAs. It is, therefore, unclear whether the EDNA designations shown in the 1978 map or the EDNA identifications based on land uses in 9.09.040(b) should apply.

For this noise analysis, land use zones (as identified in DuPont's Zoning Map) are used to determine the appropriate noise limits for the various receiving properties. This approach is consistent with the more modern language and identification of EDNA designations based on actual uses and represents a more accurate reflection of current and expected future conditions. But applying either method for identifying the appropriate EDNAs, the site would be considered a Class C EDNA, and the applicable Ln noise limits for a Class C EDNA noise source affecting different types of receiving properties are displayed in **Table 3.7-2**.

Table 3.7-2
APPLICABLE LN NOISE LIMITS FOR CLASS C EDNA NOISE SOURCES

EDNA of Source Property	Ln Limits			
	L25	L8.3	L2.5	Lmax
Class A ^a	60/50	65/55	70/60	75/65
Class B	65	70	75	80
Class C	70	75	80	85

Source: DMC 9.09.040 (d).

^a The limits for noise received in Class A EDNAs are reduced by 10 dBA during nighttime hours (10 PM to 7 AM) and are shown for Day/Night.

Because noise generated by mining would typically be fairly consistent over an hourly period, the allowances for short-term increases in the noise level limits would rarely apply. Therefore, the most stringent/conservative noise limit for mining activities (a Class C source) would be an L25 of 70 dBA at nearby Class C EDNAs, an L25 of 65 dBA at nearby Class B EDNAs, or an L25 of 60 dBA between 7 AM and 10 PM and 50 dBA between 10 PM and 7 AM at nearby Class A EDNAs.

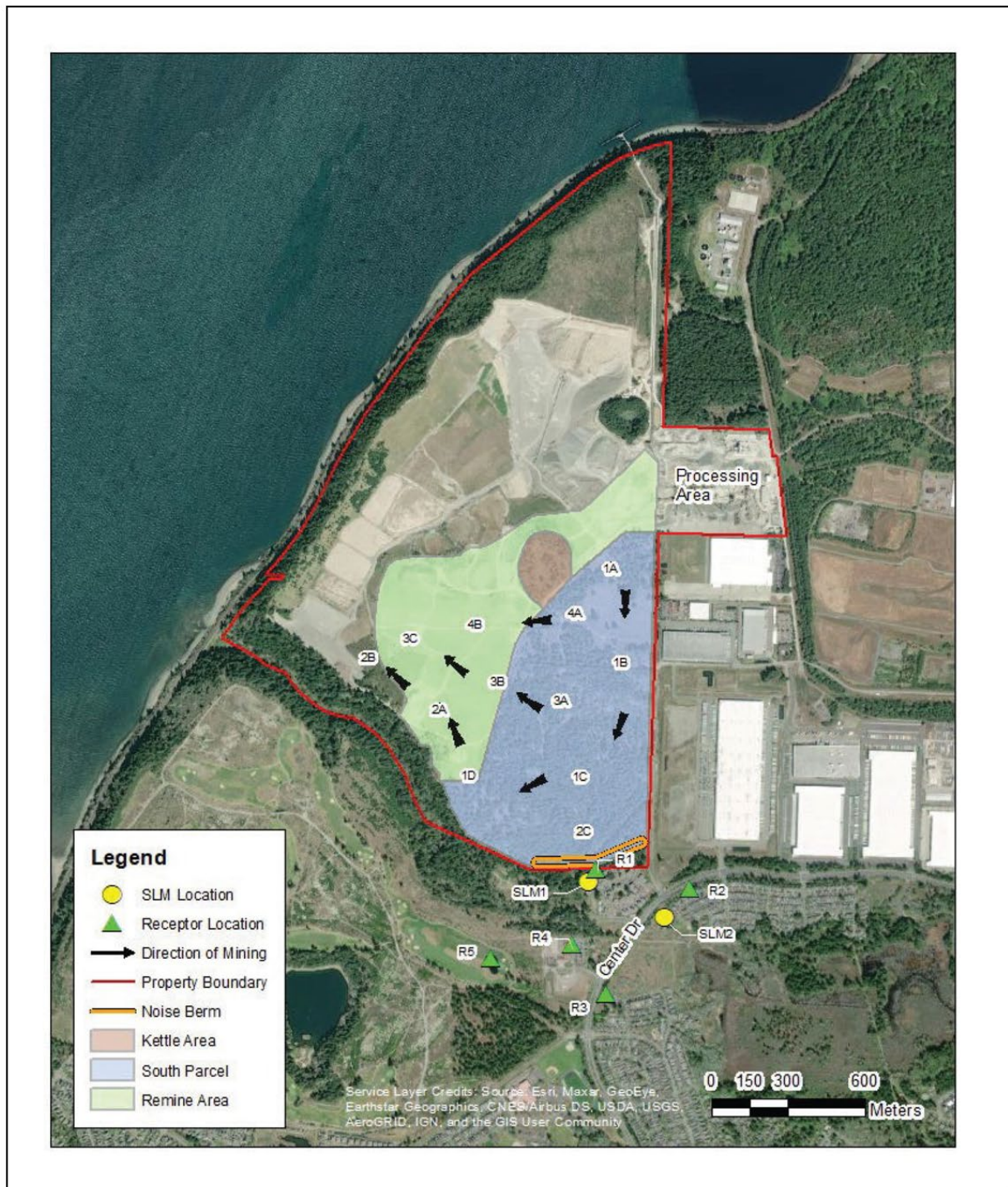
DMC 9.09.050 exempts the following sources from the above noise limits:

- Temporary construction noise, except when received in Class A EDNA properties between the hours of 10 PM and 7 AM;
- Sounds created by motor vehicles when regulated by the state noise limit (Chapter 173-62 WAC), adopted by reference in DMC 9.09.040; and
- Sounds created by motor vehicles, licensed or unlicensed, when operated off public highways, except when such sounds are received in Class A EDNAs.

Existing Sound Levels

As part of the noise study prepared for this EIS, sound level measurements were taken from two locations (see **Figure 3.7-1** for a map of the locations). SLM1 was chosen to represent the nearest residences south of the mine on the north side of the Creekside Apartment complex. SLM2 represents the residential community across Center Drive from the Expansion Area portion of the site. At both measurement locations, noise from the existing Pioneer Aggregates facility was not audible and did not substantively contribute to the measured levels. A summary of the sound level measurement results is displayed in **Table 3.7-3**.

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Source: Ramboll, 2022.



Figure 3.7-1

Sound Level Measurement and Receptor Location Map

**Table 3.7-3
RANGE OF EXISTING MEASURED HOURLY SOUND LEVELS (DBA)**

Location	Time ^a	Leq ^b	Lmax	L2	L8	L25	L90	Ldn ^b
SLM1	Day	39-48	52-72	43-56	42-49	37-47	33-45	47
	Early Morning	42-44	56-58	46-47	45-46	43-45	40-43	
	Night	35-44	48-58	39-47	37-46	35-45	33-43	
SLM2	Day	49-54	61-83	55-61	53-57	50-56	41-51	56
	Early Morning	52-55	69-700	57-59	56-58	53-56	45-49	
	Night	42-55	57-70	48-59	45-58	41-56	38-49	

Source: Ramboll, 2022.

^a Daytime hours are defined as between 7 AM and 10 PM, early morning hours are between 5 and 7 AM, and nighttime hours are between 10 PM and 7 AM.

^b The Leq is an energy-average sound level defined over a specified period of time, often one hour. It is useful for representing the energy of a fluctuating sound with a single number. The Ldn is a similar to a 24-hour Leq, except the Ldn includes an additional 10 dBA added to sound levels in each hour between 10 PM and 7 AM to account for increased sensitivity to noise at night.

SLM1 – Located behind the Creekside Apartment complex. Noise sources included JBLM and civilian aircraft, including helicopters. The noise environment at the apartment complex was relatively quiet during deployment and retrieval of the meters.

SLM2 – Located at the Edmond Village Park to represent the residential setbacks from Center Drive. The primary noise source was traffic along Center Drive. Sporadic noise sources included aircraft noise, both military and civilian.

3.7.2 Impacts of the Alternatives

This sub-section identifies and analyzes noise impacts on and in the vicinity of the site under the EIS Alternatives, including with proposed clearing and mining.

ALTERNATIVE 1 – PROPOSED ACTION

Construction Impacts

Construction directly related to the Proposed Action would be limited to logging, preparation of new mining phases/segments for excavation, expansion of the on-site conveyor system to connect the expanded mining area to the existing processing facility, and the construction of the berm on the south side of Phase 2C for noise attenuation. Much of the construction activity would entail heavy equipment similar to, or the same as, the equipment required during excavation. Therefore, the sound levels of construction are expected to be similar to the modeled operational sound levels identified below. The

exception would be sound levels associated with construction of the berm on the south side of Phase 2C. During construction of the berm, sound levels at nearby receivers may be noticeable and, at times, intrusive. This could result in temporary and short-term noise impacts at nearby properties. Construction activity is exempt from DuPont's noise regulations during daytime hours (7 AM to 10 PM).

Operational Impacts

Noise Sources

Equipment required for mining under Alternative 1 includes two front-end loaders, a bulldozer and conveyors and an electric conveyor drive motor. This equipment would work in tandem; the bulldozer would push material down the mining face to the loaders, which would load the material onto a conveyor going to the existing processing plant. The bulldozer and loaders would be the dominant noise sources at the nearest sensitive receivers to the Expansion Area portion of the site.

Noise from the excavation equipment was considered in noise modeling to estimate future noise associated with the facility. Noise from most equipment was characterized using measurements of equipment operating at the existing Pioneer Aggregates facility. The measurement of the electric conveyor drive motor was measured at a different facility and is from source sound level archives.

Because the noise from a sand and gravel operation is typically fairly constant over the course of an hour, the noise standard that would be most limiting would be the hourly L_{25} limit. In order to relate the calculated sound levels more closely with the applicable noise limits, the measured L_{25} of each source was used when this information was available. In instances where L_{25} data were not available, the L_{eq} was used to represent an L_{25} .

Noise Model

The CadnaA noise model was used to estimate sound levels expected to be generated by the expansion equipment under the Proposed Action. CadnaA is a computer program that calculates sound levels after considering the noise reductions or enhancements caused by distance, topography, ground surfaces, atmospheric absorption, and meteorological conditions. The modeling process included the following steps: (1) characterizing the noise sources based on frequency-specific measurements of representative equipment; (2) creating three-dimensional maps of the site and vicinity to enable the model to evaluate effects of distance and topography on noise attenuation, (3) assigning the equipment sound levels to the appropriate locations on the site, and (4) placing model "receptors" at several model receptor locations to represent places where the noise will be received (see **Appendix K** for details).

Noise Modeling Results

As part of the noise assessment conducted for this EIS, the model-calculated sound levels were first compared with the applicable City noise limits to assess potential compliance with the limits. Sound levels from proposed excavation activities were modeled at six receptor locations representing three residential areas, a civic center, and a golf course nearest the Expansion Area portion of the site. The receptor locations are shown in **Figure 3.7-1**. The predicted future sound levels and detailed descriptions of each receptor location are provided in **Table 3.7-4**. Noise from the existing Pioneer Aggregates operations does not substantively contribute to the sound levels at the receptor locations considered in this assessment, and the predicted sound levels provided in **Table 3.7-4** can be considered representative of the entire operation with mining under the Proposed Action.

Table 3.7-4
MODEL-CALCULATED SOUND LEVELS (LEQ/L25, DBA)

Model Receptor Location	Modeled Sound Level				Noise Limit ^a
	Phase 1B	Phase 2C	Phase 2C (No Bulldozer)	Phase 3B	
R1a	42	55	48	43	60/50
R1b	41	46	42	40	60/50
R2	40	45	43	37	60/50
R3	36	40	37	36	60/50
R4	37	39	36	38	65
R5	36	38	37	39	65

Source: Ramboll, 2022.

Receptor Locations:

R1a – Upper floor of the Creekside Apartments nearest the South Parcel

R1b – Ground floor of the Creekside Apartments nearest the South Parcel

R2 – Residences in Edmond Village

R3 – Residences in Palisade Village

R4 – Dupont Civic Center

R5 – The Home Course Golf Course

(a) The noise limits shown for residential locations are for daytime/nighttime hours, where daytime hours are from 7 AM to 10 PM and nighttime hours are from 10 PM to 7 AM.

As indicated in **Table 3.7-4**, sound levels from the Proposed Action would comply with the applicable noise limits during daytime hours (i.e., 7 AM to 10 PM) at all locations. However, sound levels at the upper floors of the Creekside Apartments facing the site may exceed the noise limits if full mining activity occurs in Phase 2C during early morning hours (i.e., between 5 and 7 AM).

Because the dominant noise source at the Creekside Apartments during Phase 2C excavation is the bulldozer, the noise benefits of restricting bulldozer use in this phase to

daytime hours only was considered. Prohibition of bulldozer use during the early morning hours results in modeled sound levels below the nighttime noise limits applied between 5 and 7 AM at all receptor locations (see **Appendix K** for details).

Receptor location R1b provides modeled sound levels at the location closest to the Sequalitchew Creek trail. Sound levels during mining phase 2C, which is closest to the trail and to recreational users, is modeled to be within applicable noise limits and is not anticipated to result in a significant adverse impact to trail users.

Increases over Existing Sound Levels

In addition to evaluating the potential compliance of on-site sources associated with Proposed Action activities, potential noise conditions associated with project-related increases over existing baseline sound levels are also considered. This assessment was restricted to residential receptor locations potentially affected by increases over existing levels under the Proposed Action.

For Proposed Action sound levels during daytime hours, the worst-case modeled levels expected during all phases of excavation were used. For sound levels during early morning hours, the worst-case modeled sound levels during all phases of excavation were used assuming no bulldozer in Phase 2C. Because mining activities in Phase 2C may exceed the nighttime noise limit of 50 dBA at the upper floors of the Creekside Apartments with all equipment in operation, use of the bulldozer in Phase 2C would be restricted to daytime hours only. The resulting increases over existing levels are displayed in **Table 3.7-5**.

The sound levels when a bulldozer is working very near the Expansion Area portion of the site boundaries in Phase 2C are substantially higher than the baseline sound levels at the upper floors of the Creekside Apartments (R1a), resulting in potential increases of 8 to 16 dBA. If these sound levels were experienced throughout the life of the project, they would represent a substantial increase. However, the modeled levels at the Creekside Apartments are dominated by noise from a bulldozer working on the slope of 2C very near the southern site boundary. This worst-case condition would only occur during Phase 2C excavation. Even during Phase 2C excavation, the bulldozer would split its time between excavation in Phase 2C and excavation in the existing mining areas farther north and west, and sound levels much of the time would be substantially lower than the worst-case levels identified. The variation in sound levels over the life of the mine and the variation in day-to-day bulldozer activities would reduce the reported potential noise impacts at the Creekside Apartments due to increases over baseline levels.

**Table 3.7-5
CALCULATED INCREASES OVER EXISTING SOUND LEVELS (LEQ, DBA)**

Model Receptor Location	Time of Day ^a	Measured Existing Levels	Level with South Parcel Expansion		
			Project Only ^b	Cumulative ^c	Increase ^d
R1a	Day	39-48	55	55-56	8-16
	Night	42-44	48	49-50	5-7
R1b	Day	39-48	46	46-50	2-8
	Night	42-44	42	45-46	2-3
R2	Day	49-54	45	51-55	0-1
	Night	52-55	43	52-55	0
R3	Day	49-54	40	50-55	0
	Night	52-55	37	52-55	0

Source: Ramboll, 2022.

Notes:

(a) Daytime hours are from 7 AM to 10 PM. Nighttime hours for the purpose of this evaluation are from 5 to 7 AM, when early morning excavation may occur.

(b) The daytime project levels shown are the highest modeled sound levels from all phases of South Parcel activities considered in this assessment. The nighttime levels shown are the highest levels from all modeled phases except 2C.

(c) Cumulative levels represent the existing measured sound levels + the modeled project-related sound levels.

(d) Apparent discrepancies in any calculated increases are artifacts of rounding the displayed sound levels to the nearest whole number.

At the more distant residential locations (R2 and R3), increases over background sound levels are 1 dBA or less during even the worst-case Phase 2C activities. Such increases would not be discernable in an active outdoor environment and would result in no impact (see **Appendix K** for details).

CUMULATIVE IMPACTS

The annual amount of mining activity, and associated noise conditions, with the Proposed Action in combination with mining at the Existing Mine would not exceed current levels, and cumulative mining noise impacts are not anticipated. In addition, noise impacts associated with mining would be temporary in nature and would occur some distance from potential future development that could occur in the vicinity, and no significant cumulative noise impacts are anticipated.

ALTERNATIVE 2 – NO ACTION

There are two No Action Alternatives- Scenario A Continuation of Existing Conditions; and Scenario B Site Development Under Existing Zoning.

Scenario A

Under Scenario A, mining activities associated with the Re-Mine Area of the site and the Existing Mine would continue as currently permitted. Mining and reclamation would continue within the currently permitted footprint of the existing mine and would continue to generate noise, similar to existing conditions. The Existing Mine has an estimated remaining life of 6 to 10 years with mining currently limited to 10 feet above groundwater. The Expansion Area portion of the site is assumed to remain undeveloped and would continue in its vegetated condition.

Scenario B

Under Scenario B, the proposal would not occur. The site would be developed for urban uses consistent with the City's Future Land Use Map. The majority of the area affected is currently designated by the City of DuPont Comprehensive Plan as Manufacturing and Research, with a smaller area designated for residential uses. The corner of the property near Center Drive is designated as Residential 12, which would allow higher density residential development where multifamily density averages 12 units per acre. Urban development, as permitted under current planning and zoning designations, is assumed to occur east of the lease line demarcating existing mining operations. The timing and nature of any such development would be driven by market forces.

Development of individual parcels would result in construction-related noise impacts. Operation of development on individual parcels would also generate noise from operational activities, depending on the type of development on the site.

3.7.3 Mitigation Measures

The following mitigation measures have been included in the Proposed Action to reduce noise impacts.

Proposed Construction Measure

- Construction activities (i.e., logging and construction of the southern berm) would be conducted during daytime hours only (7 AM to 10 PM) to minimize noise impacts.

Proposed Operation Measures

- The plans for the site include construction of a 20-foot high berm on the south side of Phase 2C to reduce noise at off-site locations, especially at the Creekside Apartments. With such a berm, modeled sound levels of worst-case mining activities are well below the applicable daytime noise limits at all receptor locations.

- Excavation in Phase 2C during early morning hours (i.e., between 5 and 7 AM) may exceed the stricter nighttime limit of 50 dBA applicable at the Creekside Apartments. Restriction of the bulldozer to daytime hours only within Phase 2C reduces the modeled sound levels at the Creekside Apartments to 48 dBA or less, which would comply with DuPont's nighttime noise limit.

3.7.4 Significant Unavoidable Adverse Impacts

With construction of the proposed berm as noted above and with restriction of hours of bulldozer operation in Phase 2C to daytime hours only, the project is expected to comply with City of DuPont noise limits. Furthermore, potential noise impacts at the Creekside Apartments (R1) can be mitigated by the proposed mitigation measures, although short-term unavoidable noise impacts may be expected. Due to the short-term nature of the impacts at R1, any such impacts would not be considered significant.