4.13 Noise

Noise is defined as sound that is perceived by humans as unpleasant or excessively loud. Noise of sufficient strength might pose health concerns such as hearing loss or sleep disturbances. Noise impacts are somewhat variable and often depend on receiving land uses. For example, areas where people sleep tend to be more sensitive to noise compared with places where people congregate during the day, such as parks and schools. This section describes basic acoustical concepts; how noise is regulated at the local and state levels; and existing noise levels in the Project site. This section also includes estimates of noise associated with the proposed Project alternatives and a discussion of appropriate mitigation to reduce noise impacts.

Sound is made up of tiny fluctuations in air pressure and is characterized by its amplitude (how loud it is), frequency (or pitch), and duration. a logarithmic scale, known as the decibel (dB) scale, is used to quantify sound intensity and to compress the scale to a more manageable range.

Noise is defined simply as unwanted sound; the terms noise and sound are often used interchangeably.

Within the range of human hearing, sound can vary in amplitude by more than 1 million units. The human ear does not hear all frequencies equally. In fact, the human hearing organs of the inner ear de-emphasize low and very high frequencies. The A-weighting scale is the most common weighting scale used to reflect this selective sensitivity of human hearing. It puts more emphasis or "weight" on the frequencies we hear well and less weight on frequencies we do not hear very well. A-weighted decibels are noted using the abbreviation dBA.

The range of human hearing extends from approximately 3 dBA to approximately 140 dBA (all sound pressure levels discussed herein are relative to 20 micropascals). Table 4-64 lists noise levels for typical sources.

Table 4-64. Typical Source Noise Levels

Sound Pressure Level, dBA	Typical Sources
90	Motorcycle at 25-foot distance Gas lawn mower at 3-foot distance
84	Tractor at 50-foot distance
80	Garbage disposal
70	City street corner Vacuum cleaner at 10-foot distance
60	Conversational speech
50	Typical office
40	Residential living room (without television)
30	Quiet bedroom at night
20	Approximate threshold of hearing

Sources: Rau and Wooten 1980; FHWA 2006; HDR Engineering, Inc.

Most sounds are made up of a wide range of frequencies and are termed broadband sounds. Sounds that are focused in a particular frequency range are tonal sounds. Sound sources can be constant or time-varying. Environmental sound levels are often expressed over periods of time, thereby allowing time-varying signals to be represented by sound levels averaged over intervals (for example, a 1-hour period). One metric used to describe environmental sound is the equivalent average sound level (Leq), which represents a constant sound that, over the specified time period, has the same acoustic energy as the time-varying signal. It is a mean average noise level over a 1-hour period.

4.13.1 Study Area

The study area for construction noise is an area around each warehouse footprint and parking lots extending approximately 500 feet beyond the outer limits of building and parking lot footprints. The study area for noise generated during operations includes typical stationary and mobile noise sources. Stationary sources include rooftop-mounted heating, ventilation, and air conditioning (HVAC) equipment and potentially emergency diesel generators. Mobile noise sources include trucks, cars, and material-handling equipment such as forklifts. It is anticipated that much of the activity that makes noise would occur indoors. Noise associated with these types of activities typically impacts areas within 500 feet of the source; therefore, this study area is utilized for the analysis.

4.13.2 Relevant Plans, Policies, and Regulations

This section summarizes state and local regulations related to noise that are applicable to the Project. There are no federal regulations related to noise that are applicable to the Project. Construction noise is addressed in the City of Puyallup and Pierce County noise ordinances and in the Washington Administrative Code. Table 4-65 outlines applicable state and local laws, policies, and codes related to noise. Major laws, policies, and codes are described in the sub-sections below.

Table 4-65. State and Local Laws, Plans, and Policies

Regulatory Program or Policies	Lead Agency	Description
State		
WAC 173-60 Maximum Environmental Noise Levels WAC 173-60-050 Exemptions	Washington State	Construction noise from temporary construction sites is exempt from the maximum allowable noise level limits in WAC 173-60-040, except when construction noise reaches Class A EDNAs (residences) between 10 p.m. and 7 a.m.
WAC 173-60 Maximum Environmental Noise Levels WAC 173-60-040 WAC 173-60-050 Exemptions	Washington State	Lands where overnight sleep occurs and park lands are both in Class A EDNA. The limit for noise from a Class A to a receiver in Class A is 55 dBA. There are other qualifiers; however, noise from electrical substations and existing stationary equipment used in the conveyance of water is exempt from regulation. (Construction of new sites is dealt with separately.)
Local		
Title 8.76 PCC, Noise Pollution Control	Pierce County	Pierce County adopts the WAC 173-60 definitions, land use categories, and noise limits.

Regulatory Program or Policies	Lead Agency	Description
Title 8.76 PCC, Noise Pollution Control Title 8.76.070 PCC, Exemptions	Pierce County	Construction noise from temporary construction sites is exempt from the maximum allowable noise level limits in Title 8.76.060 PCC, except when construction noise reaches Class A EDNAs (residences) between 10 p.m. and 7 a.m.
Comprehensive Plan, Chapter 7, Environment Element	Pierce County	Goal ENV-13. Reduce, mitigate, and where possible eliminate noise problems. Policy ENV-13.2. Reduce, mitigate, and where possible eliminate problems associated with noise generating land uses. Policy ENV-13.3. Promote cooperation between Joint Base Lewis-McCord and Pierce County to address the reduction or mitigation of noise generating uses. Policy ENV-13.3.1. Establish a disclosure process advising property owners of possible noise impacts to property around Joint Base Lewis-McChord
Chapter 6.16 PMC Noise Control	City of Puyallup	City of Puyallup adopts the WAC 173-60 definitions, land use categories, and noise limits.
Comprehensive Plan, Chapter 5, Community Character Element	City of Puyallup	Noise is a community concern, and reducing citizen's exposure to noise is a goal. Policy CC – 2.3. Buffer the visual and noise impact on residential areas of commercial, office, industrial, and institutional development. Policy CC – 6.6. Utilize landscaping buffers between different uses to provide for natural transition, noise reduction, and delineation of space while maintaining visual connection to the public amenity. Goal CC – 11. Citizens receive minimal exposure to the harmful physiological and psychological effects of excessive noise. Policy CC – 11.1. Enforce regulations to control excessive, repetitive, or continuous noises within its practical and legal abilities. Policy CC – 11.2. Mitigate the impacts of pre-existing generators of noise upon new development within the community, such as along major transportation corridors (e.g., frontages of highways and railroad tracks) or near other major noise generators; residential and commercial development may be required to mitigate the impacts of noise on new development through design and siting. Policy CC – 11.3. Foster a collaborative relationship with BNSF Railway to explore options for increasing the use of wayside

Regulatory Program or Policies	Lead Agency	Description
		horns, particularly where crossings are in proximity to residential neighborhoods
Comprehensive Plan, Chapter 2 Natural Environment Element	City of Puyallup	Goal NE-12. Identify and regulate sources of noise pollution through enforcement, abatement, and advanced planning measures that will avoid point sources impacts. Policy NE – 12.1. Maintain noise regulations to limit noise to levels that protect the public health and that allow residential, commercial, and manufacturing areas to be used for their intended purposes. Provide flexibility in the regulations to allow construction at night when necessary to protect worker safety while maintaining the tranquility of the city. Policy NE – 12.2. Provide noise reduction and mitigation measures to reduce the noise and visual impacts of freeways and arterials on residential areas. Ensure the Washington State Department of Transportation (WSDOT) provides appropriate levels of noise suppression when expanding or improving state highways. Work with WSDOT to maintain and enhance roadside vegetation that will buffer and limit noise intrusions from state highway facilities into Puyallup's neighborhoods. Policy NE – 12.3. Require buffering or other noise reduction and mitigation measures to reduce noise impacts from Commercial and Industrial zones on residential areas. Policy NE – 12.4. Ensure that mixed-use developments are designed and operated to minimize noise impacts. Measures may include provisions controlling uses, design and construction measures, and timing. requirements
Chapter 6.16.060 PMC, Noises Exempt – Completely or Partially	City of Puyallup	Construction noise is exempt from regulation under this chapter if it occurs between 7:00 a.m. and 10:00 p.m. on weekdays. The public works director may prohibit or allow construction noise during nighttime hours (10:00 p.m. to 7:00 a.m.). Noise from traffic on local roadways is also exempt except when such sounds are received in residential zones of the city. Noise from safety devices (i.e., backup beepers) is exempt. Noise from emergency or standby equipment (i.e., generators) is exempt. Noise from stationary equipment used in the conveyance of water (i.e., pump stations) and substations is exempt.
Chapter 6.16.080 PMC, Enforcement – Complaints	City of Puyallup	Complaint-Only Basis. Only after a complaint has been received from an identified person who owns, rents, or leases property that is affected by a noise source may a civil infraction be issued; provided that the section of this chapter relating to motor vehicles and noise emanating therefrom shall be subject to enforcement proceedings regardless of whether a complaint has been received; provided further, that with the exception of

Regulatory Program or Policies	Lead Agency	Description
		motor vehicle noise, noise created by industrial areas is to be enforced by the State of Washington.

EDNA = environmental designation for noise abatement.

Washington Administrative Code - Chapter 173-60

Maximum Environmental Noise Levels

The State of Washington has a robust environmental noise control program. It regulates maximum allowable noise levels using different limits for receiving lands of differing noise sensitivity. Construction noise is specifically addressed and is exempt from regulation unless it occurs during nighttime hours (10:00 p.m. to 7:00 a.m.), when it is subject to the numeric limits. If construction occurs during nighttime hours, it is subject to the maximum permissible noise levels in WAC 173-60-040, shown below. This section of the WAC establishes different noise limits, depending upon the environmental designation for noise abatement (EDNA) or area or zone (environment) within which maximum permissible noise levels are established.

Class A EDNA represents lands where people reside and sleep. Typically, Class A EDNA includes residential, multiple-family living accommodations, recreational and entertainment (e.g., camps, parks, camping facilities, and resorts), and community service (e.g., orphanages, homes for the aged, hospitals, health and correctional facilities).

Class B EDNA represents lands with uses requiring protection against noise interference with speech. Typically Class B EDNA includes commercial living accommodations; commercial dining establishments; motor vehicle services; retail services; banks and office buildings; miscellaneous commercial services; property not used for human habitation, recreation, and entertainment; property not used for human habitation (such as theaters, stadiums, fairgrounds, and amusement parks); and community services property not used for human habitation (e.g., educational, religious, governmental, cultural, and recreational facilities).

Class C EDNA represents lands with economic activities of such a nature that the normally anticipated noise levels are higher than those experienced in other areas. People working in these areas are typically covered by noise control regulations of the Washington Department of Labor and Industries. Uses typical of Class A EDNA are generally not permitted within such areas. Typically, Class C EDNA includes storage, warehouse, and distribution facilities; industrial property used for the production and fabrication of durable and nondurable man-made goods; and agricultural and silvicultural property used to produce crops, wood products, or livestock.

Under the Washington Administrative Code, no person may cause or permit noise that exceeds the maximum permissible noise levels listed in Table 4-66 to intrude into the property of another person. Between 10:00 p.m. and 7:00 a.m., the noise limitations presented in Table 4-66. Washington Administrative Code Noise Limits are reduced by 10 dBA for receiving property within Class A EDNAs. At

any hour of the day or night, those noise limitations may be exceeded for any receiving property by no more than:

- 5 dBA for a total of 15 minutes in any 1-hour period; or
- 10 dBA for a total of 5 minutes in any 1-hour period; or
- 15 dBA for a total of 1.5 minutes in any 1-hour period.

Table 4-66. Washington Administrative Code Noise Limits

EDNA of Noise Source	EDNA of Receiving Property		
	Class A	Class B	Class C
Class A	55 dBA	57 dBA	60 dBA
Class B	57 dBA	60 dBA	65 dBA
Class C	60 dBA	65 dBA	70 dBA

Source: WAC 173-60-040

The assessment of noise impacts as a result of the potential Project considers the Project site to be a park-like land use (Class A EDNA) adjacent to a residential neighborhood (Class A EDNA). Therefore, the maximum allowable nighttime construction noise level at residences surrounding the Project site is 45 dBA (55 dBA reduced by 10 dB for nighttime hours, as explained in the preceding paragraph). That limit can be exceeded for brief durations as explained above.

Pierce County Code – Title 8 Health and Welfare

Title 8.72 PCC regulates construction noise. Construction noise is exempt from regulations, except when it reaches residential parcels during nighttime hours (10:00 p.m. to 7:00 a.m.), when it is subject to the maximum permissible noise limits listed in Title 8.76.060 PCC, Maximum Permissible Environmental Noise Levels. These are the same numeric noise limits and land use classification scheme as shown in Table 4-66.

Title 8.76 PCC adopts the definitions, land use categories, and noise limits in WAC 173-60, making considerations for any special conditions that exist within Pierce County.

Noise emissions from operation of the proposed Project would be subject to regulation under Title 8 PCC.

City of Puyallup Municipal Code – Chapter 6.16 Noise Control

The City of Puyallup regulates environmental noise by adopting the State rules in WAC Chapters 70.107 (since recoded as 70A.20.010), 173-58, 173-60, and 173-62 (essentially adopting the EDNA system) (Chapter 6.16.20 PMC). Daytime construction noise, noise associated with stationary equipment used in the conveyance of water (pump stations), and substation noise are exempt. The City Public Works director has the authority to approve or prohibit nighttime construction activities. In most cases, complaints must be filed for the ordinance to be enforced. The State of Washington regulates noise created by industrial areas (under the WAC) (Chapter 6.16 PMC). Noise from the site would be regulated by PMC as locations surrounding the site that would be impacted by construction or operations on the Project site would be in the city limits.

4.13.3 Affected Environment

The Project site is a series of parcels characterized by open agricultural fields. The dominant features of the soundscape are noises from transportation corridors close to the site. The Puyallup River borders the site on the eastern and northeastern sides. Beyond the river is State Route 410, a four-lane divided highway. The western and northwestern property lines are adjacent to a railroad corridor and East Main Avenue. Shaw Road East forms the western boundary of the Project site. The southern border of the Project site is adjacent to East Pioneer, 8th Avenue Southeast, and the Meeker Southern rail line. There are residential neighborhoods to the east and southeast of the Project site and a strip of light industrial parcels to the south. Land use to the west of the site is a mixture of commercial and residential and Van Lierop Park. Overall, the density of development in the surrounding area is moderate.

Based on current uses in the area, the existing noise levels appear compatible for overnight sleep in the residential land uses that are as close as 300 feet from the site. Table 4-67 shows typical A-weighted noise levels for residential land uses. For purposes of analysis, these noise levels are utilized as the baseline noise estimates for the existing conditions in the study area.

Table 4-67. Typical Residential Noise Levels

Residential Land Use Category	Daytime Sound Pressure Level, dBA	Nighttime Sound Pressure Level, dBA
Very noisy urban	66	58
Noisy urban	61	54
Urban and noisy suburban	55	49
Quiet urban and normal suburban	50	44
Quiet suburban	45	39
Very quiet suburban and rural	40	34

Source: ANSI/ASA 2013

Sensitive receptors for noise include land uses such as hospitals, nursing homes, senior citizen centers, schools, churches, libraries, recording studios, concert halls, and residences (FTA 2006). The sensitive receptors for noise nearest to the Project site are residential in nature and Van Lierop Park.

4.13.4 Impacts

Methodology

Noise impacts are defined as exceedances of regulatory thresholds set by WAC 173-60 and adopted by both the County and City as identified in Section 4.13.2. This assessment assumes that adverse noise impacts would occur if noise levels were anticipated to *exceed* regulatory thresholds; noise levels *under* regulatory thresholds would be less than significant. A significant adverse noise impact would be an exceedance of a regulatory limit by 10 dBA or more (a 10 dBA increase is generally perceived as a doubling of sound levels).

Noise from daytime construction activities is exempt and not subject to limitation under local and state environmental noise ordinances and requirements (WAC 173-60). Noise from nighttime construction activities (10 p.m. to 7 a.m.) is subject to the limits in WAC 173-60 (i.e., the noise limits presented in

Table 4-66 minus 10 dBA). To estimate the potential the magnitude of potential daytime construction noise levels, the Project team performed a desktop construction noise assessment using methods in the *Highway Construction Noise Handbook* (FHWA 2006). Generic construction phasing and equipment information from comparable prior projects was used for this assessment to illustrate what construction noise sources and noise levels could be expected.

The *Highway Construction Noise Handbook* (FHWA 2006) is an industry standard reference for construction noise assessment. The methodology consists of identifying the types and numbers of the loudest pieces of construction equipment likely to be used in each phase of construction. Next, the hours of use per day and percent of use during those hours are estimated. Using measured noise levels for that equipment, analysts calculate resulting noise levels at increasing distance from the source. Noise levels from the loudest two pieces of equipment were averaged and are presented in this assessment. That process was repeated for each major phase of the construction process.

The operational noise analysis focuses on the most likely sources of operational noise, potential mitigation to address those activities, and identification of potential end users that could require additional mitigation.

Impacts Analysis

No Action Alternative

Under the No Action Alternative, Project construction activities would not occur. Because no construction or operation would take place under this alternative, there would be no noise impacts. Existing sources of noise in the study area would continue and could evolve over time due to changes in land uses or the regional economy.

Proposed Project

Construction Impacts

Mitigated Significant Impact. Construction equipment proposed for this Project that will generate noise include dozers, dump trucks, and excavators, rollers, dozers, excavators, and haul trucks. Some of these include noise-creating internal combustion engines, which can be an annoyance when used near noise-sensitive areas (such as residential parcels and parks).

Construction activities would occur between 7:00 a.m. and 10:00 p.m. and not during nighttime hours (defined as 10:00 p.m. to 7:00 a.m.). Daytime construction noise is exempt from regulation, and nighttime construction noise is subject to the limits in WAC 173-60. Although daytime construction noise is exempt, the exemption is not intended to preclude requirements for installation of BMPs to abate noise.

Direct effects of daytime construction noise could include speech interference (i.e., making it difficult to hear someone talking) when close to loud equipment or generating noise that is an annoyance to residents and users of Van Lierop Park. Table 4-68 presents estimates of noise from daytime construction activities. Table 4-68 lists the phases of construction activity and identifies equipment likely to be used during each phase. Table 4-68. Estimates of Construction Noise Under Action Alternatives

also notes the estimated quantity of each piece of equipment, how many hours per day that equipment is assumed to be used, and what percentage of each hour that equipment is assumed to be in use. Next, Table 4-68 presents a maximum noise level (L_{max}) at 50 feet distance from each piece of equipment taken from the *Highway Construction Noise Handbook* (FHWA 2006). Finally, Table 4-68 also shows the combined noise level from the two loudest pieces of equipment in each construction phase, propagated to distances of 100, 200, and 500 feet from the equipment.

Table 4-68. Estimates of Construction Noise Under Action Alternatives

Equipment and Phase of Construction	Qty.	Hours Use/Day	Utilization (%)	Maximum Noise Level (L_{max}) at 50 feet (dBA)	Sound Pressure Level (dBA) at Distance (feet)		
					100	200	500
Clearing							
Dozer	2	8	40	85	78	72	64
Off-road dump truck	3	8	40	84	81	75	67
Excavators	2	8	40	85	80	74	66
Combined Levels of Two Noisiest Pieces of Equipment					*84*	*78*	*70*
Utility Relocation							
Excavators	2	8	40	85	80	74	66
Dump truck	2	8	40	84	80	74	66
Combined Level of Two Noisiest Pieces of Equipment					*83*	*77*	*69*
Excavation							
Excavators	3	8	40	85	81	75	67
Off-highway trucks	6	8	40	84	84	78	70
Combined Level of Two Noisiest Pieces of Equipment					*86*	*80*	*72*
Foundation and Building Construction							
Roller	1	8	20	85	72	66	58
Dozer	2	8	40	85	78	72	64
Excavator	2	8	40	85	80	74	66
Combined Level of Two Noisiest Pieces of Equipment					*82*	*76*	*68*
Access Road							
Roller	1	8	20	85	72	66	58
Dozer	1	8	40	85	75	69	61
Combined Level of Two Noisiest Pieces of Equipment					*77*	*71*	*63*
Park Grading and Fill							
Roller	2	8	20	85	75	69	61
Dozer	2	8	40	85	78	72	64
Combined level of two noisiest pieces of equipment					*80*	*74*	*66*

Source: HDR Engineering, Inc., 2023

Daytime construction would temporarily increase noise levels in the study area. The two noisiest pieces of equipment are estimated to be 84 dBA at the nearest distance (100 feet). The nearest residential land use is 300 feet from the nearest site boundary. Direct effects of daytime construction noise could include speech interference (i.e., making it difficult to hear someone talking) when close to loud equipment. Other effects considered are annoyance to residential land uses. When used near

residences and other areas where people gather, noise from construction equipment can interfere with outdoor verbal conversations.

Although daytime construction noise is exempt from regulation, the exemption is not intended to preclude requirements for implementation of BMPs to abate noise (WAC 173-60-050[6]). The Applicant and its construction contractors are required to ensure that noise from construction equipment and activities complies with applicable noise rules and minimizes the potential for annoyance/disturbance. As such, mitigation measures N-1 and N-2 would be required:

- **N-1. Develop Construction Noise Control Plan.** Consistent with the goals and policies of the Community Character Elements of the Puyallup Comprehensive Plan (CC-2.3, CC-6.6, CC-11, and CC-11.1), a construction noise control plan should be developed during construction that would include BMPs and administrative controls to demonstrate and achieve compliance with applicable construction noise limits. BMPs could include using original equipment manufacturer (or equivalent) mufflers on equipment with internal combustion engines; ensuring that the equipment is maintained in a state of good repair; and scheduling activities that occur closest to noise-sensitive parcels for mid-day rather than early in the morning or past 8:00 p.m.
- **N-2. Prioritize Construction of Noise Restricting Project Elements.** In accordance with the community character elements of the Puyallup Comprehensive Plan (CC-2.3, CC-6.6, CC-11, and CC-11.1), the Applicant should construct all required perimeter landscaping and berming, install required fencing, and plant required landscaping prior to beginning site work and building construction on site for all areas abutting Van Lierop park and where residential land uses are adjacent to or abutting the Project site. Additionally, consider a grading plan that would store and stockpile earth in manner and location that would deflect and attenuate noise from the Project site away from residential and public parkland uses throughout all phases of construction.

Nighttime construction activities are not proposed as part of the Project. If the Applicant proposes any nighttime construction work, including work in County or City of ROW, or if utility work is required at night, the Applicant will be required to manage noise emissions in accordance with local requirements. Pierce County Code 6.16.060(2)(c) indicates that “the public works director, or his or her designee, shall have the authority to prohibit, or to allow with or without mitigating conditions, noise that emanates from construction or related activity during evening or nighttime hours.” As such, the Applicant would be required to apply for a noise variance that should include appropriate noise minimization measures and notification of the City of Puyallup and neighboring property owners by U.S. mail no less than 5 days in advance of the proposed construction activities.

Operations Impacts

Mitigated Significant Impact. Noise emissions from operation of the proposed Project would be subject to regulation under WAC 173-60. This could include noise from outdoor activities, outdoor equipment, indoor noise-generating activities, or rooftop-mounted HVAC equipment.

Operational noise can generally be characterized as indoor and outdoor noise associated with future use of the site. Although the end user of the proposed Project has not been determined by the Applicant,

operations of the facility would likely result in noise generation from outdoor noise-generating activities, including rooftop-mounted HVAC units, refrigeration units, emergency backup generators, movement and idling of vehicles, backup beepers, and material-handling activities at loading docks (e.g., forklifts). Indoor noise generation would be highly dependent on the final end uses and the specific equipment installed in the warehouses; however, some uses may be more likely to generate noise. These potential noisier activities include manufacturing and recycling collection and processing facilities that could impact surrounding Class A EDNA land uses.

Other anticipated operation-related noise sources from the proposed Project includes transportation, HVAC and refrigeration, backup generator, and interior noise as discussed in detail below.

Transportation Noise

Transportation activities are the most likely known Project action that would generate noise during operations. All of the potential allowable end uses would incorporate incoming and outgoing shipments of materials, products, traffic associated with vendors and employees, and other similar transportation-related activities. Material handling at loading docks is also anticipated, which would involve equipment such as forklift trucks and pallet movers, which are typically not loud vehicles, but may have repetitive noises such as backup audible warning noise.

WAC 173-60-040 identifies the maximum permissible environmental noise levels (dBA) at receiving locations as presented in Table 4-69. Under WAC 173-60-050 (4)(I), sounds created by motor vehicles are subject to the maximum permissible environmental noise levels when those sounds are received in EDNA Class A Environments (i.e., parks or residential areas). The proposed Project would result in the daily movement of up to 1,482 heavy-duty vehicles and 7,242 passenger/light-duty vehicles in and out of the Project site. Adjacent to the property are multiple Class A environments, including Van Lierop Park and residential zones. These vehicle movements would be subject to the maximum permissible noise levels under WAC 173-60-040. Table 4-69 presents the results from the desktop analysis of noise generation associated with vehicle traffic. It indicates that individual Project-related heavy trucks cannot be closer than 50 feet to a Class A EDNA parcel during daytime hours and 200 feet during nighttime hours for more than 1.5 minutes. Individual Project-related passenger/light duty vehicles cannot be closer than 25 feet to a Class A EDNA parcel during daytime or nighttime hours for more than 1.5 minutes. Without mitigation, this vehicle activity on the site would constitute a significant impact on these Class A environments as vehicle activity would exceed the maximum allowable noise levels.

Table 4-69. Distance from Operating Vehicles Maximum Allowable Noise Levels

	Nighttime				Daytime			
Maximum Allowable Noise Limit (dBA)	50	55	60	65	60	65	70	75
Allowed Exposure per hour (minutes)	NA	15	5	1.5	NA	15	5	1.5
Passenger/Light Duty Vehicles (feet)	NA	50	25	25	NA	25	25	25
Heavy Duty Vehicles (feet)	2,000	950	450	200	450	450	100	50

Source: HDR 2022
Note: NA = not applicable

In order for trucks to operate within the facility site within the distances noted without generated noise above the maximum permissible environmental noise levels, the following mitigation would be required:

- **N-3: Construct Noise Walls.** Noise walls would be required to mitigate noise generated from vehicle traffic on site. Twelve-foot-high noise walls would be required along all shared property boundaries with Van Lierop Park and along the Project boundary to the east of Warehouses E and G between the Project and the adjacent residential zones. The 12-foot-high wall was the shortest wall that would lower noise levels to below the maximum permissible noise levels as outlined in WAC 173-60-040 (HDR 2022).

See Section 4.6 for impacts of the noise wall on aesthetic resources.

Under WAC 173-60-050 (4)(d), sounds created by warning devices not operating continuously for more than 5 minutes, or bells, chimes, and carillons, are exempt from the maximum permissible environmental noise levels outlined in WAC 173-60-040. Any end user would be required to adhere to these requirements and would be subject to daily violations in accordance with WAC 173-60-090 if the requirements are not followed.

HVAC and Refrigeration Noise

HVAC equipment and refrigeration units would generate noise during operations. The noise generated would likely result in adverse impacts at Van Lierop Park and nearby residential areas. HVAC equipment and refrigeration units would not be exempt from the requirements of WAC 173-60 or Chapter 16 PMC; therefore, any installed equipment would be required to adhere to the maximum permissible environmental noise levels. The noise generated by HVAC and refrigeration units would be required to be analyzed during permitting, and additional mitigation measures would be identified by the permitting agency. The Applicant would be required to submit a written narrative to the permitting agency describing the noise generation from the proposed uses and compliance with all applicable laws regulating sensitive surrounding land uses such as residential and public parks.

Backup Generators

If utilized in an emergency, backup generators would generate temporary noise during operations. The noise generated during operations could be experienced at Van Lierop Park or in nearby residential areas. However, because backup generators would be only used in an emergency, they would be exempt from maximum permissible environmental noise levels in accordance with Chapter 6.16.060 (1)(c) PMC and WAC 173-60-050 (4)(l).

Indoor Noise-Generating Activities

Details of the specific noise-generating indoor equipment that would be required would be determined during the permitting phase of the Project; however, activities such as manufacturing and recycling collection and processing facilities are potential sources of indoor noise that could impact surrounding Class A EDNA land uses. The noise generated by indoor activities would be required to be analyzed during permitting, and additional mitigation measures would be identified by the permitting agency. The Applicant would be required to submit a written narrative to the permitting agency describing the noise

generation from the proposed uses and compliance with all applicable laws regulating sensitive surrounding land uses, such as residential and public parks.

The wide range of potential end uses outlined in Table 3-3 precludes identification of all potential operation-related noise impacts. As such, once a final end-user has been identified for the proposed facility, the specific noise levels would be required to be measured and analyzed during permitting and appropriate mitigation measures would be identified by the permitting agency. The potential end use categories allowed under PCC 18A.33.280(A)-(I) and described in Chapter 3, Project Description, involve vehicles of one or more types.

Warehousing, Distribution, Freight: The more transportation-intensive uses (e.g., warehousing, distribution, and freight movements) and uses such as contractor yards, salvage yards, and storage areas will generate more noise from outdoor activities both on site and off site. In general, noise emissions from outdoor activities associated with any of these use categories are a greater concern than noise inside buildings.

Fulfillment Center Warehouses: Activities inside fulfillment center warehouses are dominated by material handling (e.g., conveyors, racks) of small packages and products. General warehousing also includes material-handling equipment that is scaled up for larger packages (i.e., pallets). Forklift trucks, pallet movers, and similar machines are common material-handling equipment inside warehouses. General manufacturing is a very broad category of land use and activities that would likely include some form of material-handling systems and equipment but would also include machines and processes that make finished products. It is reasonable to assume that building envelopes would be constructed such that noise created inside the buildings would not reach nuisance levels off site or reach levels that exceed applicable noise limits outside the buildings.

Alternative 1 – Rail Transport

Construction Impacts

Mitigated Significant Impact. The construction Impacts associated with Alternative 1 would be similar to those described for the proposed Project but would include construction of a rail line that would primarily be within the same Project footprint as the proposed Project. As described for the proposed Project, construction would be limited to allowable daytime hours. Some of the techniques and equipment used to construct freight rail turnouts and sidings is specific to the rail industry. However, the internal combustion engines on larger pieces of equipment used on rail projects are comparable in size to the internal combustion engines on typical large equipment commonly used on construction projects. Both types of construction activities require use of large and small equipment with powerful engines capable of moving heavy materials or performing specific functions. On that basis, construction noise associated with Alternative 1 is anticipated to be comparable to noise associated with the proposed Project.

Although daytime construction noise is exempt from regulation, the exemption is not intended to preclude requirements for implementation of BMPs to abate noise (WAC 173-60-050[6]). The Applicant and its construction contractors are required to ensure that noise from construction equipment and activities complies with applicable noise rules and minimizes the potential for annoyance/disturbance.

As such, mitigation measures N-1 and N-2 would be required to minimize the potential for noise disturbance during construction activities.

Nighttime construction activities are not proposed as part of the proposed Project. If the Applicant proposes any nighttime construction work or if utility work is required at night, the Applicant will be required to manage noise emissions in accordance with local requirements. Title 6.16.060(2)(c) PCC indicates that "*the public works director, or his or her designee, shall have the authority to prohibit, or to allow with or without mitigating conditions, noise that emanates from construction or related activity during evening or nighttime hours.*" As such, the Applicant would be required to apply for a noise variance that should include appropriate noise minimization measures and notification of the City of Puyallup and neighboring property owners by U.S. mail no less than 5 days in advance of the proposed construction activities.

Operations Impacts

Mitigated Significant Impact. The operational noise impacts associated with Alternative 1 would be similar to those described for the proposed Project but would include noise generated from operation of the rail line. Residences near the proposed rail line are currently exposed to noise and vibration from trains on the existing mainline (Figure 3-3). Train noise and vibration decrease with increasing distance away from the rail line. Residents in that area would experience additional train noise from up to two additional trains/day on the proposed rail line. Those trains would be traveling at a low rate of speed, and slower trains are generally quieter than faster trains, although they produce longer periods of exposure to train noise than faster trains. When the locomotive and railcar wheels cross over the gap in the rail at the proposed industrial turnout, they would create a repetitive impact noise and also generate some ground-borne vibration. The residence nearest the proposed turnout is approximately 700 feet away from the turnout. The ground-borne vibration is unlikely to be noticeable beyond a few hundred feet from the turnout. Empty railcars crossing over the turnout would create more noise than loaded rail cars. The magnitude of noise and vibration levels associated with trains on the proposed turnout is expected to be less than noise and vibration from trains on the mainline because trains on the mainline travel faster than trains on the proposed siding. As trains travel through the Project site, the buildings would provide acoustical shielding (act like noise walls), reducing train noise levels at residential areas off-site.

The trains could potentially remove up to 330 trucks from the roadway network. Overall maximum noise levels from semi-trucks on local roadways is comparable to maximum noise levels from slow-moving freight trains. A key difference is the duration of the pass-by event, the number of the pass-by events, and when those events occur. Other important distinctions include the duration of the pass-by, the number of the pass-by events, and when those pass-bys occur.

Eliminating up to 330 heavy truck pass-bys throughout the day and night would reduce noise levels on noise-sensitive lands throughout the roadway network. Adding two new trains per day would increase noise at noise-sensitive lands near the proposed industrial turnout during two train pass-bys per day. The net effect would be a reduction in the areal extent of transportation-related noise and a reduction in the amount of time the noise events occur, thus reducing the overall Project-related noise exposure.

However, as discussed under the proposed Project, truck traffic on site would still be anticipated to generate noise levels that exceed maximum permissible noise levels at Class A noise environments (i.e., Van Lierop Park and nearby residential zones); therefore, implementation of N-3 would be required.

Alternative 2 – Reduced Intensity Alternative

Alternative 2 considers the potential impacts that would result if the mitigation measures that reduce the site footprint of the facility (AES-2, LU-1, REC-1, and SW-4) as outlined in this EIS for the proposed Project) were adopted by the Applicant. As noted below, Alternative 2 would still require Project implementation mitigation measures to reduce noise impacts.

Construction Impacts

Mitigated Significant Impact. The size and scale of the proposed development is smaller under Alternative 2; therefore, construction noise impacts associated with Alternative 2 are expected to be less than those discussed for the proposed Project. The nature of the construction noise would be similar to that of the proposed Project, but the duration of construction would be lessened.

Although daytime construction noise is exempt from regulation, the exemption is not intended to preclude requirements for implementation of BMPs to abate noise (WAC 173-60-050[6]). The Applicant and its construction contractors are required to ensure that noise from construction equipment and activities complies with applicable noise rules and minimizes the potential for annoyance/disturbance. As such, mitigation measures N-1 and N-2 would be required to minimize the potential for noise disturbance during construction activities.

Nighttime construction activities are not proposed as part of the proposed Project. If the Applicant proposes any nighttime construction work or if utility work is required at night, the Applicant will be required to manage noise emissions in accordance with local requirements. Title 6.16.060(2)(c) PCC indicates that “the public works director, or his or her designee, shall have the authority to prohibit, or to allow with or without mitigating conditions, noise that emanates from construction or related activity during evening or nighttime hours.” As such, the Applicant would be required to apply for a noise variance that should include appropriate noise minimization measures and notification of the City of Puyallup and neighboring property owners by U.S. mail no less than 5 days in advance of the proposed construction activities.

Operations Impacts

Mitigated Significant Impact. Operations impacts associated with Alternative 2 are expected to generally be similar to those discussed for proposed Project, although the number of truck movements in and out of the site under Alternative 2 would be lessened. Even with the decrease in the overall number of trucks, truck traffic on site would still be anticipated to generate noise levels that exceed maximum permissible noise levels at Class A noise environments (i.e., Van Lierop Park and nearby residential zones); therefore, implementation of N-3 would be required.