

**Technical Report
Noise Section
Supplemental Environmental Impact Statement
47° North/Bullfrog Flats Project
Cle Elum, Washington**

September 2020

Prepared for

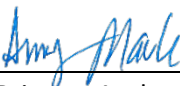
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Cle Elum, Washington



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LIST OF ABBREVIATIONS AND ACRONYMS

CEMC.....	Cle Elum Municipal Code
dBA.....	A-weighted decibel
EDNA.....	environmental designation for noise abatement
EPM.....	WSDOT Environmental Procedures Manual
FEIS.....	Final Environmental Impact Statement
FHWA.....	Federal Highway Administration
I-90.....	Interstate 90
KCC.....	Kittitas County Code
LAI.....	Landau Associates, Inc.
Leq.....	equivalent sound level
mph.....	miles per hour
N/A.....	not applicable
NAC.....	FHWA Noise Abatement Criteria
RV.....	recreational vehicle
SEIS.....	Supplemental Environmental Impact Statement
SR 903.....	State Route 903
TENW.....	Transportation Engineering Northwest, LLC
WAC.....	Washington Administrative Code
WSDOT.....	Washington State Department of Transportation

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1.0 INTRODUCTION

At the request of the City of Cle Elum, Landau Associates, Inc. (LAI) under contract with EA Engineering, Science, and Technology, Inc. prepared this report, which provides background information and analysis to support the Noise section of the Supplemental Environmental Impact Statement (SEIS) for the 47° North Project in Cle Elum, Kittitas County, Washington. This analysis and associated SEIS supplements the 2002 Trendwest Properties: Cle Elum Urban Growth Area Environmental Impact Statement (2002 Cle Elum UGA EIS) and is being completed because the City of Cle Elum concluded that proposed revisions to the Master Site Plan approved in 2002 constitute a “major amendment” to the original project.

The 2002 Cle Elum UGA EIS analyzed five alternatives, of which Alternative 5 (Bull Frog Subarea Plan Mixed-Use Zoning and Master Plan Application) was carried forward and approved as the Original Bullfrog Flats Master Site Plan. For the purposes of this analysis and associated SEIS, SEIS Alternative 5 (No Action Alternative) is considered the Approved Bullfrog Flats Master Site Plan. “47°North” refers to the project under its current ownership, and SEIS Alternative 6, or “Project” alternative, refers to the corresponding Proposed 47° North Master Site Plan Amendment.

Impacts of the following two alternatives are analyzed, and noise related to the two alternatives are forecast at a screening level:

- SEIS Alternative 6 – “Proposed 47° North Master Site Plan Amendment”
- Development of SEIS Alternative 5, the Approved Bullfrog Flats Master Site Plan, updated to reflect current conditions (No Action).

SEIS Alternative 5 has been updated to reflect current background conditions and regulations. The Final Environmental Impact Statement (FEIS) Alternative 5 (as presented in the 2002 Cle Elum UGA EIS) was compared to the updated, or SEIS, Alternative 5. The FEIS and SEIS Alternatives 5 are considered equivalent for the purposes of this analysis.

The following sections evaluate the study area, defined as the 47° North project site, adjacent noise-sensitive receiver locations, and existing residential land uses for potential community noise impacts. The study includes the temporary effects of noise from construction, and long-term effects from noise from operation of the residential, recreational, and commercial or light industrial land uses. Traffic noise on existing roadways (Interstate 90 [I-90], Bullfrog Road, State Route 903 [SR 903] / West 2nd Street, West 1st Street, Ranger Station Road, and Douglas Munro Boulevard) and planned project roadways (Connector Road and RV Access Road) was quantitatively analyzed as part of this study. This analysis assumes that full buildout for SEIS Alternative 6 will be complete by 2037 (note that this is the overall buildout date for this alternative, including the future commercial development on the adjacent 25-acre property; the assumed buildout date for the residential and commercial uses under SEIS Alternative 6 is 2028). The assumed buildout for SEIS Alternative 5 is 2051, but for quantitative

analysis purposes the amount of development that would occur by 2037 (reflected in the peak-hour vehicle data) was used for comparison with SEIS Alternative 6.

The 47° North project area is located east and south of Bullfrog Road, North of I-90 and the Washington Horse Park, and southwest of SR 903. Project boundaries are shown on Figure 1.

Under SEIS Alternative 6, full buildout is expected to be complete by 2037. Table 1 lists the projected land-use values used for this analysis.

Table 1: Increase in Land Use and Population Growth

Land Use Category (Plan)	Units	SEIS Alternative 6	SEIS Alternative 5
Residential			
Single-family	DUs	527	587
Multi-family	DUs	180	524
RV Resort	DUs	627	-
Amenity Center			
Clubhouse	1,000 sq ft	11	-
Spa/Fitness	1,000 sq ft	5.5	N/A
Recreation/Game Center	1,000 sq ft	11	N/A
Registration/Welcome	1,000 sq ft	4.0	N/A
Adventure Center (a)	1,000 sq ft	3.5	N/A
Potential Future Commercial (b)			
Grocery Store	1,000 sq ft	45	N/A
Retail	1,000 sq ft	25	N/A
Restaurant	1,000 sq ft	20	N/A
Medical Offices	1,000 sq ft	60	N/A
Combined commercial (c)	1,000 sq ft	N/A	450

Notes:

- (a) Adventure center consists primarily of outdoor recreational opportunities with a 3,500-sq-ft registration building.
- (b) Potential future commercial development is not located within the SEIS Alternative 6 site area (see SEIS Section 2.6.2.1)
- (c) Future commercial development under SEIS Alternative 5 could include light industrial, research and development, warehousing, offices, and retail uses.

DUs = Dwelling Units

sq ft = square feet

Source: EA Engineering

2.0 NOISE EXISTING CONDITIONS

The purpose of this section is to provide necessary noise-related background information, evaluate existing noise conditions in the study area, and describe the methodology used to assess existing conditions and potential noise impacts associated with the proposed alternative actions.

2.1 Characteristics of Sound and Noise

For the purposes of this analysis, noise can be described as sound that is undesired, in terms of its loudness (amplitude) and frequency (pitch). Magnitudes of typical noise levels are presented below.

Table 2: Common Sources of Noise

Noise Source	Decibel Level	Notes
Jet takeoff at 50 feet	140	Physical pain and immediate injury
Chain saw, sirens at close range	120	Uncomfortably loud
Loud entertainment venue	105-110	
Motorcycle at 50 feet	95	Very loud
Noisy urban street	85	
Washing machine or dishwasher	70	Possible annoyance
Range of normal human speech	50-70	
Average office	50	Quiet
Refrigerator hum	40	
Whisper, ticking watch	20-30	Barely audible

Sources: HUD 2009; CDC 2019.

Since the human ear is not equally sensitive to sound at all frequencies, a frequency-dependent rating relates noise to human hearing sensitivity. This is called the A-weighted decibel (dBA) scale. This scale accounts for the human perception of a doubling of loudness as an increase of 10 dBA. Therefore, a 70-dBA sound level will sound twice as loud as a 60-dBA sound level. People generally cannot detect differences of 1 to 2 dBA between noise sources of a similar nature (e.g., an increase in traffic noise compared to existing traffic noise); however, under ideal listening conditions, differences of 2 or 3 dBA can be detected by some people. Most people under normal listening conditions would probably perceive a 5-dBA change in noise of a similar nature. However, if an intruding noise is of a different nature than background noise (e.g., backup alarms in a quiet neighborhood), many people can perceive the intruding noise even if it increases the overall dBA noise level by less than 1 dBA.

A measure used to represent the average sound energy occurring over a specified time period is the equivalent sound level (Leq). Leq is the steady-state sound level that would contain the same acoustical energy as the time-varying sound that actually occurs during the monitoring period. The

1-hour A-weighted equivalent sound level (Leq 1 h) is the energy average of A-weighted sound levels occurring during a 1-hour period.

When distance is the only factor considered, sound levels from isolated point sources of noise typically decrease by about 6 dBA for every doubling of distance from the noise source. When the noise source is a continuous line, sound levels decrease by about 3 dBA for every doubling of distance; however, an attenuation rate of 4.5 dBA per doubling of distance is often used when intervening ground is effective in absorbing sound (e.g., ground vegetation, scattered trees, and clumps of bushes).

Noise levels at different distances can also be affected by several factors other than the distance from the noise source. Topographic features and structural barriers that absorb, reflect, or scatter sound waves can affect the decreasing noise levels. Atmospheric conditions (wind speed and direction, humidity levels, and temperatures) can also affect the degree to which sound is attenuated over distance.

Echoes off topographical features or buildings can sometimes result in higher sound levels (lower sound attenuation rates) than normally expected. Temperature inversions and altitudinal changes in wind conditions can also refract and focus sound waves toward a location at considerable distance from the noise source. As a result, the existing noise environment can be highly variable depending on local conditions.

2.2 Existing Noise Environment

The study area for which noise impacts were evaluated consists of the 47° North project site and the following potentially-impacted areas and sensitive receivers surrounding the project site (Figure 1):

- Residential areas north of the project site (in the Suncadia Resort), north of Bullfrog Road
- Residential areas northeast and east of the project site, east of West 2nd Street, including Cle Elum Pines West (not present in 2002)
- Cle Elum-Roslyn School District #404 campus located northeast of the project site (included in 2002 analysis but recently expanded toward the project site)
- Residences, an outdoor use area (Stewart Lodge swimming pool), and a conference center east of the project area, at the intersection of West 2nd Street and Douglas Munro Boulevard (present in 2002 but not included in the 2002 analysis)
- Laurel Hill Memorial Park, an existing cemetery located south of the eastern portion of the project site (included in the 2002 analysis)
- A residential area east of the project area on West 1st Street between North Columbia Avenue and North Teanaway Avenue (not included in the 2002 analysis)
- A residential area south of the western portion of the project area, served by Wood Duck Road, between the project area and I-90 (included in the 2002 analysis).

The following changes to the existing noise environment surrounding the project area have occurred since issuance of the 2002 FEIS:

- The Washington State Horse Park is present to the south of the eastern portion of the project area. The park includes multiple competition arenas, stables, practice areas, trailer parking, and trails that currently traverse the project site. A covered arena is planned to open in the summer of 2020. The Horse Park produces noise associated with horse riding activities, spectators, and visitor traffic.
- Suncadia's Prospector and Rope Rider Golf Courses, north of the project site, opened in 2005 and 2011, respectively. Residential development around the golf courses has also increased. Increased noise is associated with golfing activities, as well as increased traffic to the courses and associated residences.
- Annual average daily traffic volume on I-90 at Cle Elum has increased from 27,000 vehicles per day in 2002 to 32,600 in 2019, approximately 20 percent (WSDOT; accessed June 23, 2020).

2.3 Thresholds of Significance

Since issuance of the 2002 FEIS, the City of Cle Elum has annexed the project site into the city limits. Portions of the study area adjacent to the project remain within Kittitas County jurisdiction (to the north, south, and west of the site). The following city, county, state, and federal policies were used in this study to evaluate noise impacts associated with the project.

2.3.1 Washington State Noise Regulations

Chapter 173-60 of the WAC restricts noise within the state by establishing maximum permissible noise levels for various environments (Table 3). Noise limits are based on the environmental designation for noise abatement (EDNA) of the noise source and receiving property. Construction and operational activities under all alternatives would be subject to these provisions. Chapter 176-60 WAC also allows local jurisdictions to further regulate nuisance noise in addition to the regulations set forth by the state.

Table 3: Maximum Permissible Noise Levels

EDNA of Noise Source	EDNA of Receiving Property		
	Class A	Class B	Class C
Class A (Residential)	55 dBA	57 dBA	60 dBA
Class B (Commercial)	57	60	65
Class C (Industrial)	60	65	70

Note: EDNA Classes are defined in more detail in WAC 173-60-030.

Additionally, the WAC states the following:

Between the hours of 10:00 p.m. and 7:00 a.m. the noise limitations of the foregoing table shall be reduced by 10 dBA for receiving property within Class A EDNAs. At any hour of the day or night the applicable noise limitations may be exceeded for any receiving property by no more than 5 dBA for a total of 15 minutes in any one-hour period; 10 dBA for a total of 5 minutes in any one-hour period; or 15 dBA for a total of 1.5 minutes in any one-hour period.

2.3.1.1 Construction Noise

Sounds originating from temporary construction sites as a result of construction activity are exempt from the noise limits in Table 3, except insofar as such provisions relate to the reception of noise within Class A EDNAs (residences) between the hours of 10:00 p.m. and 7:00 a.m.

2.3.1.2 Traffic Noise

Motor vehicle noise is exempt from the noise limits in Table 3, but is regulated by Chapter 173-62 WAC, Motor Vehicle Noise Performance Standards. Chapter 173-62 WAC applies to motor vehicles operating on public highways, including roadways within the study area.

The Federal Highway Administration (FHWA) requires state departments of transportation to develop noise policies that apply to projects within that state. Washington State outlines procedures in the Washington State Department of Transportation (WSDOT) Environmental Procedures Manual (EPM) to comply with FHWA. The WSDOT 2020 Traffic Noise Policy and Procedures, part of the EPM, is also used by WSDOT to ensure equitable treatment of citizens seeking relief from highway traffic noise.

Screening-level traffic noise modeling was conducted using approved methods presented in the WSDOT 2020 Noise Policy and Procedure (WSDOT; accessed June 23, 2020) to determine traffic noise impacts of the project alternatives, and determine whether substantial sound level increases (defined by WSDOT as 10 dBA or greater when a screening analysis is used) are expected (see Section 3.1.2.1 for methodology). As defined by WSDOT, a screening (or straight line) model describes a worst-case scenario with conservatively higher sound levels than would be expected in detailed modeling and can be used when a full abatement analysis is not required.

At this time, WSDOT funding for roadway improvements associated with either alternative is not anticipated, and no currently-planned roadway improvements were identified to be completed by 2037 within the study area (TENW 2020). However, changes to the existing roadway system may be needed to accommodate increased traffic associated with the project. If those improvements receive WSDOT or FHWA funding or require federal approval, they would need to comply with WSDOT noise standards.

The FHWA Noise Abatement Criteria (NAC) have been updated since issuance of the 2002 FEIS. WSDOT has adopted the NAC, which establish absolute noise levels for varying land-use categories, to determine whether traffic noise impacts occur. The NAC for residential development, schools, and cemeteries is 67 dBA at exterior use locations, reflected in WSDOT's peak-hour traffic noise level

threshold of 66 dBA. Consistent with the NAC, WSDOT defines a traffic noise impact as either of the following:

- Peak-hour traffic noise level of 66 dBA (Leq) or greater at the exterior outdoor use area of any existing or future dwelling
- Increase in peak-hour traffic noise of 10 dBA Leq or greater (future project level minus existing level) at the exterior outdoor use area of any existing dwelling (considered a “substantial increase”).

Use of federal or state funds for roadway or intersection improvements would trigger the WSDOT requirement to model traffic noise impacts and evaluate traffic noise abatement, and to present the results of the noise abatement analysis in National Environmental Policy Act environmental documentation for any roadway projects. Due to the absence of planned roadway improvements using federal or state funds, traffic noise abatement analysis was not considered appropriate for the SEIS.

2.3.2 Cle Elum Municipal Code

The Cle Elum Municipal Code (CEMC) does not address or provide numerical thresholds for traffic or construction noise. Chapter 8.12.020(E) of the CEMC designates nuisance noise, in part, as *any loud or irritating noises caused or made at unreasonable times and places, the question of reasonableness to be determined in view of all the circumstances*. Sections of the CEMC relevant to this study include the following, which are discussed in later sections of this analysis as applicable to potential noise impacts of the project:

- Chapter 8.12.020 Nuisances: Loud noises prohibited
- Chapter 2.48.130 City Cemeteries: Disturbing the peace by noises or disorderly or improper conduct within the cemetery
- Chapter 17.36.040 Industrial District: Performance Standards
 - No person shall operate or cause to be operated any source of sound in such a manner as to create a sound level that exceeds 60 dBA in any residential district.
- Chapter 10.20 Snowmobiles
- Chapter 10.24.020 Vehicle Equipment: Compression brakes – prohibited.
- Chapter 17.51.010 Recreational vehicles, recreational vehicle parks, and camping
 - A written management plan including quiet hours (as defined in Chapter 173-60 WAC; see Section 2.3.1) must be submitted for approval as part of the conditional use permit process or agreements.

Washington State noise regulations would apply where the CEMC has not established noise thresholds (Revised Code of Washington 70.107.060 (3); see Section 2.3.1).

The Cle Elum UGA Trendwest Master Site Plan Conditions of Approval (City of Cle Elum 2002a) require noise abatement measures addressed in Section 4.1.

2.3.3 Kittitas County Code

Portions of the study area to the north, south and west of the project site are outside of Cle Elum, in Kittitas County. While Kittitas County Code (KCC) does not have jurisdiction within the project area, existing and future development in areas in unincorporated Kittitas County adjacent to the project site would be governed by the KCC, contributing to the local noise environment. Cross-jurisdictional noise complaints would be governed by Washington State noise regulations (see Section 2.3.1).

Chapter 9.45 Noise Control has been updated since issuance of the 2002 FEIS; however, as in 2002, the KCC does not provide numerical thresholds for noise. The KCC defines a public disturbance as unlawful when the following are true:

- Sound is plainly audible within any dwelling unit which is not the source of the sound or is generated within 200 feet of any dwelling unit, and;
- Either reasonably annoys, disturbs, injures, or endangers the comfort, repose, health, peace, or safety of others.

The KCC states that “it shall be a rebuttable presumption that sounds created between 8:00 a.m. and 10:00 p.m. do not unreasonably annoy, disturb, injure, or endanger.” Off-highway vehicles (which would include snowmobiles) while being used in off-road vehicle parks are exempt from the KCC and Chapter 46.09 of the Revised Code of Washington is incorporated by reference. Variances to the noise ordinance may be granted “on a fact and date specific basis.”

Motor vehicles on public highways are exempt from the KCC noise ordinance (KCC 9.45.040), but Chapter 173-62 WAC – Motor Vehicle Noise Performance Standards is incorporated by reference (see Section 2.3.1.2).

Temporary daytime construction activity is not regulated under the KCC, and construction noise is exempt from the noise ordinance between 6:00 a.m. and 10:00 p.m.

3.0 IMPACTS

Noise impacts of SEIS Alternative 6 and SEIS Alternative 5 were qualitatively addressed for the following elements: Temporary construction noise and long-term (operational) noise from residential development, parks/recreation uses, and commercial or light industrial uses. Noise associated with vehicular traffic on existing roadways (I-90, Bullfrog Road, SR 903 / West 2nd Street, West 1st Street, Ranger Station Road, and Douglas Munro Boulevard) and planned project roadways (Connector Road and RV Access Road) was quantitatively addressed.

For this screening-level study, a traffic noise impact at an existing noise-sensitive receiver location was defined as an increase in peak-hour traffic noise of 10 dBA Leq or greater (future project level minus existing level) at the exterior outdoor use area of any existing dwelling.

3.1 Impacts Common to Both Alternatives

3.1.1 Temporary Construction Noise

Clearing and grading activities and construction of new infrastructure and housing are usually accompanied by temporary increases in noise due to the use of heavy equipment and hauling of construction materials. Noise impacts depend on the background sound levels, the type of construction equipment being used, and the amount of time it is in use.

The CEMC does not provide numerical thresholds for traffic or construction noise. Temporary daytime construction activity is exempt from state noise regulations, except between the hours of 10 p.m. and 7 a.m. (WAC 173-60-050). Construction noise may still have a temporary, localized impact on nearby residences, businesses, schools, and parks.

3.1.2 Traffic Noise

Both alternatives would result in increased traffic on local roadways within and around the study area. Traffic on I-90, Bullfrog Road, and SR 903 will include project-related traffic; but a large portion of the traffic on these major roadways includes east- and west-bound through traffic, traffic serving Suncadia to the north, the Washington State Horse Park to the south, and downtown Cle Elum to the east. Residential and RV Resort (the latter under SEIS Alternative 6 only) traffic on local roads will include residents/visitors entering, leaving, and traveling within the 47° North project site as well as delivery and service vehicles entering, leaving, and traveling within the area. Traffic associated with commercial areas and light industrial areas (the latter under SEIS Alternative 5 only) would also increase under all alternatives (see Sections 3.1.3 and 3.3.3).

As mentioned above, use of federal or state funds for roadway or intersection improvements would trigger the WSDOT requirement to model traffic noise impacts and evaluate traffic noise abatement. No federal or state funds are currently anticipated for roadway/intersection improvements for the proposed project and no currently-planned roadway improvements were identified to be completed

by 2037 within the study area (TENW 2020). Therefore, screening-level traffic noise modeling was conducted as described in Section 3.1.2.1 and no traffic noise abatement analysis was performed for the SEIS. The City of Cle Elum Transportation Element of the Comprehensive Plan (City of Cle Elum 2019) recognizes that improvements to the City's transportation infrastructure will be necessary if development continues at the currently anticipated pace.

3.1.2.1 Traffic Noise Modeling Methods

For this assessment, traffic noise impacts caused by increased traffic on the following roads were evaluated for existing noise-sensitive receivers and representative project areas (receiver locations are shown on Figure 1). WSDOT's approved screening method (WSDOT; accessed June 23, 2020), a straight-line model using the FHWA Traffic Noise Model as described below, was used to screen receiver locations for traffic noise impacts.

- Residential areas north of the project site (in the Suncadia Resort), north of Bullfrog Road (Receivers A1 and A2).
- Residential area east of the project site (Cle Elum Pines West), east of West 2nd Street / SR 903 (Receiver B1).
- Cle Elum-Roslyn School District #404 campus located northeast of the project site (Receiver B2).
- A planned future residential area near West 2nd Street / SR 903 and the planned Connector Road (Receiver B3).
- Residences, an outdoor use area (Stewart Lodge swimming pool), and a conference center east of the project site, at the intersection of West 2nd Street and Douglas Munro Boulevard (represented by highest-impacted Receiver C).
- Laurel Hill Memorial Park, an existing cemetery located south of the eastern portion of the project site (Receiver D). This receiver location is also representative of worst-case noise impacts at the planned cemetery expansion.
- A residential area east of the project site on West 1st Street between North Columbia Avenue and North Teanaway Avenue (Receiver E).
- A residential area south of the project site, served by Wood Duck Road, north of I-90 (Receiver F).

Worst-case Sunday PM peak-hour traffic volumes along these streets in the project vicinity under the existing conditions (2019) and projected for each alternative (2037) are listed in Table 4. Traffic data for I-90 were acquired from WSDOT's Traffic GeoPortal (WSDOT; accessed June 23, 2020) and scaled to projected 2037 traffic volumes using compounding based on 2000 through 2019 traffic data and on-ramp/off-ramp data provided by Transportation Engineering Northwest, LLC (TENW). Peak-hour traffic volume forecasts for all other roadways were provided by TENW (2020).

Table 4: Sunday, Summer PM Peak-Hour Automobile, Medium Truck, and Heavy Truck Traffic Volumes in Project Vicinity

Representative Receiver Location	Roadway	Existing (2019)	SEIS Alternative 6 (2037)	SEIS Alternative 5 (2037)
Residential Receivers A1 and A2	Bullfrog Road	1,023 (9,1)	1,971 (55,6)	1,890 (53,6)
Residential Receivers A1 and A2	RV Access Road (project)	N/A	131 (4,0)	150 (4,0)
Residential Receiver B1, School B2, Future Residence B3	West 2 nd Street / SR 903	1,104 (10,1)	2,144 (32,4)	2,173 (33,4)
Residential Receiver B1, School B2, Future Residence B3	Connector Road (project)	N/A	797 (22,2)	518 (14,2)
Residential Receiver C	West 2 nd Street / SR 903	1,063 (11,11)	2,091 (24,5)	2,135 (24,5)
Residential Receiver C	Ranger Station Road	147 (0,0)	387 (7,1)	376 (7,1)
Residential Receiver C	West 1 st Street	425 (10,2)	537 (15,3)	531 (15,3)
Cemetery Receiver D	Douglas Munro Boulevard	50 (3,0)	67 (3,0)	67 (3,0)
Cemetery Receiver D	1 st Street (I-90 on-ramp Westbound)	368 (3,1)	515 (9,2)	513 (9,2)
Cemetery Receiver D	1 st Street (I-90 on-ramp Eastbound)	313 (5,1)	515 (9,2)	514 (9,2)
Cemetery Receiver D	I-90 Westbound	1,706 (125,27)	2,653 (194,41)	2,669 (195,42)
Cemetery Receiver D	I-90 Eastbound	1,301 (108,7)	1,895 (158,10)	1,909 (159,10)
Residential Receiver E	1 st Street	1,068 (18,3)	1,290 (18,3)	1,338 (19,4)
Residential Receiver F	I-90 Westbound	1,706 (125,27)	2,799 (200,42)	2,813 (201,43)
Residential Receiver F	I-90 Eastbound	1,301 (108,7)	1,895 (158,10)	1,909 (159,10)

XX= Automobile traffic volume, (XX, XX)=Medium and heavy truck traffic volume

Traffic volume measured in vehicles per hour (combined vehicles in all directions). Sunday peak-hour was determined to represent worst-case traffic volumes.

The FHWA Traffic Noise Model Version 2.5 (USDOT FHWA 2004) was used to predict existing and future noise levels during peak hours under the screening-level assumptions listed below. The model was configured as follows for the roads listed above.

- No field measurements were performed for this screening-level noise study.
- It was assumed that all receivers have a direct line-of-sight to impacted roadways; barrier analysis was not conducted.
- Traffic was assumed to travel at the following speeds, based on posted speed limits except where noted:
 - Bullfrog Road: 50 miles per hour (mph)
 - RV Access Road (project): 25 mph (TENW 2020)
 - West 2nd Street / SR 903 (near Receivers B): 45 mph
 - Connector Road (project): 35 mph (TENW 2020)

-
- West 2nd Street / SR 903 (near Receiver C): 25 mph
 - Ranger Station Road: 25 mph
 - West 1st Street: 25 mph
 - Douglas Munro Boulevard: 25 mph
 - 1st Street (I-90 on-ramps): 50 mph
 - I-90 both directions: 70 mph (WSDOT; accessed June 23, 2020)
 - 1st Street (near Receiver E): 30 mph.
- The surface between the street and nearby residences consists mainly of vegetated areas; therefore, the ground surface type was defined as “lawn.”
 - All receiver locations were modeled at a distance representing the outdoor use area nearest the roadway. All distances were estimated using Google Earth, with the exception of planned new roadway widths, which were provided by TENW.
 - Consistent with WSDOT guidance for determination of worst hourly noise levels, a screening analysis was conducted to determine worst-case traffic volumes, which occur during peak summer season, Sunday PM peak-hour.
 - All roads were modeled as straight lines; the model was not configured to account for existing or proposed topography, roadway improvements, or configuration changes resulting from the project.

The modeled noise levels for the roadways described above, under the existing conditions and two alternatives, are shown in Table 5. Table 5 lists the modeled daytime Leq noise levels at each representative receiver location for the existing conditions, SEIS Alternative 5, and SEIS Alternative 6. As shown, the modeled peak-hour traffic noise increase at full buildout would not exceed the WSDOT “substantial increase” impact threshold of 10 dBA at any representative receiver locations under any of the alternatives.

Table 5: Estimated Traffic-Related Noise Levels (Sunday, Summer PM Peak Hour)

Receiver	Road Segment	Modeled Noise Level (dBA)			
		Existing (2019)	SEIS Alternative 6 (2037)	SEIS Alternative 5 (2037)	Difference Between Existing and SEIS Alternative 6
A1 - Residence	A - Bullfrog Road at RV Access Primary Entry	50	54	54	4
A2 - Residence	A - Bullfrog Road at RV Access Primary Entry	43	46	46	4
B1 - Residence	B - SR 903 (West 2 nd Street) at Connector Primary Entry	65	68	68	3
B2 - School	B - Between West 2 nd Street (SR 903) and Connector	41	45	45	4
B3 - Future Residence at 8 feet from Connector	B - Between West 2 nd Street (SR 903) and Connector	N/A	66	N/A	N/A
B3 - Future Residence at 21 feet from Connector	B - Between West 2 nd Street (SR 903) and Connector	N/A	64	N/A	N/A
C - Residence	C - West 2 nd Street at Ranger Station Road and West 1 st Street	63	66	66	2
D - Cemetery	D - Douglas Munro Boulevard, I-90 E and W, West 1 st Street (on/off ramps)	67	69	69	2
E - Residence	E - 1 st Street near North Columbia Avenue	63	64	63	1
F - Residence	F - I-90 E and W	56	58	58	2

Noise impacts are rounded to the nearest whole decibel, consistent with WSDOT traffic noise modeling guidance.

Bold text indicates an exceedance of WSDOT's 66 dBA noise impact threshold.

3.1.3 Commercial Development

As described in Section 2.6.2.1 of the SEIS, a 25-acre property located off site, adjacent to the site's eastern boundary, could be developed for commercial use at some point in the future by the property owner. This potential commercial development could include uses such as a grocery store, general retail, restaurants, and medical offices. Noise impacts associated with commercial development are similar to those associated with residential development; however, commercial development is generally associated with a greater amount of vehicle traffic (employees, customers, and diesel delivery truck traffic). Mechanical equipment (such as commercial boilers and heating units), and trucks at loading docks at office and retail buildings could result in noise impacts to adjacent residential properties, including existing residences adjacent to the southeast, Cle Elum Pines West

development to the north (opposite SR 903), the cemetery adjacent to the south, and planned residential development within the project site, adjacent to the west.

Potential commercial development is not part of the proposed 47° North project; however, traffic volumes associated with potential commercial development have been included in vehicle counts (as presented in Table 4 and TENW 2020); therefore, associated traffic noise is included in this analysis.

Commercial or light industrial development is part of the approved SEIS Alternative 5. The commercial development associated with SEIS Alternative 5 has not been precisely defined, but could include light industrial, research and development, warehousing, offices, and limited retail uses. All commercial or industrial development would be required to comply with local and state noise ordinances, as applicable (see Section 2.3).

3.2 SEIS Alternative 6 – Proposed 47° North Master Site Plan Amendment

3.2.1 Temporary Construction Noise

Temporary construction noise impacts at the 47° North project site under SEIS Alternative 6 would be as described in Section 3.1 of this document and would result from site clearing and grading, and construction of homes, recreational and commercial structures, and park areas throughout the development, until full buildout in 2037. Fewer single-family residences would be constructed as part of SEIS Alternative 6 than SEIS Alternative 5, replaced primarily by the RV Resort area in the central portion of the site. Additionally, the single-family residential and some of the multi-family development will consist of modular or manufactured homes (constructed off site and assembled on site), which will reduce the amount and duration of onsite construction in the eastern portion of the site. Fewer square feet of commercial structures would be constructed as part of SEIS Alternative 6, resulting in less construction-related noise due to commercial development.

Temporary construction noise associated with potential future commercial development would be similar to onsite residential development noise. The potential future commercial development under SEIS Alternative 6 includes fewer square feet of commercial space than SEIS Alternative 5; therefore, noise impacts associated with the potential commercial development related to SEIS Alternative 6 would be expected to be less than impacts associated with SEIS Alternative 5.

3.2.2 Local Roadway Noise

Noise impacts from traffic on local roadways would be as described in Section 3.1 of this document. The modeled noise level increases for the roadways described above under the existing conditions and two alternatives are shown in Table 5. The increases of traffic noise from the existing condition are expected to range from 1 to 4 dBA. As noted in Section 2.1, people can generally not detect differences between 1 and 2 dBA, but may be able to detect differences of 2 or 3 dBA, depending on

conditions. No modeled noise level increases were above the significance threshold of 10 dBA. The difference in modeled noise levels between SEIS Alternatives 5 and 6 is negligible.

The CEMC does not address or provide numerical thresholds for traffic noise. Noise impacts exceeding the NAC and WSDOT's threshold of 66 dBA were modeled to occur at two existing residential receiver locations (B1 and C) and the cemetery (D) during the worst-case Sunday PM peak hour in 2037. Use of federal or state funds for roadway or intersection improvements would trigger the WSDOT requirement to model traffic noise impacts and evaluate traffic noise abatement at impacted receivers.

The locations of specific residences and outdoor use areas have not been finalized; however, for planning purposes, Receiver B3 was included to represent a potential future residential location at a worst-case location near both West 2nd Street / SR 903 and adjacent to the planned Connector Road. Based on roadway sections provided by TENW, a 21-foot landscaped clear area zone is planned for one side of the Connector Road, while a 3-foot landscaped clear area zone followed by a 5-foot asphalt path (8 feet total) is planned for the other side of the Connector Road. The proposed receiver location B3 was modeled at 8 feet and 21 feet from the roadway. At 8 feet, noise impacts equal WSDOT's noise impact threshold; at 21 feet, modeled noise impacts are below the threshold.

3.2.3 Operational Noise

Operational noise under SEIS Alternative 6 would include single family residences, multi-family residences, parks, indoor and outdoor recreation spaces, commercial uses, and a RV Resort. Outdoor spaces, including formal sports/recreation areas and trails, can produce noise associated with maintenance, amplified and unamplified human voices. The RV Resort can produce noise associated with camping and outdoor recreation including unamplified human voices. While generator use would not be explicitly prohibited within the RV Resort, power would be provided at each site, making generator use unnecessary. All noise produced by the residences, outdoor recreation, and RV Resort is regulated by state and local regulations, as described above, including the establishment of quiet hours for the RV Resort.

Less noise associated with commercial uses would be expected under SEIS Alternative 6 than SEIS Alternative 5 due to the smaller square footage of commercial use planned under SEIS Alternative 5. Noise associated with different uses can vary based on use, as described in Section 3.3.3.

3.3 No Action, SEIS Alternative 5 – Approved Bullfrog Flats Master Site Plan

3.3.1 Temporary Construction Noise

Temporary construction noise impacts in the project site under SEIS Alternative 5 would be as described in Section 3.1 of this document and would result from site clearing and grading, and construction of homes, recreational, commercial and light industrial structures, and park areas

throughout the development, until full buildout. SEIS Alternative 5 includes more single-family residences and more square feet of commercial space than SEIS Alternative 6, resulting in more construction noise associated with single-family and commercial development. Under SEIS Alternative 5, residences and recreational building would be built on-site, resulting in longer construction times than the modular or manufactured homes planned as part of SEIS Alternative 6. The duration of construction noise would also be longer, as buildout of SEIS Alternative 5 is assumed to be over a 30-year period (vs. the 17-year period under SEIS Alternative 6).

3.3.2 Local Roadway Noise

Noise impacts from traffic on local roadways would be as described in Section 3.1 of this document. The modeled noise level increase for the roadways described above under the existing conditions and two alternatives are shown in Table 5. The increases of traffic noise are expected to range from 1 to 4 dBA. As noted in Section 2.1, people can generally not detect differences between 1 and 2 dBA, but may be able to detect differences of 2 or 3 dBA, depending on conditions. No modeled noise level increases were above the significance threshold of 10 dBA. The difference in modeled noise levels between Alternatives 5 and 6 is negligible.

CEMC does not address or provide numerical thresholds for traffic noise. Noise impacts exceeding the NAC and WSDOT's threshold of 66 dBA were modeled to occur at two existing residential receiver locations (B1 and C) and the cemetery (D) during the worst-case Sunday PM peak period in 2037. Use of federal or state funds for roadway or intersection improvements would trigger the WSDOT requirement to model traffic noise impacts and evaluate traffic noise abatement at impacted receivers.

3.3.3 Operational Noise

Operational noise under SEIS Alternative 5 would include single-family residences, multi-family residences, parks, indoor and outdoor recreation spaces, and commercial and light industrial uses. Outdoor spaces, including formal sports/recreation areas and trails, can produce noise associated with maintenance, amplified and unamplified human voices. All noise produced by the residences and outdoor recreation are regulated by the CEMC and KCC, as described above. Noise associated with residential development under SEIS Alternative 5 is expected to be similar to noise associated with SEIS Alternative 6; however, more residences are planned under SEIS Alternative 5; therefore, more noise related to residential use would be expected. Noise associated with the RV Resort would not be included under SEIS Alternative 5.

Noise associated with commercial uses located in the eastern portion of the site, is also regulated by the CEMC, including 17.36.040, which incorporates the Washington State standards for noise, as described above. More noise associated with commercial uses would be expected under SEIS Alternative 5 than SEIS Alternative 6 due to the greater square feet of commercial or light industrial use planned under SEIS Alternative 5. Noise associated with light industrial uses vary significantly by

type of use, but can be associated with more operational noise than commercial uses, for example: delivery loading/unloading and idling vehicles, or high-powered cooling equipment. Other light industrial uses that operate primarily indoors could be associated with lower noise levels than some commercial development with high delivery and customer traffic.

4.0 MITIGATION MEASURES

The following mitigation measures are proposed to address the potential impacts from construction and operation of the project under both SEIS Alternatives 5 and 6.

4.1 Conditions of Approval

The Cle Elum UGA Trendwest (Bullfrog Flats) Master Site Plan Conditions of Approval (City of Cle Elum 2002a) require the following noise abatement measures:

- Construction within the UGA shall be limited to 7:00 a.m. to 7:00 p.m., Monday through Saturday. Sunday construction shall be on an emergency basis only and shall be approved by the City.
- Equipment servicing and maintenance times will be unrestricted. The City may review and approve case-by-case exceptions to this condition if justified to comply with Washington State Department of Natural Resources industrial restrictions.
- All construction equipment shall have adequate mufflers, intake silencers, and engine enclosures to minimize construction equipment noise.
- Any stationary equipment that generates noise shall be located away from sensitive receivers, including residential uses, the school property, the cemetery, and open space areas.
- Roof equipment in the commercial development may require noise baffling, if necessary, to meet state noise standards. This condition will be reviewed and any baffling requirements imposed as part of the building permit review for the business park buildings.

4.2 Construction and Demolition

In addition to the measures required by the Conditions of Approval, construction noise could be reduced by using enclosures or walls to surround noisy stationary equipment, substituting quieter equipment or construction methods, and minimizing time of operation. To reduce construction noise at nearby receiver locations, the following mitigation measures could be incorporated into construction plans and contractor specifications:

- Erect portable noise barriers around loud stationary equipment located near sensitive receivers
- Turn off idling construction equipment
- Require contractors to rigorously maintain all equipment
- Train construction crews to avoid unnecessarily loud actions (e.g., dropping bundles of rebar onto the ground or dragging steel plates across pavement) near noise-sensitive areas.

A qualitative evaluation of project impacts indicates no adverse impacts will occur to noise-sensitive receivers in the study area.

4.3 Operational Noise

Under both alternatives, undeveloped open space in the western portion of the project area would be preserved and vegetated areas consisting of managed and natural open space would create a buffer along the southern project boundary and between various areas of the project. Vegetation would be maintained and potentially enhanced to serve as a noise buffer between the site and the adjacent neighborhood under both alternatives as well. Woodland and vegetated buffers would assist in reducing the impact of noise from the project site on the surrounding areas.

Under the CEMC, the RV Resort would be required to submit a management plan, including rules governing park quiet hours.

4.4 Traffic Noise

The modeled peak-hour traffic noise increase at full buildout would not exceed the WSDOT substantial increase impact threshold of 10 dBA at any representative receiver locations under either alternative.

CEMC does not address or provide numerical thresholds for traffic noise; however, use of federal or state funds for roadway or intersection improvements would trigger WSDOT requirements. Based on the modeled traffic noise levels exceeding the NAC and WSDOT's threshold of 66 dBA at residential receiver locations B1 and C and the cemetery (D), site-specific traffic noise studies and evaluation of feasibility/reasonability of noise abatement for impacted receivers would be required if future roadway improvements receive WSDOT or federal funding or require federal approval.

No currently-planned roadway improvements were identified to be completed within the study area by the city, county, or state before 2037 (TENW 2020); however, the City's Transportation Element of the Comprehensive Plan (City of Cle Elum 2019) recognizes that improvements to the City's transportation infrastructure will be necessary if development continues at the currently anticipated pace. Additionally, TENW 2020 identified the following intersections near Receivers B1, C, and D as needing improvements under both Alternatives 5 and 6:

- West 2nd Street / SR 903 at the Connector Road
- Ranger Station Road at West 2nd Street
- Douglas Munro Boulevard at West 1st Street.

Noise impacts at receiver B3, the representative planned future residential receiver, equaled WSDOT's threshold for noise impacts at a residential outdoor use area at 8 feet from the planned Connector Road but were below the threshold at 21 feet from the roadway. The locations of specific residences and outdoor use areas are not yet finalized. Additional vegetated buffer or other traffic noise mitigation measures, such as noise barriers, could be provided if needed to reduce noise impacts on residences near the Connector Road. Chapter 4 of the US Department of Housing and Urban

Development Noise Guidebook provides additional guidance for how these noise attenuation measures could be incorporated into development near roadways including the use of barriers, site planning with buffers and building orientation, and construction methods and materials (HUD 2009).

5.0 SIGNIFICANT UNAVOIDABLE ADVERSE IMPACTS

Under both SEIS alternatives, compared to pre-development noise levels, noise levels will likely increase in the study area from short-term clearing/grading, demolition and construction noise, and long-term traffic and human noise sources. However, the impact of noise from residential development, commercial/light industrial and parks/recreation uses is expected to be minimal and no significant impacts are expected.

6.0 USE OF THIS REPORT

The conclusions made in this report are based on the results of a qualitative analysis of planning documents that did not include field measurements or incorporation of detailed site-specific information. While this review allows for a preliminary assessment of potential impacts, it does not constitute a site-specific noise study.

This screening-level noise study has been prepared for the use of EA Engineering, Science, and Technology, Inc. and the City of Cle Elum to support the preparation of the Noise section of the Supplemental Environmental Impact Statement for the 47° North project in Cle Elum, Kittitas County, Washington. Further, the reuse of information, conclusions, and recommendations provided herein for extensions of the project or for any other project, without review and authorization by LAI shall be at the user's sole risk.

LAI warrants that within the limitations of scope, schedule, and budget, our services have been provided in a manner consistent with that level of care and skill ordinarily exercised by members of the profession currently practicing in the same locality under similar conditions as this project. LAI makes no other warranty, either express or implied.

7.0 REFERENCES

- CDC. 2019. "Loud Noise Can Cause Hearing Loss." Centers for Disease Control and Prevention. https://www.cdc.gov/nceh/hearing_loss/what_noises_cause_hearing_loss.html.
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- USDOT FHWA. 2004. Federal Highway Administration's Traffic Noise Model User's Guide (Version 2.5 Addendum). US Department of Transportation Federal Highway Administration. April. https://www.fhwa.dot.gov/environment/noise/traffic_noise_model/tnm_v25/users_manual/v25uga00.cfm#top.
- WSDOT. Traffic GeoPortal. Washington State Department of Transportation. <https://www.wsdot.wa.gov/data/tools/geoportal/?config=traffic>.

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LEGEND

- MASTER SITE PLAN BOUNDARY
- SEIS STUDY AREA BOUNDARY
- CONNECTOR ROAD

RESIDENTIAL USES

- SINGLE FAMILY RESIDENTIAL
- AFFORDABLE HOUSING
- MULTI-FAMILY RESIDENTIAL

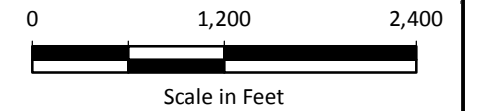
RV RESORT USES

- RV SITES

TRACTS AND OPEN SPACE

- RIVER CORRIDOR OPEN SPACE
- MANAGED OPEN SPACE
- NATURAL OPEN SPACE
- MUNICIPAL REC. CENTER
- ADVENTURE CENTER
- AMENITY CENTERS
- CEMETERY EXPANSION
- POWER EASEMENTS
- WETLANDS AND BUFFERS

- REPRESENTATIVE RECEIVER LOCATIONS
- NEW ROADS
- CLE ELUM CITY LIMITS



Notes

1. Site features are approximate.
2. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

Data Sources: ESM Consulting Engineers, 2020; Esri World Imagery.

47° North SEIS
Noise Impact Analysis
Cle Elum, Washington

Representative Receiver Locations

Figure
1