Conconully Safety of Dams Modification Project Final Environmental Assessment

Vibration Impact Analysis Memorandum

November 2025

Analysis Area

The analysis area for vibration is a 600-foot buffer around the project area (**Map 1**).

Affected Environment

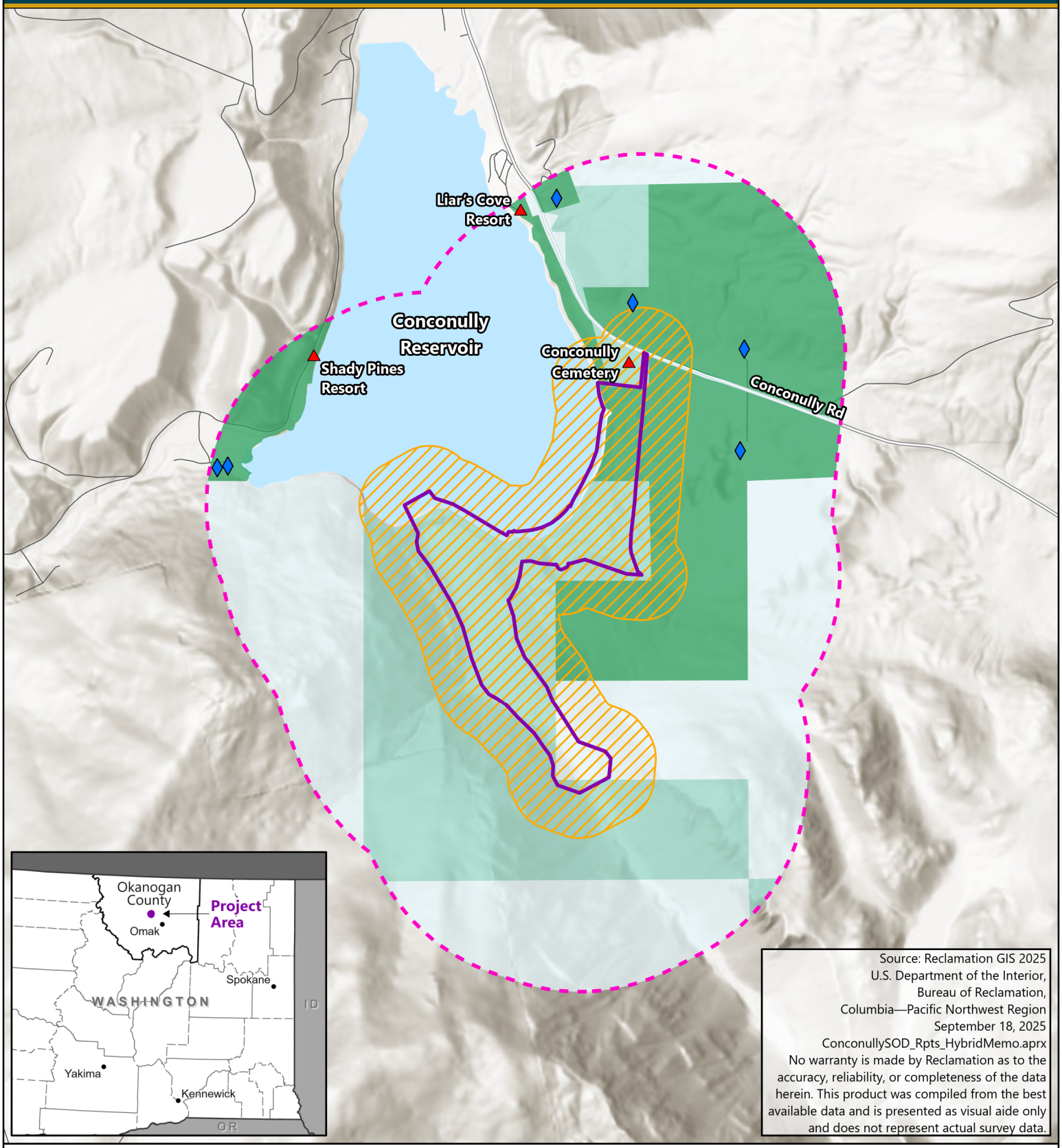
Humans, buildings, wildlife, and other structures can be sensitive to vibration. Ground-borne vibration consists of fluctuating motions of the ground transmitted into a receptor (such as a building) from a vibration source (such as construction equipment). Vibration criteria for humans and buildings typically reference vibration velocity. The vibration velocity level is expressed in terms of vibration decibels (VdBs), which are decibels relative to a reference velocity of 1 micro-inch per second. This level of vibration represents the velocity amplitude at which the ground is moving.

No major existing sources of vibration in the analysis area are known. These would typically include railways, heavy industrial machinery, or mining operations.

Where noise-sensitive biological resources are identified within the analysis area, certain federal provisions may apply depending on the resource (**Section 3.3** of the environmental assessment [EA]). Otherwise, there are no federal laws, regulations, statutes, or orders that would apply to noise or vibration generated during construction or operation of this project. The Environmental Protection Agency offers non-binding guidelines for noise levels, including a maximum day-night sound level of 55 A-weighted decibels in residential areas in an effort to address interference with sleep. However, the Noise Control Act of 1972 reserves primary responsibility for setting noise limits to state and local authorities. See **Appendix B** of the EA for additional information on laws, regulations, and policies related to vibration.

CONCONULLY SAFETY OF DAMS MODIFICATION PROJECT

Environmental Assessment



Source: Reclamation GIS 2025
U.S. Department of the Interior,
Bureau of Reclamation,
Columbia—Pacific Northwest Region
September 18, 2025
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Map 1. Noise and Vibration Analysis Areas

- Project Area
- Point of Interest
- Residence*
- Noise Analysis Area
- Vibration Analysis Area
- EDNA Class A
- EDNA Class B
- EDNA Class C

*There are no residences in the vibration study area.

N

0 0.25 0.5 Miles

Environmental Consequences

Methods and Criteria

Analysis Indicators

- Vibration levels will be evaluated in VdB and will be compared against Federal Transit Administration (FTA) criteria

Assumptions

- Assumptions have been made on the equipment type and extent of use based on Reclamation's experience with other dam projects and have been used in this analysis.

Alternative A – No Action

No construction activities would occur as part of the No Action alternative, and therefore, no construction vibrations would be generated. Therefore, no vibration impacts would occur under the No Action alternative.

Alternative B – Proposed Action

A list of vibration levels associated with some common construction equipment and distances to impact thresholds are displayed in **Table 1**. The vibration damage impact threshold is determined using the most conservative criteria according to FTA, which is for buildings extremely susceptible to vibration damage. Buildings less susceptible to vibration damage, such as engineered steel-framed buildings, would have a higher impact threshold, not shown here. The annoyance impact threshold is based on frequent vibration occurrences at residences and buildings where people normally sleep and would include campgrounds as well.

Since no residences, buildings, or campgrounds are within any of the impact distances listed above, measured from the limits of construction, no vibration impacts are expected.

Table 1. Typical construction equipment vibration levels

Equipment	Peak Particle Velocity at 25 feet (inch/second)	Distance to Damage Impact at 0.12 inch/second (feet)	Approximate Vibration Level at 25 feet (VdB)	Distance to Annoyance Impact at 72 VdB (feet)
Pile Driver (impact)- upper range	1.518	136	112	523
Pile Driver (impact)- typical	0.644	77	104	295
Pile Driver (sonic)- upper range	0.764	86	105	331
Pile Driver (sonic)- typical	0.170	32	93	122
Clam shovel drop	0.202	35	94	136
Vibratory Roller	0.210	36	94	140
Hoe Ram	0.089	20	87	79
Large Bulldozer	0.089	20	87	79

Equipment	Peak Particle Velocity at 25 feet (inch/second)	Distance to Damage Impact at 0.12 inch/second (feet)	Approximate Vibration Level at 25 feet (VdB)	Distance to Annoyance Impact at 72 VdB (feet)
Caisson drilling	0.089	20	87	79
Loaded trucks	0.076	18	86	71
Jackhammer	0.035	11	79	42
Small bulldozer	0.003	2 ft	58	8

Source: FTA 2018
*Vibration level in VdB relative to a reference of 1 micro-inch/second root-mean-square velocity

Alternative C – Preferred

Construction vibration equipment and usage would be similar to Alternative B with potentially less duration, so impacts due to construction vibration would be negligible.

Acronyms

EA	environmental assessment
FTA	Federal Transit Administration
VdB	vibration decibel

References

FTA (Federal Transit Administration). 2018. Transit Noise and Vibration Impact Assessment Manual. Internet website: https://www.transit.dot.gov/research-innovation/transit-noise-and-vibration-impact-assessment-manual-report-0123.