



## **Appendix B: Supporting Documentation**

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## MEMORANDUM

**TO:** Project File  
**FROM:** Marley Madsen, Biologist  
**DATE:** May 11, 2022  
**SUBJECT:** Migratory Bird Nesting Survey  
Alpine Aqueduct Environmental Assessment

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### INTRODUCTION

Central Utah Water Conservancy District (District) and the Department of the Interior – Central Utah Project Completion Act Office (Interior) are evaluating alternatives to increase the resiliency and reliability of the Alpine Aqueduct Reach 1 (AA-1). The District and Interior, as Joint Lead Agencies (JLAs), have initiated an Environmental Assessment (EA) to analyze and disclose the potential impacts of the Alpine Aqueduct Reach 1 Replacement and Resiliency Project (Project).

Migratory birds receive protections from the Migratory Bird Treaty Act (MBTA) of 1918, and Executive Order (EO) 13186: *Responsibilities of Federal Agencies to Protect Migratory Birds* requires federal agencies taking actions that could result in take or other negative effects to migratory birds to comply with MBTA. Almost all bird species in the United States are covered by the MBTA. Additionally, the Bald and Golden Eagle Protection Act (BGEPA), originally passed in 1940, provides protection to eagles by prohibiting take.

To ensure project compliance with the MBTA and BGEPA, a nesting bird survey was conducted in the study area. The purpose of this report is to document the results of that survey.

### EVALUATION METHODS

On May 6, 2022, Marley Madsen and Gabriella Lawson of Horrocks Engineers conducted a survey of the study area to locate any existing migratory bird nests and to assess habitat suitability for birds. Prior to conducting the survey, areas of potentially suitable habitat were identified from aerial imagery and previous nest occurrence data was reviewed. Survey efforts in the field focused on potentially suitable habitat and the locations of previously recorded nests. At each of these locations, the surveyors listened for bird calls and used binoculars to look for birds and bird sign (e.g., nests, whitewash). When birds or sign were detected, the surveyors attempted to determine if a nest was occupied and to identify the species. The survey took place during the breeding season for most species of birds known to occur in the area.



## SURVEY RESULTS

### Habitat Conditions

The habitat in the study area can be classified as northern mountain brush complex using *Woody Plants of Utah* (Van Buren et al. 2011). This vegetative community occurs in the foothills of mountain ranges and is dominated by shrubs such as Gambel oak (*Quercus gambelii*), bigtooth maple (*Acer grandidentatum*), box elder (*Acer negundo*), curl-leaf mountain mahogany (*Cercocarpus ledifolius*), alderleaf mountain mahogany (*Cercocarpus montanus*), and sagebrush (*Artemisia spp.*).

Due to the 2020 Range Fire, which burned approximately 3,500 acres at the mouth of Provo Canyon, very few trees and shrubs are present in the study area. Instead, the study area is dominated by various species of native and non-native grasses and forbs such as intermediate wheatgrass (*Thinopyrum intermedium*), crested wheatgrass (*Agropyron cristatum*), and bulbous bluegrass (*Poa bulbosa*), and cheat grass (*Bromus tectorum*) (see Figure 1).

In addition to the grassland habitats available in the study area, suitable habitat for migratory birds occurs in small patches of oakbrush, sagebrush, and Utah juniper (*Juniperus osteosperma*), as well as along the large limestone cliffs at the mouth of Provo Canyon (see Figure 2).



**Figure 1:** General habitat conditions in study area. Photo was taken along the Bonneville Shoreline Trail looking south toward Orem/Provo.



**Figure 2:** General habitat conditions along the limestone cliffs on the eastern edge of the study area. The spillway and cement roadway can be seen in the middle/right of the photo. Image was taken using Google Earth Street View.

### **Migratory Birds**

Six large platform nests were observed in and near the study area during surveys (see attached survey results map). Only one nest was able to be positively identified as belonging to mated pair of red-tailed hawks. The red-tailed hawk nest is located along the limestone cliffs near the eastern edge of the study area (see attached survey results map). The other five nests are located in scattered Utah juniper trees and may belong to common ravens or other large predatory birds (see Figure 3). Other nests belonging to small migratory species undoubtedly occur in and near the study area. For example, flocks of white-throated swifts and barn swallows were observed by the limestone cliffs and there are likely dozens of nests along the cliff face.



**Figure 3:** An example of a migratory bird nest found in the study area. This nest is located in a Utah juniper and belongs to an unknown species of bird.

Several different species of migratory birds and raptors were observed in and near the study area:

- Turkey vulture (*Cathartes aura*)
- Red-tailed hawk (*Buteo jamaicensis*)
- Great-horned owl (*Bubo virginianus*)
- American kestrel (*Falco sparverius*)
- Barn swallow (*Hirundo rustica*)
- Spotted towhee (*Pipilo maculatus*)
- Warbling vireo (*Vireo gilvus*)
- White-throated swift (*Aeronautes saxatalis*)
- American robin (*Turdus migratorius*)
- Lazuli bunting (*Passerina amoena*)
- Stellar's jay (*Cyanocitta stelleri*)

It is unlikely this is a comprehensive list of all the migratory birds and raptors that occur in the study area. However, it does provide evidence that the study area contains enough suitable habitat to support a diverse bird community.

### RECOMMENDED MITIGATION

The following mitigation measures are recommended to avoid impacts to migratory birds:

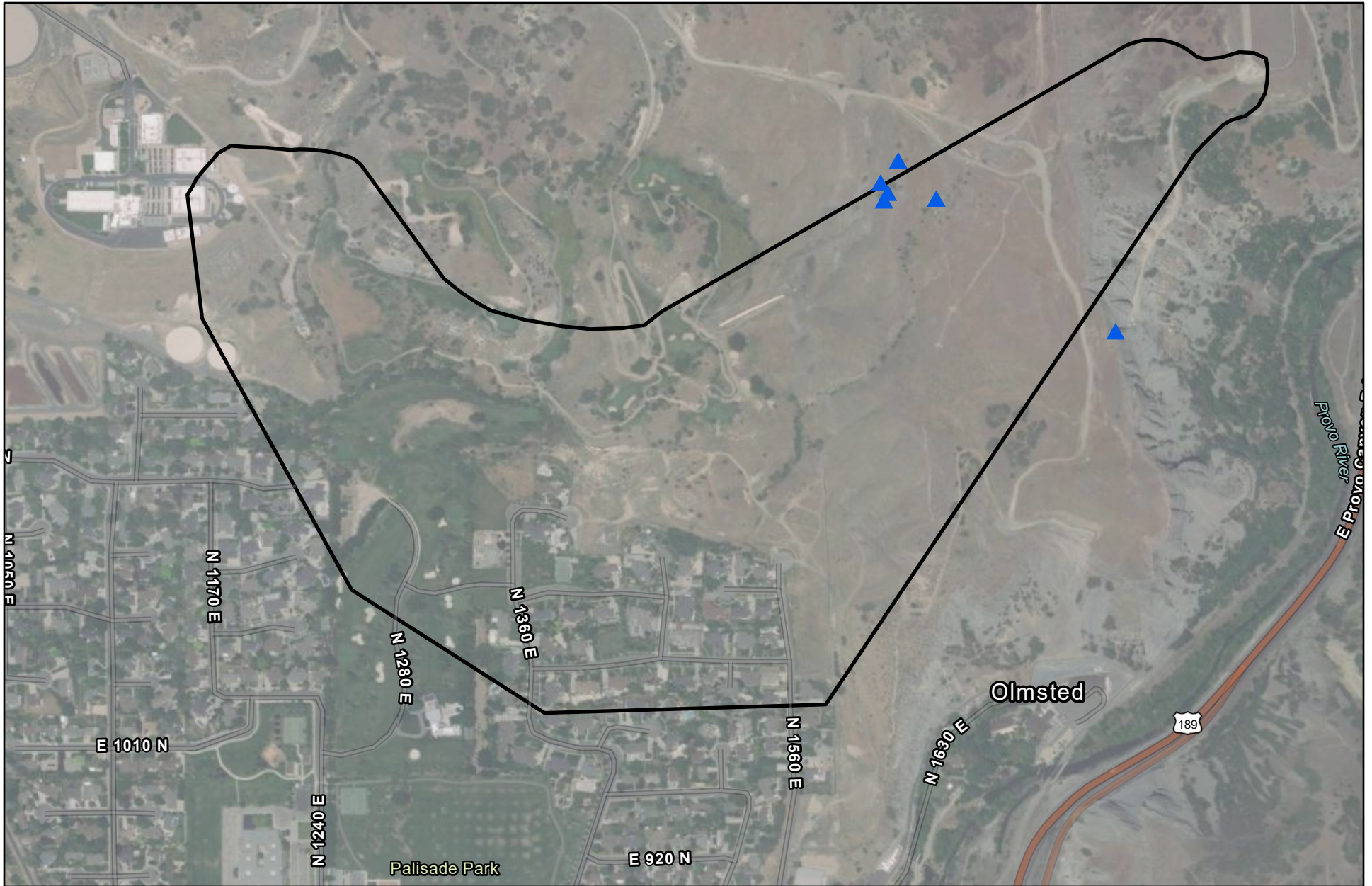
- All vegetation in the construction area must be cleared and grubbed outside the breeding season for most migratory birds (May 1 – August 31).
- Construction activities, including storing equipment and parking vehicles, must not take place directly above or below the red-tailed hawk nest during the nesting season (May 1 – August 31).

### CONCLUSION

There is suitable habitat in the study area for migratory birds. A total of six nests, one belonging to a pair of red-tailed hawks and five belonging to other large birds, were found in and near the study area boundary. At least eleven species of migratory birds occur in and near the study area. If the recommended mitigation measures are implemented, the project would not result in take to migratory birds.

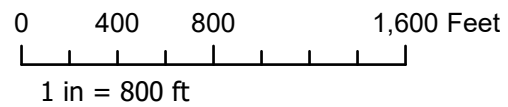
### REFERENCES

Van Buren, R., Cooper, J.G., Shultz, L.M., and Harper, K.T. 2011. *Woody Plants of Utah*. Utah State University Press. Logan, Utah.



Study Area

Nest



Alpine Aqueduct  
Migratory Bird Survey Results

## MEMORANDUM

**TO:** Project File  
**FROM:** Gabriella Lawson, Environmental Specialist  
**DATE:** May 11, 2022  
**SUBJECT:** Yellow-billed Cuckoo Habitat Noise Analysis  
Alpine Aqueduct Environmental Assessment

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### INTRODUCTION

Central Utah Water Conservancy District (District) and the Department of the Interior – Central Utah Project Completion Act Office (Interior) are evaluating alternatives to increase the resiliency and reliability of the Alpine Aqueduct Reach 1 (AA-1). The District and Interior, as Joint Lead Agencies (JLAs), have initiated an Environmental Assessment (EA) to analyze and disclose the potential impacts of the Alpine Aqueduct Reach 1 Replacement and Resiliency Project (Project).

Section 7 of the Endangered Species Act (ESA) of 1973 (7 USC §136, 16 USC §1531 et seq.), as amended, requires federal agencies to consult with the U.S. Fish and Wildlife Service (USFWS) if listed species or designated Critical Habitat may be affected by the Preferred Alternative. If adverse impacts would occur as a result of the Preferred Alternative, the ESA requires federal agencies to evaluate the likely effects and ensure that it neither jeopardizes the continued existence of federally listed ESA species, nor results in the destruction or adverse modification of designated Critical Habitat.

Yellow-billed Cuckoo (*Coccyzus americanus*) are federally listed threatened species. Found in mixed native and non-native riparian woodlands. Patches vary in size and shape but must be  $\geq 12$ -acres and 100m wide or more in at least one location. Quality habitat is structurally diverse with a multi-layered overstory and dense understory. No critical habitat for yellow-billed cuckoo (YBC) exists in or within 0.5-miles of the study area, and no YBC have been observed nearby. However, there is habitat that meets USFWS guidelines for suitable habitat within 0.5-miles of the study area along the Provo River at the mouth of Provo Canyon.

To ensure project compliance with USFWS guidelines, a noise screening was conducted to identify whether noise from project activities would increase the noise levels within suitable habitat for yellow-billed cuckoo. The purpose of this report is to document the results of that screening.

### EVALUATION METHODS

The ambient noise level is defined as the all-encompassing noise level associated with a given noise environment. A common statistical tool to measure the ambient noise level is the average,

or equivalent, sound level (Leq) over a given period. The sound levels described in this memo are expressed as Leq. Table 1 shows the relationship between decibel changes and the corresponding relative loudness. The Federal Highway Administration Traffic Noise Screening Tool and Roadway Construction Noise Model were used to predict noise levels within adjacent suitable, yellow-billed cuckoo habitat.

**Table 1. Sound Level Change vs. Relative Loudness**

Sound Level Change	Relative Loudness
1 dBA	No perceptible change
3 dBA	Barely perceptible change
5 dBA	Readily perceptible change
10 dBA increase	Perceived as twice as loud

### HABITAT LOCATION

Construction noise levels were analyzed for suitable habitat closest (approximately 740-feet) to the proposed construction area (See Figure 1). Traffic noise levels were analyzed for the same suitable habitat point, located 500 feet to the west of mile marker 8.1.



**Figure 1. Suitable Habitat Distance to Construction and Roadway**

### BASELINE ROADWAY NOISE LEVELS

Baseline roadway noise levels were calculated using the Federal Highway Administration’s (FHWA) Traffic Noise Screening Tool (TNST). Average Annual Daily Traffic on US-189 in 2019 was



28,000 vehicles per day with total truck volumes at 26.4% (20.2% single unit, 6.2% combination unit). Average hourly traffic was set at 2,800 vehicles (700 per lane) as best practice is to take 10% of daily traffic volumes to reflect peak noise. FHWA TNST calculated noise levels to be 59.22 dBA in the closest suitable habitat.

The screenshot displays the FHWA TNST software interface, organized into three main sections: Project Settings, Traffic Input, and Computations and Results.

**Project Settings:** This section contains various input fields for project parameters. # Near Lanes is set to 2, Near Lane Grade % is 2, and Ground Type is Lawn. # Far Lanes is 2, Far Lane Grade % is -2, and Traffic Average Period is Hourly. Lane Width (ft) is 12, Receiver Distance (ft) is 500, and NAC Category is B. Pavement Type is Average, and Receiver Height (ft) is 5. There is an unchecked checkbox for "Compute Substantial Increase".

**Traffic Input:** This section is divided into tabs for Diagram, NL 1, NL 2, FL 2, and FL 1. The FL 1 tab is active. Inputs include Lane Speed (mph) at 55, Average Total Traffic at 700, and Average Hourly Traffic at 700. Traffic composition is defined as 74% Auto (518 vehicles), 20% MT (140 vehicles), and 6% HT (42 vehicles).

**Computations and Results:** This section includes buttons for "Start Computation" and "Write Summary". A progress bar for "Far lane 1" is shown at 100%. Results are displayed for "Near Lane LAeq 1hr (dBA)" at 56.82 and "Far Lane LAeq 1hr (dBA)" at 55.50. A checkbox "Greater than NAC - 3 dB?" is marked "NO". The "Total Lane LAeq 1hr (dBA)" result is 59.22, which is highlighted with a red border.

Figure 2. FHWA TNST Results for Baseline Roadway Noise Levels

### CONSTRUCTION ACTIVITY NOISE LEVELS

Construction activity noise levels were calculated using FHWA’s Roadway Construction Noise Model (RCNM). The RCNM enables the prediction of construction noise levels for a variety of construction operations based on a compilation of empirical data and the application of acoustical propagation formulas. The noise levels were analyzed for construction in the closest suitable habitat (740 feet away) for each piece of equipment that will be used individually and those that are likely to be used together. Results from the analysis are described in the following sections.

#### Blasting

The RCNM calculated the noise levels (Leq) associated with blasting to be 50.6 dBA in the closest suitable habitat, 8.62 dBA less than the baseline roadway noise level.

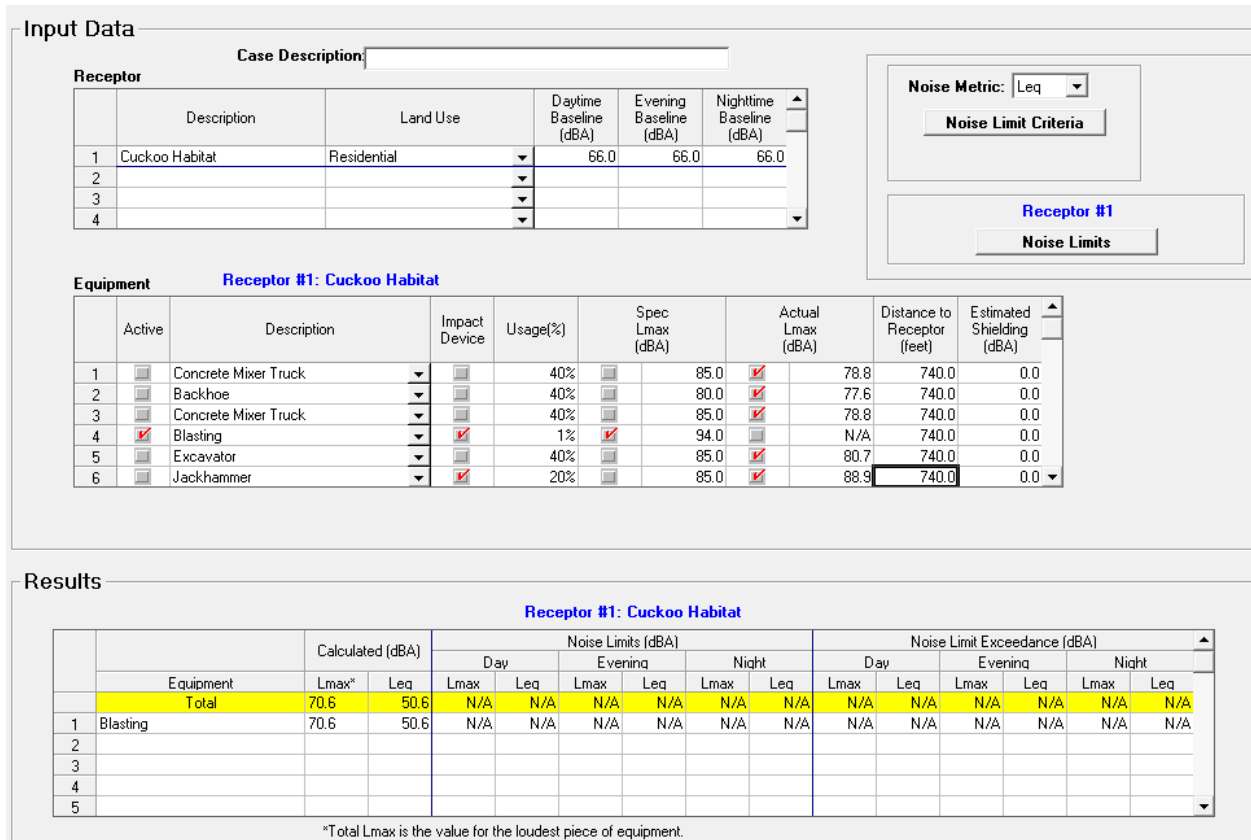


Figure 3. RCNM Result for Blasting

**Jack Hammering**

The RCNM calculated the noise levels (Leq) associated with blasting to be **58.5 dBA** in the closest suitable habitat, **0.72 dBA less than the baseline roadway noise level**.

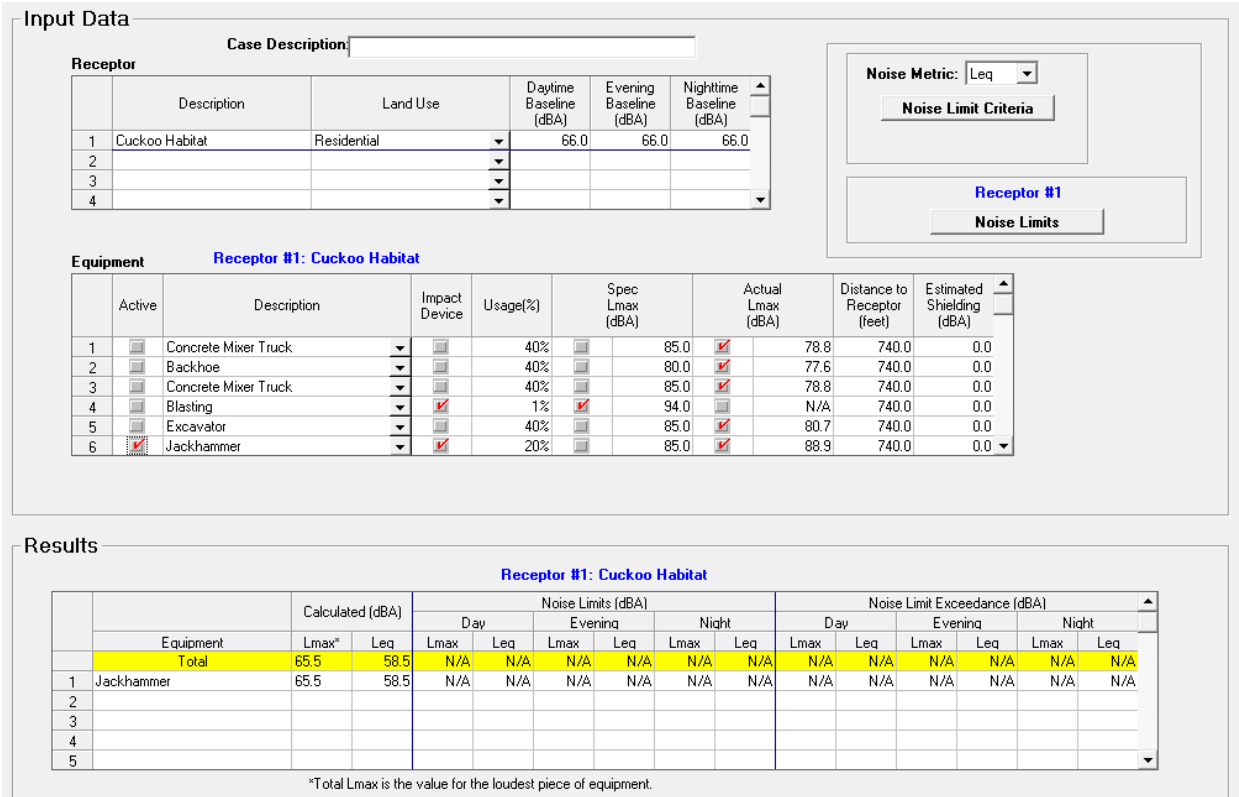


Figure 4. RCNM Result for Jack Hammering

**Concrete Mixer**

The RCNM calculated the noise levels (Leq) associated with blasting to be **51.4 dBA** in the closest suitable habitat, **7.82 dBA less than the baseline roadway noise level**.

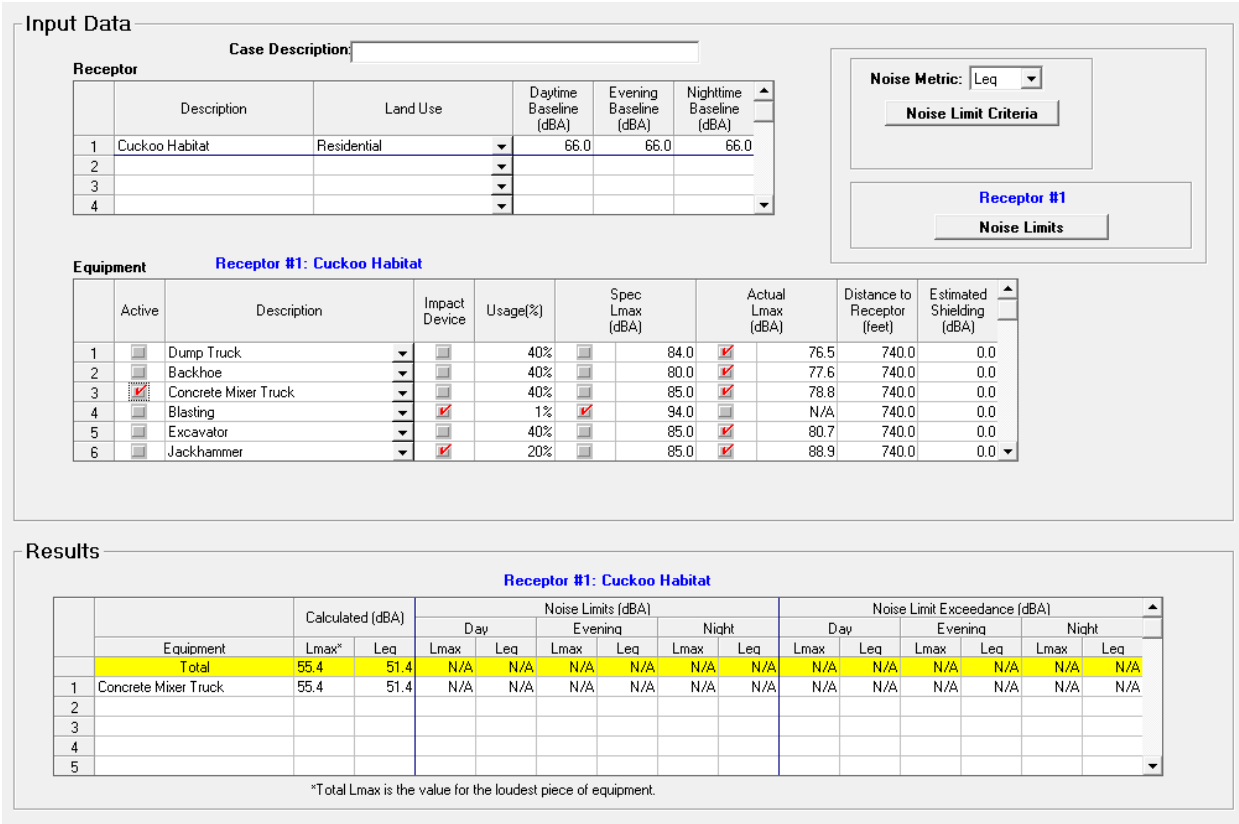


Figure 5 RCNM Result for Concrete Mixer Truck

**Front End Loader**

The RCNM calculated the noise levels (Leq) associated with blasting to be **51.7 dBA** in the closest suitable habitat, **7.52 dBA less than the baseline roadway noise level**.

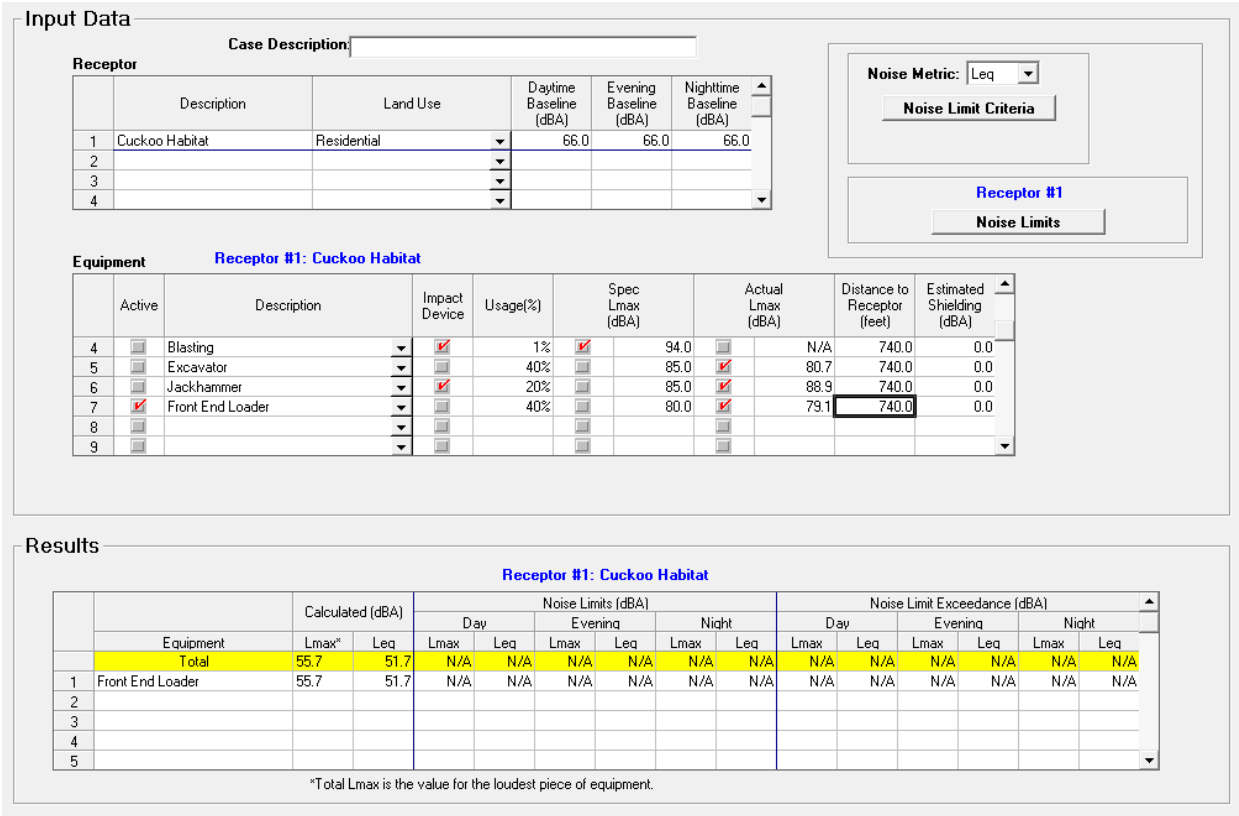


Figure 6. RCNM Result for Front End Loader

**Dump Truck**

The RCNM calculated the noise levels (Leq) associated with blasting to be **49.1 dBA** in the closest suitable habitat, **10.12 dBA less** than the baseline roadway noise level.

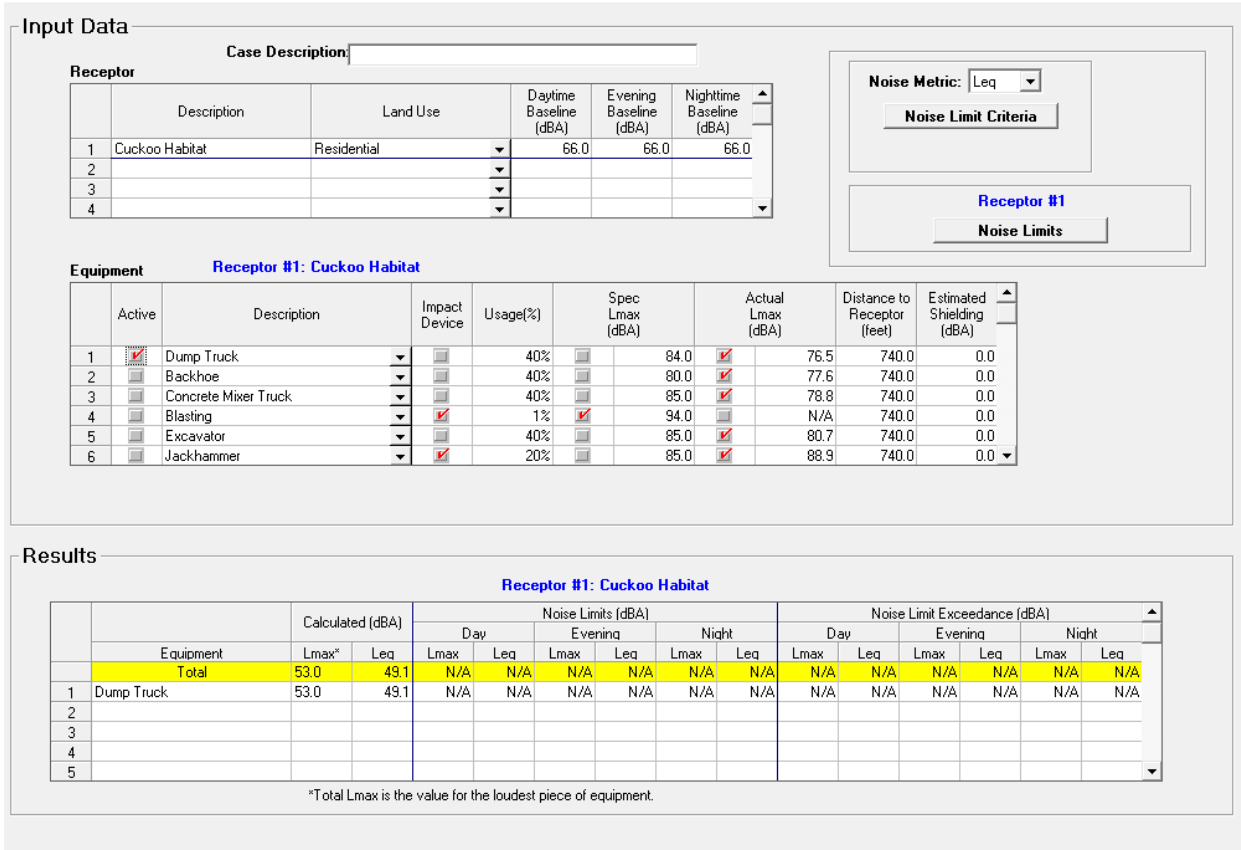


Figure 7. RCNM Results for Dump Truck

*Track Hoe*

The RCNM calculated the noise levels (Leq) associated with blasting to be **53.3 dBA** in the closest suitable habitat, **5.92 dBA less** than the baseline roadway noise level.

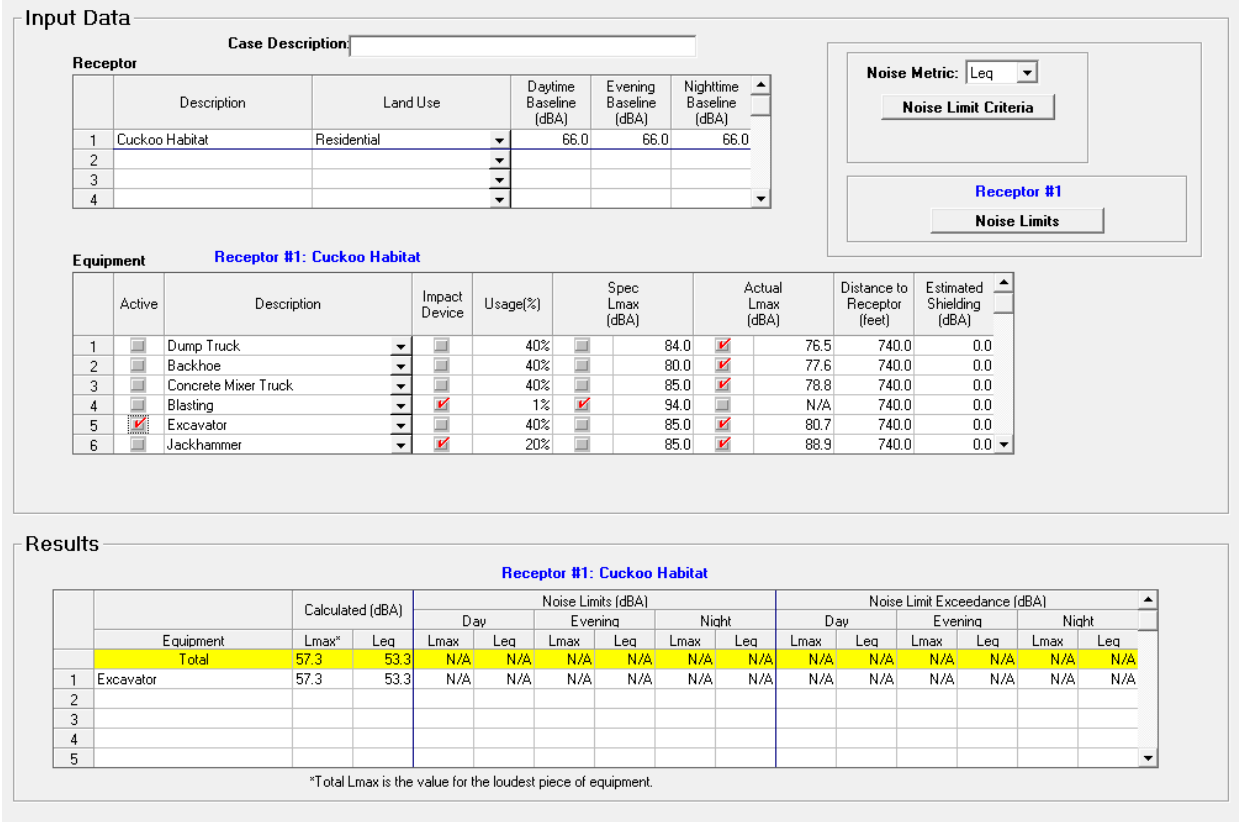


Figure 8. RCNM Results for Track Hoe

*Loaders, track hoe, dump truck*

The RCNM calculated the noise levels (Leq) associated with blasting to be **56.5 dBA** in the closest suitable habitat, **2.72 dBA less** than the baseline roadway noise level.

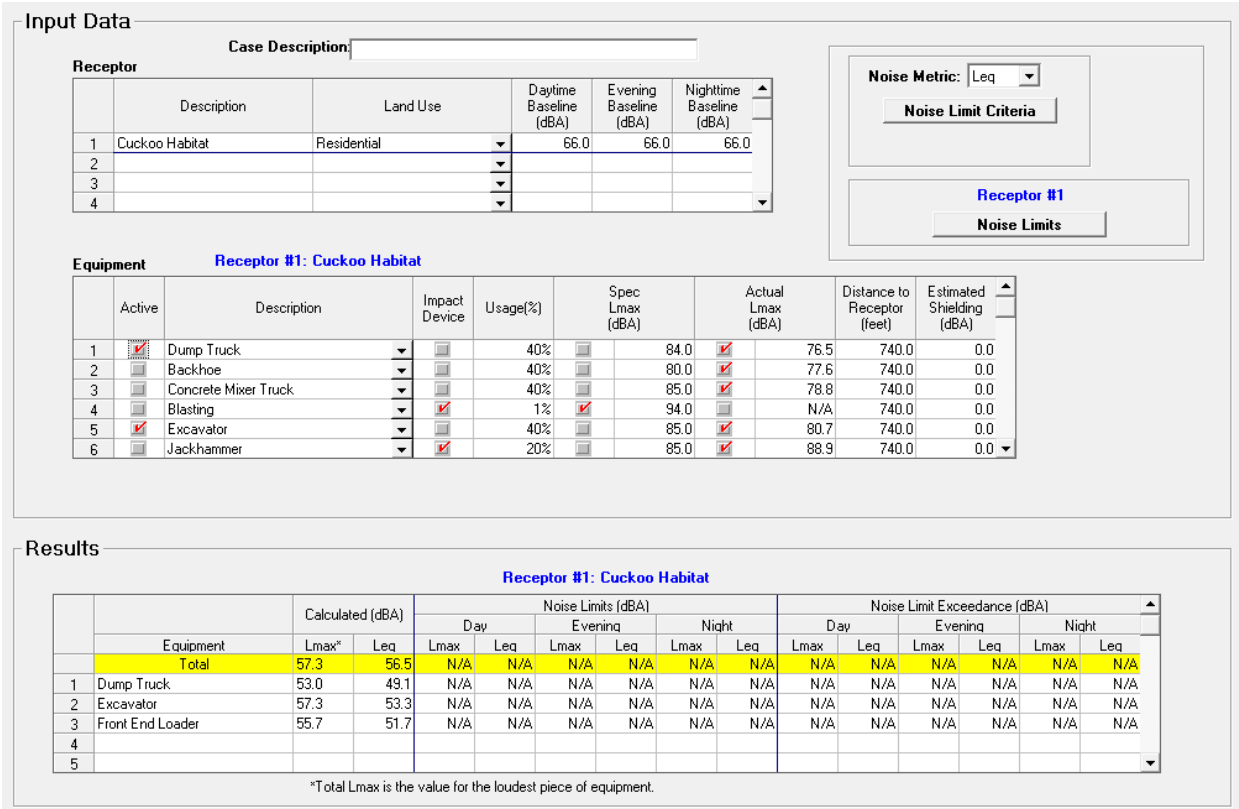


Figure 9. RCNM Results for Loaders, Track Hoe, and Dump Truck



**SUMMARY**

On average, noise from construction will be 6.2 dBA less than the baseline roadway noise level within the suitable yellow-billed cuckoo habitat. No construction activities were found to be louder than the baseline roadway noise levels within the potential suitable habitat for yellow-billed cuckoo (Table 2).

**Table 2. Construction vs. Baseline Roadway Noise Level**

Construction Activity	Baseline Roadway Noise Level (dBA)	Construction Activity Noise Level (dBA)	Difference
Blasting	59.22	50.6	-8.62
Jack Hammering	59.22	58.5	-0.72
Concrete Mixer	59.22	51.4	-7.82
Front End Loader	59.22	51.7	-7.52
Dump Truck	59.22	49.1	-10.12
Track Hoe	59.22	53.3	-5.92
Loaders, track hoe, dump truck	59.22	56.5	-2.72