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Job # S200514

Burns & McDonnell Engineering Co., Inc.
Attention: Mark Van Dyne
9400 Ward Parkway
Kansas City, Missouri 64114

Subject: Moosa Creek Riparian Restoration Project – Noise Analysis

The purpose of this analysis is to evaluate construction noise impacts associated with the proposed project, the Moosa Creek Restoration Project (Project) to adjacent sensitive habitats.

Project Description

The applicant is proposing a Grading Permit for the restoration of riparian and upland habitats on 67 acres of land within the Bonsall Community Plan area that contains a portion of the former Moosa Creek Golf Course. The site is designated for Open Space (Recreation) and zoned for Open Space Use (S80). The proposed habitat restoration work is consistent with the existing zoning for the site. The project site is located between State Route-76 and Interstate-15, south of Camino Del Rey, and is bisected by Moosa Creek. The on-site reach of the creek flows from the eastern end of the project site westward where it exits the project site at the western end of Old River Road. From the property, Moosa Creek continues another half mile off site to the southwest before ultimately joining the San Luis Rey River.

The Project would remove existing infrastructure and recontour portions of the property to be planted with native riparian and upland species. Approximately 10 acres of the Project site contains existing riparian habitat along Moosa Creek, with the remainder featuring ornamental and developed areas consistent with the previous use as a golf course. Planned restoration activities would consist of regrading the area adjacent to but outside the creek and removing approximately 4.5 acres of existing infrastructure (tennis courts, parking lots, golf course features, etc.) to establish and/or enhance approximately 39 acres of riparian habitat and approximately 28 acres of native riparian-upland transitional buffers and other site improvements.

Proposed earthwork would be conducted to extend the top of the Moosa Creek bank to create a high flow terrace/floodplain. Restoration strategies planned for the site include riparian re-establishment (consisting of a mulefat-willow dominated riparian habitat that may also include wetlands depending on conditions), floodplain re-establishment (floodplain transitional species that include riparian and upland species), coast live oak savannah re-establishment (coast live oak savannah with associated species), and riparian enhancement (control of non-native species and light seeding or planting). The Project would re-establish and rehabilitate endangered species riparian habitat. The restoration effort is being designed under the guidance of the United

States Fish and Wildlife Service (USFWS) to offset corresponding endangered species riparian habitat impacts at the Marine Corps Air Station (MCAS) at Camp Pendleton.

Project implementation is anticipated to commence in the winter of 2021 but may need to be adjusted to account for weather or to avoid sensitive bird breeding and nesting seasons. While one construction stage is anticipated, the overall work may be broken into two distinct phases: demolition/earthwork and planting. After construction, the restoration areas would be monitored for up to five years in accordance with the proposed restoration plan, and, as necessary, invasive species removal and other vegetation management activities would be performed during the monitoring period.

CEQA Significance Determination

The following noise analysis has been prepared for the Moosa Creek Riparian Restoration Project (hereafter "Project") to assess construction noise impacts generated by the Project.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
XIII. NOISE. Would the project result in:				
a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b) Generation of excessive groundborne vibration or groundborne noise levels?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
c) For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

Less Than Significant. The primary source of noise generated by the Project at noise-sensitive land uses will be related to temporary construction, as no permanent operational noise sources would be present. The nearest residences to the north, south, and west are located approximately 40 feet, 60 feet, and 70 feet from the boundary of the work area, respectively. In addition, the Project site contains potential habitat for biologically sensitive species, including the Least Bell's Vireo. An analysis of construction noise has been performed to determine noise levels at both residential and biologically sensitive receiver locations.

Applicable Noise Standards

The County of San Diego Noise Ordinance, Section 36.408, restricts construction activity to the hours of 7 a.m. to 7 p.m. on Mondays through Saturdays. Construction is prohibited on Sundays and holidays. In addition, Section 36.409 states that construction noise levels may not exceed an eight-hour average sound level of 75 dBA when measured at the boundary line of the property where the noise source is located or on occupied property where the noise is being received. Section 36.410 contains additional noise limits that apply to impulsive construction noise, such as rock crushing, pile driving, or other such activity; however, as no impulsive construction is anticipated at the Project, the analysis of noise at residential receivers has been evaluated per the standards of Section 36.409.

Additionally, as biologically sensitive habitat is located within the work area, noise from construction activity that would take place during the breeding season for riparian avian species (March 15 to September 15) should be limited. As the County of San Diego Noise Ordinance does not have an established noise limit for biologically sensitive habitats, noise limits at the sensitive habitats have been taken from the San Diego County Water Authority Subregional Natural Community Conservation Plan/Habitat Conservation Plan (NCCP/HCP). Section 6.4.2.1 of the NCCP requires that noise be limited to less than 60 dBA L_{EQ} (1-hour) or the ambient noise level plus 3 decibels, whichever is greater, at active nest locations. As ambient noise levels at the Project are less than 60 dBA, the applicable noise limit at nest locations during breeding season would be 60 dBA.

Analysis

The anticipated construction schedule, proposed activities, and equipment are shown in Table 1. Areas of construction specified herein are indicated in Figure 1.

Table 1. Anticipated Construction Schedule			
Phase	Anticipated Large Equipment	Areas	Duration
Mobilization	Semi-trailer trucks, forklifts	All	2 days
Demolition, Debris Removal and Disposal	2 excavator, 2 loader, 4 dump trucks	Infrastructure Removal	10 days
Clearing and Grubbing	2 dozer, 2 loader, 2 dump trucks, 2 scrapers	Proposed Cut, Proposed Fill	5 days
Site Grading	1 excavator, 2 dozer, 4 scrapers	Proposed Cut, Proposed Fill	20 days
Planting	1 tractor, 4 pickup trucks, 1 skid steer	Proposed Cut, Proposed Fill, Infrastructure Removal	60 days
Hydroseeding	1 hydroseed truck	Proposed Cut, Proposed Fill, Infrastructure Removal	8 days
Demobilization	Semi-trailer trucks, forklifts	All	2 days

Please refer to Table 2 for typical noise levels of construction equipment expected to be used on site, as described above. Unless otherwise noted, all noise levels have been provided by the UK Department for Environment, Food and Rural Affairs (DEFRA), and duty cycle information was taken from the Federal Highway Administration (see references). Although FHWA offers noise levels of construction equipment, professional experience and observations of construction activity

by Eilar Associates, Inc. suggest that the noise levels given by DEFRA are more representative of equipment noise levels that would be generated at smaller scale construction sites such as the proposed project.

Table 2. Typical Construction Equipment Noise Levels		
Noise Source	Duty Cycle (%)	Calculated Noise Level (L _{MAX}) at 50 feet (dBA)
Excavator ¹	40	75
Loader ¹	40	72
Dump Truck	40	76
Dozer ¹	40	74
Scraper ¹	40	72
Tractor	40	76
Pickup Truck	40	76
Skid Steer Loader	40	65
Hydroseed Truck ²	100	76

¹Source: Noise measurements made by Eilar Associates on 3/25/2010 for Brutoco Engineering & Construction, Inc. for the Orange Line Extension Project, Metro Contract #C0943, City of Los Angeles.

²Lesser duty cycle scenario not evaluated as 100% duty cycle shown to demonstrate compliance.

Noise levels were calculated at the residential receivers detailed above. Any other residential receivers are located at a greater distance from the Project site and therefore would be exposed to lesser noise impacts. Noise impacts have not been calculated for the mobilization or demobilization as impacts are expected to be lesser than those anticipated for other phases on site. Construction noise sources were incorporated as area sources adjacent to residential receivers to evaluate typical impacts to this receiver as equipment moves around portions of the site. Noise calculations consider typical duty cycles of equipment to account for periods of activity and inactivity. Noise levels are shown in Table 3. Noise source and receiver locations are shown in Figure 1. Figure 2 shows the current nest locations based on the least Bell's Vireo 2020 breeding season survey conducted by Blackhawk Environmental.

Table 3. Worst-Case Temporary Construction Noise Levels at Nearest Sensitive Receiver			
Phase	8-Hour Average Noise Level (dBA)		
	R1 (North Residential)	R2 (South Residential)	R3 (West Residential)
Demolition, Debris Removal and Disposal	52	67	65
Clearing and Grubbing	70	66	63
Site Grading	68	64	62
Planting	64	59	57
Hydroseeding	56	63	60

Mitigation

MM NOI-1 If work will take place during the breeding season of the least Bell's Vireo (March 15 through September 15), the minimum distances listed herein for each phase should be maintained from the center of the work area to active nest locations:

- At least 275 feet from active nests during Demolition, Debris Removal, and Disposal
- At least 265 feet from active nests during Clearing and Grubbing
- At least 235 feet from active nests during Site Grading
- At least 145 feet from active nests during Planting
- At least 220 feet from active nests during Hydroseeding

In the event that these setbacks cannot be maintained during the breeding season, a supplemental focused analysis shall be performed for the applicable phase(s) of construction to determine appropriate barrier heights, duty cycle restrictions, monitoring requirements, or other measures required for maintaining average noise levels of 60 dBA L_{EQ} (1-Hour) or less at habitat locations.

Best Management Practices

BMP NOI-1 To reduce potential construction noise disturbance at residential receiver locations, the Contractor shall commit to incorporating the following measures:

- Limit noise-producing construction activities to the hours of 7 a.m. to 7 p.m., Mondays through Saturdays, with construction prohibited on Sundays and holidays, as per Section 36.408 of the County of San Diego Noise Ordinance.
- Maintain equipment in proper working order, equipped with effective mufflers that are in good condition and appropriate for the equipment.
- Avoid unnecessary idling by turning off equipment while not in use.
- Minimize the use of backup alarms, as feasible.
- Place stationary equipment and/or staging areas for mobile equipment as far as practicable from noise-sensitive receivers.
- Establish a "Noise Disturbance Coordinator" for the Project who would be responsible for responding to any complaints about construction noise and establishing reasonable actions to correct the problem.

b) Generation of excessive groundborne vibration or groundborne noise levels?

Less Than Significant Impact. The grading stage of construction has the potential to generate the highest vibration levels of the phases, as it would take place closest to residential receivers and would include the use of bulldozers. According to the Federal Transit Administration Transit Noise and Vibration Assessment Manual (see reference), a small bulldozer generates a peak particle velocity (PPV) of approximately 0.003 inches/second at a distance of 25 feet from equipment. The evaluation of an impact's significance can be determined by reviewing both the likelihood of annoyance to individuals as well as the potential for damage to existing structures. According to the Caltrans Transportation and Construction Vibration Guidance Manual (see reference), the appropriate threshold for damage to modern residential structures is a PPV of 0.5 inches/second. Annoyance is assessed based on levels of perception, with a PPV of 0.01 being considered "barely perceptible," 0.04 inches/second as "distinctly perceptible," 0.1 inches/second as "strongly perceptible," and 0.4 inches/second as "severe." The vibration level generated by a small bulldozer at 25 feet is less than both the threshold for damage to structures and the "barely perceptible" threshold for annoyance. As the nearest residential structure is approximately 60 feet from the boundary of the work area, to the south of the site, vibration will be further reduced in this location. For this reason, temporary construction vibration impacts would not be "excessive" and therefore are less than significant.

c) For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?

No Impact. The Project is located approximately 4.75 miles southeast of the Fallbrook Community Airpark, and approximately 7.15 miles northwest of Blackinton Airport, and all work areas are located outside of the Airport Land Use Compatibility Plans for both airports. Therefore, no impacts would occur.

Certification

All calculations detailed herein are based on the best information available at the time our consulting services are provided. However, as there are many factors involved in sound transmission, and Eilar Associates has no control over site activity, Eilar Associates is specifically not liable for final results of any recommendations or implementation of recommendations.

This report was prepared by Rachael Cowell and Amy Hool. Please feel free to contact us with any questions.



Rachael Cowell, Acoustical Consultant



Amy Hool, President/CEO

Figure

1. Preliminary Grading Map Showing Project Areas and Receiver Locations
2. Blackhawk Environmental Least Bell's Vireo Survey Results

References

- Blackhawk Environmental. July 20, 2020. *2020 Least Bell's Vireo & Southwestern Willow Flycatcher Survey Results, Moosa Creek Riparian Restoration Project, Bonsall, San Diego County, California.*
- County of San Diego Code of Regulatory Ordinances, Title 3, Division 6, Chapter 4, Noise Abatement and Control, effective February 4, 1982. Available at <https://www.sandiegocounty.gov/dplu/docs/NO.pdf>. Accessed June 18, 2020.
- San Diego County Water Authority. October 2010. *Subregional Natural Community Conservation Plan/Habitat Conservation Plan*. Available at <http://www.sdcwa.org/natural-community-conservation-plan-habitat-conservation-plan>. Accessed June 18, 2020.
- Department for Environment Food and Rural Affairs (DEFRA). 2005. *Update of Noise Database for Prediction of Noise on Construction and Open Sites*.
- Federal Highway Administration (FHWA). August 2006. *Construction Noise Handbook*.
- San Diego County Regional Airport Authority (SDCRAA). 2011. *Fallbrook Community Airpark Land Use Compatibility Plan*. Available at https://www.san.org/DesktopModules/Bring2mind/DMX/API/Entries/Download?Command=Core_Download&EntryId=2945&language=en-US&PortalId=0&TabId=225. Accessed June 18, 2020.
- Federal Transit Administration (FTA). September 2018. *Transit Noise and Vibration Impact Assessment*.
- California Department of Transportation (Caltrans). September 2013. *Transportation and Construction Vibration Guidance Manual*.

Figure 1

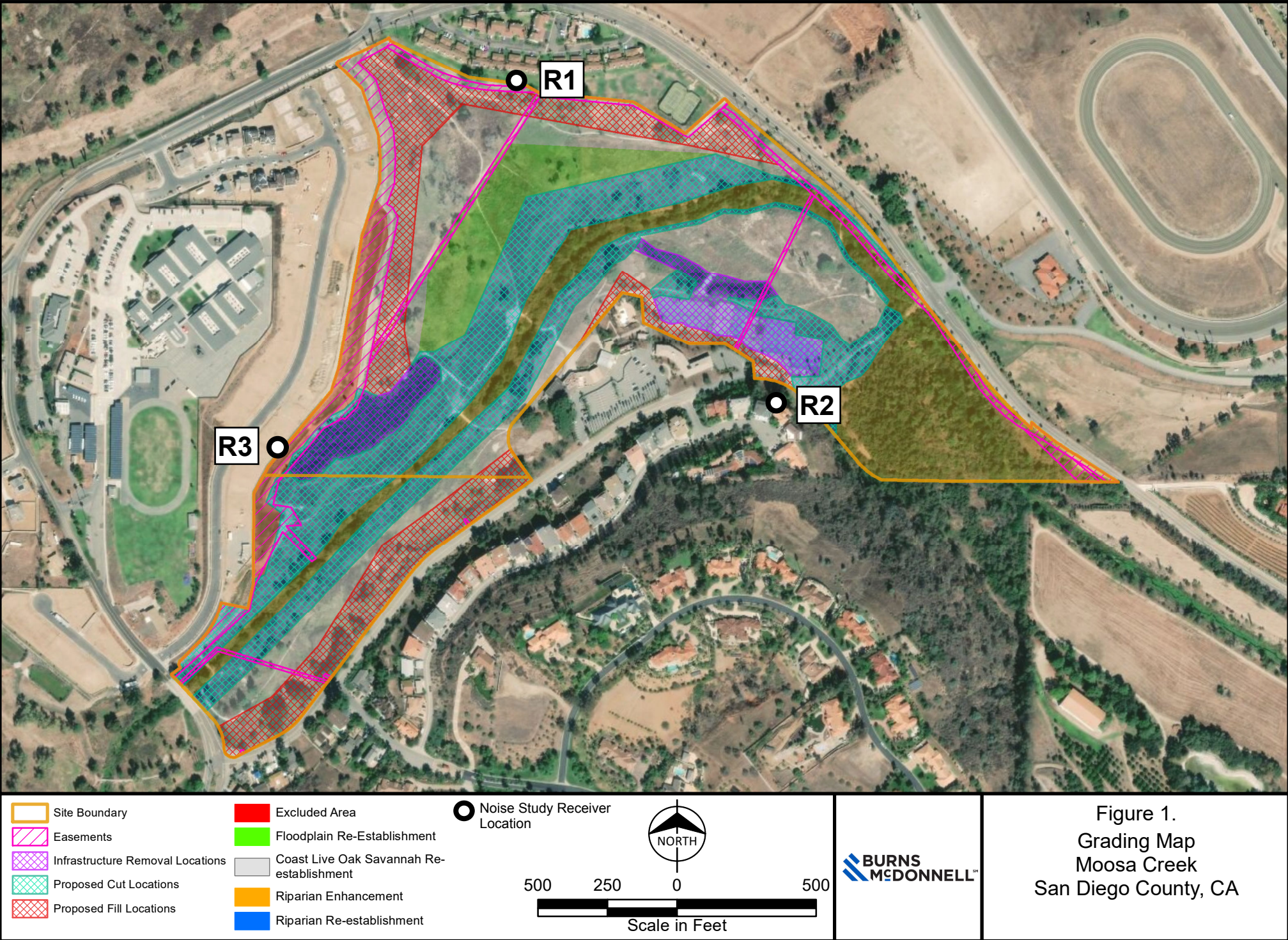
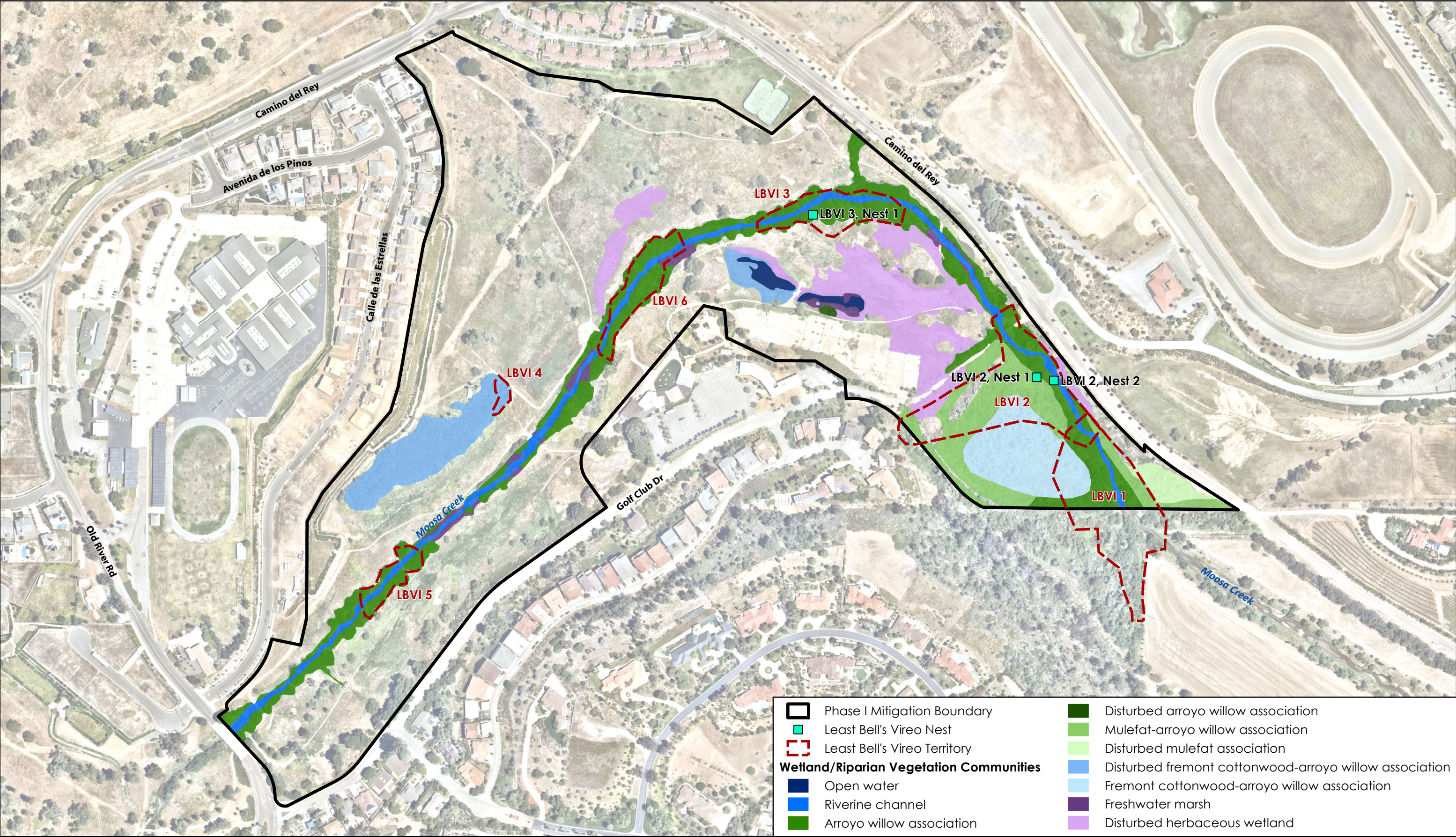


Figure 2



Source: Nearemap 2020

Figure 2