

June 7, 2017

**TECHNICAL MEMORANDUM**

To: Steve Clough  
Nevada Environmental Response Trust

From: John Pekala and Jessica Donovan, Ramboll Environ

Re: **RI Phase 2 Modification No. 3  
Nevada Environmental Response Trust Site  
Henderson, Nevada  
Ramboll Environ Project No. 21-41400C, M08**

This Technical Memorandum presents Ramboll Environ’s recommended Modification No. 3 to the scope of work for the Remedial Investigation (RI) Phase 2 Investigation currently in progress at the Nevada Environmental Response Trust Site (the “Site”) located in Henderson, Nevada. This recommended modification proposes additional surface water sampling for perchlorate at locations within Las Vegas Wash (the “Wash”) to improve our understanding of perchlorate mass loading.

Flow within the Wash has been historically monitored using four stream gages previously installed by the United States Geological Survey (USGS). Recently, the USGS has installed three additional stream gages in the Wash within and downstream of the RI study area that provide continuous measurements of streamflow. These gages were installed as part of the ongoing NERT RI, specifically the Downgradient Study Area investigation led by the Nevada Division of Environmental Protection (NDEP). The existing and newly installed stream gages are listed in Table 1 and the locations are shown on Figure 1.<sup>1</sup> In addition, as part of a groundwater seepage study, the USGS is making supplemental instantaneous streamflow measurements at five locations, some of which overlap with stream gage locations. These supplemental measurements began in December 2016 and will be conducted every six months for two years. The locations of the supplemental measurements may change with each sampling event depending on the results of previous events. The locations measured during the first event in December 2016 are shown on Figure 1.

The scope of the USGS work includes measuring streamflow at the stream gages and supplemental measurement locations to identify gaining/losing portions of the Wash. This information will be critical in identifying areas where perchlorate is discharging to the Wash. The streamflow measurements need to be combined with chemical concentration measurements to calculate chemical mass loading. Perchlorate mass loading has been calculated by NERT at three locations co-located with USGS gaging stations (LVW0.55,

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<sup>1</sup> Figure 1 also shows the location of a USGS gage in Duck Creek, a tributary to the Wash.

LVW6.05, and LVW8.85) in the Wash as a performance metric as discussed in previous remedial performance reports:

- Northshore Road - NERT has been collecting quarterly perchlorate samples near the Northshore Road gage (LVW0.55) for many years, and monthly samples from that location since June 2015.
- Pabco Road - NERT began collecting monthly perchlorate samples near the Pabco Road gage (LVW6.05) in November 2016.
- Las Vegas Wasteway - NERT relies on sampling performed by the Southern Nevada Water Authority (SNWA) at the Las Vegas Wasteway station (LVW8.85) in order to evaluate this metric.

As shown in Table 1, SNWA collects monthly perchlorate samples from locations near most of the stream gages. However, SNWA collects the samples for their own purposes and does not follow the sampling and analysis plans or quality assurance plans developed for the NERT RI. As such, NERT is proposing to implement a separate monitoring program to ensure data quality meets the Data Quality Objectives of the RI.

To support the RI, it is proposed to expand the monthly perchlorate sampling by NERT to include collection of surface water samples along transverse transects at three of the USGS stream gage locations. As such, NERT will collect samples from a total of six USGS gage locations, as shown in Table 1.<sup>2</sup> This will allow monthly perchlorate mass loading to be calculated at additional locations along the Wash. Current sampling by SNWA and NERT includes collection of a single grab sample of surface water at each location. However, preliminary results from perchlorate sampling along transverse transects across the Wash reported by AECOM as part of the Downgradient Investigation have shown that concentrations are not uniform along transects at locations downstream of the Pabco Road gage. Thus, we propose collecting multiple samples along transverse transects near gages downstream of Pabco Road in order to provide more representative data for mass loading calculations. It is proposed to continue collecting a single sample at Northshore Road, as has been performed for many years, since the Wash is expected to be well-mixed at this location after passing through a pipeline under Lake Las Vegas. Table 1 and Figure 1 show the proposed sampling locations. The proposed number of samples in each transect is listed in Table 1 and was determined based on the width of the Wash at each location. The surface water samples will be collected using discrete depth sampling equipment from approximately the midpoint of the water column from locations with a minimum water depth of 1 ft. No sampling is proposed for the Duck Creek Confluence gage because only background levels of perchlorate have been found at this location during prior sampling, and background perchlorate levels are already being measured near the Las Vegas Wasteway gage (LVW8.85).

In addition to the monthly surface water sampling, we propose sampling at the USGS supplemental streamflow measurement locations at approximately the same time as the streamflow measurements are made. The specific locations and number of surface water samples collected at each location will be determined in consultation with the USGS since

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<sup>2</sup> Sampling location LVW8.85 is currently inaccessible due to property access issues. Sampling at this location will begin once property access is granted.

the locations of the supplemental streamflow measurements by the USGS are anticipated to vary from one measurement event to the next.

Please contact us should you have any questions about the recommended surface water sampling.

**Attachments**

Table 1 Surface Water Sampling at Stream Gages in Las Vegas Wash

Figure 1 Las Vegas Wash Proposed Surface Water Sampling Locations

**Table 1. Surface Water Sampling at Stream Gages in Las Vegas Wash**

RI Phase 2 Modification No. 3

Nevada Environmental Response Trust Site; Henderson, Nevada

USGS Stream Gages	Monthly Perchlorate Sampling Near Stream Gages		
	SNWA	Proposed NERT	Note
Las Vegas Wasteway	LW8.85	LVW8.85 <sup>1</sup>	single sample location
Duck Creek Confluence	LW7.2	--	--
Pabco Road	LW6.05	LVW6.05	single sample location
Bostick Weir	LW5.5	LVW5.3	3 sample transect
Homestead Weir	--	LVW4.2	4 sample transect
Three Kids Weir	LW3.4	LVW3.5	6 sample transect
Northshore Road	LW0.9	LVW0.55	single sample location

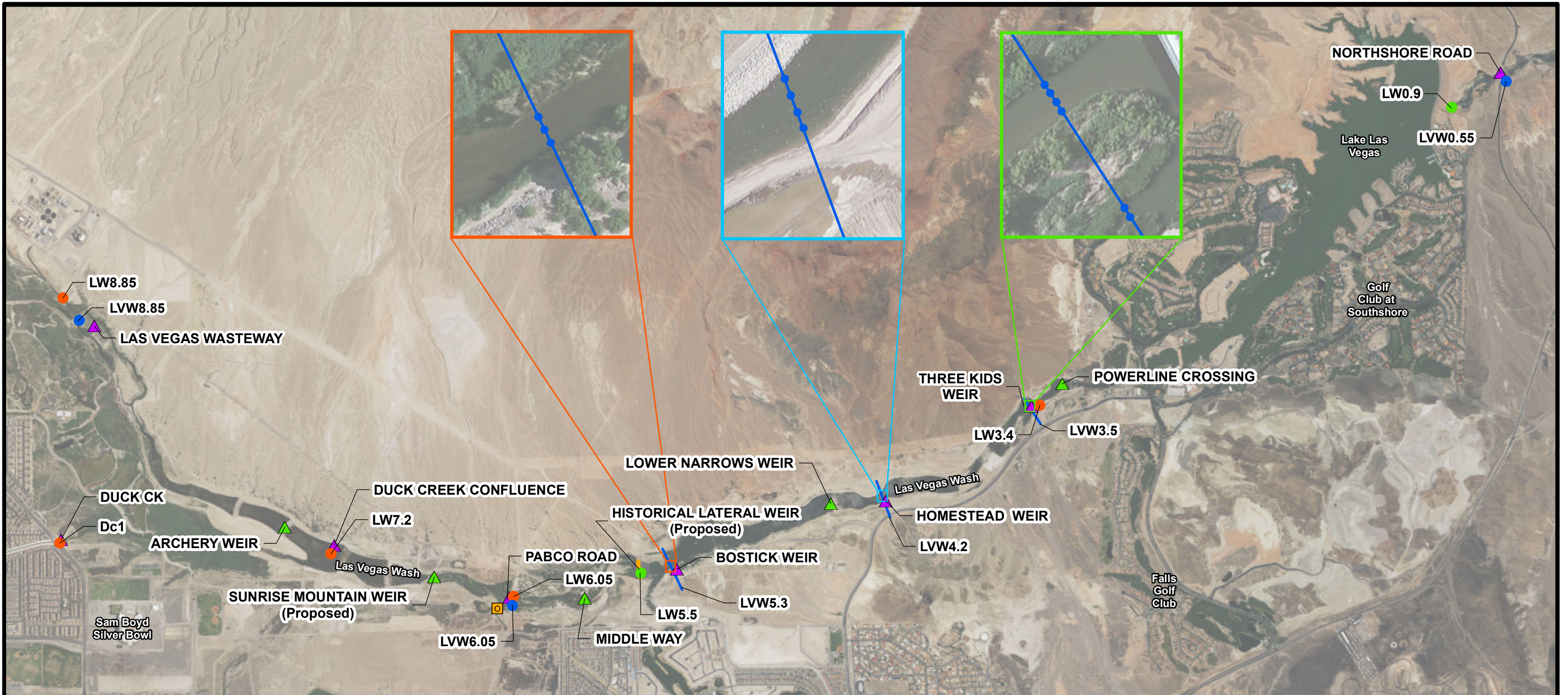
**Notes:**

SNWA = Southern Nevada Water Authority

NERT = Nevada Environmental Response Trust

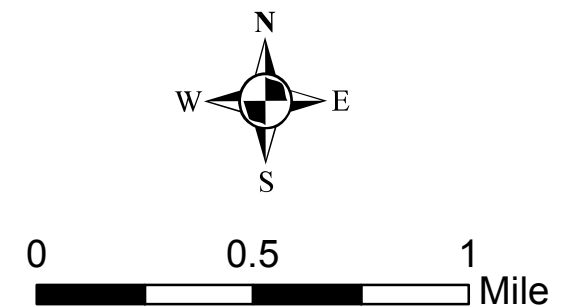
<sup>1</sup> Sampling location LVW8.85 is currently inaccessible due to property access issues. Sampling at this location will begin once property access is granted.

Additional surface water samples will be collected at approximately the same time as USGS streamflow measurements at supplemental locations, which are made on a semi-annual basis through 2018, in consultation with the USGS.



**Explanation**

- NERT Proposed Surface Water Sampling Location
- NERT Proposed Surface Water Sampling Transect (actual sampling locations subject to change based upon field inspection)
- SNWA Surface Water Sampling Location
- ▲ USGS Measured Discharge Location (December 2016)
- ▲ USGS Continuous Gaging Station
- NERT/AMPAC/TIMET/COH Outfall Location



**LAS VEGAS WASH PROPOSED SURFACE WATER SAMPLING LOCATIONS**

Nevada Environmental Response Trust Site  
Henderson, Nevada

Figure

**1**

PROJECT: 21-41400C