

May 16, 2012

## MEMORANDUM

To: Shannon Harbour, NDEP  
From: Jim Hutchens, ENVIRON International  
Subject: Proposed Erosion Control Measures – NERT Henderson

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McGinley and Associates performed a site inspection of the Nevada Environmental Response Trust site in Henderson, Nevada, on March 22, 2012. Observations of the site visit included the following:

- a) Debris from the AP building had migrated into the Central basin. This material appeared to be foam roof insulation which had dislodged during high winds.
- b) Areas of erosion were identified on slopes of the area formally known as RZC 1,2,3 between 4th and 5th Street north of Avenue F.
- c) West slope of GW-11 – Areas of the cover appeared to be "damp" in the same areas that the soil material appeared "damp" during construction.

Photographs taken during the inspection are attached to this memorandum.

This memorandum provides results of additional investigation of these issues and a plan of action to address each of the issues.

### Findings and Recommendations

- a) Debris within Central Basin – The material has been removed and disposed of by Tronox.
- b) Erosion Areas – ENVIRON staff were on site the week of April 16, 2012, and met with an excavation/grading contractor to determine the most feasible approach to repair these areas and design features to minimize future erosion from rainfall events. During construction activities in 2011, a large rainfall event created similar areas of erosion at various locations throughout the site. Those areas were re-graded and repaired and now appear to be performing as required. We are therefore recommending similar repairs to the areas identified in the photographs.

Figure 1 identifies the areas which will require repair and additional grading work. The damaged areas will be re-graded to previously designed grades. Directional berms will then be installed to move the water to a designated energy dissipating channel into the respective basin. The flow channel will consist of a geotextile fabric covered by approximately 8 inches of 3" to 6" angular stone. Photographs of the typical flow channels previously constructed on the site are attached.

In addition to the repairs, ENVIRON proposes to inspect all of the basins as part of the storm water plan monitoring on a quarterly basis.

- c) GW-11 Pond Berm – To better understand the issues associated with the discolored soils, ENVIRON contracted with Cesare, Inc. to perform moisture testing of the material. A copy of the Cesare report is attached to this memorandum. In summary, Cesare collected soil samples from seven locations, both within and outside of the discolored areas. Results of the moisture tests do not indicate a correlation between discoloration and soil moisture content. Based on these results, ENVIRON concludes that there is no evidence of a pond liner breach at GW-11 and the observed discoloration is likely due to underlying composition of the material.

We propose to inspect these areas on a quarterly basis to monitor the areas of discoloration. If the areal extent increases or additional areas of discoloration are noted, additional investigation will be proposed at that time.



**Photo 1:** Looking south-southwest rill in southern slope of Beta Ditch just east of 5th Street.



**Photo 2:** Looking west from 4th Street.

**Title:** Site Photographs – NERT Site  
**Site:** Henderson, Nevada

**Date:** March 2012  
**ENVIRON**



**Photo 3:** Large washout area looking northeast.



**Photo 4:** Looking southwest over rail crossing at large wash out.



**Photo 5:** Looking west at a wash out off of 5th Street.




**Photo 6:** Looking south at same area, approximately 34 inches deep.



Proposed Energy Dissipation Channels



Proposed Directional Berm

PROJECT: NERT Henderson, Nevada		SHEET TITLE: Erosion Control Plan		 <a href="http://www.vironcorp.com">www.vironcorp.com</a> 175 N. Corporate Dr, Suite 160, Brookfield, WI 53045 PHONE: (262) 901-0099 FAX: (262) 901-0079
PROJECT NO.: 21-29100F	DATE: 01/01/2011	FIGURE NO.: 1		



**Photo 1:** Typical Energy Dissipating Channel – Geotextile Fabric Covered with approximately 8” of Stone



**Photo 2:** Typical Energy Dissipating Channel

**Title:** Proposed Erosion Repairs  
**Site:** Nevada Environmental Response Trust – Henderson, Nevada

**Date:** May 2012  
**ENVIRON**

May 3, 2012

Mr. James L. Hutchens, PE  
ENVIRON International Corp.  
175 North Corporate Drive, Suite 160  
Brookfield, Wisconsin 53045

Subject: Data Summary for Soil Sampling and Moisture Content Test Results  
NERT/Tronox Site  
Henderson, Nevada  
Project No. 11.1049

Dear Mr. Hutchens:

This letter presents results of soil sampling and moisture content tests for materials encountered on the west side of the pond containment berm, on April 23, 2012, at the NERT/Tronox site in Henderson, Nevada. Some areas of the pond slope and toe of slope are discolored and appear to be wetter than surrounding areas. The scope of our work included obtaining soil samples from several areas of the slope and adjacent to the toe of slope for moisture content testing.

Test holes were excavated at 7 locations on the berm slope and on fairly level ground in 3 areas adjacent to the toe of the slope. The test hole locations are shown in Photo Plate 1 and the approximate measurements between test holes are shown in Photo Plate 2. Soil samples were obtained from the slope for moisture testing at depths of 12 and 24 inches and adjacent to the slope at a depth of 12 inches. The moisture content of each sample was tested in our laboratory and a summary of the materials sampled and moisture contents obtained are shown in Table 1.

Results of the moisture tests indicate the discolored soils on the surface, that appear wet, do not necessarily contain higher moisture contents as indicated by test holes 5, 6, 8 and 10. Conversely, the dry appearance of some surface soils may contain relatively high moisture contents as indicated in test holes 2 and 4. Photographs of test holes 1 through 8 and the appearance of the soils encountered are shown in Photo Plate 3.

The locations with the highest moisture contents were found to be at higher elevations on the slope. Test holes 1, 2 and 4 are 12 to 34 feet above the toe of slope and contained moisture contents ranging from 16.5% to 32.3%. Samples obtained at lower elevations on the slope and areas in front of the slope ranged between 4.1% and 6.9% moisture content. Further investigation would need to be performed to determine possible reasons for these moisture conditions.

The soil samples obtained from the test holes are available in our laboratory for additional examination or testing. Please let me know if you would like us to retain those samples or deliver them to you.



If you have any questions or comments in regards to this information, please feel free to contact me.

Sincerely,  
CESARE, INC.



John J. Durkin, PE  
Principal

Attachments: Table 1 – Soil Sample Summary  
Photo Plates 1, 2 and 3

**TABLE 1**  
**NERT/Tronox Soil Sample Summary**

Sampled: 4/23/2012

Project No. 11.1049

Test Hole No.	Sample Depth (in.)	Surface Appearance	Material Description	In place Consistency	Moisture Content (%)
TH 1	12	wet	clayey sand, black	med. dense	17.2
	24		clayey sand, black	med. dense	23.9
	36		clayey sand, black	med. dense	20.4
TH 2	12	dry	clayey sand, black	med. dense	16.5
	24		clayey sand, black	med. dense	28.8
TH 3	12	dry	sandy gravel, gray	very dense	5.3
	24		silty sand, brown	dense	6.4
TH 4	12	dry	clayey sand, gray	med. dense	20.3
	24		clayey sand, gray	med. dense	32.3
Th 5	12	wet	silty sand, brown	dense	5.4
	24		silty sand, brown	dense	6.3
TH 6	12	wet	silty sand, brown	very dense	6.4
	24		silty sand, brown	very dense	5.3
Th 7	12	dry	silty sand, brown	very dense	6.3
	24		silty sand, brown	very dense	6.5
TH 8	12	wet	silty sand, dark brown	very dense	4.1
TH 9	12	dry	silty sand, brown	very dense	6.9
TH 10	12	wet	silty sand, brown	very dense	5.5

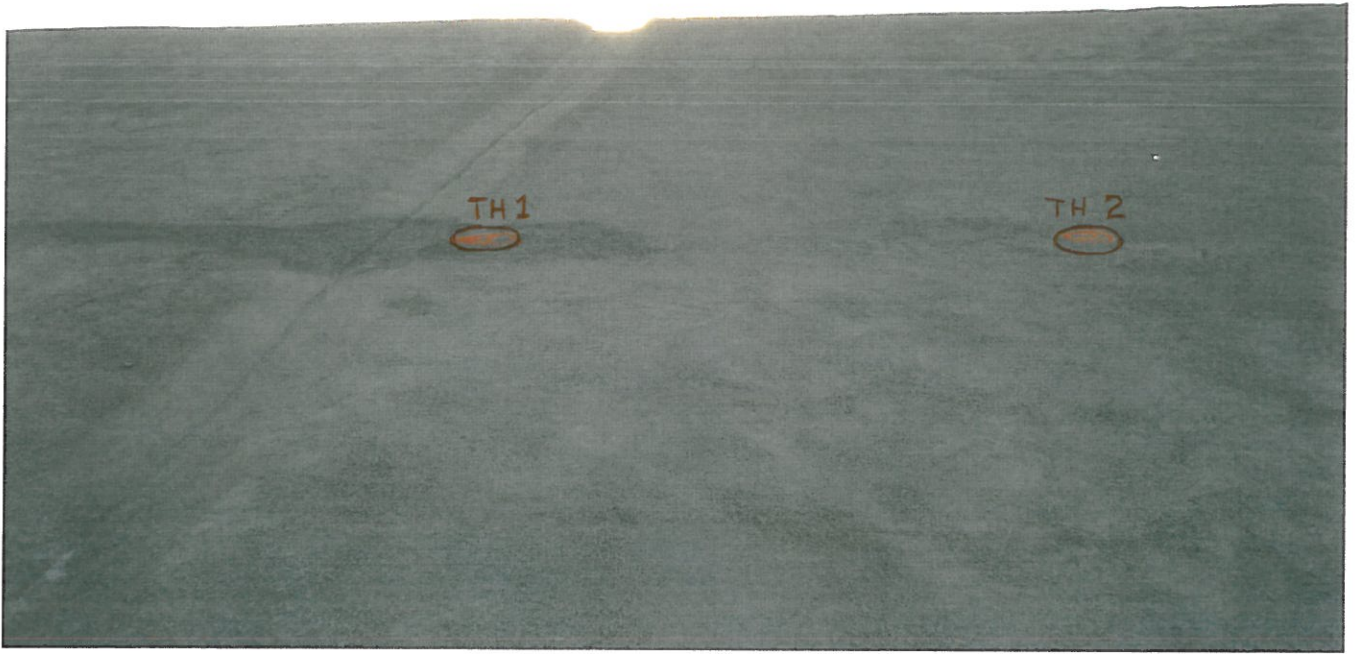


Photo 1: West pond slope discolored area and location of Test Holes 1 and 2 .

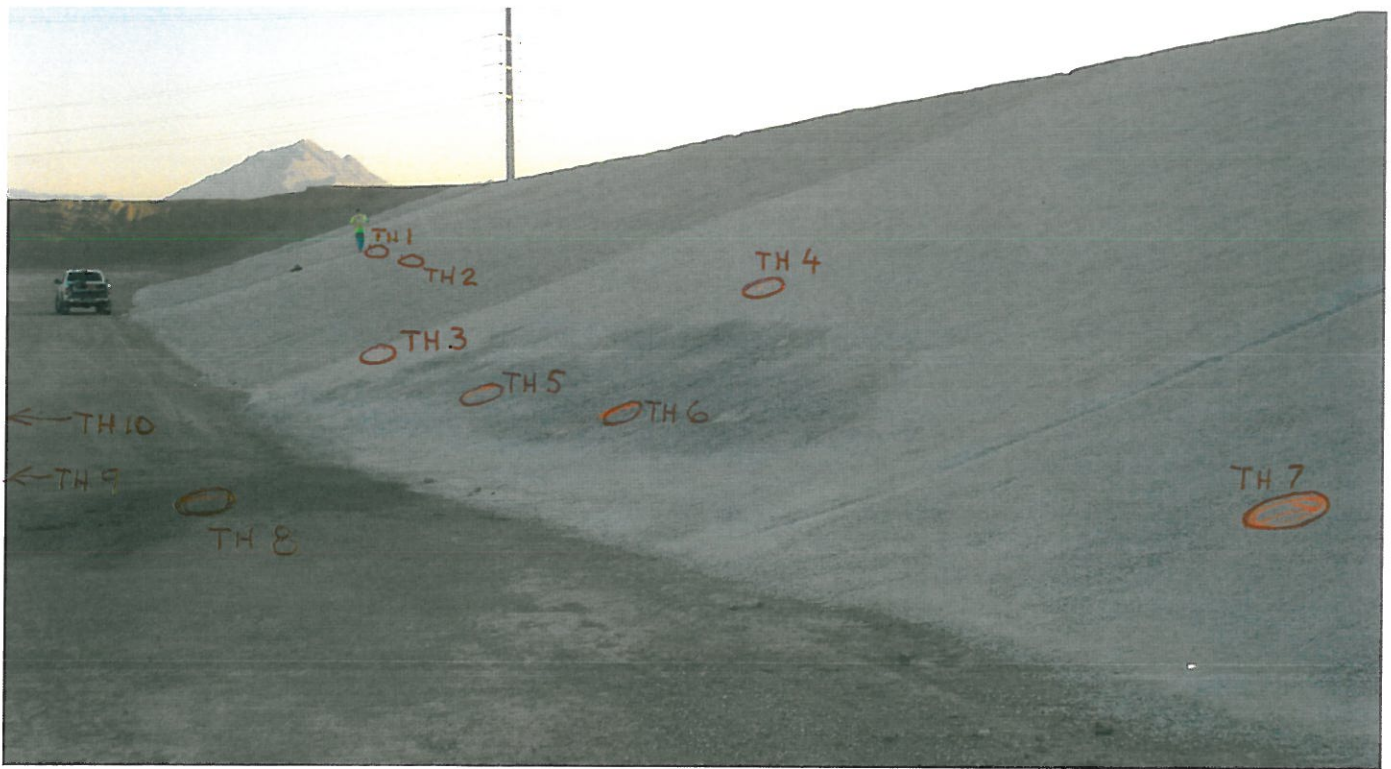


Photo 2: West pond slope discolored area and location of Test Holes 3, 4, 5, 6, 7 and 8.

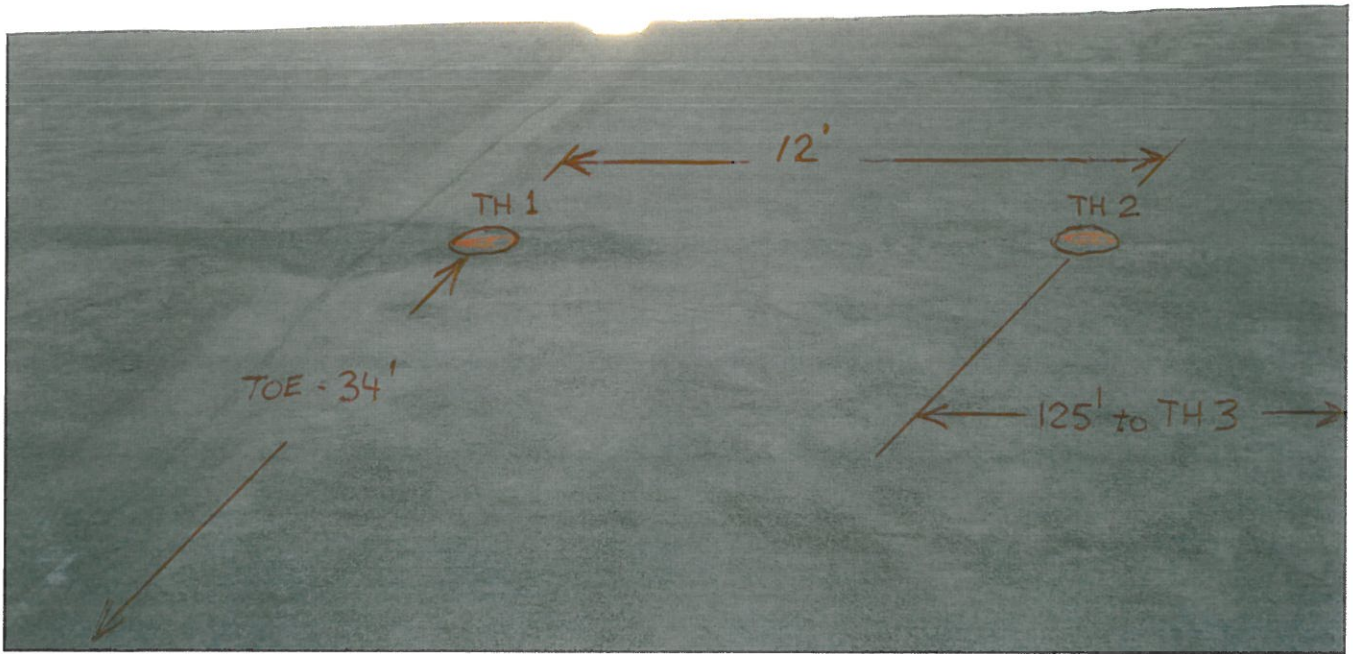


Photo 3: West pond slope, Test Holes 1 and 2, dimensions.

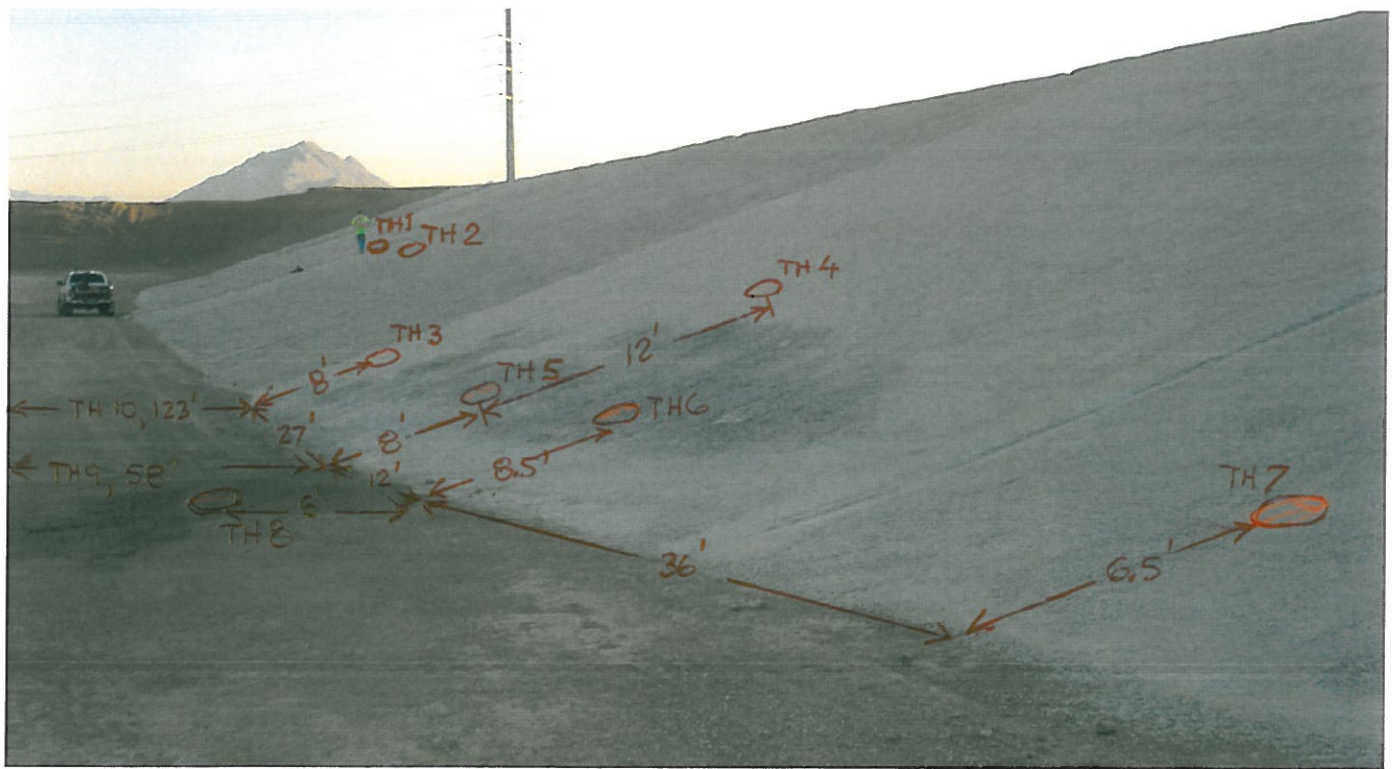


Photo 4: West pond slope, Test Holes 3, 4, 5, 6, 7, 8, 9 and 10, dimensions.

NERT/Tronox Soil Sample Test Holes – April 23, 2012

