

April 19, 2011

**TECHNICAL MEMORANDUM**

To: Nevada Department of Environmental Protection

From: Jim Hutchens, ENVIRON International Corporation

Subject: Proposed Conceptual Interim Drainage Plan  
Nevada Environmental Response Trust Site

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On behalf of the Nevada Environmental Response Trust (NERT), ENVIRON International Corporation (ENVIRON) has developed a proposed conceptual interim drainage plan for portions of the NERT Site in Henderson, Nevada (Site). The plan presented herein is designed to address storm water management during the interim period after the current excavation program is complete, but before final decisions are made regarding ultimate land use and grading of the Site.

In the remainder of this technical memorandum, ENVIRON presents a brief description of the Site, describes the current lease of portions of the Site by Tronox, and presents a conceptual drainage plan to cover certain portions of the Site that are currently the subject of a remediation (excavation) program being conducted under the purview of the Nevada Department of Environmental Protection (NDEP). Upon NDEP's concurrence of the concepts presented herein, ENVIRON will proceed with detailed design engineering and analysis required for permitting of the grading plan.

**Site Description**

The Site is generally rectangular in shape with the long side in the north-south direction. Elevations across the Site range from approximately 1,677 to 1,873 feet above mean sea level. The land surface generally slopes toward the north at a gradient of approximately 0.023 feet per foot (ft/ft). The developed portions of the Site have been modified by grading to accommodate plant facility buildings, surface impoundments, access roads, a landfill, and other site features.

Tronox currently leases and operates on a portion of the Site which includes the general area comprising Unit Buildings 1 to 6, Leach Plant, WC Ponds (to the north of the Leach Plant), and other areas as shown on Figure 1. Unit Building 3 is currently used by Tronox for offices and storage. Unit Buildings 5 and 6 are currently used by Tronox for production of manganese dioxide, with Unit Building 5 also used for storage. Unit Buildings 1, 2, and 4 are not currently used and have been partially demolished. Other buildings exist on the Site including an administrative office building, a wash room building, Tronox production facilities, a laboratory building, former perchlorate production facilities, and other buildings.

The Site is crossed by asphalt and concrete roads, dirt roads, and railroad spurs. One of the rail spurs is still in service. A network of active and inactive underground utilities is present under the roads and open areas at the Site. A drainage ditch (Beta Ditch) crosses the Site from west to east. During the main production era, the Beta Ditch was a primary surface drainage pathway for liquid wastes that flowed to the pond areas to the east. Since the majority of the southern portion of the Site is tied into the storm sewer network, the drainage plan consists of the areas south of Avenue F.

Soil remediation at the Site is being performed in accordance with the Removal Action Work Plan for Phase B Soil Remediation of Remediation Zones RZ-B through RZ-E, submitted to the NDEP in March 2010. The remediation consists of removal and off-site disposal of contaminated soils, backfill portions of the excavations with imported material, and construction of interim basins to contain storm water.

### **Conceptual Interim Drainage Plan**

The existing on-site storm water management system was constructed in 1941 with modifications to the system as facility operations changed or were added. The existing storm water drain network is shown on Figure 2, which was supplied by Tronox. As shown on Figure 2, the on-site storm drains flow to two outfalls. One of the outfalls (Outfall 1) discharges directly to the Beta Ditch and the second outfall (Outfall 2) discharges to a drainage swale east of the property boundary and eventually into the Beta Ditch on the Timet property. It is ENVIRON's understanding that Tronox is currently in the process of obtaining a NPDES general industrial permit to cover its discharges of storm water from the leased property.

The conceptual interim drainage plan was developed with the following primary objectives:

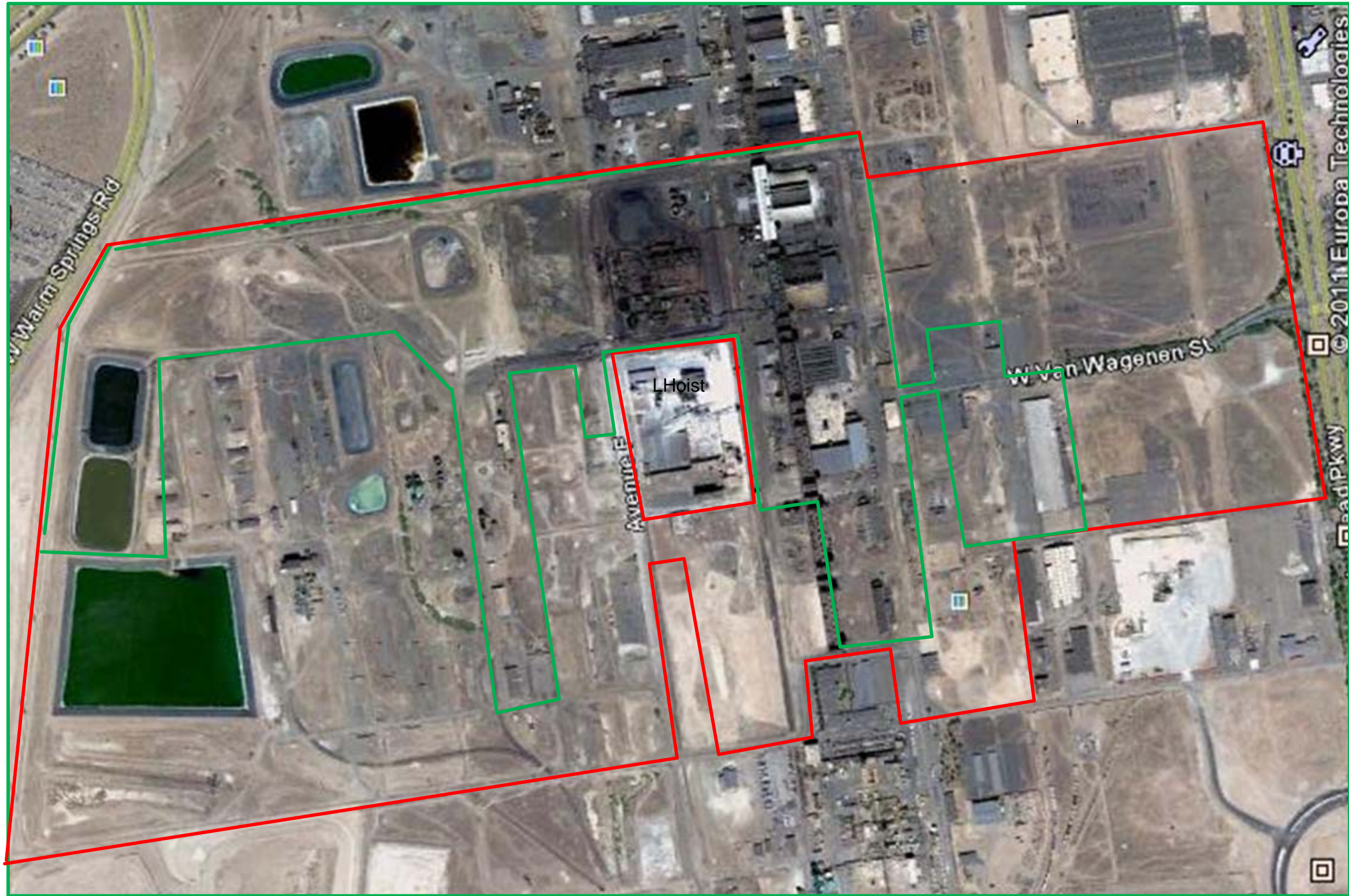
- 1) to minimize the discharge of storm water off site;
- 2) to utilize (to the extent feasible) the existing and projected post-excavation site topography to minimize the extent of backfilling requirements; and
- 3) to manage storm water at the Site consistent with state and federal requirements.

Figure 3 depicts the current topography of the Site based on the excavations which have been performed to date. Two designated retention areas are planned as shown on the figure. Figure 3 also shows the estimated drainage areas for the various areas as well as the approximate location of existing monitoring wells on the Site. Figure 4 is an aerial photograph with the assumed surface flows based on proposed topography after backfilling of areas for safety considerations.

Due to existing roads, utility berms, or other site features, many of the areas identified have grades inward which will keep storm water from flowing out of the area. Based on the surface areas and soil types, it is ENVIRON's opinion that ponding will not occur in these areas outside of major storm events. The designated retention and associated drainage areas being considered include the following:

- Retention Area C/Beta Ditch – Surface runoff from the area identified as C5, as well as the storm drainage from the majority of the storm sewer network from the Tronox property. Storm water also enters the Site from the west through surface flow and from the Beta Ditch west of 4<sup>th</sup> Street. This will also collect on site in the Beta Ditch and Retention Area C.
- Retention Area D – Surface runoff from north of the Beta Ditch (Areas D2, D3).

Currently the Beta Ditch is blocked by an earthen dam near the eastern end, which allows water to collect within the ditch. As shown on the figure, Retention Area C and the Beta Ditch are split with a utility berm towards the west end of the retention area. The existing culverts in this area contain asbestos and will be removed during excavation activities. A new culvert will be installed to allow flow between the two areas.



- Approximate NERT Property Boundary
- Approximate Tronox Leased Area

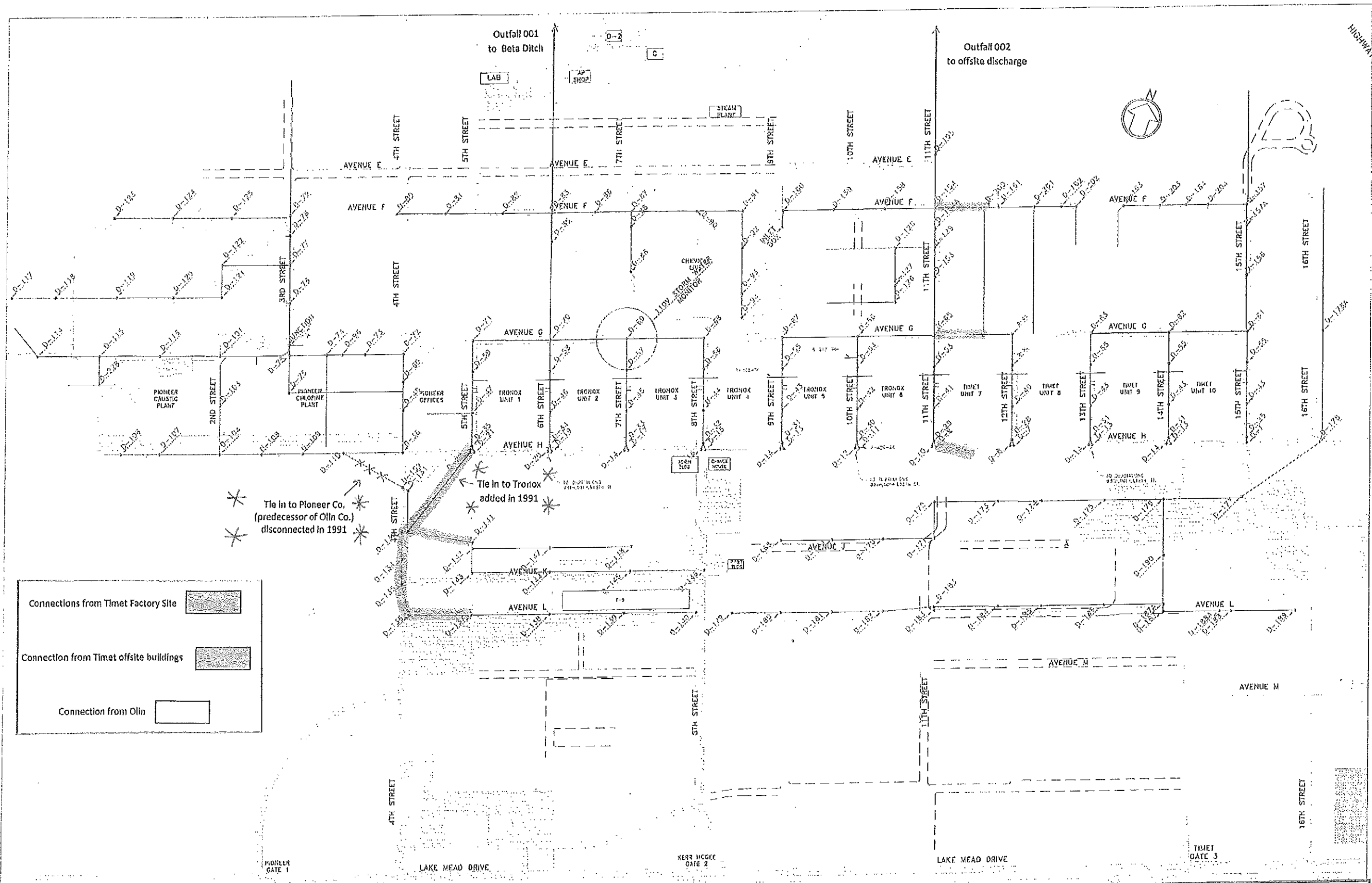
PROJECT: Nevada Environmental Response Trust

SHEET TITLE: Approximate Property Boundaries

DATE: 4/14/11      FIGURE No.:  
PROJECT NO.: 21-26719E      1

**ENVIRON**  
www.environcorp.com

175 N. Corporate Drive, Suite 160  
Brookfield, WI 53045  
PHONE: (262) 901-0099  
FAX: (262) 901-0079



NO.	DATE	REVISION	BY	CHECKED
01	05/18/01	DRAWN SPECIAL		BASIC WATER COMPANY
02	01/02/03	CORRECTIONS/ADJUSTS	CHRIS	
03	01/17/04	CONVERT TO DIGITAL FILE	KEVIN WILSON	CHECKED
APPROVED BASIC WATER COMPANY [Signature]				

**SCALE:**  
1" = 225' - 0"

**BASIC WATER COMPANY**  
375 West Ocean Springs Road  
Buckhorn, Nevada 89103  
(702) 567-6654 Fax (702) 567-0457

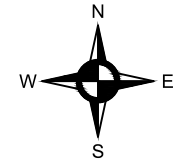


**BASIC MAGNESIUM, INC.**  
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**Figure 1. Stormwater Sewer System.**

Page 3.

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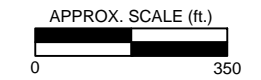


**LEGEND**

- SHALLOW ZONE WELL (Qal)
- ▲ NON-TRONOX PHASE B, SHALLOW WELL (Qal)
- SHALLOW ZONE WELL (Qal/UMCf)
- ▲ NON-TRONOX PHASE B, SHALLOW WELL (Qal/UMCf)
- SHALLOW ZONE WELL (Qal/UMCf)
- MIDDLE ZONE (UMCf)
- DEEP ZONE (UMCf)
- OUTFALL
- ▨ PROPOSED RETENTION AREA
- ▨ BETA DITCH

**PROPOSED DRAINAGE AREAS**

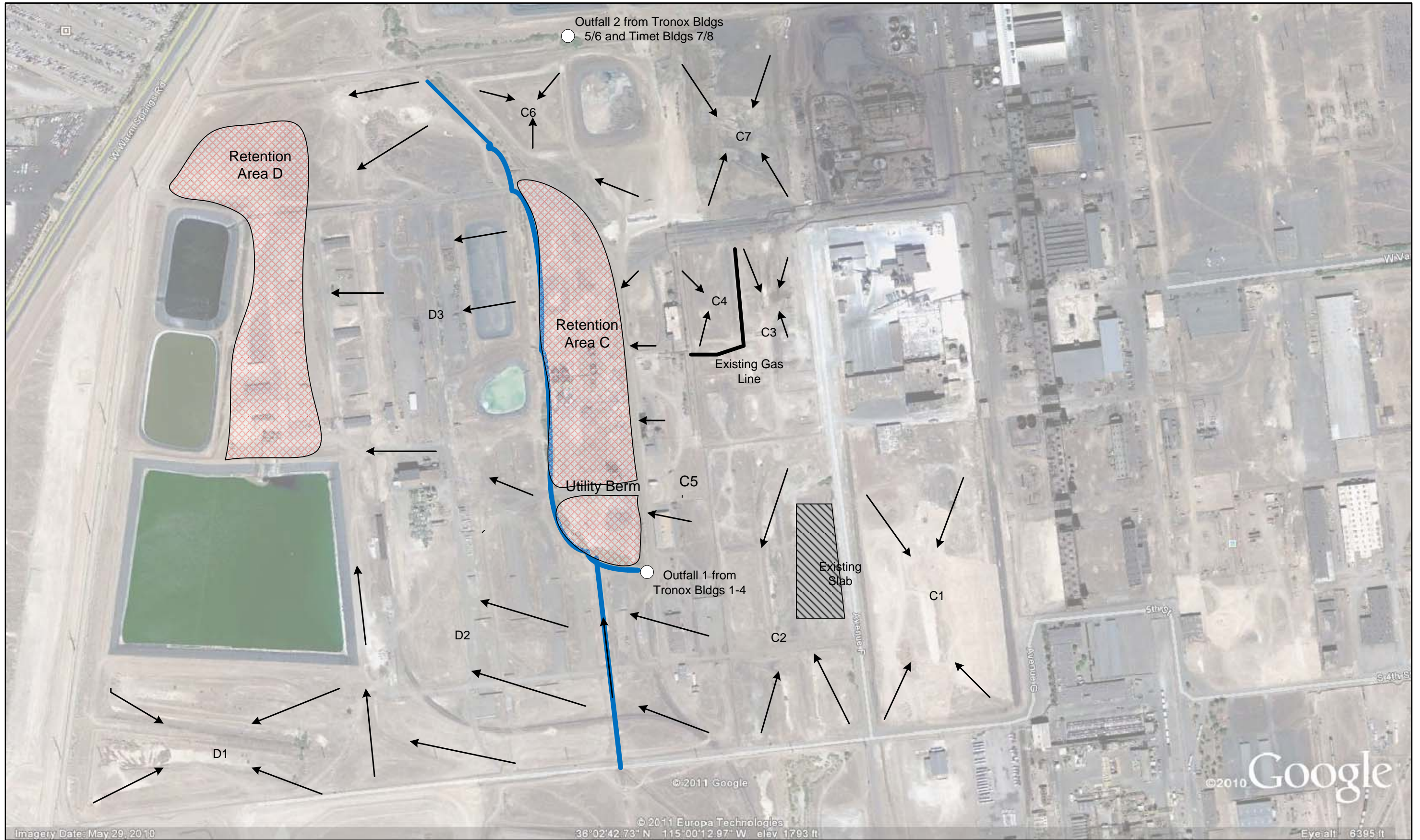
DRAINAGE AREA	AREA (APPROX. ACRES)	DRAINS TO
C1	12.2	C1
C2	12	C2
C3	3.5	C3
C4	3.3	C4
C5	27	Retention Area C
C6	8	C6
C7	8	C7
D1	10	D1
D2	26	Retention Area D
D3	24	Retention Area D
SS1	--	Retention Area C
SS2	--	East of Fence, Drains to North



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**PROPOSED CONCEPTUAL INTERIM DRAINAGE PLAN**  
HENDERSON, NEVADA

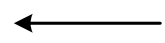
DATE: 4/19/11	CONTRACT NUMBER: 21-26719E	FIGURE: 3
DRAFTER: ELS	APPROVED:	REVISED:



Proposed Retention Area



Existing Beta Ditch/  
Drainage Swale



Estimated Surface  
Flow Direction



N

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Figure 4