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WASTE DELINEATION AND CHARACTERIZATION

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MAKAH LANDFILL
NEAH BAY, WASHINGTON

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1.0 Purpose

The purpose of the work conducted was to complete the excavation and sampling of backhoe pits to obtain samples suitable for Toxicity Characteristic Leaching Procedure Testing (TCLP) and on site soil samples for material testing to determine the suitability of the soils for use as landfill material and to gather information regarding the depth of the waste material sufficient to develop a volume estimate. The waste samples were collected and will be sent for analysis if determined to be needed by the future disposal site operator. The substrate samples were collected to help assess the possibility of in place closure at this site. The sample types were collected and the work was conducted concurrent with site survey work to maximize the efficiency of the field work.

1.1 Site Description and History

The site is located approximately 2 miles West, Northwest of Neah Bay, on the Makah Indian Reservation, within Clallam County, Northwestern Washington State, within the Olympic Peninsula physiographic province. The land fill is described as being in the NW 1/4 of Section 4, T33N, R15W, WM. Refer to Figure 1, Site Location. The landfill is immediately bounded by heavy vegetation (rainforest) and the Strait of Juan De Fuca lies within 1/2 mile North of this site.

The original landfill area lies on the south side of a small hill which is reached by a road which trends northwest, then switches back to the southeast. Garbage was initially pushed over the south side of this hill into a small gully bounded on the south by a ditch. The volume of material received has far exceeded the capacity of this area and materials are currently pushed over the south side, the east side and the north side of the hill. Additionally, material is dumped, and then pushed over each side of the road approaching the hill. Finally, there are various "mini" dump sites lining the arterial roads and the road to the main site. Refer to Figure 2, Site Map, and to Photographs 1 through 11.

The hill is composed of a very coarse, gravel and sand conglomerate which readily weathers to a sandy gravel. There is an outcrop of black shale west of the road and north of the location of TP-9 which may be of sufficient size and quality for use as landfill cover material.

The site has been used for approximately 20 years by the members of the Makah Tribe. Prior to use by the Makahs, the U. S. Air Force used this dump site. There are unconfirmed rumors of illegal dumping of materials by non-tribal people. Currently, this site is under the regulatory authority of the United States Environmental Protection Agency, Region 10 and must be brought into compliance with Subtitle D of 40 CFR, part 258.

(Inset - route to site, showing location of Indian Health Clinic)

FIGURE 1: SITE LOCATION

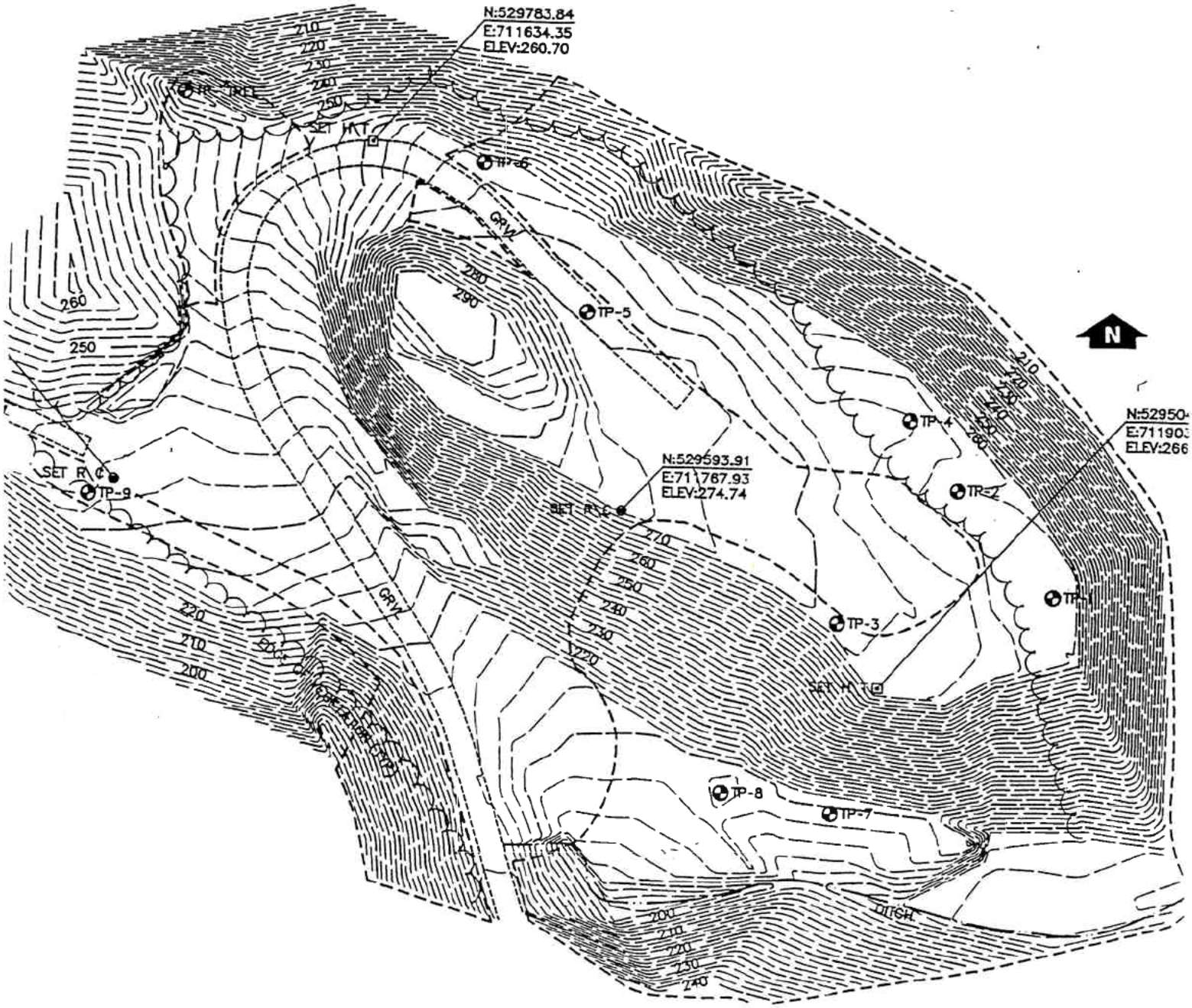


FIGURE 2: SITE MAP

The site is open at this time for use by tribal members. Materials are stockpiled on the hill at the top of the site and burned to reduce the volume of waste. This practice produces a thick, white, choking smoke which does not always rise straight up, but more often lies close to the ground. It was not determined how often material is burned at this site.

1.2 Description of the Waste

The most notable features of the waste material at the Makah Landfill are:

1. The lack of hazardous materials and;

2. The presence of recyclable and reusable items.

Potentially hazardous waste noted included 2 batteries, about fifteen (full to partially full with no sign of spillage) 10 gallon plastic storage containers labeled as motor oil, but with unknown contents (shown in photographs 5, 6, and 7), one hypodermic needle, approximately 7 to 10 % of the material is tires, and 15 to 20 % of the material is composed of appliances which may contain residual ammonia or other potentially hazardous material. There was some roofing and other construction material present that consisted of less than 1% of the total landfill material. The remainder of the waste was unidentifiable organic material including carcasses and parts of carcasses, a large percentage (20 to 30%) metal composed of car bodies, appliance parts and other unidentifiable metal framework. Of the small cans noted on site, approximately 75% were aluminum. There is an estimated 20 to 30% glass, both colored and clear, broken and unbroken. There was a striking percentage (25 - 30%) of visibly reusable items such as toys, clothing, blankets and a sleeping bag, furniture, wood, weights and tools.

SUMMARY OF WASTE

Potentially Hazardous Materials	*Percent by Volume	
Batteries	<0.1%	
Used motor oil (or unknown material)	<0.1%	
Hypodermic needles	<0.001%	
Tires	7 to 10%	
Appliances (could retain ammonia)	Volume estimate included in metals	
Roofing/construction material	<1.0%	
Other waste	**Percent by Volume**	
Unidentifiable organic material and identifiable household waste	20 to 30%	60-75% of this material could be reusable
Metal (car bodies, appliances, framework)	20 to 30%	85-100% of this material could be recyclable
Glass	20 to 30%	85-100% of this material could be recyclable

*Percent by volume is an estimate based on visual observation only. No actual waste analysis was performed.

2.0 Description of Work

The site has been mapped topographically and the visible extent of the garbage as it was the 7th and 8th of November 1995 has been plotted on the site map (Figure 2). The site is active and material is added and moved on a continual basis, so the volume and exact location of the waste material will vary somewhat from that shown in Figure 2.

Nine test pits were excavated November 7 using a 225 Trackhoe to depths which either reached the native soils or to a depth of 22′ (22′ is the maximum reach of the trackhoe) and the location of these pits is shown on Figure 2. Fifteen samples were collected for material or soil characterization purposes. An additional sample of roofing material on site was collected for analysis for asbestos materials.

2.1 Test Pit #1

Test Pit #1 was excavated at the eastern extremity of the landfill, as shown in Figure 2. The landfill material is not visibly apparent in this area as it is heavily overgrown with blackberry bushes. Test Pit #1 was excavated to a depth of 6′. There was garbage to a depth of 5.5′ consisting of well-compacted ash and organic garbage with nets, ash, glass

and metallic debris. Two samples were collected from Test Pit #1, one composite sample of waste material was taken from depths between 3′ and 5′, and one sample of the substrate was taken at 6′ in depth.

2.2 Test Pit #2

Test Pit #2 was excavated at the northeasterly edge of the landfill, to a depth of 22′, and the landfill material was also not visible at this site due to the growth of blackberry bushes. The landfill material consisted of well-compacted ash and organic garbage with nets, glass and metallic debris and it extended to a depth of 21′. Two samples were collected from test pit #2, one composite material sample from depths between 12′ and 16′, and one sample of the substrate material taken from 22′.

2.3 Test Pit #3

Test Pit #3 was excavated on the southern side hill to determine the depth of garbage covering the surface of the slope. Waste similar to that described in test pits 1 and 2 was excavated to a vertical depth of 10′. Boulders were encountered and dislodged at that depth. Although material was excavated to a vertical depth of 10′, this area is a sidehill and the material is not thicker than approximately 6′. One composite waste material sample was collected from this pit, taken from depths between 2′ and 8′. The one hypodermic needle noted in this report was located just east of test pit #3.

2.4 Test Pit # 4

Test Pit # 4 was excavated on the North- northeastern extremity of the landfill to a depth of 5′. The waste material was well-compacted ash and organic material with nets, glass and metallic and wood debris, and it extended to a depth of 4′. One composite waste material sample was collected from this site and one substrate sample was taken from a depth of 5′.

2.5 Test Pit # 5

Test Pit # 5 was excavated the morning of November 7, 1995. At that time, there was 2.5′ of garbage covering this spot. However, the material was moved and presumably pushed over the south side the afternoon of November 7, 1995. One composite sample was collected of this material and one sample of the substrate was taken.

2.6 Test Pit # 6

Test Pit # 6 is the northern most pit and it was excavated to a depth of 2'. Garbage material was surficial in this area, and consisted of organic material, wood, glass, tires, furniture and glass. This area has not been burned. One composite sample of the waste was collected here and one sample of the substrate material was taken from a depth of 2'.

2.7 Test Pit # 7

Test Pit # 7 was excavated in the fill material between the toe of the slope and the ditch at the southeasternmost point that was safely accessible to the trackhoe. This pit was excavated to a depth of 22' and the material encountered was compacted ash, trash, glass, tires and a very high percentage of metallic debris. Groundwater was intercepted at about 21.5 in this hole. One composite sample of the material close to the bottom and in contact with groundwater was collected.

2.8 Test Pit # 8

Test Pit # 8 was excavated in the fill material between the toe of the slope and the seasonal creek, at the southernmost point that was safely accessible to the trackhoe. This pit was excavated to a depth of 22' and the material encountered was compacted ash, trash, glass, tires and a very high percentage of metallic debris. Groundwater was intercepted at about 22' in this hole. One composite sample of the material close to the bottom and in contact with groundwater was collected.

2.9 Test Pit # 9

Test Pit # 9 was the westernmost pit excavated in the material adjacent to the road. This material proved to be superficial, as expected there is approximately 1.5' of debris in this area. One composite sample of the waste material was collected, and one of the substrate. The substrate sample was collected from a depth of 2'.

2.10 Site T.P. "Tree"

Site T.P. "Tree" was not an excavated pit. A large tree had recently blown over exposing the surficial stratigraphy in this area. There was approximately 2.5 feet of unburned waste material consisting of unburned wood, paper, glass, tires and organic material. No samples were collected from this site.

3.0 Conclusion and Recommendations

The scope of this project was to complete the excavation and sampling of backhoe pits to obtain samples suitable for Toxicity Characteristic Leaching Procedure Testing (TCLP) and on site soil samples for material testing to determine the suitability of the soils for use as landfill material and to gather information regarding the depth of the waste material sufficient to develop a volume estimate. Nine pits were excavated and fifteen samples were collected. The materials encountered have been described in this report, photographed, and a the site map with depth estimates is included with this report. While it is possible to generate a density estimate using the percentage of materials listed in this report, we do not recommend a density estimate for the following reasons:

- Density of the material will vary from the density of cloth or paper to the density of metals and estimates based on assumptions of materials could be misleading.

- It could be cost prohibitive to generate a density estimate that will, in the final analysis be only an estimate that may be misleading.

- The volume estimate given in this report with a "fluff" factor of 30% may adequately serve the purpose to estimate the number of trucks required to move the waste.

We offer the following recommendations to initiate the landfill closure process.

1. Burning unidentified material poses a probable health risk to Makah tribal members who are exposed to the smoke, and this practice may also pose an environmental risk or a liability risk. It is our recommendation that the Makah cease the practice of burning landfill material.

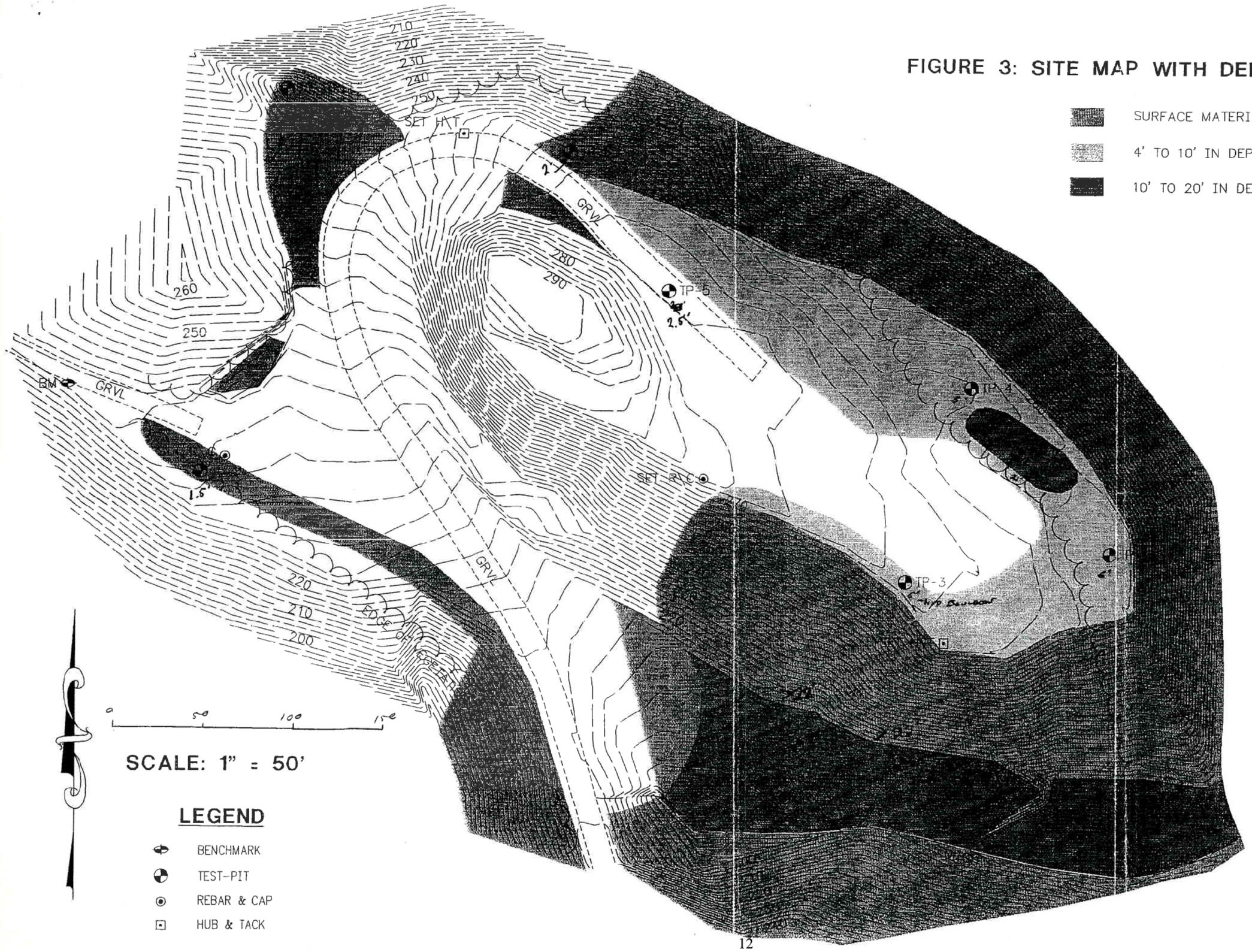
2. Immediately initiate a recycle - reuse program. Jill Zubia, Brown and Caldwell suggested the program "The Fourth R" which was funded by a Public Participation Grant for the Washington State Department of Ecology (WDOE) and presented by the Chehalis, Nisqually, Shoalwater Bay, Skokomish and Squaxin Island Tribes. This program may be ideal for the Makah Tribe.

3. Send the waste samples for characterization by TCLP method for eight metals, total petroleum hydrocarbons (HCID), and volatile and semi-volatile compounds, if required by regulatory authorities or the final disposal site.

4. Send the roofing sample for asbestos analysis.

5. Attempt to find the person or party who left the unidentified material contained in the small blue drums (photos 5, 6 & 7), or sample the material to identify it.

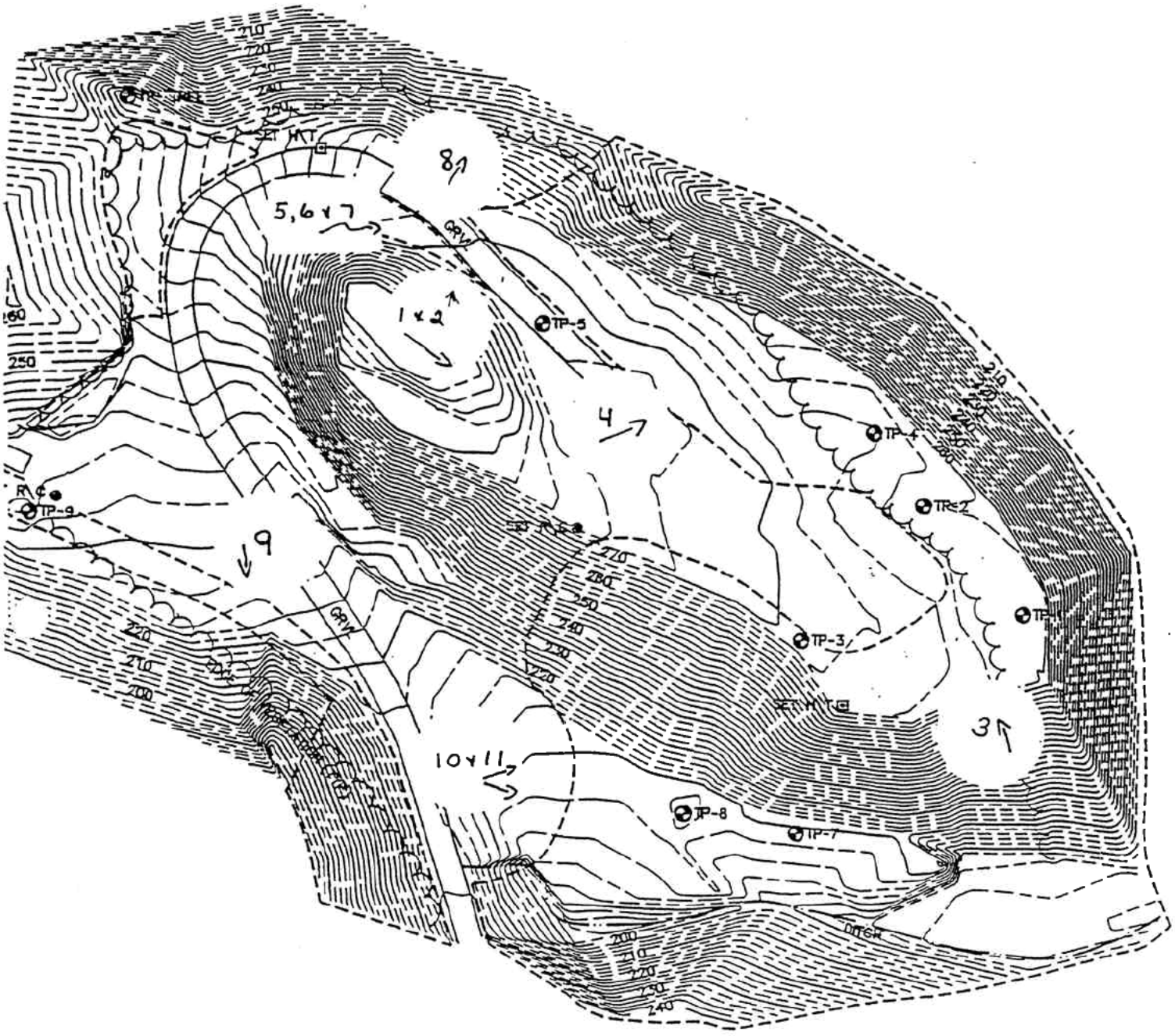
FIGURE 3: SITE MAP WITH DEPTH ESTIMATES



6. Send the substrate samples for grain size analysis, prior to beginning in place closure design.

7. Check with the Indian Health Clinic to determine their disposal policy for sharp and / or hazardous materials.

APPENDIX A



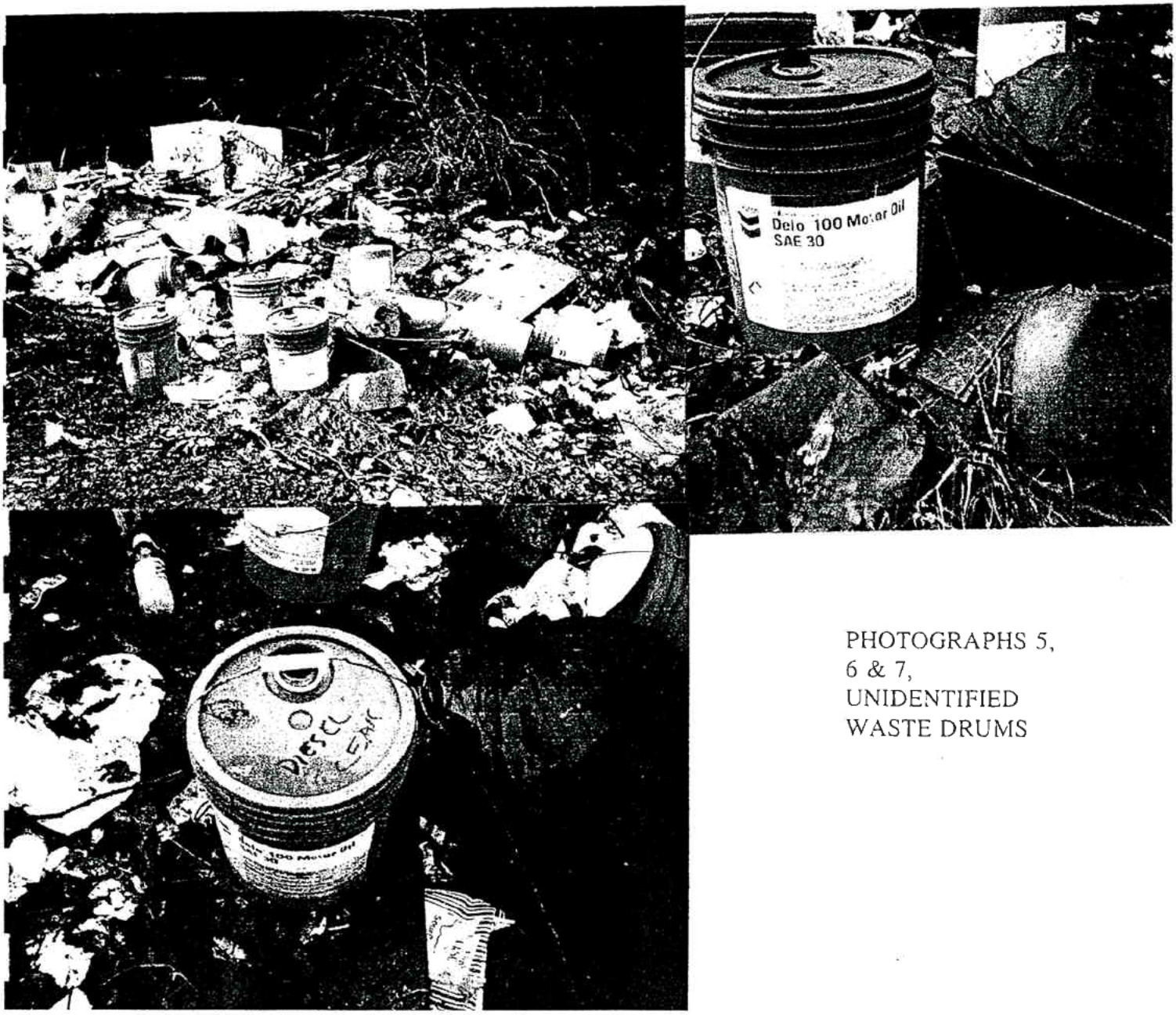
PHOTOGRAPH LOCATION KEY -- NUMBER INDICATES PHOTOGRAPH NUMBER, ARROW GIVES THE DIRECTION THE PHOTOGRAPHER WAS FACING.

PHOTOGRAPH # 1:
TAKEN FROM TOP OF
HILL LOOKING E, SE.

PHOTOGRAPH #2:
TAKEN FROM TOP OF
HILL LOOKING N, NW.

PHOTOGRAPH #3:
TAKEN FROM EAST
EDGE, LOOKING UP
GRADIENT, AND TO THE
N.W.

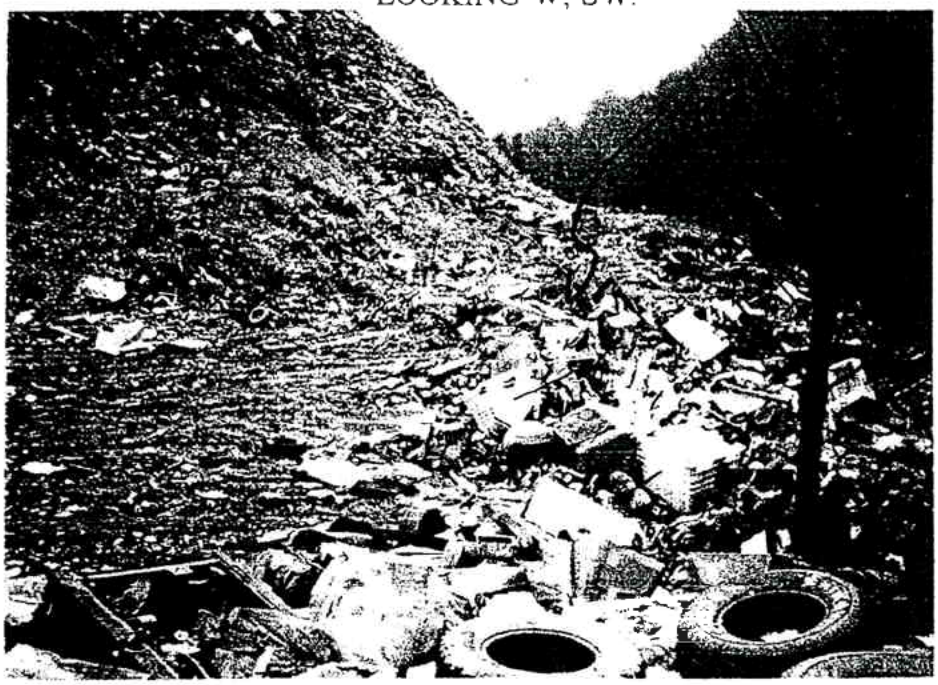
PHOTOGRAPH #4: LOOKING NORTHEAST, TOWARD TP #4



PHOTOGRAPHS 5, 6 & 7, UNIDENTIFIED WASTE DRUMS

PHOTOGRAPH 8: T.P. 6, LOOKING NORTH

PHOTOGRAPH 9: WEST SIDE OF ACCESS ROAD, LOOKING W, SW.



PHOTOGRAPHS 10 & 11: LOOKING WEST TOWARD THE SIDEHILL AND LOWER LANDFILL AREA.