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RESULTS OF THE MECHANICAL TESTING FOR CULTURAL RESOURCES AT LANDFILL 1A IN SUPPORT OF THE 300-FF-1 REMEDIATION PROJECT

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Remediation activities for Landfill 1A, part of the 300-FF-1 Remediation Project, are scheduled to begin in May 1999. Waste materials consisting of contaminated soil, solid waste, and construction debris are believed to be buried in the waste site. Because of the cultural sensitivity in the area and the potential for undisturbed ground in the waste site, the Environmental Restoration Contractor (ERC) cultural resource staff recommended subsurface testing prior to remediation activities. On June 15 and 16, 1998, mechanical testing for cultural resources in Landfill 1A was performed. This report presents the results of the test trenching.

LOCATION

The testing location is within Landfill 1A in the 300 Area of the Hanford Site (Figure1). The 300 Area is located on the west bank of the Columbia River about 1 mile north of the Richland city limits. Trenching took place about 70 ft north of the southern boundary of Landfill 1A and about 210 ft downriver from the 42-mile marker placed on the cutbank above the shoreline. Compass bearing from the east end of test hole 1 was 81 degrees to the Potholes Canal Spillway on the left bank of the Columbia River and almost directly west of the downriver tip of Johnson Island (Figure 2).

TOPOGRAPHY

The test holes were located in an area gradually increasing in elevation as distance inland from the cutbank increased. Elevation in the test hole area is about 360 ft. Previous construction-related activities have altered much of the surrounding surface landscape in the waste site.

SOILS

The soils in the waste site area are primarily wind-transported sands and silts that reach depths up to 3 m (9.8 ft). The dunes formed by these wind-transported materials have vegetated and stabilized over time. Soils in the test trench area are classified as Rupert Sand that are described as follows:

> The surface is a brown to grayish brown coarse sand, which grades to a grayish brown sand at about 36 inches. Rupert soils developed under grass, sagebrush, and hopsage in coarse sandy alluvial deposits, which were mantled by wind-blown sand. Relief characteristically consists of hummocky terraces and dune-like ridges. This soil may be correlated as Quincy sand (PNNL 1996).

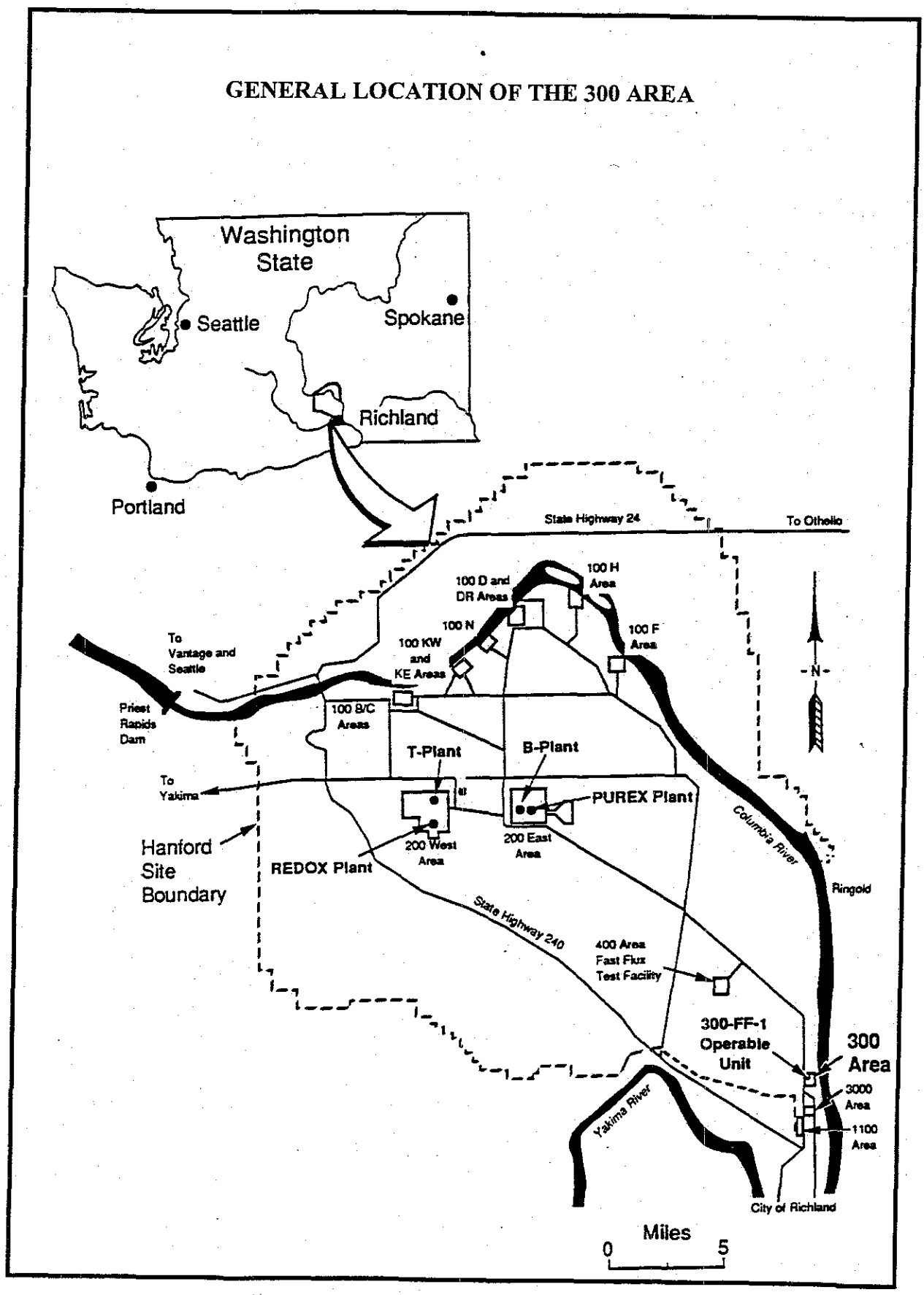


Figure 1: General Location of the 300 Area.

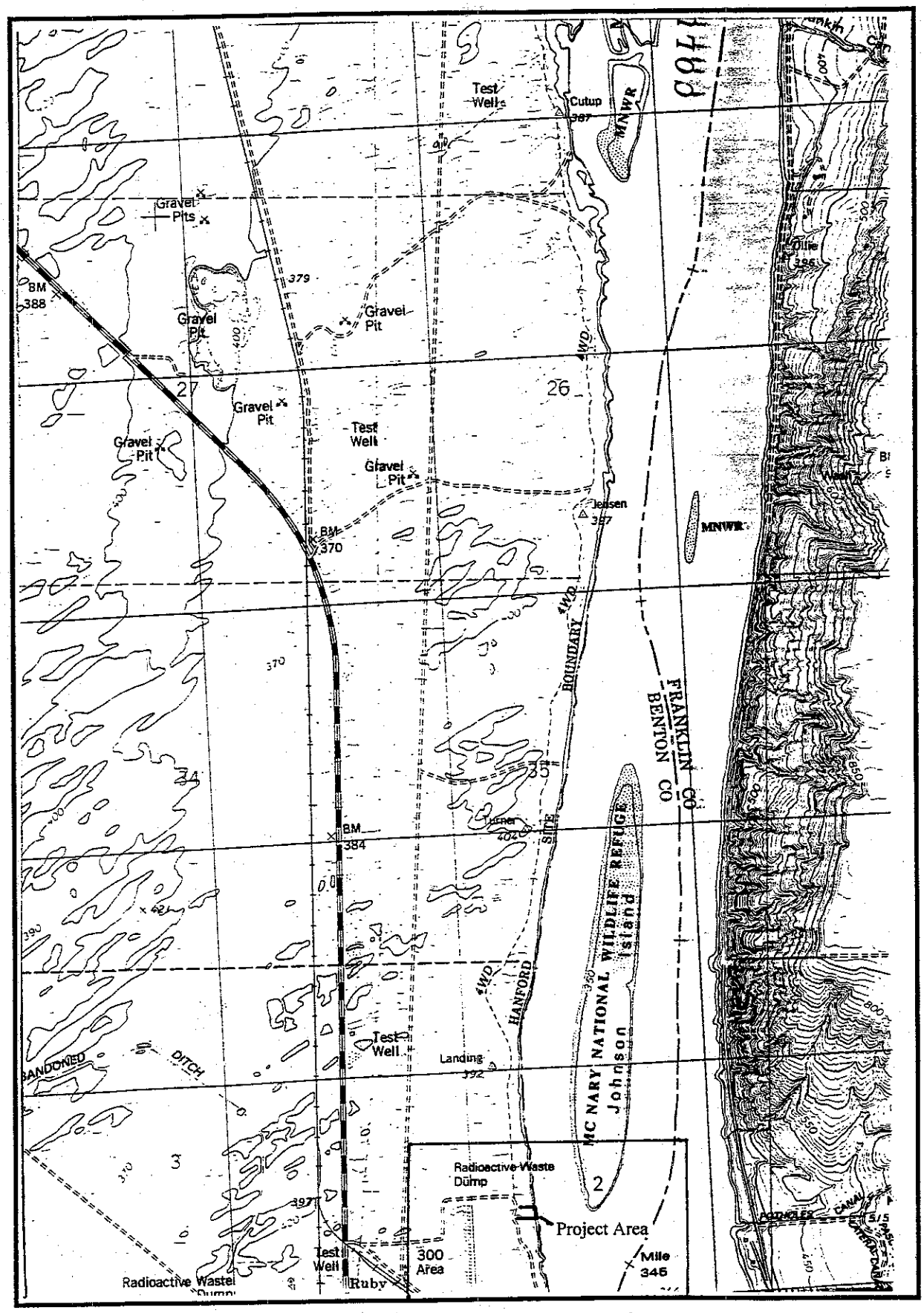


Figure 2: Quadrangle Location of the Project Area.

Beneath the sand and silts are the glaciofluvial deposits referred to as the Pasco gravels (BHI 1994).

VEGETATION

Vegetation in the test area consists of gray rabbitbrush *(Chrysothamnus nauseous),* dune scerf pea (*Psoralidium lanceolatum),* and other groundcover plants typical of shrub-steppe habitat. Non-native plants include cheatgrass *(Bromus)*, fiddleneck (*Boraginaceae),* and skeletonweed (*Asteraceae),* among others.

HISTORY

Landfill 1A is believed to have been in operation in 1948. The waste site covers about 5 acres. It contained a steel mesh cage used to burn paper and building waste and three burial trenches (BHI 1996, PNL 1991). As a result of these activities, it is believed to contain miscellaneous, low-level radiologically contaminated solid waste.

In 1968, Dr. David Rice surveyed the Columbia River shoreline for cultural resources and recorded sites 45-BN-162 on the downriver side of the waste site and 45-BN-163 on the upriver side (Rice 1968). Recent field inspections have confirmed the presence of cultural materials in both site areas.

TESTING PROCEDURE

Information obtained from ground penetrating radar (GPR) (Figure 3) and aerial photographs (Figure 4) indicate the area north of the southernmost waste trench received little or no previous subsurface ground disturbance related to the construction and subsequent use of the waste site.

Mechanical testing (backhoe) rather than hand excavation was selected due to possible contamination concerns. Fourteen test holes averaging 2.6 m (8.5 ft) deep by 2.7 m (8.8 ft) long by 1.9 m (6.2 ft) wide were excavated. Two meters (6.6 ft) of untested soil remained between each test hole (Figures 4 and 5). To maintain vertical and horizontal control, the mechanical testing removed only about 30 cm (1 ft) of subsurface materials at a time. Sidewalls and floors were continuously monitored for cultural resources. Depths of the test holes were determined either by the mechanical ability of the equipment or caliche covered subsurface river cobbles. The removed materials were stockpiled nearby for monitoring and backfilling. Each bucket was inspected as it was deposited. Testing began about 7.5 m (25 ft) west of the edge of the cutbank that overlooks the shoreline to the Columbia River and continued west to the gravel access road that borders the waste site (Figure 5).

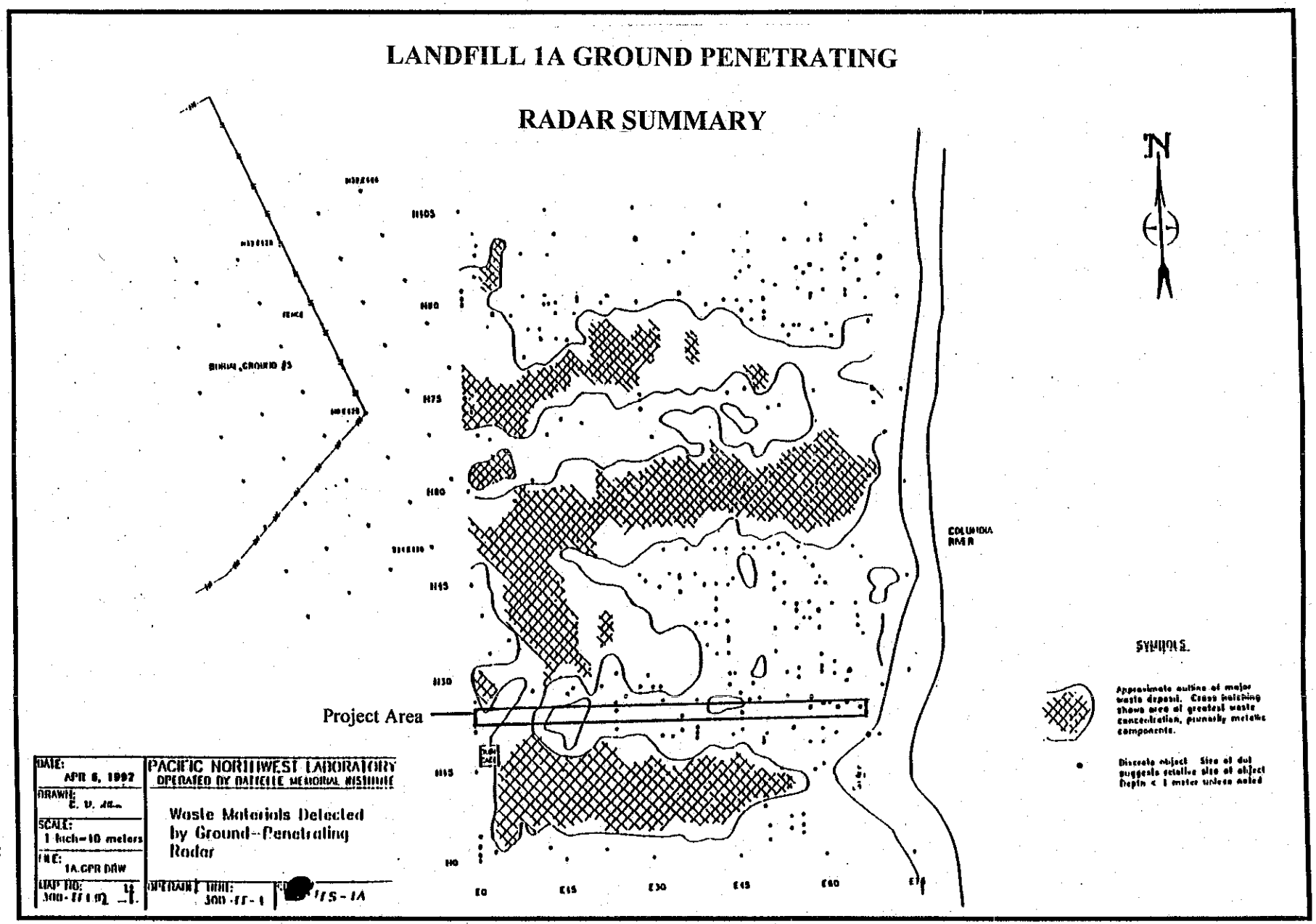
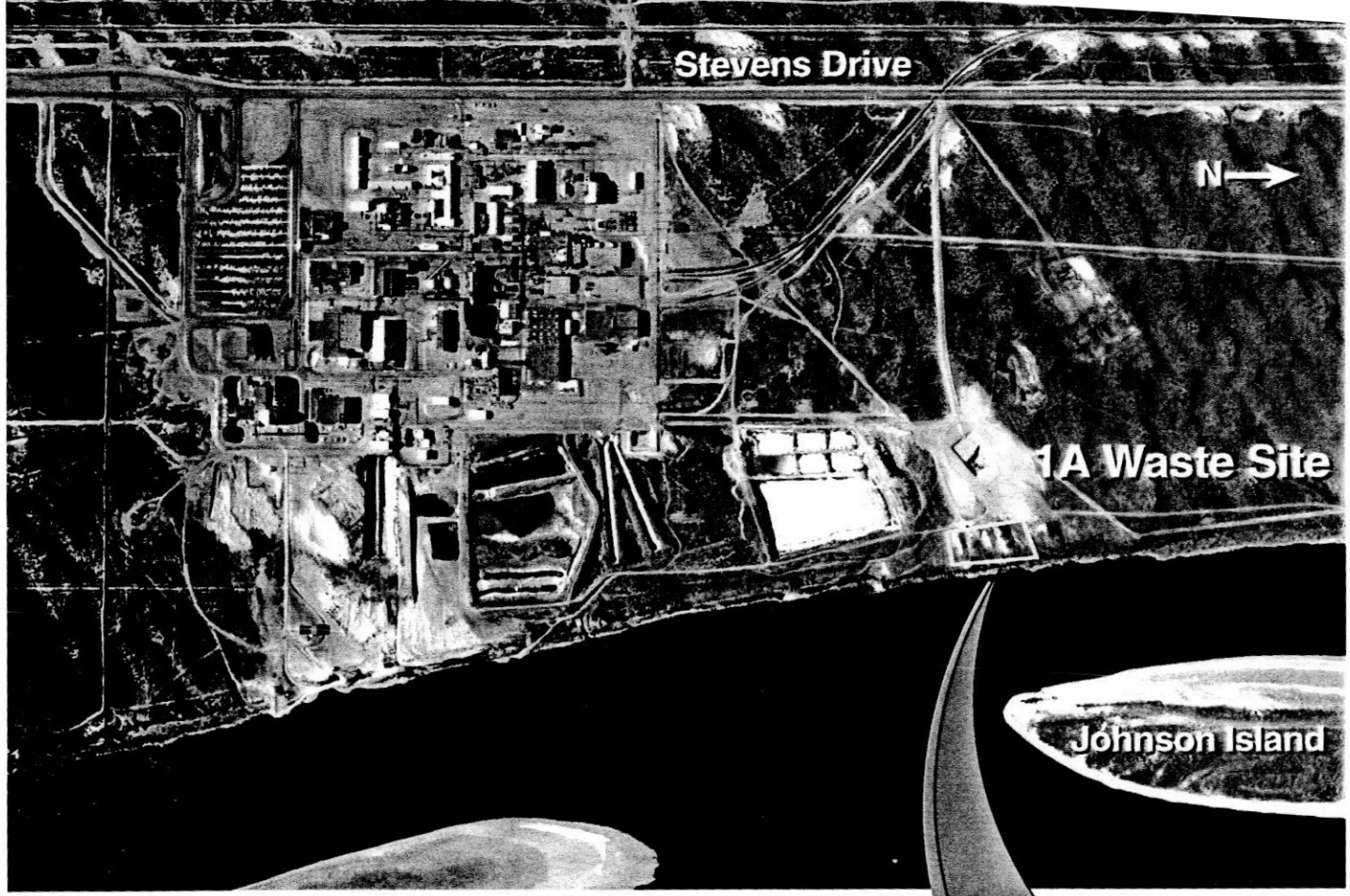


Figure 3: Landfill 1A Ground Penetrating Radar Summary (WHC-SD-TI-060, Rev.0).



1962 Photo

300-FF-1
Remedial Action Pr

Landfill 1A

300-FF-1
Remedial Action Project
Landfill 1A

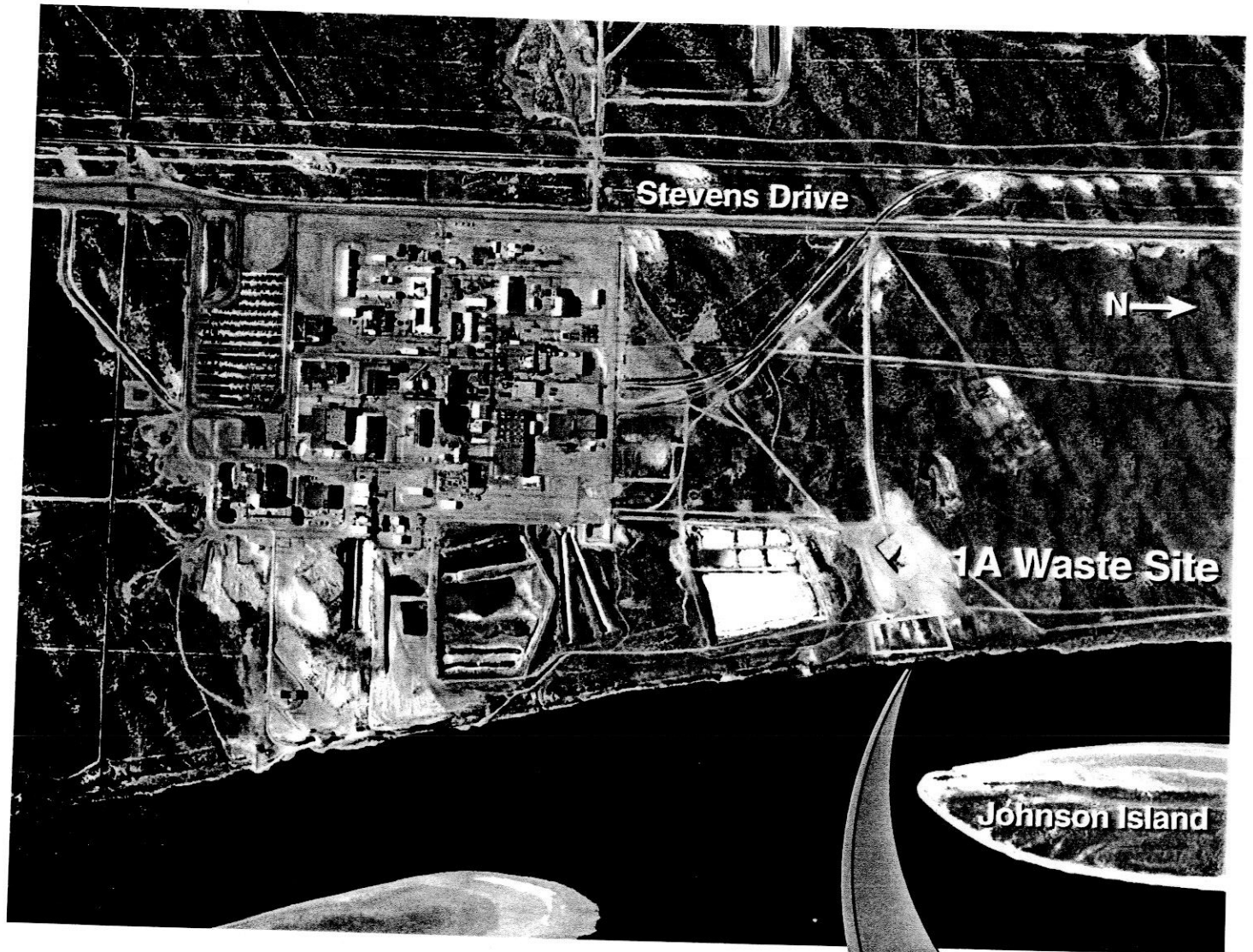


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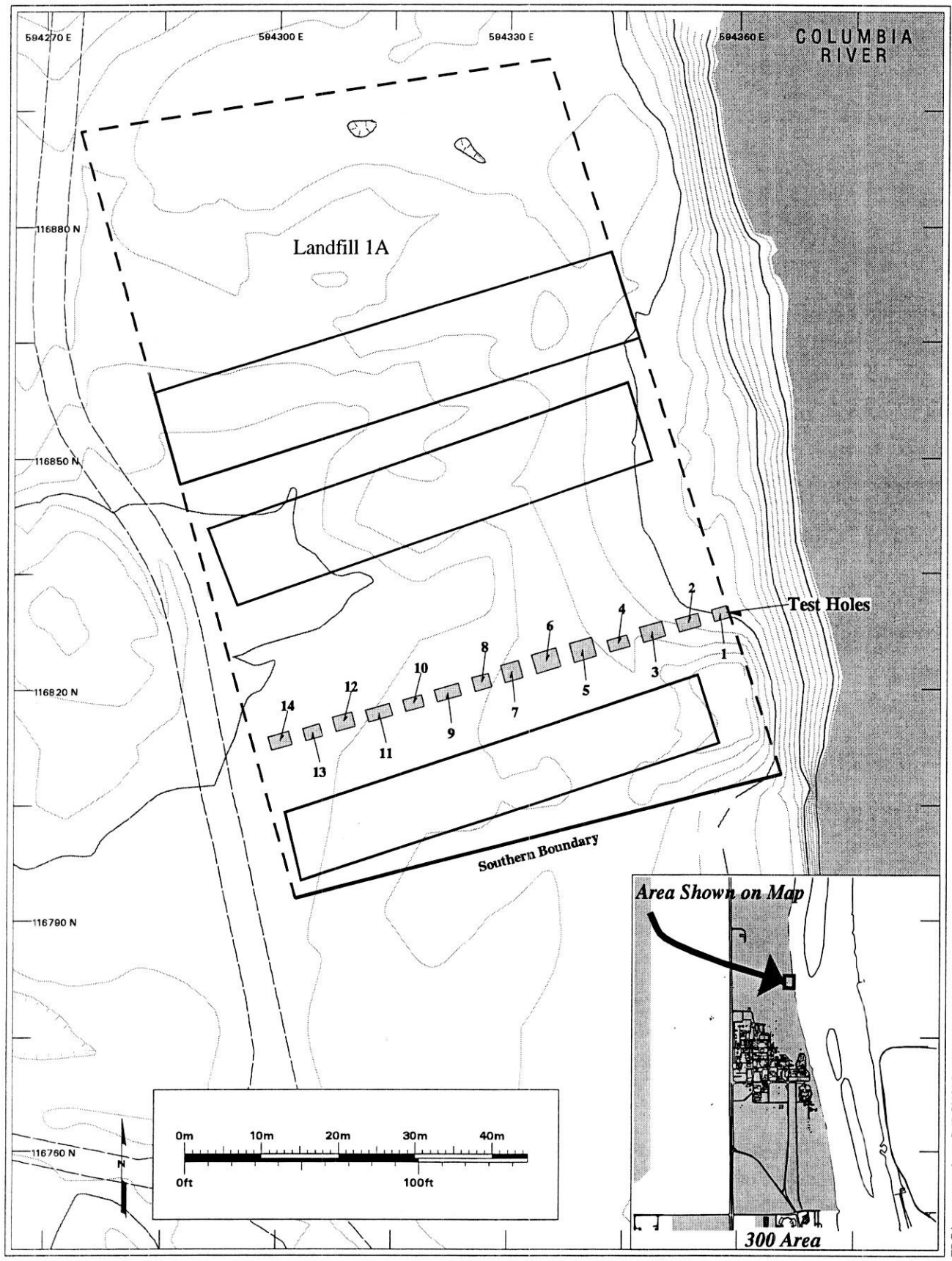
Figure 4: Landfill 1A



ERC:jrc map_a.aml rev. C JRC0301 Database: 05-AUG-1998

Figure 5: Landfill 1A Test Hole Locations

Thomas E. Marceau and James J. Sharpe, ERC cultural resource staff, and Melvin Lucei representing the Wanapum Band participated in the trenching activities. Personnel furnished by the Weston Company operated the equipment, and Thermo Hanford, Inc. provided radiological control. A summary of the findings are listed below for each test hole.

TEST HOLE RESULTS

Test Hole 1

Test hole 1 began at the eastern edge of Landfill 1A about 7.5 m (25 ft) west of the cutbank near the Columbia River shoreline and about 22 m (70 ft) north of the site's southeast boundary. This test hole was 3.8 m (12.5 ft) deep, the deepest of any of the test holes excavated. Excavation terminated at this depth only because the reach of the backhoe was exceeded. The hole was 2 m (7 ft) long by about 1.7 m (5.6 ft) wide. At a depth of about 1.8 m (6 ft), animal bone was observed. The bones, from a mid-sized ungulate, possibly deer, consisted of a right mandible containing three molar teeth, a partial rib, and a non-diagnostic bone fragment (Figure 6). The bones were partially mineralized from deep burial. At about 2.7 m (9 ft), soil color changed to a light gold tan. This soil layer contained a charcoal fragment, a mussel shell fragment, a non-diagnostic fragment of animal bone, and a small fragment of animal tooth enamel. No river cobbles were observed at the bottom of this test hole.

Test Hole 2

Test hole 2 was 3.2 m (10.5 ft) deep by 3 m (9.8 ft) long by 1.7 m (5.6 ft) wide. Friable, thin walled mussel shell fragments were observed. The lower level of the hole contained river cobbles beginning at about 3 m (9.8 ft) below the surface.

Test Hole 3

Test hole 3 was 3.1 m (10.2 ft) deep by 3 m (9.8 ft) long by 2 m (6.6 ft) wide. With the exception of aluminum foil-like fragments in the upper level, no other cultural materials were noted throughout the remainder of the test hole. Insufficient moisture in the subsurface soils resulted in repeated sidewall sluffing. River cobbles were not observed.

Test Hole 4

Test hole 4 was 2.4 m (8 ft) deep by 2.7 m (9 ft) long by 1.5 m (4.9 ft) wide. Insufficient moisture in the subsurface soils resulted in repeated sidewall sluffing. Friable thin-walled mussel shell fragments were observed. River cobbles were not observed.

Test Hole 5

Test hole 5 was 2.4 m (8 ft) deep by 2.5 m (8.2 ft) long by 3 m (9.8 ft) wide. A lens of black sands about 90 cm (3 ft) wide by 13 cm (5 in.) thick was observed in the southern

Figure 6. Bone fragments from test-hole one.

sidewall of the hole. This lens was similar in appearance to the "black sands" found near the 100-F Area. At about 1.8 m (6 ft) a bird bone fragment, from a large bird, possibly goose, was unearthed. No other materials were observed. Caliche covered river cobbles were reached about 2.1 m (7 ft) below the surface.

Test Hole 6

Test hole 6 was 2.1 m (7 ft) by 3.3 m (10.8 ft) long by 2.5 m (8.2 ft) wide. Thin-walled friable mussel shell fragments and a non-diagnostic animal bone fragment were observed. Caliche covered river cobbles were reached at 2.1 m below the surface.

Test Hole 7

Test hole 7 was 2.1 m (7 ft) deep by 2.4 m (7.8 ft) long by 2.3 m (7.5 ft) wide. Thin-shelled friable mussel shell fragments were observed. At about 1.7 m (5.5 ft) soil color changed to a tannish brown. River cobbles occurred at about 1.8 m (6 ft).

Test Hole 8

Test hole 8 was 2.4 m (8 ft) deep by 1.8 m (5.9 ft) long by 2.2 m (7.2 ft) wide. At about 70 cm (2.5 ft) below the surface, a lens of black sand similar to that noted in test hole 5. was observed. It contained no organic materials. River cobbles were encountered at 2.4 m.

Test Hole 9

Test hole 9 was 2.38 m (7.8 ft) deep by 3.2 m (10.5 ft) long by 1.6 m (5.3 ft) wide. Caliche covered river cobbles were encountered at about 2.1 m (7 ft). Friable thin-walled mussel shell fragments appeared at the same level as the river cobbles.

Test Hole 10

Test hole 10 was 2.5 m (8.2 ft) deep by 2.5 m (8.2 ft) long by 1.5 m (4.9 ft) wide. A layer of white ash covered about 10 cm (4 in) of the surface. A change to a darker colored soil occurred at about 2.1 m (7 ft). Caliche-covered river cobbles were encountered at 2.3 m (7.5 ft). Friable thin-walled mussel shell occurred at the same level as the river cobbles.

Test Hole 11

Test hole 11 was 2.6 m (8.5 ft) deep by 3.2 m (10.5 ft) long by 1.6 m (5.3 ft) wide. A layer of powdery white ash about 10 cm-15 cm (4 in-6 in) thick extended down from the surface. Caliche covered river cobbles were encountered at about 2.1 m (7 ft).

Test Hole 12

Test hole 12 was 2.4 m (8 ft) deep by 2.6 m (8.6 ft) long by 1.9 m (6.2 ft) wide. A layer of powdery white ash about 10 cm-15 cm (4 in-6 in) thick extended down from the surface. A small diffuse scatter of friable thin walled mussel shell was observed in the west wall about 55 cm (1.8 ft) below the surface. Caliche covered rock cobbles were encountered about 2.1 m (7 ft) below the surface. Thin-walled friable mussel shell was also encountered at the river cobble level.

Test Hole 13

Test hole 13 was 2.4 m (7.8 ft) deep by 2.3 m (7.5 ft) long by 1.6 m (5.3 ft) wide. A layer of powdery white ash about 10 cm-15 cm (4 in-6 in) thick extended down from the surface. No mussel shell was observed. Caliche covered river cobbles were encountered at about 2.1 m (7 ft).

Test Hole 14

Test hole 14 was 2.7 m (8.7 ft) deep by 2.8 m (9.2 ft) long by1.8 m (5.9 ft) wide. White powdery ash was observed in the first 10 cm (4 in) of the test hole. The soil immediately beneath the ash and extending to a depth from 30 cm-35 cm (12 in-14 in) was burnt orange in color. The discoloration is possibly the result of heat generated from ash pit operations. Caliche-covered river cobbles were encountered at about 2.1 m (7 ft).

TEST HOLE SUMMARY FOR LANDFILL 1A						
TEST TRENCH #	DEPTH (in meters)	LENGTH (in meters)	WIDTH (in meters)	BONE	SHELL	OTHER
1	3.8	2	1.6	X	X	Charcoal
2	3.2	3	1.7		X	
3	3.1	3	2			
4	2.4	2.7	1.5		X	Aluminum foil
5	2.4	3	2.5	X		
6	2.1	3.3	2.5	X	X	
7	2.1	2.4	2.3		X	
8	2.4	2.2	1.8			
9	2.4	3.2	1.6		X	
10	2.5	2.5	1.5		X	Ash
11	2.6	3.2	1.6			Ash
12	2.4	2.6	1.9		X	Ash
13	2.4	2.3	1.6			Ash
14	2.7	2.8	1.8			Ash

FINDINGS

- Soils throughout the testing area were fined-grained sand. Because of insufficient moisture to support the sidewalls, various amounts of sluffing occurred in all test holes.

- Caliche-covered Pasco gravels lie beneath the sand. The caliche consists of a white crust of calcium carbonate. When a definable layer of river cobbles was encountered, trenching was terminated.

- Approximately 331.5 m^2 of surface area and 182.5 m^3 of excavated soil were monitered; however, no lithic waste, tools, tool fragments, organic stains, charcoal lenses, fire-cracked rock, features, or other cultural manifestations were observed in any of the sidewalls or excavated soils.

- Animal bone was observed in three test holes (i.e., 1, 5, and 6). However, their presence does not appear to be due to cultural factors.

- Diffuse friable mussel shell fragments occurred at random levels; however, the greatest concentrations were within the sand/cobble interface in culturally sterile areas. Mussel shell appears to decrease as distance from the shoreline increases.

- The bone, charcoal, and mussel shell in test hole 1 suggest a higher probability of cultural deposits near the river.

- The test trenching supported the Ground Penetrating Radar findings of the location of concentrated wastes within this portion of Landfill 1A.

- Ash deposits increased near the west end of the trenched area. This was the general area of the burn cage. The last five test holes contained ash deposits.

CONCLUSION

The test trenching of Landfill 1A revealed diffuse scatters of mussel shell and occasional animal bones in the undisturbed subsurface deposits. Although no materials were discovered within an archaeological context, this testing does not eliminate the possibility that subsurface cultural resources remain within the area of potential effect, particularly in proximity to the shoreline. Because of the continuing probability of discovery of cultural deposits in areas not disturbed by the initial construction of the waste trenches, monitoring will be required for remedial actions taking place outside the perimeters of the three waste trenches known to exist within Landfill 1A.

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