FINAL DECISION DOCUMENT

No Further Action
SWMU K03G Camp Jumbo

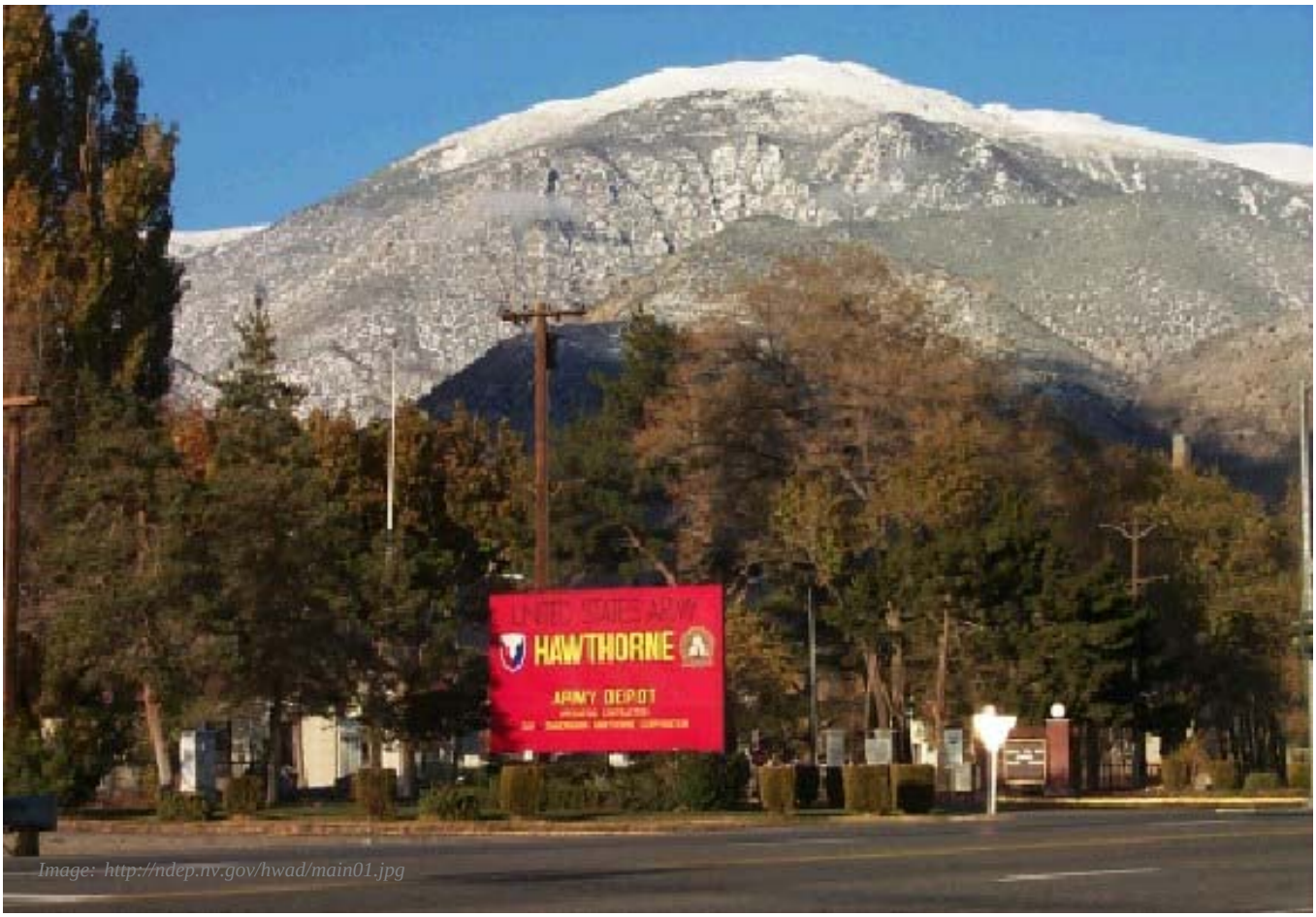
April 2011
Version 02

Hawthorne Army Depot

Hawthorne, Nevada

U.S. Army Corps of Engineers - Sacramento District

Contract W91238-06-D-0019
Task Order 0004



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No Further Action

SWMU K03G Camp Jumbo

Hawthorne Army Depot, Nevada

Contract No. W91238-06-D-0019

Original Submittal: September 1995
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Prepared for:

US Army Environmental Command

Hawthorne Army Depot
Hawthorne, Nevada

Prepared by:

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Final Closure Decision Document

Solid Waste Management Unit K03
Camp Jumbo Underground Storage Tank Site

Decision Document
Camp Jumbo Underground Storage Tank Site
Hawthorne Army Depot
Hawthorne, Nevada
February 1996

1.0 PURPOSE OF DECISION DOCUMENT

This decision document describes the rationale for the proposed closure of the Camp Jumbo underground storage tank sites at the Hawthorne Army Depot (HWAD), Hawthorne, Nevada. This decision document was developed for the US Army Corps of Engineers, Sacramento District (USACE), and the HWAD, with support from the Nevada Department of Conservation and Natural Resources, Division of Environmental Protection (NDEP).

1.1 Site Description

The Camp Jumbo site is located approximately one mile west of the HWAD main gate. Camp Jumbo was the site of former barracks used to house installation workers during World War II. Five underground storage tanks (USTs) have been removed from the site. The locations of these former USTs are referred to as Camp-1 through Camp-5. The excavations to remove each of these tanks were about 20 feet by 20 feet (400 square feet). The excavations were partially backfilled.

Two of the five former USTs showed no visual or analytical evidence of releases. The remaining three former USTs were suspected to have leaked, based on visual inspections of the tanks and analytical results of soil samples collected during the removals. These three former USTs suspected of leaking are Camp-1, Camp-4, and Camp-5. Each of the USTs suspected of leaking had a capacity of 275 gallons and stored #2 diesel fuel.

The USTs were removed from the site on 17 September 1991. On 20 September 1991, two soil samples were collected from near the north and south ends of the Camp-4 and Camp-5 USTs, and three soil samples were collected from the Camp-1 UST site (two from the excavation and one from the supply line trench). The excavation samples were reportedly collected from depths of six to eight feet (Bramco), however there is no indication if the depth referred to feet below ground surface (bgs) or feet below the base of the excavation. It is assumed the samples were collected from six to eight feet bgs.

The samples were analyzed for total petroleum hydrocarbons as diesel (TPH-d), volatile organic compounds (VOCs), polychlorinated biphenyls (PCBs), pesticides, and eight metals regulated under the Resource Conservation and Recovery Act (RCRA) using the toxicity characteristic leaching procedure (TCLP). The concentrations of TPH-d ranged from 6,100 milligrams per kilogram (mg/kg) to below the laboratory's method detection limit. One sample collected from the Camp-4 excavation was reported to contain 1,140 mg/kg total xylenes, but no other VOCs, pesticides, or PCBs were detected. The eight RCRA metals were not found in high concentrations in any of the samples.

In 1992 the United States Army Environmental Hygiene Agency (USAEHA) supervised the drilling of one soil boring in the center of the partially backfilled excavation at the Camp-1 site, and two borings at the Camp-4 site. Two soil samples were collected from the boring at the Camp-1 site, and two samples were collected from one of the borings at the Camp-4 site. Concentrations of TPH-d for all four samples were reported as being below the laboratory's method detection limit. A summary of the analytical soil sample results is shown on Table 1.

TABLE 1

ANALYTICAL RESULTS OF SOIL SAMPLES COLLECTED FROM THE CAMP JUMBO SITE

Sample Collection Depth (feet bgs)	TPH-d mg/kg
Camp-1	
6 (north excavation)	<10
6 (south excavation)	<10
10 (boring)	<10
25 (boring)	<10
2 supply line trench)	1950[a]
Camp-4	
8 (north excavation)	6100
8 (south excavation)	<10
10 (boring)	<10
25 (boring)	<10
Camp-5	
6 (north excavation)	540
6 (south excavation)	<10

Notes:

mg/kg - milligrams per kilogram
bgs - below ground surface
TPH-d - Total petroleum hydrocarbons as diesel, method 8015
<10 - less than the indicated method detection limit
[a] - sample also contained 1,140 mg/kg xylenes, analyzed by EPA method 8240

The soil types of the excavation and soil boring samples, as described in the USAEHA report, were yellowish-brown, medium to coarse sands and gravels. The estimated depth to ground water at Camp Jumbo is approximately 300 feet bgs based on the regional ground water level survey conducted by Tetra Tech, Inc. in the spring of 1994. The regional ground water flow direction is north-northwest towards Walker Lake, but in the vicinity of Camp Jumbo the flow direction may be altered by the influence of pumping from supply wells.

2.0 SUMMARY OF SITE RISK

The only detection of contaminants at the Camp Jumbo UST sites were in the soil samples collected during the tank removals at the Camp-1, Camp-4, and Camp-5 excavations. No contamination was observed or detected in the soil samples collected from the Camp-2 or Camp-3 excavations. Soil samples collected during subsequent borings contained no quantifiable concentrations of the contaminants. Therefore, the area of soil impacted by leaking petroleum hydrocarbon compounds is limited to the near surface zone of less than 10 feet bgs in the vicinity of the Camp-1, Camp-4, and Camp-5 excavations.

The principal pathways for potential exposure to these contaminants are 1) through surface contact, and 2) through migration of these contaminants downward through the vadose zone to the ground water, followed by lateral advective movement in the saturated zone to a point of contact. The impacted soils have been covered with non-contaminated soils. Therefore, the first proposed pathway through surface contact has been eliminated. The second proposed pathway through migration to the ground water is evaluated below.

There are three principal processes that affect petroleum hydrocarbon contaminants in the vadose zone:

- The force of gravity will pull the free-phase liquid vertically downward. Infiltrating precipitation will accelerate the downward migration rate, however, the HWAD is in an arid climate where annual precipitation rates are low. Therefore, this leaching factor does not need to be considered.

- Adsorption of petroleum hydrocarbons compounds by soil particles reduces the mass fuel available for downward migration.

- Biodegradation of the fuel-contaminated soils by naturally occurring bacteria will reduce the mass of fuel available for downward migration.

A method of estimating the volume of fuel necessary to overcome the effects of adsorption and reach the water table is presented in the US Environmental Protection Agency's (EPA) document *Underground Technology Update, Volume 4, Number 4, August 1994.*

"Soil porosity and bulk hydrocarbon physical characteristics will determine the soil volume (Vs) necessary to immobilize a release (through adsorption)." This soil cubic yardage can be estimated by the following formula:

$Vs = (0.2) \times (Vhc)/(P) \times (RS)$, where;

Vhc is the volume of discharged hydrocarbons, in barrels (one barrel is equal to 44 gallons);

P is the effective soil porosity; and

RS is the residual saturation capacity.

The residual saturation capacity of soils is generally about 33 percent of the soil's water holding capacity. As stated in the EPA document, RS values for various hydrocarbon compounds are as follows:

- Light oil and gasoline = 0.1
- Used and fuel oil = 0.15
- Lube and heavy oil = 0.2

For this site where #2 diesel fuel was reportedly stored, the RS value of 0.15 will be used.

To calculate the minimum amount of hydrocarbon release needed to impact the ground water ($Vhc_{to\ impact}$) from a tank release at a depth of eight feet bgs, to the water table at 300 feet bgs, over a 400 square foot area (20 ft by 20 ft), the above equation may be used as follows:

$Vs = [(300\ ft) - (8\ ft)] \times 400\ ft^2 = 116{,}800\ ft^3 = 4{,}326$ cubic yards

P = 25 percent = 0.25 (assumed for medium to coarse sands and gravels)

RS = 0.15

$Vhc_{to\ impact} = (Vs) \times (P) \times (RS)/(0.2) = (4{,}326) \times (0.25) \times (0.15)/(0.2)$
$Vhc_{to\ impact} = 811$ barrels = 35,690 gallons

Therefore, the volume of a release from a depth of eight feet from the former USTs at the Camp Jumbo site that would be necessary for petroleum hydrocarbon compounds to impact the ground water at a depth of 300 feet is 35,690 gallons of #2 diesel fuel.

The soil sample collected from a depth of eight feet bgs was contaminated, however no contaminants were detected in the samples collected from depths of 10 and 25 feet. A conservative assumption of the depth of soil contamination is therefore 10 feet bgs. Assuming that all of the pore space in the soils within the 400 square foot area of the former excavations between the depths of six feet bgs (minimum impacted depth) and 10 feet bgs contained free-phase liquid fuel, the volume of mobile petroleum hydrocarbon compounds from the release ($Vhc_{max\ released}$) can be calculated using the same equations:

$Vs = [(10\ ft) - (6\ ft)] \times 400\ ft^2 = 1{,}600\ ft^3 = 59$ cubic yards

P = 25 percent = 0.25

RS = 0.15

$(Vhc_{max\ released}) = (Vs) \times (P) \times (RS)/(0.2) = (59) \times (0.25) \times (0.15)/(0.2)$
$(Vhc_{max\ released}) = 11$ barrels = 484 gallons

Therefore, the calculated maximum volume of mobile petroleum hydrocarbon compounds that may have impacted the soil from the released fuel is 484 gallons.

Since $Vhc_{to\ impact}$ (35,690 gallons) is considerably larger than $Vhc_{max\ released}$ (484 gallons), the calculated remaining mobile petroleum hydrocarbon compounds at the Camp Jumbo site does not appear to be sufficient for vertical migration of these compounds through the vadose zone. Based on these calculations, the adsorption of the fuel by the soil particles is sufficient to reduce the mass available for downward migration to the extent that the petroleum hydrocarbons compounds will not impact the ground water. Naturally occurring biodegradation, if present, will further reduce the mass of fuel available for migration. Therefore, the migration pathway to the ground water at this site does not likely exist.

These calculations show that there are no potential exposure pathways at the site that would pose a threat to human health or the environment. Therefore, it is recommended that the site be closed with regard to the release of fuel from the former USTs, without further remedial actions.

3.0 PUBLIC / COMMUNITY INVOLVEMENT

It is US Department of Defense (DOD) and Army policy to involve the local community throughout the investigation process at an installation. To initiate this involvement, HWAD has established a repository library in the local public library, that includes final copies of all past studies and documents regarding environmental issues at the facility. This repository will be maintained and updated with all future final documents as they are issued to HWAD.

HWAD has solicited community participation in establishment of the restoration advisory board (RAB). However, because of insufficient public response, HWAD has not formed a RAB. HWAD will continue to solicit community involvement, if sufficient community interest can be obtained.

4.0 DECLARATION

Based on the investigation data, petroleum hydrocarbon compounds as diesel are known to occur in the soils at concentrations above the HWAD basewide proposed closure goal (PCG) of 100 mg/kg for diesel, which has preliminary acceptance from the NDEP as lead agency for the site. However, based on the summary of risk in this document, it has been shown that there are no potential exposure pathways for this contamination to impact human health or the environment. Unless future information is forthcoming that would necessitate the reevaluation of this site, it is recommended that this site be closed with regard to the release of fuel from the former USTs with no further actions. Therefore, the selected remedy for this site is the no further action alternative.

The selected remedy is protective of human health and the environment, and a waiver can be justified for the Federal and State applicable or relevant and appropriate requirements (ARARs) that will not be met. It has been shown that a complete exposure pathway to human health and

the environment does not exist, and there is no potential for such an exposure pathway to be completed in the future.

9/12/96
Date

US ARMY

By: [signature]

Title: COMMANDER, HQUAD

10/3/96
Date

STATE OF NEVADA

By: [signature]

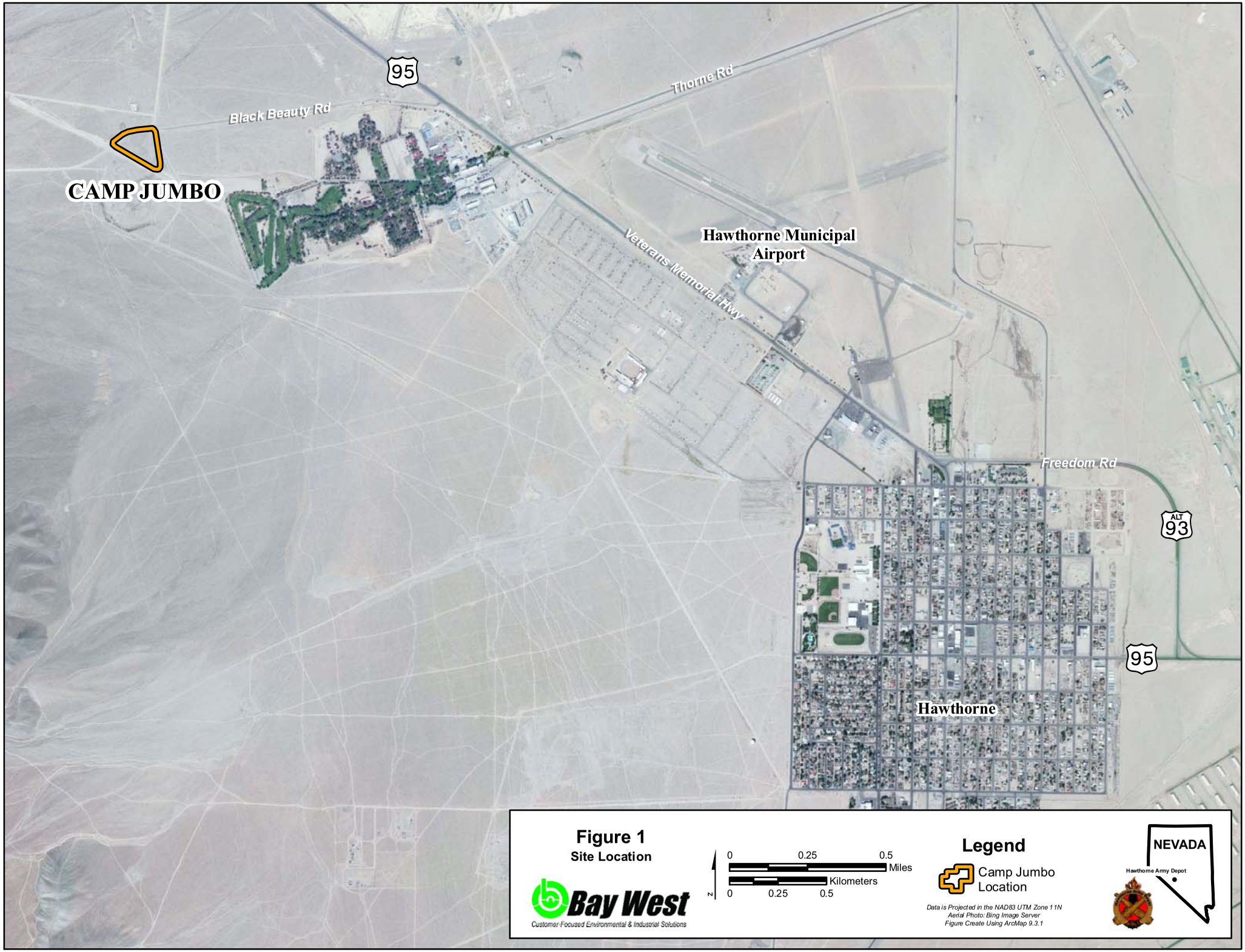
Title: EMS III

General References

Bramco Construction Corporation, September 26, 1991. Report of Closure of Inactive UST's.

USAEHA, 10-21, August 1992. Geohydrologic Study No. 38-26-KP66-92, Former Underground Storage Tank Sites, HWAAP, Hawthorne, Nevada.

US Environmental Protection Agency, August 1994. Underground Technology Update, Volume 4, Number 4.


95
Thorne Rd
Black Beauty Rd
CAMP JUMBO
Hawthorne Municipal Airport
Veterans Memorial Hwy
Freedom Rd
ALT 93
95
Hawthorne
Figure 1
Site Location
Bay West
Customer Focused Environmental & Industrial Solutions
0 0.25 0.5 Miles
0 0.25 0.5 Kilometers
N
Legend
Camp Jumbo Location
Data is Projected in the NAD83 UTM Zone 11N
Aerial Photo: Bing Image Server
Figure Create Using ArcMap 9.3.1
NEVADA
Hawthorne Army Depot

To Highway 95
Black Beauty Rd
Schweer Dr
Camp 4
Camp 3
Camp 2
Camp 1
Figure 1
Camp Jumbo - Site Features
Bay West
Customer Focused Environmental & Industrial Solutions
N
0
75
150
Feet
Meters
0
25
50
Legend
Camp Locations
(Assumed)
Data is Projected in the NAD83 UTM Zone 11N
Aerial Photo: Bing Image Server
Figure Create Using ArcMap 9.3.1
NEVADA
Hawthorne Army Depot

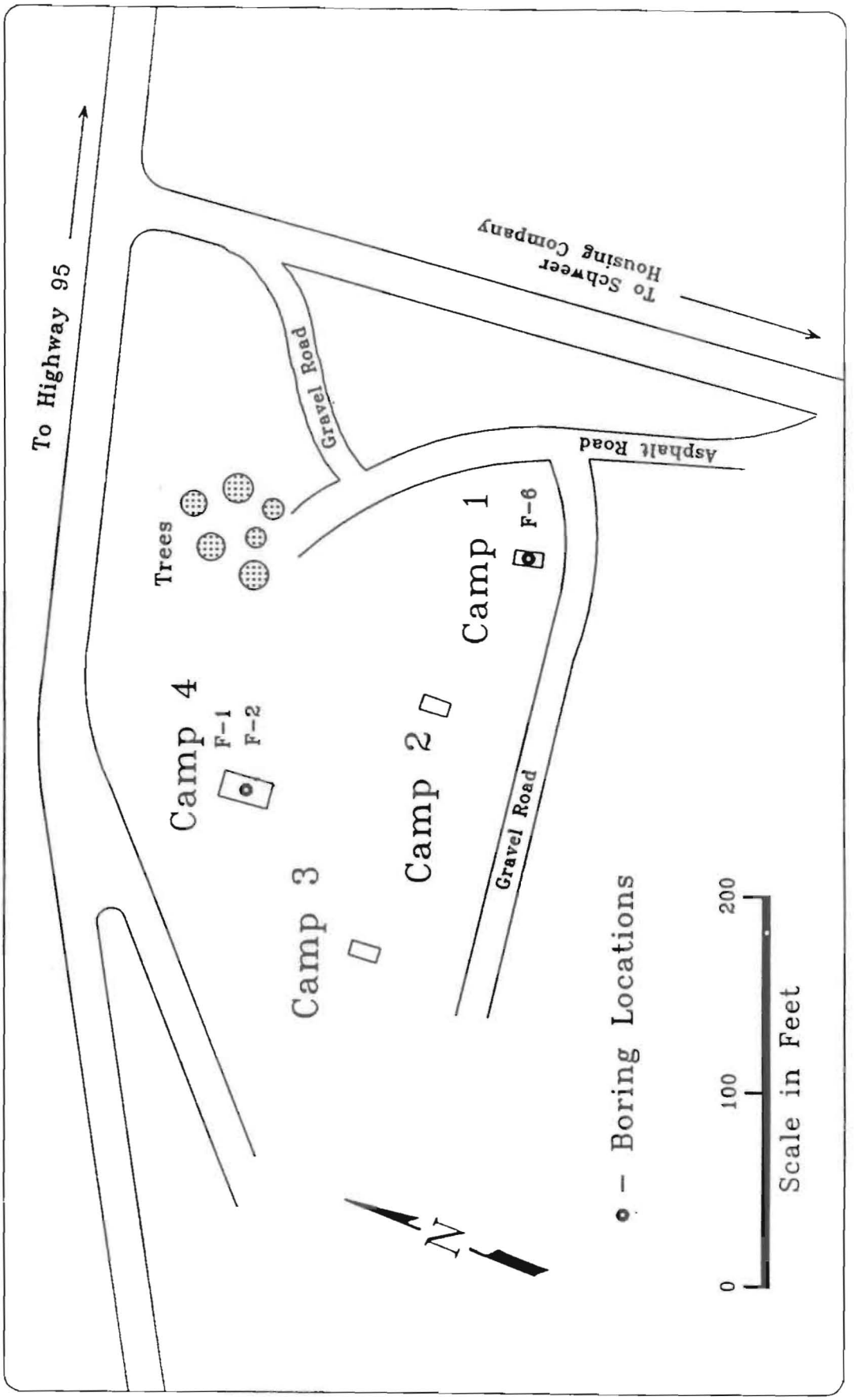
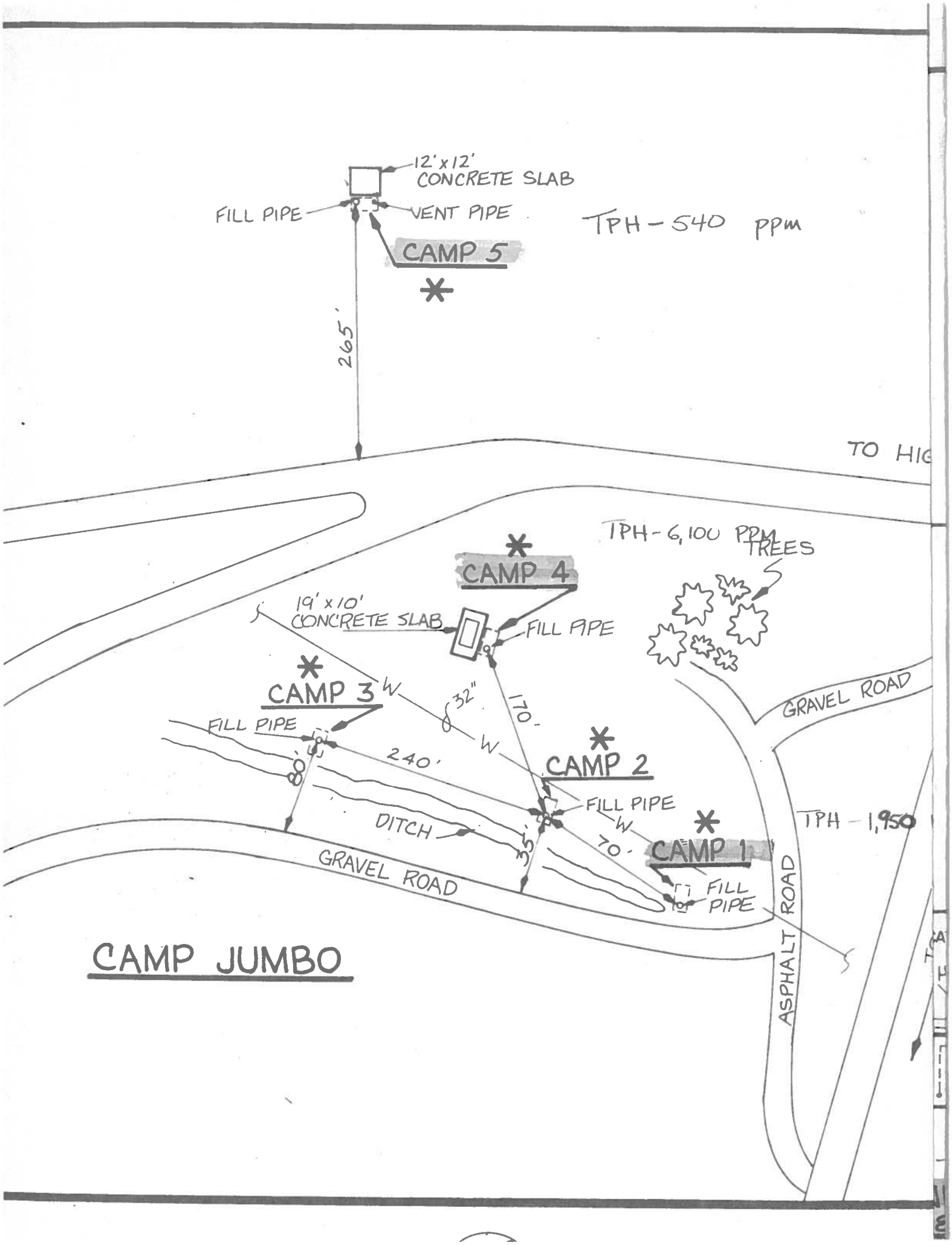


Figure 6
Boring Locations,
Camp Jumbo.


12' x 12'
CONCRETE SLAB
FILL PIPE
VENT PIPE
TPH - 540 ppm
CAMP 5
265'
TO HIG
TPH - 6,100 PPM
TREES
CAMP 4
19' x 10'
CONCRETE SLAB
FILL PIPE
CAMP 3
W
32"
170'
GRAVEL ROAD
FILL PIPE
240'
W
CAMP 2
FILL PIPE
DITCH
35'
W
70'
CAMP 1
TPH - 1,950
GRAVEL ROAD
FILL
PIPE
ASPHALT ROAD
CAMP JUMBO