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NAVAL BASE, NORFOLK
INSTALLATION RESTORATION
TECHNICAL REVIEW COMMITTEE MEETING
18 DEC 1991

WELCOME/ OPENING REMARKS (0900 - 0915)	Cherryl F. Barnett, P.E. Director, Environmental Programs Department
COMMUNITY RELATIONS (0915 - 0930)	John Peters Public Affairs Officer Atlantic Division, Naval Facilities Engineering Command
CAMP ALLEN LANDFILL (0930 - 1015)	Doug Dronfield Professional Geologist CH2M Hill
BREAK (1015 - 1030)	
BUILDING P-71 FORMER TRANSFORMER STORAGE AREA (1030 - 1115)	Doug Dronfield Professional Geologist CH2M Hill
Q DRUM STORAGE AREA (1115 - 1135)	Carol Bowers Certified Professional Geologist Environmental Science and Engineering
CD LANDFILL (1135 - 1155)	Carol Bowers Certified Professional Geologist Environmental Science and Engineering
BUILDING LP-20 (1155 - 1215)	Carol Bowers Certified Professional Geologist Environmental Science and Engineering

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SITE SUMMARY

Issue

Norfolk Naval Base, Sewells Point Naval Complex
Q Area Drum Storage Yard

Summary

Soil sampling indicates VOC and TPH contamination. VOC TCLP concentrations were below federal standards; however, more than 50 percent of the samples were above the VWCB TPH guidelines (100 ppm) for soil disposal.

Shallow groundwater samples indicate VOC, TPH, and metals contamination. A plume has formed beneath and west-southwest of the HM area. Potential ARARs were exceeded by TCE, PCE, and carbon tetrachloride. VWCB groundwater standards were exceeded for TPH, arsenic, cadmium, chromium, lead, and zinc. Deep groundwater indicated low levels of volatile organics.

Background

The site was created in the early 1950s by filling with dredged materials from Willoughby Bay. The drum storage yard has been in use since approximately that time, and tens of thousands of drums have been stored in that time. Types of drummed materials include petroleum, oil lubricants, various organic solvents, paint thinners, and some pesticides, formaldehyde, and acids.

Discussion: Remedial Investigation/Risk Assessment

36 soil borings, 8 shallow (25 feet) and 2 deep (45 feet) groundwater monitor wells were drilled in September 1989.

Total volatile concentrations in soils were generally less than 100 µg/kg. PCE was the only volatile detected in TCLP extracts, but was below Federal standards. More than half of the soil samples exceeded 100 ppm TPH within the fenced area of the site. Metal concentrations were slightly elevated compared to background samples; however, none were above Federal standards for TCLP.

Shallow groundwater samples from the northern portion of the site indicated volatile organic contamination. VWCB surface water standards for TCE and PCE were exceeded in one well and by carbon tetrachloride in two wells. TPH concentrations in one well ranged from 1 to 5 ppm, exceeding the VWCB 1 ppm groundwater standard. Groundwater standards for cadmium, chromium, lead, and zinc were exceeded in three wells. The groundwater standard for arsenic was exceeded in two wells.

Deep groundwater samples indicated low level volatile organic contamination (75 µg/l total VOAs). None exceeded VWCB surface water standards for non-public water supply (when available). However, the contaminants found in the deep

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well were also found in the adjacent shallow nested well, suggesting downward migration of contaminants.

Contaminant migration pathways include: air emissions, wind, surface water, and groundwater transport. Groundwater flow and transport modeling suggests an extraction system operating from one of two existing wells would capture most of the upgradient portion of the plume but would fail to capture much of the downgradient plume.

The risk assessment determined that risk to human receptors was of low probability and that chemicals in the soil should not cause significant groundwater contamination. However, it would be prudent to maintain controls over groundwater consumption. It is also extremely unlikely that organic chemicals at the site would impact aquatic receptors.

Feasibility Study

Four remedial alternatives were assembled for groundwater at the site:

- No action/institutional controls: remedial technologies includes long-term monitoring and water use restrictions
- Collection/onsite treatment/offsite discharge: remedial technologies include extraction wells, precipitation/flocculation, air stripping, and discharge to Willoughby Bay.
- Collection/offsite treatment: remedial technologies include extraction wells, precipitation/flocculation, and discharge to WTP
- Collection/onsite treatment/in-situ treatment/onsite discharge: remedial technologies include extraction wells, precipitation/flocculation, air stripping, aquifer reinjection, microbial degradation

Seven remedial alternatives were assembled for surface soil at the site:

- No action/institutional controls: remedial technologies include no action, land-use restrictions, and surface water run-off monitoring
- Source containment: remedial technology includes asphalt cap
- Removal/offsite disposal: remedial technologies include excavation and offsite permitted landfill disposal
- Removal/offsite treatment: remedial technologies include excavation and offsite low temperature thermal treatment
- Removal/onsite treatment/onsite disposal: remedial technologies include excavation, onsite low temperature rotary dryer treatment, and onsite disposal as clean fill
- Removal/onsite treatment/onsite disposal: remedial technologies include excavation, onsite solvent extraction, and onsite disposal as clean fill
- Removal/onsite treatment/offsite disposal: remedial technologies include excavation, soil solidification/stabilization, and offsite disposal as clean fill

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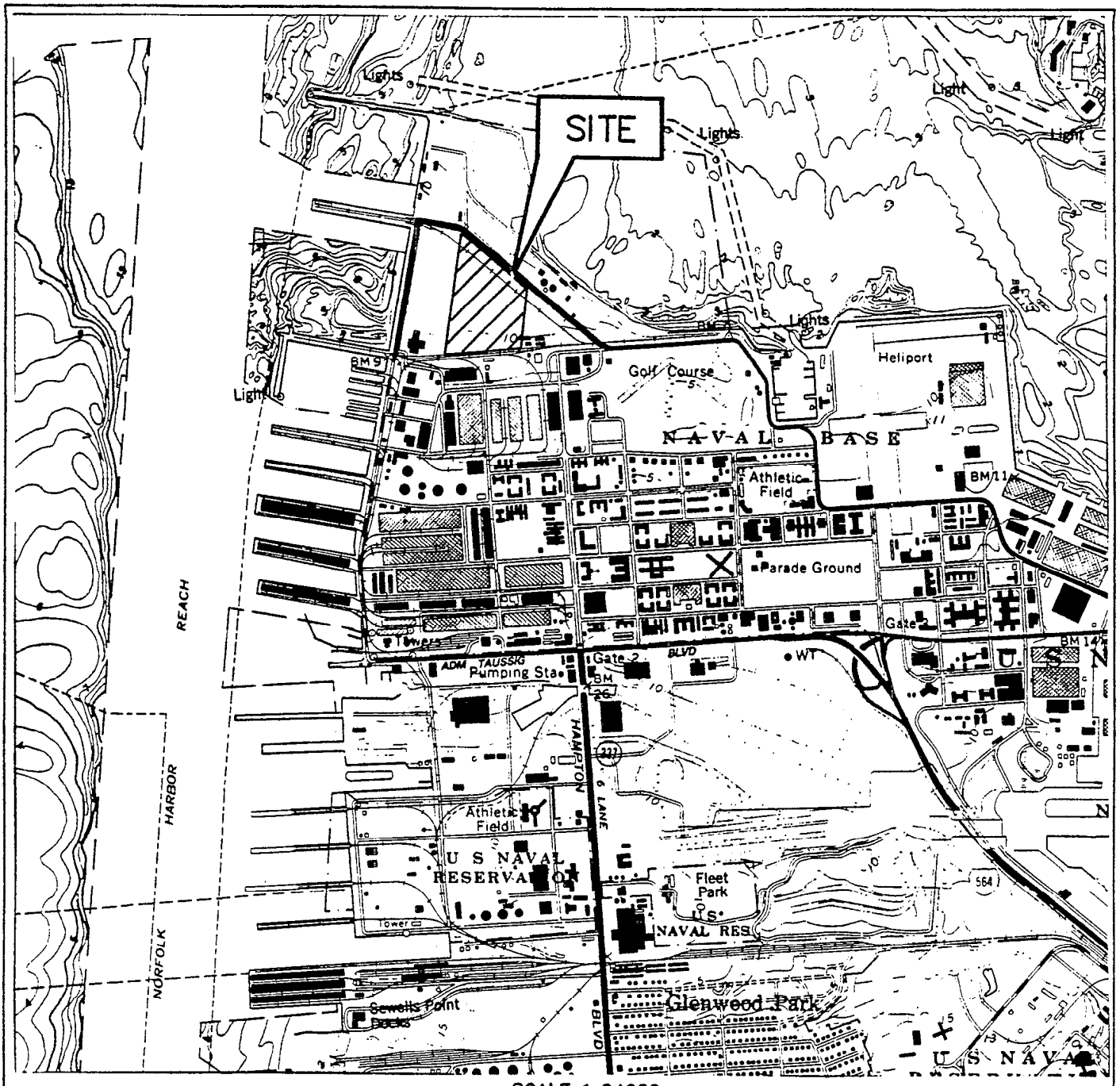

ESE Environmental Science & Engineering	DATE 6-3-91	SCALE SHOWN	TITLE Site Location Map – Q Area Drum Storage Yard – Norfolk Naval Base – Norfolk, Virginia
	DRAWN BY LAF	APPROVED BY	
	JOB NO. 4901107	DWG. NO./ REV. NO. 1 –	CLIENT LANTNAVFACENGCOM
			FIGURE 1–1

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SITE SUMMARY

Issue

CD Landfill at Norfolk Naval Base, Norfolk, Virginia

Summary

Seventeen groundwater and surface water samples were collected during two sampling events on 20 February and 10 June 1991. The samples were analyzed for cadmium, groundwater quality and indicator parameters. Analytical results indicate that the groundwater quality is being impacted beyond the allowable Virginia Water Control Board (VWCB) standards.

Twenty-nine soil and sediment samples were collected during the week of 20 February 1991 to potentially identify the lateral extent of contamination. Results indicate that cadmium and lead contamination in the soils and sediment exceed the solid waste boundaries. Vertical and horizontal contamination extent remain inconclusive.

Background

When the Navy purchased the site in 1974, landfilling activities began that year and ended in 1987. Records indicate that construction debris and other inert waste by-products (sandblasting grit, ash) were deposited. Samples from the surface water and sediment were collected from 26 January 1983 through 2 December 1985; cadmium was detected in both media. No other analytes were tested at that time.

Discussion

Soil samples were collected from six different soil boring locations; sediment samples were collected five different locations. The vertical and horizontal extent of contaminants remains inconclusive; however, data suggest that cadmium and lead exceed the solid waste boundary (drainage ditch).

Cadmium was not detected in any water samples. However, lead exceeded VWCB guidelines in four of the six groundwater samples collected during ESE's last sampling event. It appears the landfill is impacting the water quality of the shallow aquifer by exceeding total organic carbon (TOC) standards in two samples.

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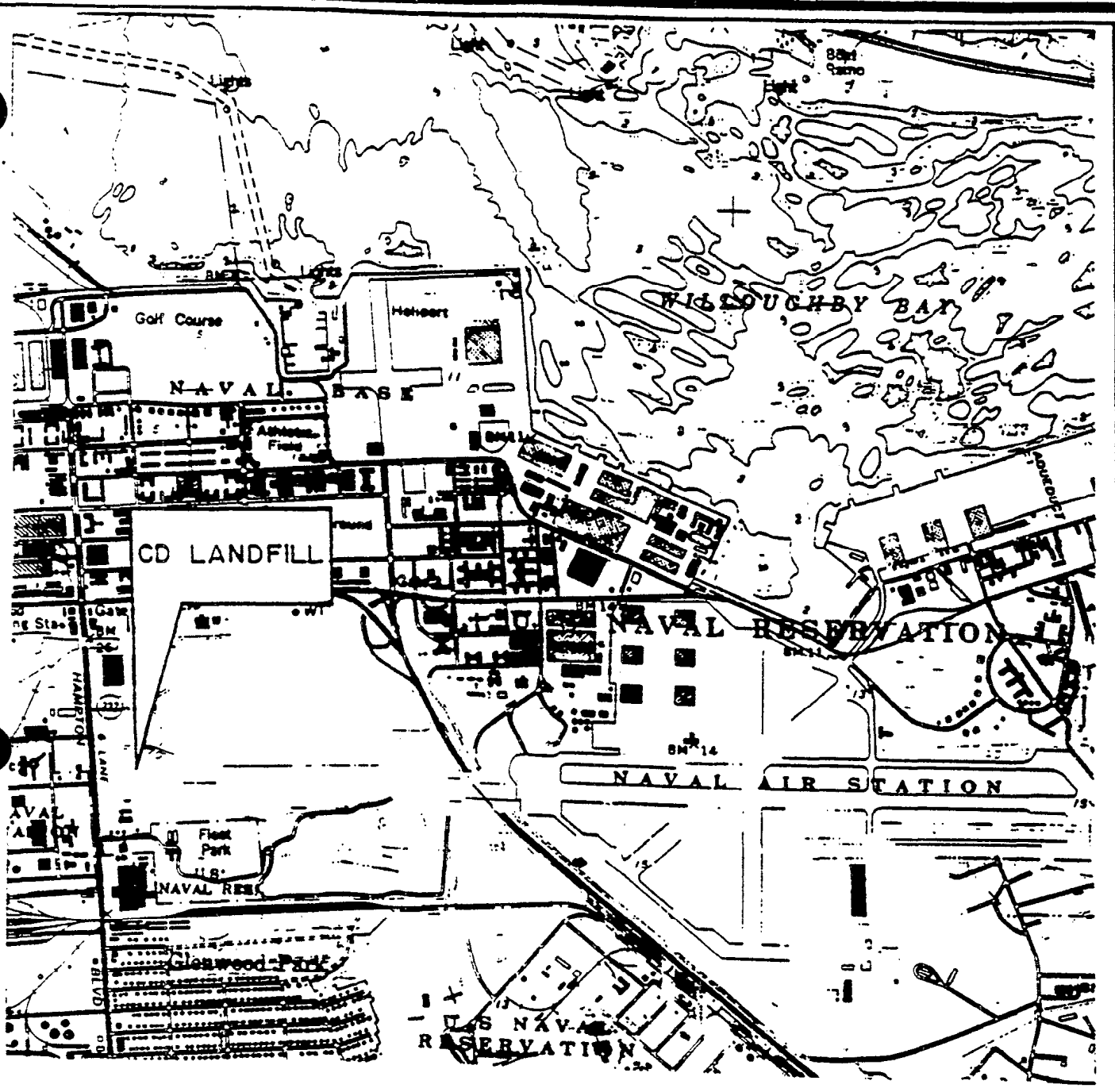

SCALE 1:24000

1 1/2 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 .5 0 1 KILOMETER

CONTOUR INTERVAL 10 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

MN GN

UTM GRID AND 1984 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

SOURCE: USGS 7.5 MINUTE SERIES NORFOLK NORTH QUADRANGLE

ESE Environmental Science & Engineering	DATE 7-29-91	SCALE SHOWN	TITLE SITE LOCATION MAP
	DRAWN BY LAF	APPROVED BY	
	JOB NO. 4901162	DWG. NO./ REV. NO. 1 –	CLIENT LANTNAVFACENGCOM CD LANDFILL
			FIGURE 1–1

SITE SUMMARY

Issue

LP-20 aircraft engine overhaul facility and former plating shop, NAS Norfolk

Background

LP-20 is a 90,000 ft^3 facility used for aircraft engine overhaul and maintenance where solvents such as TCE (and probably other solvents and cleansers) have been used during operations. Additionally, the building housed a metal plating shop. A listing of potential contaminants used at the facility was not available; TCE and PCE were identified during the investigation of a nearby fuel facility (which led to the need to identify the source of the solvents). Widespread jet fuel contamination was identified during those investigations. The facility has been in operation for a number of decades. Releases may have occurred from storage areas and through floor drains beneath the building.

Summary of Remedial Investigation (RI)

An interim (Phase I) RI was performed at the site. The investigation consisted of advancing six soil borings and collecting subsurface soil samples. Each boring was converted into a monitor well and groundwater samples collected from each of the six wells plus six existing wells. At the Navy's request, the investigation focused on the solvents rather than petroleum contamination.

Results

Soil

Analyses detected minor concentrations of solvents in four borings. The highest concentration observed was for toluene (55,000 ppb). Acetone was observed in the three wells ranging from 31 to 4500 ppb. TCE, 1,2-DCE, and 1,1-DCA were observed at concentrations below 50 ppb in one boring. Significant petroleum contamination was observed in four borings ranging from 2200 to 43,500 ppm.

Groundwater

Groundwater samples were collected in two rounds; 12 wells were sampled during the first round but only six during the second round, at the Navy's request. Seven chlorinated solvents (or daughter products) were detected in the samples, ranging in concentration from 8 ppb to 13,000 ppb for individual compounds.

The compounds included: TCE; PCE; 1,2-DCE; 1,1,1-TCA; 1,1-DCA; vinyl chloride; and chloroethane. Some BTEX compounds were also observed.

Some metals were also detected. Arsenic, chromium, lead, nickel, and zinc were all observed at concentrations ranging from not detected up to 187 ppb. Phenols

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were detected in six wells ranging from 1 ppb to 95 ppb. Cyanide was not detected in any wells.

The subsurface geology at the site consists of tan-grey sands and silty sands. A single unconfined water table aquifer system is located beneath the site; other aquifers may be located at depth. Flow is to the northeast and southeast from a groundwater ridge that is present beneath the building. The horizontal gradient is approximately 0.001 ft/ft.

Discussion

VWCB standards for surface water and/or groundwater were exceeded for a number of compounds. There are no groundwater standards for chlorinated solvents; the standards for surface water were used as a comparison guideline, since the aquifer is not allowed to be used as a source of drinking water.

Standards were exceeded for TCE, 1,1-DCA, and vinyl chloride; standards are not in place for 1,2-DCE and chloroethane.

Groundwater standards were exceeded for a number of metals including chromium, lead, and zinc.

The groundwater standard for phenols was exceeded in all of the wells sampled for phenols.

Two groundwater contaminant plumes have developed; one to the northeast and one to the southeast.

Potential sources for the solvents include the industrial waste sewer (IWS) lines and floor pits, pipes, and drums located within and around the facility.

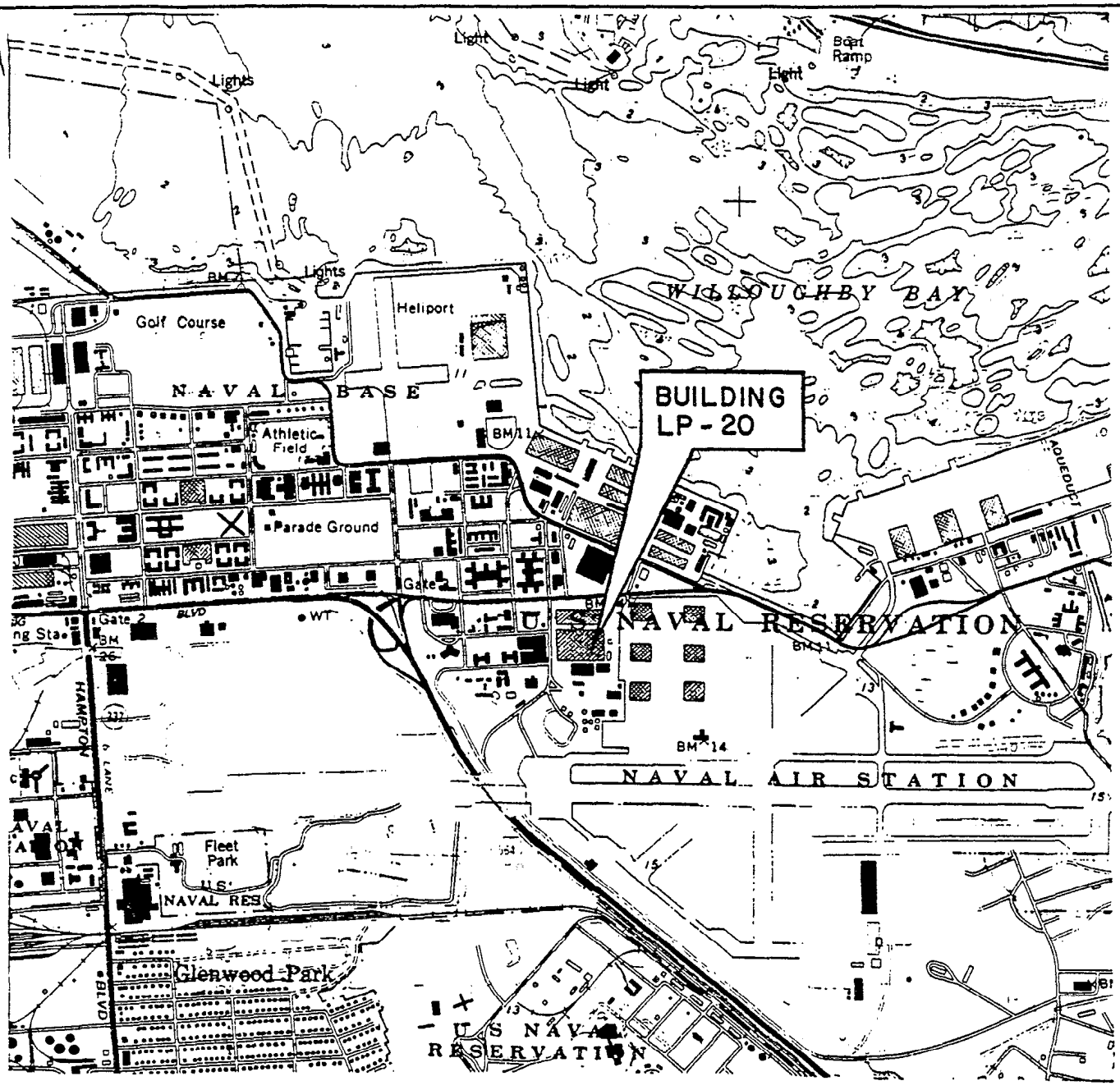
Additional Actions Required

Additional soil characterization needs to be undertaken to locate sources of solvents, extent of soil contamination, and groundwater plumes. Additional borings and other testing will be required.

The groundwater will also need to be further characterized. Deeper wells will be needed to characterize lower aquifers if they are located and additional shallower wells will be required to delineate the lateral extent of the plumes.

Aquifer testing and groundwater modeling should be performed to evaluate the hydrogeologic characteristics of the aquifer.

The information gained should then be used to compile the Risk Assessment, Final RI Report and Feasibility Study.



Environmental Science & Engineering	DATE 7-29-91	SCALE SHOWN	TITLE SITE LOCATION MAP
	DRAWN BY LAF	APPROVED BY	
	JOB NO. 4901161	DWG. NO./ REV. NO. 1 –	CLIENT LANTNAVFACENGCOM LP-20
			FIGURE 1-1

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Public Affairs Office
NAVFAC Atlantic
6506 Hampton Blvd.
Norfolk, VA 23508-1278

757-322-8005
NFECL_PAO@navy.mil