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FEASIBILITY STUDY
SITE 20 – AREA A WEAPONS CENTER
NAVAL SUBMARINE BASE, NEW LONDON
GROTON, CONNECTICUT

Comprehensive Long-Term
Environmental Action Navy Contract

Contract No. N62472-92-D-1296
Contract Task Order No. 0090

Prepared for

Department of the Navy
Northern Division
Naval Facilities Engineering Command
10 Industrial Highway
Mail Stop No. 82
Lester, Pennsylvania 19113-2090

Prepared by

EA Engineering, Science, and Technology
The Maple Building
3 Washington Center
Newburgh, New York 12250

June 2000
FINAL
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23 June 2000

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FINAL
296.0090

QUALITY REVIEW STATEMENT

Contract No. N62472-92-D-1296 EA Project Number: 29600.90.3650
Contract Task Order No. 0090
Activity: Naval Submarine Base, New London, Groton, Connecticut

Description of Report/Deliverable:

Final Feasibility Study, Site 20 – Area A Weapons Center, Naval Submarine Base, New London, Groton, Connecticut

EA CTO Manager: Charles E. McLeod, Jr., P.E.

In compliance with EA's Quality Procedures for review of deliverables outlined in the Quality Management Plan, this final deliverable has been reviewed for quality by the undersigned Senior Technical Reviewer(s). The information presented in this report/deliverable has been prepared in accordance with the approved Implementation Plan for the Contract Task Order (CTO) and reflects a proper presentation of the data and/or the conclusions drawn and/or the analyses or design completed during the conduct of the work. This statement is based upon the standards identified in the CTO and/or the standard of care existing at the time of preparation.

Senior Technical Reviewer

26 June 2000

Geoffrey A. Tizard, P.E. (Date)
Senior Engineer

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LIST OF ACRONYMS AND ABBREVIATIONS

ARAR	Applicable or relevant and appropriate requirements
BERA	Baseline ecological risk assessment
bgs	Below ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CGS	Connecticut General Statutes
cm/sec	Centimeter/second
COC	Constituent(s) of concern
CTDEP	Connecticut Department of Environmental Protection
DDD	4,4'-Dichlorodiphenyldichlorethane
DDE	4,4'-Dichlorodiphenyldichlorethylene
DDT	4,4'-Dichlorodiphenyltrichloroethane
EA	EA Engineering, Science, and Technology
ELUR	Environmental land use restriction
EPA	(U.S.) Environmental Protection Agency
FS	Feasibility study
ft	Feet
GRA	General Response Action
HHRA	Human health risk assessment
HI	Hazard indices
HQ	Hazard quotient
ICDEC	Industrial/Commercial Direct Exposure Criteria
in.	Inch
mg/kg	Milligrams per kilogram
mg/L	Milligrams per liter
μg/kg	Microgram per kilogram
μg/L	Microgram per liter
μg/m	Microgram per meter
mi	Mile
mi^2	Square miles
mph	Miles per hour

NSB NLON	Naval Submarine Base, New London
NCP	National Oil and Hazardous Substance Contingency Plan
NPDES	National Pollutant Discharge Elimination System
O&M	Operations and maintenance
OSWER	Office of Solid Waste and Emergency Response
PAH	Polycyclic aromatic hydrocarbons
PCB	Polychlorinated biphenyls
PMC	Pollutant Mobility Criteria
PRG	Preliminary Remediation Goal(s)
RAO	Remedial Action Objective(s)
RBC	Risk-based concentrations
RCRA	Resource Conservation and Recovery Act
RCSA	Regulations of Connecticut State Agencies
RDEC	Residential Direct Exposure Criteria
Redox	Reduction/oxidation
RI	Remedial investigation
RSR	Remediation Standard Regulations
SARA	Superfund Amendments and Reauthorization Act
SPLP	Synthetic Precipitation Leachate Procedure
SVE	Soil vapor extraction
SVOC	Semivolatile organic compound(s)
TCLP	Toxicity Characteristics Leachate Procedure
TPH	Total petroleum hydrocarbons
UCL	Upper confidence limit
UF	Uncertainty factors
USC	United States Code
VOC	Volatile organic compound(s)
yd^3	Cubic yards

EXECUTIVE SUMMARY

ES.1 SCOPE

This Feasibility Study (FS) was conducted by EA Engineering, Science, and Technology for Northern Division, Naval Facilities Engineering Command in accordance with Contract Task Order 0090, under Contract No. N62472-92-D-1296. The primary objective of the FS was to develop and evaluate potential remedial alternatives for addressing impacted soil and sediment at Site 20 – Area A Weapons Center of the Naval Submarine Base, New London, Connecticut (NSB NLON). A base-wide ground-water operable unit will be addressed under a separate FS. This FS builds upon the findings of a remedial investigation that identified Drainage Areas 1 and 3 as the primary sources for constituents of concern (COCs) for impacted soil and sediment at the site.

The FS was conducted in accordance with the Navy's Installation Restoration Program, which closely follows the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986.

ES.2 BACKGROUND

Pursuant to CERCLA/SARA, the U.S. Environmental Protection Agency placed NSB NLON on the National Priorities List on 28 August 1991 due to the identification of uncontrolled hazardous waste sites. Site 20 is located in the northeast portion of NSB NLON and is contiguous with the northwestern edge of Area A Wetlands. The site is characterized by three discrete drainage areas. Stormwater runoff generally drains offsite to the west through the adjacent wetlands toward the Thames River. Ground water present in both the overburden and the bedrock underlying Site 20 flows toward the southwest. The Connecticut Department of Environmental Protection has classified ground water at Site 20 as GB (indicating that the area has been used for long-term, intense industrial or commercial development, and the ground water is not used as a drinking water source). The Area A Weapons Center is well developed and consists of Building 524 situated on top of a bedrock high and the weapons storage bunkers located adjacent to the wetlands. During a 1992 site inspection, it was determined that Building 524 was primarily used for administration, minor torpedo assembly, and storage of simulator torpedoes. The weapon bunkers were used for storage of liquid fuel such as Otto fuel (a liquid fuel propellant), JP-10 (a liquid fuel propellant), kerosene (TH Dimer), and storage of live torpedoes and missiles. Currently, the bunkers are used for the storage of live and simulator torpedoes and missiles. Building 524 is not part of the area addressed in this FS.

Based on the results of the remedial investigation, Site 20 is characterized by relatively low concentrations of COCs, limited COC mobility, and low risks to human health. The primary COCs impacting shallow soil and sediment include the following polycyclic aromatic hydrocarbons and inorganic constituents:

- **Sediment**—Arsenic, antimony, cadmium, chromium, manganese, vanadium, benzo(a)pyrene, benz(a)anthracene, benzo(b)fluoranthene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene

- **Shallow soil**—Arsenic, benzo(a)pyrene, benzo(b)fluoranthene, chrysene

- **Total soil**—Arsenic, benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, dibenz(a,h)anthracene.

Concentrations of benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and chrysene exceeded Connecticut Pollutant Mobility Criteria. Concentrations of benz(a)anthracene and benzo(b)fluoranthene exceeded the Connecticut Residential Direct Exposure Criteria. No COCs exceeded the Industrial/Commercial Direct Exposure Criteria. Concentrations of arsenic in soil and benzo(a)pyrene in sediment exceeded human health risk-based Preliminary Remediation Goals.

The results of the ecological risk assessment conducted during the remedial investigation indicated that with the exception of soil invertebrates, potential risks exist for terrestrial receptors using this area, assuming that the Area A Weapons Center provides a suitable habitat and forage. However, because of the site development and use, the area does not provide a habitat capable of supporting ecological receptors. Considering these factors, it is concluded that the Area A Weapons Center represents little potential risk to ecological receptors that might utilize this area. Although unlikely, sediment COCs have the potential to impact ecological receptors inhabiting the adjacent wetlands due to potential transport of drainage swale sediment from Site 20. This potential migration is addressed via development of the Remedial Action Objectives.

ES.3 REMEDIAL GOALS FOR SITE 20

Federal and state applicable or relevant and appropriate requirements were identified for developing and evaluating remedial alternatives for Site 20. Preliminary Remediation Goals, which serve as potential cleanup criteria for impacted soil and sediment, were developed from the human health risk assessment conducted during the remedial investigation, as well as the Connecticut Department of Environmental Protection's Direct Exposure Criteria and Pollutant Mobility Criteria.

The following Remedial Action Objectives were developed based on results of the human health and ecological risks assessments, as well as a comparison of COC data to Preliminary Remediation Goals:

1. Minimize potential human exposure to COCs above Connecticut Remediation Standard Regulations in soil and risk-based Preliminary Remediation Goals in soil and sediment under the current industrial and future residential land use scenarios

2. Minimize the potential migration of COCs above Pollutant Mobility Criteria in soil into ground water

3. Minimize potential future overland transport of COCs from the three drainage areas into the Area A Wetlands and the Area A Downstream watercourses.

In order to achieve these Remedial Action Objectives, the following General Response Actions were evaluated:

- No action (required for consideration by the National Contingency Plan as a comparative baseline)
- Institutional controls for soil and sediment
- Soil and sediment containment
- Source area removal
- *In situ* soil and sediment treatment
- *Ex situ* soil and sediment treatment
- Disposal.

ES.4 REMEDIAL ALTERNATIVES FOR SITE 20

Various standard and innovative environmental remediation technologies that address the General Response Actions were screened based on their effectiveness and implementability for the specific conditions at Site 20. Several remedial alternatives were then developed from the technologies and process options that were retained from the initial screening. The remedial alternatives developed for Site 20 to meet the Remedial Action Objectives for various cleanup scenarios are as follows:

- Alternative 1: No Action

- Alternative 2: Institutional Controls and Monitoring

- Alternative 3a: Selective Excavation, Asphalt Batching or Offsite Disposal, and Institutional Controls and Monitoring (More Stringent of Remediation Standard Regulations or Industrial 10^{-5} Risk-Based Preliminary Remediation Goal Scenario for Soil and Industrial 10^{-5} Risk-Based Preliminary Remediation Goals for Sediment)

- Alternative 3b: Selective Excavation, and Asphalt Batching or Offsite Disposal (More Stringent of Remediation Standard Regulations or Residential 10^{-5} Risk-Based Preliminary Remediation Goal Scenario for Soil and Residential 10^{-5} Risk-Based Preliminary Remediation Goals for Sediment).

Pursuant to U.S. Environmental Protection Agency guidance, the remedial alternatives were evaluated with respect to the following National Contingency Plan evaluation criteria:

1. Overall Protection of Human Health and the Environment
2. Compliance with Applicable or Relevant and Appropriate Requirements
3. Long-Term Effectiveness and Permanence
4. Reduction of Toxicity, Mobility, and Volume through Treatment
5. Short-Term Effectiveness
6. Implementability
7. Cost.

The last two National Contingency Plan evaluation criteria, State Acceptance and Community Acceptance, were not addressed in the FS but will be addressed during preparation of the Record of Decision. Prior to the Record of Decision, the Navy will present the preferred remedial alternative for Site 20 in a Proposed Plan for public review and comment.

1. INTRODUCTION

This Feasibility Study (FS) was conducted by EA Engineering, Science, and Technology (EA) for Northern Division, Naval Facilities Engineering Command in accordance with Contract Task Order 0090, under Contract No. N62472-92-D-1296. The FS identified and evaluated remedial alternatives for Area A Weapons Center (Site 20) at the Naval Submarine Base, New London, Connecticut (NSB NLON) (Figure 1-1). The FS builds upon the findings of the Phase II Remedial Investigation (RI) completed for Site 20 (Brown & Root 1997).

The FS was conducted in accordance with the Navy's Installation Restoration Program, which closely follows the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986. The original framework for a FS was established under the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (40 Code of Federal Regulations [CFR] Part 300).

1.1 FEASIBILITY STUDY OBJECTIVES

1.1.1 Purpose

The purpose of the FS was to develop and evaluate potential remedial alternatives for addressing impacted soil and sediment at Site 20 of NSB NLON based upon information obtained during previous investigations. This FS does not address ground water at Site 20. A base-wide ground-water operable unit will be addressed under a separate FS. The U.S. Navy, the U.S. Environmental Protection Agency (EPA), and the Connecticut Department of Environmental Protection (CTDEP) will select a remedial action for Site 20. The Record of Decision will be based on the findings of this FS and a proposed remedial action plan that will be issued for public comment subsequent to this FS.

1.1.2 Scope

The FS was based upon the results of environmental studies presented in the RI that investigated soil, sediment, ground water, and surface water within Drainage Areas 1, 2, and 3 at Site 20. The RI identified Drainage Areas 1 and 3 as the primary sources for constituents of concern (COCs) for impacted soil and sediment at Site 20. The FS addresses potential risks to human health and the environment and elevated COC concentrations in soil and sediment in all three drainage areas at Site 20. Remedial alternatives that address the three site drainage areas were identified and screened in accordance with federal, state, and local applicable or relevant and appropriate requirements (ARARs) and To Be Considered regulatory guidelines.

1.1.3 Report Organization

This report is divided into the following chapters:

- **Chapter 1, Introduction**—Outlines the purpose and scope of the FS and summarizes the background information and physical characteristics of Site 20. This chapter also includes a summary of relevant findings from previous investigations.

- **Chapter 2, Development of Remedial Goals**—Provides an overview of the FS evaluation process; identifies the chemical-, location-, and action-specific ARARs; develops Preliminary Remediation Goals (PRGs); defines the Remedial Action Objectives (RAOs); and identifies General Response Actions (GRAs) for the environmental media of concern and the identified COCs.

- **Chapter 3, Identification and Screening of Technology Types and Process Options**—Presents an evaluation of potential remedial technologies and process options for remediation of COC-impacted soil and sediment at Site 20.

- **Chapter 4, Development and Detailed Analysis of Remedial Alternatives**—Begins with a development of remedial alternatives based upon the technologies that were retained from the screening process in Chapter 3. This chapter then presents a detailed evaluation and comparative analysis of each of the remedial alternatives with respect to seven of the nine NCP evaluation criteria.

1.2 BACKGROUND INFORMATION

This section contains a description of Site 20 and a summary of the environmental investigations completed by the Navy.

1.2.1 Naval Submarine Base, New London: Site 20 – Area A Weapons Center

1.2.1.1 Location

NSB NLON is located in southeastern Connecticut in the Towns of Ledyard and Groton (Figure 1-2). The facility is situated on the eastern bank of the Thames River, approximately 6 mi north of Long Island Sound. NSB NLON is bordered to the east by Connecticut Route 12, to the south by Crystal Lake Road, and to the west by the Thames River. The northern border is a low ridge that trends approximately east/southeast from the Thames River to Baldwin Hill. The City of New London is located on the western bank of the Thames River.

Site 20 at NSB NLON is located in the northeastern portion of the base, contiguous to the northwestern edge of Area A Wetland and at the southeastern end of Triton Avenue. The Area A Weapons Center consists of Building 524 and the southern bunker area (Figure 1-3). Building

524 is located near the top of a local topographic and bedrock high. The southern area bunkers are located southeast and downhill of Building 524 adjacent to the Area A Wetland. No impacted soil or sediment was identified at Building 524; therefore, this building is not included in this FS. Site 20 consists of three drainage areas in the southern bunker area, identified as Drainage Areas 1, 2, and 3.

1.2.1.2 History

In 1867, the State of Connecticut donated a 112-acre parcel of land on the eastern bank of the Thames River to the Navy. In 1868, the Navy officially designated the property as a Navy Yard. The Navy Yard was used to moor small craft and obsolete warships, and served as a coal fueling station for the Atlantic fleet. The Navy designated the facility as a submarine base in 1916. During World War I, facilities at the base were extensively expanded as 6 piers and 81 buildings were added. In 1917, a submarine school was established, and the following year the Submarine Medical Center was founded.

Between 1935 and 1945, the Navy constructed more than 180 buildings at the base and acquired additional adjacent land that increased the area occupied by the base from 112 acres to 497 acres. The growth of NSB NLON continued after World War II; and in 1946, a Medical Research Laboratory was established at the site.

In 1968, the status of the Submarine School was changed from an Activity to a Command, and the school became the largest tenant on the base. The Naval Submarine Support Facility was established in 1974, and the Naval Undersea Medical Institute was established the following year. Currently, NSB NLON consists of more than 300 buildings on 576 acres of land.

Pursuant to CERCLA/SARA, the EPA placed NSB NLON on the National Priorities List on 28 August 1991 due to the identification of uncontrolled hazardous waste sites. The National Priorities List is a list of uncontrolled or abandoned hazardous waste sites identified by EPA as requiring priority remedial actions.

In January 1995, the Navy, EPA, and the State of Connecticut signed the Federal Facilities Agreement for NSB NLON. The Federal Facilities Agreement was established to ensure that environmental impacts associated with past and present activities at NSB NLON are thoroughly investigated and that the appropriate remedial action is pursued to protect human health and the environment. In addition, the Federal Facilities Agreement establishes a procedural framework and timetable for developing, implementing, and monitoring appropriate responses at NSB NLON in accordance with CERCLA/SARA, the NCP, the Resource Conservation and Recovery Act (RCRA), the Hazardous and Solid Waste Amendment of 1984, Executive Order 12580, and applicable state laws.

The 23-acre Area A Wetland borders the south and southeast side of Site 20. Until the 1950s, this area was undeveloped, wooded land. In the late 1950s, dredge material from the Thames

River was pumped upgradient into this area and contained by an earthen dike that extends from the Area A Landfill to the south side of the Area A Weapons Center. A combination of the fine-grained dredged sediment and the elevated water table (caused by the damming of the stream) has created this large wetland. Based on the boring logs, the total volume of dredged material that was deposited into this area was approximately 1,170,000 yd^3 (Atlantic 1992). The Area A Wetland currently supports standing surface water much of the year. However, the wetland is dominated by an invasive reed, *Phragmites australis.* In the 1960s/1970s, the Navy often placed pesticides in this marsh as a mosquito control practice (Brown & Root 1997).

Building 524, the Area A Weapons Center, was constructed in 1990/1991. Prior to construction, the site was mainly woodlands. Portions of the site were blasted to remove bedrock during construction. The southern area of the weapons storage bunkers was first evident in aerial photographs from 1969, and the northern area was evident in February 1974 (Brown & Root 1997).

The drainage area bunkers were reconstructed in the mid-1980s. Part of the reconstruction involved removal of structurally unsuitable soil from the site, most likely dredge spoils associated with the Area A Wetland. Prior to offsite disposal, the material, excavation, and ground water were sampled and analyzed for metals, volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), cyanide, 4,4'-dichlorodiphenyltrichloroethane (4,4'-DDT), and total petroleum hydrocarbons (TPHs). Cyanide, TPHs, and various metals were detected in the samples of the material being disposed. However, the Phase II RI completed in 1997 did not identify cyanide or TPH as COCs in soil or sediment at Site 20. The results of the Phase II RI are summarized in Sections 1.2.2 (Previous Investigations) and 1.4 (Nature and Extent). Comparison of available COC concentration data to cleanup goals is presented in Section 2.4.

1.2.1.3 Operations

NSB NLON currently provides base command for Naval submarine activities in the Atlantic Ocean. It also provides housing for Navy personnel and their families and supports submarine training facilities, military offices, medical facilities, and facilities for submarine maintenance, repair, and overhaul.

On 11 September 1992, an inspection was performed at Site 20 during the Phase I RI (Atlantic 1992). Building 524 was used for administration, minor torpedo assembly, and storage of simulator torpedoes. No weapon production took place in Building 524. Chemicals and chemical waste generated in the building were stored in 1- to 5-gal containers in seven metal storage cabinets located on a paved area to the south of the building. Chemicals used included cleaning and lubricating compounds, paints, and adhesives classified as corrosive or flammable materials. There was liquid fuel stored in the weapons bunkers including Otto Fuel (a liquid fuel propellant), JP-10 (a liquid fuel propellant), and TH Dimer (kerosene). The waste storage and

management practices appeared to be acceptable (Brown & Root 1997). Currently, the bunkers are used for the storage of live and simulator torpedoes and missiles.

1.2.2 Previous Investigations

1.2.2.1 Initial Assessment Study

In 1982, the Navy conducted an Initial Assessment Study (Envirodyne 1983) of NSB NLON as part of the Navy Assessments and Control of Installation Pollutants. The purpose of the Initial Assessment Study was to identify and evaluate past hazardous waste disposal practices and to assess the potential for environmental contamination. At that time, the Area A Weapons Center was not identified as a potential site that may contain hazardous substances and was, therefore, not investigated.

1.2.2.2 Remedial Investigations

The Navy completed a Phase II RI in 1997. The investigation consisted of soil, ground-water, surface water, and sediment samples collected from Drainage Areas 1, 2, and 3. Samples were also collected in the vicinity of the site as part of the Area A Wetland investigation.

A total of 10 soil, 15 sediment, and 2 surface water samples were collected, as well as two rounds of ground-water sampling. Ground-water samples were collected from 4 overburden monitoring wells. Table 1-1 summarizes the Phase II RI sampling and analytical program. As a result of sampling data, the Phase II RI recommended Site 20 proceed to an FS to evaluate a "limited action" effort consisting of a ground-water monitoring program and possibly access/use restrictions.

The Phase II RI reported that phthalate esters and PAHs were the primary chemicals detected. Various soil, sediment, ground-water, and surface water samples had reported COC concentrations that exceeded the Connecticut remediation standards and federal Maximum Contaminant Levels. Sediment COCs were identified in the RI by comparison of the detected concentrations of inorganic chemicals to the Ontario Ministry of Environment Lowest Effect Level and Severe Effect Level and comparison of non-polar organic compounds to (EqP) model estimates of biological availability. Cadmium and zinc reported at one surface water sampling location in the Area A Wetland within Drainage Area 3 exceeded the acute Connecticut Ambient Water Quality Criteria for aquatic life. Arsenic exceeded the Ambient Water Quality Criteria for organism consumption. Soil COCs were identified by comparison of measured concentrations of chemicals to Pollutant Mobility Criteria (PMC), Industrial/Commercial Direct Exposure Criteria (ICDEC), and Residential Direct Exposure Criteria (RDEC). The Phase II RI identified the following potential COCs in soil: arsenic, benz(a)anthracene, benzo(a)pyrene, and benzo(b)fluoranthene.

The Phase II RI indicated that there is limited impact to ground-water and surface water at Site 20 (Brown & Root 1997).

The Phase II RI identified two major areas of impacted soil and sediment at Site 20: Drainage Area 1 and Drainage Area 3. Chemical concentrations in Drainage Area 2 were generally lower than concentrations in the other two areas (Brown & Root 1997).

1.3 PHYSICAL CHARACTERISTICS OF THE SITE

This section provides a summary of the general physical characteristics of NSB NLON, and specifically at Site 20, such as the topography and surface features, climate and meteorology, surface water quality and hydrology, soil characteristics, geology, and hydrogeology.

1.3.1 Climate Characterization

Southeastern Connecticut is in the northern temperate zone. The climate is influenced by cold and dry continental-polar air during the winter and warm, humid maritime air during the summer. During the winter, this region is located near the Polar Front boundary, which separates regions of cold, dry continental-polar air and warm, moist tropical air. The area experiences extensive winter storm activity and variable daily temperatures. During the summer, the Polar Front boundary is located farther north, and the region experiences warm weather.

The prevailing winds are southwesterly from the continent and bring most of the weather into the region. Land-sea breezes are also present in the region. Occasional storms moving northward along the Mid-Atlantic Coast provide strong northeasterly winds and storms, commonly known as "coastals" or "nor'easters." Storms are extensive, with heavy rainfall, and are occasionally of hurricane intensity. Dense fog is frequently advected onshore from the Atlantic Ocean from the spring through the fall (NOAA 1988).

The average annual temperature at New London, Connecticut, is approximately 50°F. Average monthly temperatures vary from 58 to 72°F in July/August to 23 to 30°F in January/February. The average wind speed is approximately 10 mi per hour (mph). Precipitation ranges from 32 to 65 in. of water per year and averages approximately 44 in. per year, as measured at New London over an 81-year period. The greatest amount of precipitation generally occurs in March and August and the least in June and September. Evaporation averages approximately 23 in. per year (NFEC 1988).

1.3.2 Demography and Land Use

The Phase I RI (Atlantic 1992) reported that several communities are located within 1 mi of NSB NLON. According to the U.S. Bureau of the Census, three neighborhoods in the Town of Groton lie adjacent to or within NSB NLON. The neighborhood boundaries are as follows with the population figures based on data from the 1980 census:

- **Northeast**—This community of 5,520 people is located adjacent to NSB NLON on the eastern side of Route 12 from the Groton/Ledyard town line to Walker Hill Road on the south. The neighborhood extends westward to the Ledyard Reservoir.

- **Pleasant Valley**—This community of 4,374 people borders the southern boundary of NSB NLON. The neighborhood is bounded by Connecticut Route 12 on the east and by the Thames River on the west. The southern boundary is Grove Street and Walker Hill Road.

- **NSB NLON**—This community of 4,099 people is considered a neighborhood in Groton, although portions of it are located in Ledyard.

Site 20 is located just west of the Baldwin Hill neighborhood. The Gales Ferry section of Ledyard is located adjacent to NSB NLON to the north. The Town of Groton and NSB NLON are on the east bank of the Thames River, approximately 6 mi north of Long Island Sound. The City of New London is located on the western bank of the Thames River. Chemical companies, oil terminals, power plants, and wastewater treatment plants occupy both banks of the river downstream. There are power plants and a chemical company located upstream of NSB NLON. Pfizer Pharmaceutical, Hess Oil, Electric Boat, City Coal, the former Naval Undersea Warfare Center, and city and state piers are located in the vicinity of NSB NLON on both sides of the Thames River.

1.3.3 Topography

In general, the topography of NSB NLON consists of irregular, hilly upland areas with poorly drained valleys (Figure 1-2). Glacial terraces and river alluvium flank the Thames River valley. Hills and ridges in the area generally have a north-south orientation.

Bedrock outcrops are prevalent along steep topographic slopes. Four bedrock highs form the topographic upland areas at NSB NLON and the surrounding area. In the northern, central, and southern portions of the base, elevations of the bedrock highs exceed 200 ft above mean sea level. East of the base, Baldwin Hill has a maximum elevation of 245 ft above mean sea level. In addition to the large bedrock highs, there are several small subridges at the base that are visible as bedrock outcrops. Two primary subridges include one east of the Defense Reutilization and Marketing Office and one northeast of the Goss Cove Landfill, with elevations of approximately 80 and 60 ft, respectively.

The bedrock high in the center of the base divides drainage from the base into northern and southern valleys, both draining westward to the Thames River. In the northern valley, the ground elevation ranges from approximately 80 ft above mean sea level in the east to near sea level along the Thames River. The eastern (upper) portion of the northern valley contains the Site 20

and Area A Wetland, which drain through an earthen dike into the Area A Downstream Watercourses. The ground surface drops steeply across the dike to 30-40 ft below the elevation of the wetland.

Historically, the ground surface decreased more uniformly toward the Thames River (USGS 1960). The construction of the dike and subsequent filling of the wetland area with dredge spoils from the Thames River created the current steep drop in the ground elevation.

Figure 1-4 depicts the topography and surface features of Site 20. The site consists of Building 524 and weapons storage bunkers. The Area A Weapons Center is located near the top of the northern topographic and bedrock high. The ground surface generally slopes from the northern bedrock high to the south toward the Area A Wetland. The 90-ft ground surface contour surrounds the site. The shape of this contour is consistent with the topography on the historical surficial geology map (USGS 1960). The ground surface across Site 20 is relatively flat. The topography has been altered as the bedrock was blasted during construction of Building 524. To the west and southwest, the ground surface slopes to a ravine (Area A Downstream Watercourses) and toward the Overbank Disposal Area Northeast.

The Area A Wetland was a woodland area that was filled in the late 1950s with dredged sediment from the Thames River. Based on the boring logs, the maximum wetland sediment thickness is approximately 35 ft and the total volume of dredged material that was deposited is 1,170,000 yd^3 (Atlantic 1992).

1.3.4 Surface Water Features

NSB NLON is located on the east bank of the Thames River within the Thames River Watershed. The Thames River originates in the City of Norwich Harbor, at the confluence of the Shetucket and Yantic rivers, and discharges into Long Island Sound approximately 6 mi south of NSB NLON. The Thames River and its tributaries drain approximately 1,500 mi^2 of eastern Connecticut, western Rhode Island, and south/central Massachusetts. The Thames River estuary extends northward from Long Island Sound to Norwich (16 mi).

Site 20 is principally urbanized and runoff is managed via a stormwater conveyance system constructed as part of the facility infrastructure. Runoff is conveyed through a series of grass-lined swales. Two drainage culverts (one along the northwest side and one along the southeast side of the site) collect runoff from the surrounding hillsides and from Site 20 and discharge it to the Area A Wetland (Figure 1-4). The drainage culvert along the northwest side eventually discharges to a storm sewer that passes along the southern side of the site and discharges into the Area A Wetland (Drainage Area 1). The drainage culvert along the southeast side of the site collects runoff from the hillside north of the site and continues along the southeast side of the site, eventually discharging to the Area A Wetland (Drainage Area 2). There are no drainage culverts in Drainage Area 3; however, there is a storm sewer under the southern bunkers in Drainage Area 3 along the southeast fence that discharges into the Area A Wetland (Figure 1-4).

The Area A Wetland serves as a detention basin for Site 20 drainage. Drainage from Area A Wetland is controlled by dike and discharge culvert elevations that detain water in the depression. The culvert has a water control gate that can control water elevations in the wetlands. The Area A Wetland discharges to the Area A Downstream Watercourses and subsequently into the Thames River.

As part of this FS, the Navy reinspected the drainage channels at Site 20. Based on types of vegetation present and/or because of the presence of surface water for most of the year, the Navy considers the material in the drainage channels to be sediment. One exception is the swale in the northwest corner of Drainage Area 1 (the portion of the channel that includes sample locations 2WCSD1 and 2WCSD2). This portion of the drainage system is often dry (receives limited runoff) and does not exhibit hydrophilic vegetation or hydric soil. Therefore, for the purpose of data comparison in this FS, the Navy considers this one area to be "soil" and the remaining drainage channels to be "sediment."

CTDEP has classified the Thames River water quality as SC/SB. This classification designates the water for marine fish, shellfish, and wildlife habitat, certain aquaculture operations, recreational uses, and industrial and other legitimate use. The classification indicates that the waters presently are not meeting water quality criteria or are not supporting one or more designated uses as a result of pollution (CTDEP 1992). Surface water within the Area A Wetland has a default classification "A," which indicates that the water is known or presumed to meet water quality criteria that support designated uses (e.g., wildlife habitat).

Site 20 is not located within the 100-year floodplain.

1.3.5 Geology

Detailed descriptions of the regional geology are provided in the Phase I RI (Atlantic 1992) and the Initial Assessment Study (NEESA 1983). Regional and site-specific geologic information is provided below.

NSB NLON is situated in the Eastern Uplands region of Connecticut. The area has irregular hills of exposed bedrock and poorly drained, uneven valleys. The faulted and folded bedrock consists of metamorphosed rocks of sedimentary and igneous origin. A major east-west trending fault (the Honey Hill Fault) is located approximately 6 mi north of NSB NLON, but the fault does not intersect the facility. Glacial terraces and river alluvium flank the Thames River valley. Hills and ridges in the area generally have a north-south orientation, as modified during the Wisconian glaciation (USGS 1967).

According to the bedrock map (USGS 1967), the NSB NLON facility is underlain by five bedrock formations: Alaskite Gneiss, Granitic Gneiss, Mamacoke Formation, Plainfield Formation, and Westerly Granite. Of the five different types of bedrock, only the biotite-quartz-feldspar gneiss of the Mamacoke Formation and the Granitic Gneiss were identified during

drilling at NSB NLON. The Granitic Gneiss was identified at Site 20. Both formations were identified within the Area A Wetland and the Defense Reutilization and Marketing Office site.

In the two nearly east-west trending valleys between the bedrock highs around NSB NLON, the bedrock surface continues along slopes similar to the hills whereas the topographic surface flattens. In the northern valley, the bedrock surface decreases to a general elevation of 30 ft. The overburden thickness is typically 20-30 ft. However, it is thicker in the eastern portion of the valley in the vicinity of the Area A Wetland. There are three oblong-shaped bedrock highs that protrude within the valley. On these hills, the depth to bedrock is less than 10 ft. The southern valley is broader and bedrock elevations decrease to below mean sea level, and overburden thickens to greater than 50 ft.

At Site 20, the bedrock surface generally slopes to the southwest, toward the valley occupied by the Area A Wetland. The bedrock elevations at the 2WCTB1 and 2WCTB4 test borings (located in the southern portion of Site 20) are higher than the 2WCTB6 test boring bedrock elevation indicating that the bedrock surface does not slope uniformly and that localized bedrock surface depression(s) are present. This identified bedrock depression is most likely the result of the blasting activities that occurred during the construction of the Area A Weapons Center. The U.S. Geological Survey (1960) surficial geology map indicates that the bedrock formerly rose steeply to the 2WCTB1 and 2WCTB4 test borings and then rose gently to the 2WCTB6 test boring location. Geologic conditions are shown on cross-sections E-E' and F-F' (Figures 1-5 and 1-6, respectively).

The overburden material at Site 20 consists of 4-16 ft of coarse sand, gravel, and rock fill that is underlain by up to 17 ft of fine-grained dredge spoils. At the 2WCTB1 and 2WCTB4 test boring locations, 8 and 4 ft, respectively, of fill material rests directly on bedrock (Mamacoke Formation). These are the only test borings where the bedrock was encountered and dredge spoils were not present at Site 20.

1.3.6 Soil Characteristics

Regionally, most of the surficial deposits are unconsolidated glacial materials that were deposited during the Pleistocene Age. There are two types of glacial deposits throughout NSB NLON: stratified drift and glacial till. Stratified drift consists of sorted till, sand, and gravel that were deposited by meltwater streams. Stratified drift is located on terraces of the Thames River and is mapped along the western portion of the facility (USGS 1960). Glacial till consists of a dense, heterogeneous mixture of clay, silt, sand, and rock fragments as large as boulders. Glacial till occurs as a thin mantle over the underlying bedrock, is exposed on most of the bedrock highs, and most likely underlies outwash materials in the valleys. The thickness varies considerably but averages less than 10 ft across NSB NLON.

The remainder of the surficial deposits is the product of post-glacial river/floodplain processes and modifications from past construction activities. Quaternary alluvium that consists of sand, silt, and gravel has been mapped in the area of the Area A Wetland (USGS 1960). Artificial and natural fill are prevalent at NSB NLON.

The U.S. Department of Agriculture Natural Resources Conservation Service soils map (USDA 1983) classifies the soil at Site 20 as Udorthents-Urban land. This soil type is defined as excessively to moderately drained soil that has been disturbed by cutting and filling. Blasting in some areas of the site has altered the bedrock surface. Other areas, including the Area A Wetland, have been filled with dredge material. Native soils at Site 20 were likely the same as those found along the northern bedrock high. Available Natural Resources Conservation Service mapping classifies this soil as the Hollis-Charlton-Rock complex, which is defined as stones and boulders intermingled with a dark, fine, sandy loam. Bedrock outcrops are common.

1.3.7 Hydrogeology

For the State of Connecticut, the U.S. Geological Survey National Water Summary (USGS 1986) reports that "...ground water beneath more than 90 percent of the land in the State is considered to be suitable for drinking without treatment...." Saltwater intrusion impacts ground water in coastal areas. Ground water is "hard" to "very hard" in 70 percent of the wells in the State's carbonate rock aquifer, 40 percent of the wells in the State's sedimentary rock aquifer, and 15 percent of the wells in the stratified drift and crystalline bedrock aquifers. NSB NLON can be characterized as being located in the stratified drift and crystalline bedrock aquifers of the State. Large concentrations of iron (as large as 40,000 μg/L) and manganese (as large as 14,000 μg/L) are a common natural ground-water quality condition in Connecticut (USGS 1986).

There are users of potable water wells within surrounding communities at distances greater than 1,250 ft from the Site 20 boundary. These include the Groton Water Department, the Southeastern Connecticut Water Authority, the Town of Ledyard, and residences adjacent to the base. The Groton Water Department supplies potable water to NSB NLON. The primary sources of the Groton water supply are reservoirs, which are supplemented with ground-water wells. The water supplies are located within the Poquonock River Watershed, located east of NSB NLON, which is not within the NSB NLON watershed.

Ground water is present in both the overburden soil and the bedrock underlying Site 20. The saturated thickness of the overburden deposits is variable, ranging up to 25 ft or more. Overburden ground water is primarily found within the dredge material, with only the lowermost few feet of the coarser-grained fill deposits saturated. Figure 1-7 depicts the shallow overburden ground-water contours for the Area A Weapons Center and nearby areas. Figure 1-8 depicts bedrock ground-water contours for the same areas. Ground water in both the overburden and bedrock flows across the Weapons Center to the southwest. Cross-sections E-E' and F-F' (Figures 1-5 and 1-6) depict the ground-water flow from the Area A Weapons Center toward the south and southwest. The depth to the ground-water table varies from 0 to 15 ft across Site 20.

Although monitoring well 2WMW6S was dry during the August 1997 round of data collection, the March 1997 data presented a downward gradient between 2WMW6S and 2WMW6D, indicating downward flow from the overburden to the bedrock (Brown & Root 1997).

The shallow overburden hydraulic gradient across Site 20 is 0.019 ft/ft. Assuming an average horizontal hydraulic conductivity of 2.7 ft/day or 9.5×10^{-4} cm/sec (based on a pumping test at the Area A Landfill) and a porosity of 0.30, the seepage velocity for this area is estimated to be approximately 0.17 ft/day. The bedrock ground-water flow gradient is similar to the overburden gradient; however, there are not sufficient data available regarding bedrock permeability and porosity to calculate flow velocities within the bedrock.

1.3.7.1 Connecticut Department of Environmental Protection Ground-Water Classifications

CTDEP has classified ground water beneath Site 20 as GB. The GB classification indicates that the area has been used for long-term, intense industrial or commercial development and the ground water is not used as a drinking water source. Ground water beneath the remainder of NSB NLON is also classified as GB except for a small portion north of Perimeter Road, which is classified as GA. The GA classification signifies ground waters presumed suitable for direct human consumption without the need for treatment.

1.3.7.2 Local Background Ground-Water Quality

Southeastern Connecticut Water Authority provides potable ground water to residents in areas north, east, and northwest of NSB NLON. Water quality data collected in 1991 and 1994 from 16 Southeastern Connecticut Water Authority divisions were obtained from the Water Authority. Barium, sodium, chloride, fluoride, sulfate, nitrates, and nitrites were reported to be present in ground water. These results are summarized in the Phase II RI Report (Brown & Root 1997).

The Town of Ledyard also uses ground water for residential supplies. The Ledyard Water Pollution Control Authority monitors ground-water quality. Iron and manganese were reported in Well No. 1 in the Highland Well Field by the Water Pollution Control Authority. This well is approximately 6 mi northeast of NSB NLON. The data obtained included seven sampling rounds from July and August 1995. The concentrations of iron ranged from 2,170 μg/L to 2,780 μg/L. The concentrations of manganese ranged from 1,100 μg/L to 1,400 μg/L. The analytical results did not indicate whether samples were filtered prior to analyses.

1.3.7.3 Naval Submarine Base, New London Ground-Water Quality

Manganese concentrations in offsite residential wells located upgradient of NSB NLON ranged up to 2,130 μg/L (Atlantic 1994). These concentrations are typical of most wells on the base. Maximum concentrations of manganese in ground water at several locations at NSB NLON are within one order of magnitude of the offsite concentrations. Data collected during previous

investigations indicated that the manganese is dissolved in the ground water. In general, the maximum concentrations of manganese were detected in the Area A Wetland, the Area A Downstream Watercourses/Overbank Disposal Area near Streams 1 and 5, and the Torpedo Shops in the vicinity of the former Otto Fuel underground storage tank. Many other areas of NSB NLON had limited or no data available, and conclusions could not be drawn about the concentration of manganese in ground water for those areas.

The maximum concentrations of iron detected in the shallow overburden and bedrock ground water were 141,000 μg/L (Goss Cove Landfill) and 108,000 μg/L (Area A Wetland), respectively. Areas of NSB NLON that had high concentrations of manganese typically also had high concentrations of iron. These areas included the Area A Wetland, Area A Downstream Watercourses/Overbank Disposal Area, and the Torpedo Shops.

1.4 NATURE AND EXTENT

This section summarizes the nature and extent of chemicals detected in each of the three drainage areas at Site 20 as presented in the Phase II RI (Brown & Root 1997). Relatively low chemical concentrations and limited chemical mobility are present at Site 20. Phthalate esters, PAHs, and metals were identified as the primary chemicals in soil and sediment at Site 20. The highest concentrations were reported in samples from Drainage Areas 1 and 3.

1.4.1 Soil

During the Phase II RI, PAHs were more frequently detected than VOCs. A surface soil sample collected southwest of the bunkers along Triton Road (2WCTB2) contained the highest concentrations of PAHs, including fluoranthene (5,700 μg/kg), phenanthrene (4,200 μg/kg), pyrene (4,000 μg/kg), benzo(b)fluoranthene (3,200 μg/kg), and chrysene (2,300 μg/kg). The concentrations of PAHs decreased with depth in all samples collected. Analytical results did not indicate substantial VOC concentrations. Maximum detected concentrations of VOCs were acetone (690 μg/kg) and 2-butanone (240 μg/kg) from an 8- to 10-ft sample (2WCTB6). Other VOCs were reported at concentrations of 11 μg/kg or less.

A few phthalate esters were detected in both subsurface and surface soil samples. Benzoic acid (47-480 μg/kg) was detected in 5 of 7 subsurface soil samples. Carbazole (84 μg/kg) and dibenzofuran (31 μg/kg) were detected in the surface soil samples.

A few pesticides were also detected in the surface and subsurface soil samples. Endrin (14 μg/kg), 4,4'-dichlorodiphenyldichlorethylene (DDE) (7.4 μg/kg), and endrin aldehyde (7 μg/kg) were reported at maximum concentrations in the surface soil sample from boring 2WCTB2 along Triton Road; and endrin aldehyde (6.4 μg/kg) was detected in a subsurface soil sample.

1.4.2 Sediment

1.4.2.1 Drainage Area 1

Drainage Area 1 is located at the northwest portion of the weapons storage bunkers and includes 6 sample locations. PAHs were the most prevalent chemicals found in this area with concentrations of fluoranthene and pyrene reported up to 6,900 μg/kg. Both carcinogenic and non-carcinogenic PAHs were detected. Only trace VOCs (toluene [2 μg/kg] and methylene chloride [12 μg/kg]) were reported in sediment samples from Drainage Area 1. Several phthalate esters, including bis(2-ethylhexyl)phthalate, di-n-butylphthalate, di-n-octylphthalate, and butylbenzylphthalate, were reported at concentrations between 26 and 1,100 μg/kg. Several pesticides, including 4,4'-dichlorodiphenyldichlorethane (4-4'-DDD), 4,4'-DDE, 4,4'-DDT, endosulfan sulfate, endrin, and heptachlor, were reported at concentrations ranging from 2.8 to 32 μg/kg. Various metals, including lead (127 mg/kg), manganese (1,480 mg/kg), and zinc (274 mg/kg), were detected in the downstream sample. Barium was detected in Toxicity Characteristic Leaching Procedure (TCLP) leachate of sample 2WCSD2.

1.4.2.2 Drainage Area 2

Drainage Area 2 is located on the northeast side of the weapons storage bunkers and includes 4 sample locations. None of the samples were analyzed for VOCs or pesticides/PCBs. PAHs and benzoic acid were the only SVOCs reported in these samples. Concentrations of PAHs, benzoic acid, and metals were generally lower than concentrations in the other two drainage areas. The maximum concentrations of SVOCs reported were 660 μg/kg of chrysene and 93 μg/kg of benzoic acid. Various metals, including aluminum (13,700 mg/kg), iron (31,200 mg/kg), lead (28 mg/kg), manganese (483 mg/kg), magnesium (5,080 mg/kg), and potassium (3,090 mg/kg), were reported. In this area, the maximum concentrations were primarily found in the most upstream sample (2WCSD10), although some maximum concentrations were found in the most downstream sample (2WCSD12).

1.4.2.3 Drainage Area 3

Drainage Area 3 is located on the southwest side of the weapons storage bunkers and includes 5 sample locations collected in the Area A Wetland. PAHs were the most prevalent chemicals reported, with pyrene having the highest concentration (5,200 μg/kg). Both carcinogenic and non-carcinogenic PAHs were detected. Only low/trace VOC concentrations were identified, including toluene, tetrachloroethane, 1,1,1-trichloroethane (4-13 μg/kg), trichloroethene, and methylene chloride (22 μg/kg). Benzoic acid, di-n-octylphthalate, carbazole, and dibenzofuran were also reported in one sample. The maximum concentrations of pesticides found in this area were endrin aldehyde (140 μg/kg) and 4,4'-DDT (60 μg/kg). Reported inorganic analytes included barium (0.248 mg/kg), cadmium (29.5 mg/kg), lead (204 mg/kg), manganese (2,640 mg/kg), and zinc (292 mg/kg).

1.4.3 Surface Water

Limited impact on surface water quality in the stormwater swales at Site 20 has occurred. Di-n-octylphthalate (1 μg/L) and butylbenzylphthalate (2 μg/L) were the only organic compounds detected. Arsenic (2.6 μg/L), cadmium (6.6 μg/L), and zinc (135 μg/L) were also detected in the same sample (2WCSW3) located at the southern end of the site. Barium, calcium, iron, lead, magnesium, manganese, and sodium were reported at maximum concentrations at the northern sample location (2WCSW5).

1.5 TRANSPORT AND FATE

PAHs and phthalate esters are the primary classes of analytes reported in the RI for Site 20. These compounds have a low solubility and are most likely to adsorb to soil and migrate via soil erosion. No PAHs were detected in the surface water. PAHs have been transported from Site 20 via the drainage channels, and appear to originate from Drainage Areas 1 and 3 and eventually discharge into the Area A Wetland. It is believed that the source of PAHs is runoff/discharge from the northern and western portions of Site 20. The Phase II RI (Brown & Root 1997) concluded that ground water and surface water indicate that Site 20 is not acting as a source of contamination for downstream or downgradient locations.

1.6 BASELINE HUMAN HEALTH RISK ASSESSMENT

As part of the Phase II RI, the Navy conducted a baseline Human Health Risk Assessment (HHRA) to evaluate the potential hazards of exposure to COCs in soil and ground water at Site 20. As summarized below for soil and sediment, the HHRA was based on the analytical results obtained from the sampling efforts conducted during the Phase II RI. Potential risks associated with ground water will be addressed in a separate FS for the ground-water operable unit.

1.6.1 Exposure Assessment

Two receptor groups were considered likely to be exposed to soil and sediment at Site 20: full-time employees and construction workers. Full-time employees could conceivably come into contact with surface soil on a routine basis (assumed to be 150 days/year for 25 years under the Reasonable Maximum Exposure scenario and for 6 years under the Central Tendency Exposure scenario). The construction worker scenario was defined as having a one-time exposure while involved in a 1-year construction project. The Reasonable Maximum Exposure construction worker was assumed to be exposed to soil for a period of 120 days while the Central Tendency Exposure worker was assumed to be exposed for 80 days.

Currently, Site 20 is a high security/restricted access area. However, the site is located in an area that could potentially be redeveloped for residential use if NSB NLON were to close in the future. Therefore, a future residential exposure scenario was also evaluated during the HHRA.

It was assumed that future residents could come into direct contact with total soil (soil from depths of 0-10 ft) for 150 days/year.

Inhalation of fugitive dust and volatile emissions from soil was evaluated quantitatively by a comparison of maximum soil concentrations to EPA soil screening levels for the inhalation pathway. Maximum concentrations for chemicals detected in the soil were below the inhalation soil screening levels, which indicated relative insignificance of this exposure route and eliminated the need for further quantitative evaluation of this exposure pathway.

Dermal contact with soil was not evaluated quantitatively because cadmium, dioxins, and PCBs were not detected in soil samples. In addition, exposures to sediment and surface water at the site were not evaluated in a quantitative fashion as these exposures were presumed to be of lesser magnitude than direct contact with soil. Full-time employees, construction workers, and future residents would more likely come into contact with soil and ground water at a greater frequency and duration than exposure to sediment and surface water.

1.6.2 Risk Characterization

1.6.2.1 Non-Carcinogenic Risks

No unacceptable non-carcinogenic risks were identified for full-time employees, construction workers, or future resident because cumulative Hazard Indices (HI) were determined to be less than 1 for both Central Tendency Exposure and Reasonable Maximum Exposure scenarios. As mentioned earlier, dermal contact with soil and exposures to sediment and surface water were not evaluated quantitatively for Site 20.

1.6.2.2 Carcinogenic Risks

Cumulative incremental cancer risks were shown to be less than or only slightly above 1×10^{-6} for the full-time employee and the construction worker under both exposure scenarios. The cumulative incremental cancer risk for the Central Tendency Exposure future resident (6.6×10^{-5}) was also within EPA's target risk range from 1×10^{-4} to 1×10^{-6}. However, for the Reasonable Maximum Exposure future resident, the cumulative incremental cancer risk (6.7×10^{-4}) exceeded 1×10^{-4}. Unacceptable carcinogenic risks in soil for future residents under the Reasonable Maximum Exposure scenario were shown to be primarily attributable to incidental ingestion of benzo(a)pyrene and arsenic in soil.

1.6.3 Summary of the Phase II Remedial Investigation Human Health Risk Assessment

No unacceptable non-carcinogenic risks were identified (i.e., HI <1) for the full-time employee, construction worker, or future resident under the Central Tendency Exposure and Reasonable Maximum Exposure scenarios. Incremental lifetime cancer risks for receptors other than future residents under the Reasonable Maximum Exposure scenario were shown to be within EPA's

acceptable target risk range. Unacceptable carcinogenic risks for future residents under the Reasonable Maximum Exposure scenario were shown to be primarily attributable to incidental ingestion of benzo(a)pyrene and arsenic in soil.

Based on the current land use scenario, human health risks associated with Site 20 are low due to restricted site access and the predominantly paved surface coverage. In addition, it is highly unlikely that the future residential and construction worker scenarios that were evaluated in the RI would occur under the anticipated future land use. Federal requirements already specify that health and safety measures be instituted to minimize direct soil contact during construction. In addition, the future land use of Site 20 is anticipated to remain non-residential. Therefore, the construction worker and future resident scenarios in the HHRA are highly conservative.

1.7 ECOLOGICAL RISK ASSESSMENT

A site-specific baseline ecological risk assessment (BERA) was performed at Site 20 in support of the Phase II RI (Brown & Root 1997). The methods, findings, and uncertainties of the BERA are summarized in Subsections 1.7.1, 1.7.2, and 1.7.3. The procedure used for the BERA was equivalent to a Tier I screening in which conservative assumptions and parameters were consistently incorporated, resulting in a highly conservative estimation of exposure and risk. This approach was taken in the BERA in order to maximize confidence that those chemicals not retained as COCs have negligible potential to represent a risk to ecological receptors in accordance with EPA guidance. Even with these conservative assumptions, the predicted risk to ecological receptors from Site 20 COCs was found to be relatively small. Under more probable conceptual model conditions and exposure scenarios, COCs at Site 20 were concluded to represent negligible risk to ecological receptors.

1.7.1 Representative Ecological Receptors and Exposure Pathways

The Site 20 Area A Weapons Center is extensively developed with buildings, weapons storage bunkers, paved surfaces, and maintained lawns that provide limited quality habitat for potential ecological receptors. Site 20 is surrounded by upland coniferous/deciduous forest, including a small area characterized as upland deciduous forest/shrub, and by the Area A Wetland. The Area A Wetland is an emergent non-tidal freshwater marsh altered during the 1950s by the placement of dredged material from the Thames River. Currently, the vegetation in the wetland is dominated by the invasive common reed, *Phragmites australis*. To a lesser extent, managed lawns and impervious surfaces occur in the areas adjacent to Site 20. The surrounding areas of Site 20 are likely to support ecological receptors that have the potential to encounter chemicals originating from the Area A Weapons Center.

The conceptual site model developed for the BERA evaluated the potential direct exposure to COCs via ingestion or direct contact with sediment, surface water, and shallow soil, as well as the potential indirect exposure via ingestion of impacted prey. The ecological community in the vicinity of Site 20 was represented by two groups: aquatic receptors and terrestrial receptors.

While the industrialized nature of the site limits its value to populations of many terrestrial wildlife receptors, the BERA conservatively assumed that the site supports a large population of soil invertebrates that serve as prey for short-tailed shrews that inhabit and forage in the area. Short-tailed shrews were assumed to be the primary prey item for higher trophic predators (represented by the red-tailed hawk in the BERA). Exposure pathways for small mammals included direct contact with soil, incidental ingestion of soil while foraging, ingestion of surface water, and consumption of prey. Consumption of prey, ingestion of surface water, or incidental ingestion of soil constituted the expose pathways for large predators at the site.

Site 20 contains surface water runoff drainage ditches. Due to the shallow ground-water table, sediment in these drainage ditches is generally wet, however, the drainage ditches do not provide a habitat capable of supporting aquatic receptors, and do not provide significant habitat for aquatic communities. During runoff periods, these ditches may be a source of drinking water for terrestrial fauna. Although they do not currently support an aquatic community, for the purposes of the BERA, the RI conservatively assumed that the ditches were inhabited by aquatic organisms throughout the year. The BERA assumed that exposure of these aquatic receptors to COCs occurred through direct contact with or ingestion of surface water and sediment, and indirectly through ingestion of prey.

Both maximum exposure point and average exposure scenarios were considered in evaluating potential risks to ecological receptors.

1.7.2 Risk Characterization

Risks to aquatic biota, terrestrial vegetation, soil invertebrates, and terrestrial vertebrates were evaluated in the BERA.

1.7.2.1 Aquatic Biota

Potential risks to aquatic biota were evaluated in the BERA by comparing the maximum and average surface water and sediment concentrations that exceeded background concentrations to selected ecotoxicological benchmarks that are protective of ecological receptors. For surface water, the chronic effects benchmarks were selected from the following measurements listed in order of preference:

- CTDEP and EPA chronic Ambient Water Quality Criteria
- No observed effect concentration from chronic test
- Acute test LC50 divided by 100
- Lowest observable effect concentration from chronic test
- EPA quantitative structure-activity relationship model.

When a chemical in surface water exceeded the chronic ecotoxicological benchmark the maximum and average concentrations were compared to acute benchmarks. For sediment, the following benchmarks were used to identify COCs and to estimate potential risks to ecological receptors:

- Inorganic Chemicals
    1. Ontario Ministry of the Environment chronic Screening Level Concentration approach
    2. Ontario Ministry of the Environment acute Severe Effects Level
    3. Effects Range-Median and Effects Range-Low (Long et al. 1995)
- Organic Chemicals
    1. Site-specific sediment benchmarks using the Equilibrium Partitioning model (EqP) (U.S. EPA 1993)
    2. Ontario Ministry of the Environment Severe Effects Level
    3. Effects Range-Median.

Maximum concentrations of cadmium, iron, lead, and zinc in surface water exceeded background concentrations and chronic exposure benchmark values indicating a potential risk to aquatic receptors that might potentially inhabit the drainage ditches in the Area A Weapons Center. The maximum concentration of iron (1.1 mg/L) was only slightly above the chronic Federal Ambient Water Quality Criteria for aquatic life (1.0 mg/L). The chronic criteria for iron is a questionable indicator of potential risk because it is based on several previous field studies that do not adequately document the wide range of ambient water quality parameters that can strongly influence the valence state and toxicity of iron. The average concentrations of cadmium, lead, and zinc exceeded the benchmark values and were predicted to pose a potential risk to aquatic biota. Maximum and average concentrations of cadmium and zinc exceeded respective acute benchmarks. Concentrations of organic chemicals detected in surface water samples were not predicted to represent a risk to aquatic biota.

Maximum sediment concentrations of arsenic, cadmium, chromium, copper, lead, manganese, mercury, nickel, selenium, and zinc exceeded background concentrations and their respective chronic sediment benchmark values. Only cadmium, chromium, copper, mercury, and selenium were predicted to represent a potential risk to aquatic organisms when average concentrations were compared to chronic sediment benchmarks. Maximum concentrations of cadmium, manganese, and selenium exceeded acute sediment benchmarks, but the average concentration of selenium was the only inorganic chemical that exceeded acute benchmark values.

The maximum concentrations of the pesticides 4,4'-DDE, 4,4'-DDT, and endrin aldehyde exceeded chronic sediment benchmarks and, therefore, were predicted to represent potential risk to aquatic biota that might potentially inhabit the drainage ditches within Site 20. The average concentrations of 4,4'-DDE, endosulfan sulfate, endrin aldehyde, and methoxychlor were higher than chronic sediment benchmarks. Maximum and average concentrations of endosulfan sulfate and methoxychlor exceeded acute sediment benchmarks.

The Hazard Quotient (HQ)[1], based on maximum concentration in the sediment at Site 20 is 1.5×10^2, and cadmium, endrin aldehyde, and 4,4'-DDE, accounts for approximately 60 percent of the potential risk to benthic invertebrates. The maximum concentrations of cadmium and endrin aldehyde were reported in sample 2WCSD5 collected from the edge of the Area A Wetland; 2WCSD1 (the northern end of the drainage ditch in Drainage Area 1) was the only location in which 4,4'-DDE was detected. The HQ calculated for average concentration is 5.1×10^1 with the pesticides 4,4'-DDE, endrin aldehyde, methoxychlor, and endosulfan sulfate accounting for approximately 56 percent of the estimated risk to benthic invertebrates.

Although the BERA predicted potential risk to aquatic organisms inhabiting the drainage ditches within Site 20, it is unlikely that aquatic resources will actually be impacted. The onsite drainage ditches are not permanent water courses. In particular, the swale in the northwest corner of Drainage Area 1 (the portion that includes sample locations 2WCSD1 and 2WCSD2) is often dry and is considered soil as indicated in Section 1.3.4. As such, the swales do not provide permanent habitat for significant populations of aquatic organisms. Some aquatic organisms may opportunistically invade these ditches from downstream wetlands during temporary periods of inundation; however, the duration of their use of this habitat and associated exposure would be relatively short and thus, the risk would be commensurately reduced from that predicted by the BERA.

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1. The BERA reported that maximum and average concentrations of gamma-chlordane exceeded the chronic benchmark and that the HQ, 3.6×10^2 (Tables 8-20 and 8-21 in the RI), indicated that gamma-chlordane made the most significant contribution to the risk calculation for benthic invertebrates. However, the site-specific sediment quality benchmark (1.92×10^{-5} mg/kg) reported in Appendix 1.4 of the BERA was incorrectly calculated. The correct site-specific sediment quality benchmark for gamma-chlordane is 9.6×10^{-3} mg/kg, calculated as follows:

   Site-specific sediment quality benchmark = CAWQC * f_{oc} * K_{oc}

   where
   CAWQC = Connecticut chronic ambient water quality criterion = 4.3×10^{-6} mg/L
   f_{oc} = Fraction of organic carbon = 0.016
   K_{oc} = Organic carbon partitioning coefficient = 1.4×10^5.

   Using the corrected sediment quality benchmark, the calculated HQ based on the maximum detected a concentration of gamma-chlordane (7.00×10^{-3} mg/kg) is 7.27×10^{-1}. The maximum concentration does not exceed the site-specific sediment quality benchmark; therefore, gamma-chlordane should not be carried through the risk assessment for benthic invertebrates.

1.7.2.2 Terrestrial Vegetation

Potential risks to terrestrial vegetation were evaluated in the BERA by comparing maximum and average chemical concentrations to conservative, phytotoxicity benchmarks (Will and Suter 1994). HQs (the ratio of the observed concentration to the benchmark concentration) were determined for each chemical identified from the Area A Weapons Center. HQs that exceeded 1.0 were considered to represent a potential risk to terrestrial vegetation.

When maximum concentrations of inorganics detected in surface soil samples were compared to phytotoxicity benchmark values, the HQs for aluminum, chromium, vanadium, and antimony were greater than 1.0. Comparison of average surface soil inorganic concentrations to phytotoxicity benchmarks indicated that three of these four inorganics (aluminum, chromium, and vanadium) still had HQs greater than 1.0. Based on this conservative assessment, the BERA concluded that terrestrial vegetation associated with Site 20 may potentially be adversely impacted as a result of exposure to surface soil. However, the benchmark for aluminum is highly uncertain and likely overestimates the risk from soil aluminum on vegetation. The study on which this benchmark was based has been called into question by the federal inter-agency Soil Screening Level Committee as the soil pH was amended to increase availability of aluminum. The Committee is recommending that pH is a better predictor of aluminum toxicity and that pH above 5.5 aluminum will not be toxic. Furthermore, the Committee concluded that measurement of total aluminum is meaningless in evaluating aluminum toxicity (Brown & Root 1997).

In addition, the confidence level is also low for both vanadium and chromium soil benchmarks. There are no primary data available to support the vanadium value, and the single secondary reference provides none of the necessary information on test conditions to validate the conclusions. The chromium benchmark is based on only two studies that added hexavalent chromium into the soil as compared to total chromium measured for the RI.

1.7.2.3 Soil Invertebrates

Conservative benchmark values protective of earthworms were used in the BERA to evaluate potential risks to soil invertebrates. Maximum concentrations in surface soil samples were compared to benchmark values developed to be protective of soil invertebrates. The results of this comparison determined that the chemicals detected at the site do not represent a risk to soil invertebrates (i.e., HQs were less than 1.0). However, because soil invertebrates such as earthworms are known to bioaccumulate heavy metal such as cadmium, it is possible that they may serve as a source of COCs for some predatory animals.

1.7.2.4 Terrestrial Vertebrates

The short-tailed shrew and red-tailed hawk were selected for the BERA to be representative of the potential risks to terrestrial ecological receptors utilizing habitat at Site 20. Exposure pathways

considered included the ingestion of prey, direct contact with the soil, incidental ingestion of soil, and ingestion of surface water.

HIs calculated using maximum surface soil and surface water concentrations indicated that the short-tailed shrew was potentially at risk from exposure to antimony, barium, and phenanthrene. Incidental ingestion of soil followed by ingestion of prey were the primary sources of risk to terrestrial receptors. The same three analytes were also identified as sources of risk based on average soil concentrations. HIs calculated using average soil concentrations were lower compared to indices based on maximum soil concentrations. Use of acute toxicity benchmark values for the short-tailed shrew showed that all HIs were less than 1.0 for both maximum and average concentration exposure scenarios indicating that there is no significant acute risk to this receptor.

Comparing maximum and average soil and surface water concentrations to conservative benchmark values for the red-tailed hawk indicated that antimony was the only analyte that had an HI greater than 1.0. For both average and maximum concentrations, incidental ingestion of soil followed by ingestion of prey represented the primary sources of risk at the site. Similar to the short-tail shrew, the HIs for the red-tailed hawk based on acute toxicity benchmark values were less than 1.0 for both maximum and average concentration exposure scenarios indicating that there is no significant acute risk to the avian receptor. Considering that the Area A Weapons Center comprises less than 5 percent of the home range of a red-tailed hawk, potentially impacted soil, surface water, and prey from Site 20 would likely comprise less than 5 percent of the dietary uptake of this avian predator. When the area of exposed soil, i.e., non-paved, at the Area A Weapons Center is factored into the HI calculations for the short-tailed shrew and red-tailed hawk, the resulting values are less than 1.0. These considerations, coupled with the fact that this site does not provide high quality habitat, suggest that COCs detected at Site 20 are unlikely to represent an adverse risk to this receptor (Brown & Root 1997).

1.7.3 Risk Assessment Uncertainties

In addition to the conservative aspects of the conceptual model identified above, the BERA also made several other assumptions contributing further to the highly conservative nature of the assessment including:

- Ecological receptors were assumed to live and forage exclusively within the site boundaries
- Minimum body weights were used to calculate receptor dose
- Maximum ingestion rates were used to calculate receptor dose
- COCs were assumed to be 100 percent biologically available

- Comparisons to ecotoxicological benchmarks were made assuming exposure to the most sensitive life stage

- Representative ecological receptors for each trophic level were assumed to consume only impacted prey.

Although the consistent application of multiple conservative assumptions in the risk assessment model significantly reduces uncertainty associated with eliminating many of the analytes from further consideration in the BERA, this process can significantly overestimate the potential adverse effects resulting from exposure of ecological receptors to those chemicals retained as COCs. An understanding of the magnitude and influence of these uncertainties is important in interpreting the results of the BERA.

The BERA assumes that receptors are exposed to and consume only impacted soil and prey from the site. However, receptors actually are not confined to live and forage only within the site boundaries. The home range of short-tailed shrews is approximately one tenth of the size of Site 20; thus, some shrews may utilize habitat only within the site. In contrast, the area within Site 20 constitutes less than 5 percent of the home range of one red-tailed hawk and cannot be considered preferred or quality habitat for this receptor. Therefore, the majority of prey for a hawk is likely to come from offsite. In addition, Site 20 is likely to be included within the home territory of only a few individuals for a top terrestrial predator such as the red-tailed hawk; thus; the overall population effect is negligible. Furthermore, many avian predators such as the red-tailed hawk are seasonal migrants, and would utilize the site for only a portion of the year.

While the BERA assumed that receptors consume only impacted prey, it is much more likely that ecological receptors, including short-tailed shrew and red-tailed hawk, feed on a range of impacted to non-impacted prey. Thus, the ecological risk model overestimates the exposure to site COCs and the associated risk to ecological receptors.

Body weight and ingestion rates are critical in the estimation of COC dose to a receptor. Any given population of receptors would exhibit a wide distribution of body weight and ingestion rates that would significantly reduce the overall calculated dose to receptor populations from that based on minimum weight and maximum ingestion rate. The application of these two conservative factors has a compounding effect on overestimating exposure, in that it is unlikely that the smallest individuals have the largest ingestion rate.

The amount of a COC that is available to biological receptors and transfer through the food chain is affected by the chemical conditions in the matrix. A significant fraction of some COCs can be bound to particulates in soil, sediment, and water, which, although ingested, are subsequently excreted without being metabolized. When a significant portion of a COC is bound in this manner, analytical results significantly overestimate the amount of COCs biologically available and, thus, the dose to receptors. In contrast, ecotoxicological benchmarks are typically derived

from laboratory tests in which most of the measured chemicals are biologically available. Thus, the results of such studies typically overestimate the actual toxicity of ambient matrix material.

Another source of uncertainty likely to result in overestimates of potential risk to ecological receptors is the process for selection of ecotoxicological benchmarks. These benchmarks are generated to be protective of the most sensitive receptors and life stages. It is not uncommon that laboratory toxicity test data are not available for specific chemicals, matrices, and receptors relevant to the conceptual site model for a specific ecological risk assessment. In such cases, uncertainty factors (UFs) are applied to available surrogate data to provide conservative protective benchmarks. For the Site 20 BERA, the UFs were constructed using the following equation:

$$FinalUF = \frac{1}{(UF_a * UF_b * UF_c * ... UF_x)}$$

where

UF_{xx} are individual adjustments for specific sources of uncertainty. These include:

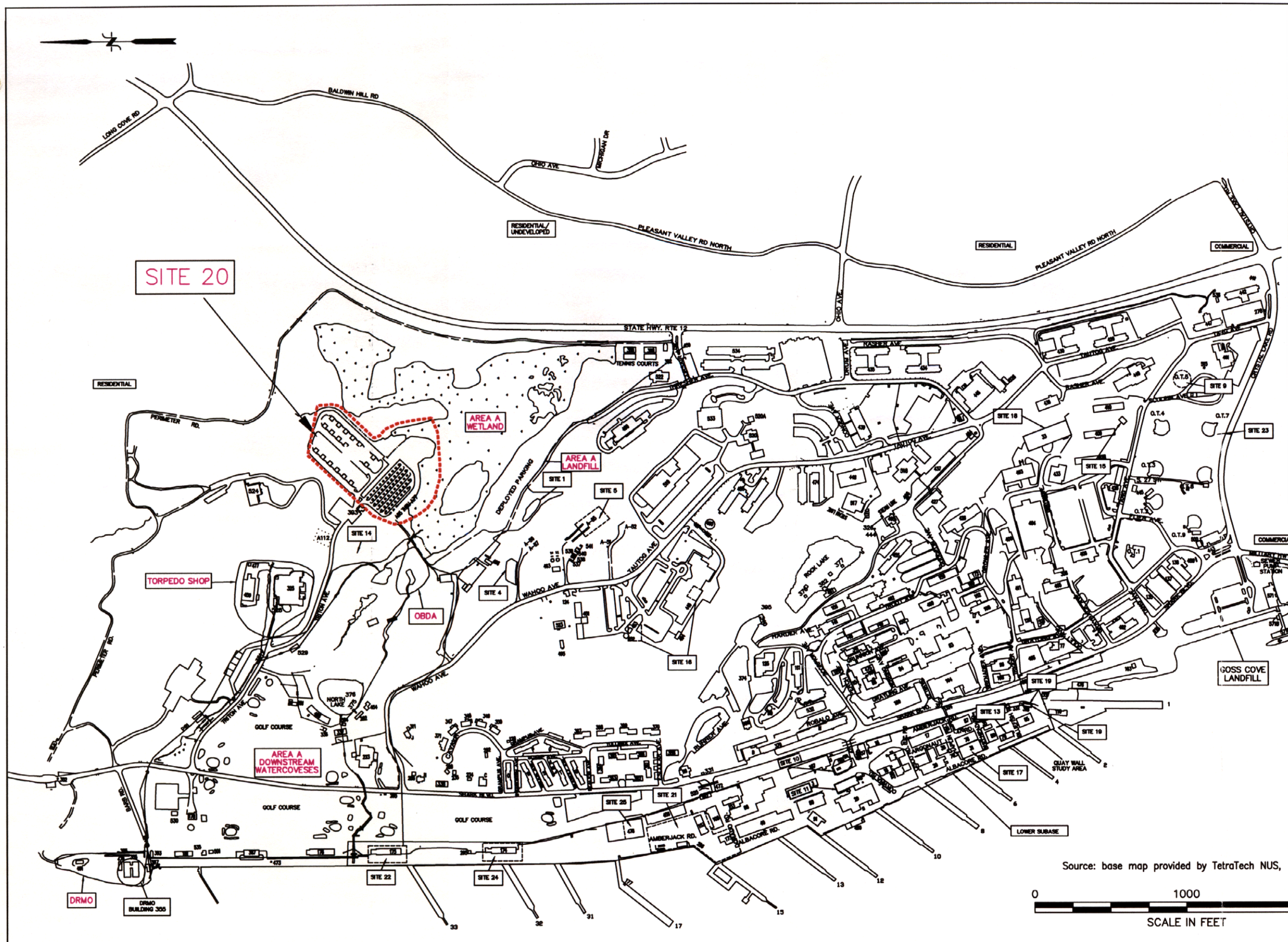
- Study duration of less than one full life cycle when the most sensitive stage of the life cycle was not tested (UF = 10)
- To adjust from test endpoints to more sensitive endpoints; for example, LD50 to acute lowest-observed-adverse-effects-level (UF = 5), acute lowest-observed-adverse-effects-level to chronic lowest-observed-adverse-effects-level (UF = 5), chronic lowest-observed-adverse-effects-level to chronic no-observed-adverse-effects-level (UF = 5)
- Extrapolate among taxonomic groups; for example, within taxonomic order (UF = 2), between taxonomic orders (UF = 5), and from Class Mammalia to Class Aves (UF = 10).

The test result is multiplied by the final UF to estimate a protective reference dose or benchmark. The derivation of chemical-specific UF is summarized by species in Tables 3-19 to 3-25 in the BERA (Brown & Root 1997). Thus, the benchmarks for antimony, which contributed most significantly to the HI calculated for short-tailed shrew and red-tailed hawk, are potentially very conservative having been adjusted using a final UF of 8×10^{-3} and 4×10^{-3}, respectively.

1.7.4 Ecological Risk Assessment Summary

The results of the BERA suggested that with the exception of soil invertebrates, most other ecological receptors, if present at Site 20, would potentially be at risk. However, Site 20 does not have high ecological habitat value, consisting primarily of impervious surfaces (buildings and pavement) with some maintained grass. Consequently, use of this area by ecological receptors is likely to be limited and the actual risks to ecological receptors would be lower than estimated by the BERA. Areas bordering Site 20, such as the wetlands and upland coniferous/deciduous

forest, do represent desirable habitat for a variety of fauna and flora. Some of these fauna may be exposed to surface water and sediment in the Site 20 drainage areas, and soil in vegetated areas, as they move across the site between these adjacent wetlands or other upland areas. However, the fence that surrounds Site 20 probably limits such movement for large mammals. Considering the relatively low use of Site 20 by terrestrial and aquatic organisms, and the other very conservative characteristics and uncertainty adjustments of the BERA, it is likely that the potential ecological risk from soil, sediment, and surface water COCs at Site 20 is low. The Phase II RI concluded that when site conditions are factored into the evaluation, Site 20 represents little real risk to ecological receptors in the vicinity (Brown & Root 1997).



NOTES:

1. SITE AND STUDY AREA LOCATIONS WERE TAKEN FROM THE FOLLOWING REPORTS:
   - FEDERAL FACILITY AGREEMENT UNDER CERCLA 120, NAVAL SUBMARINE BASE, NEW LONDON, CONNECTICUT
   - FINAL INITIAL ASSESSMENT STUDY (ENVIRODYNE, MARCH 1983)
   - HYDROGEOLOGIC INVESTIGATION UNDERGROUND STORAGE TANKS OT-4, OT-7, OT-8, OT-9, AND 54-H (FUSS & O'NEILL, SEPTEMBER 1989)
   - PHASE I REMEDIAL INVESTIGATION (ATLANTIC, AUGUST 1992)
   - SITE CHARACTERIZATION REPORT FOR OT-10, BUILDING 325, AND BUILDING 89 (HNUS, APRIL 1995)
   - DRAFT FINAL SUPPLEMENT TO INITIAL ASSESSMENT STUDY (NAVAL FACILITIES ENGINEERING SERVICE CENTER, APRIL 1995)
   - REMOVAL SITE EVALUATION FOR QUAY WALL (HNUS, MAY 1995)
2. SITE AND STUDY AREA BOUNDRIES ARE APPROXIMATE.

SITE 1 – CONSTRUCTION BATTALION UNIT (CBU) DRUM STORAGE AREA
SITE 2 – (A) AREA A LANDFILL AND (B) AREA A WETLAND
SITE 3 – (A) AREA A DOWNSTREAM WATER COURSES AND (B) OVERBANK DISPOSAL AREA (OBDA)
SITE 4 – RUBBLE FILL AREA AT BUNKER A-86
SITE 5 – HAZARDOUS WASTE STORAGE FACILITY AT BUNKER A-85
SITE 6 – DEFENSE REUTILIZATION AND MARKETING OFFICE (DRMO)
SITE 7 – TORPEDO SHOPS
SITE 8 – GOSS COVE LANDFILL
SITE 9 – OILY WASTEWATER TANK (OT-5)
SITE 10 – LOWER SUBASE-FUEL STORAGE TANKS AND TANK 54-H
SITE 11 – LOWER SUBASE-POWER PLANT OIL TANKS
SITE 13 – LOWER SUBASE-BUILDING 79 WASTE OIL PIT
SITE 14 – OVERBANK DISPOSAL AREA NORTHEAST (OBDANE)
SITE 15 – SPENT ACID STORAGE AND DISPOSAL AREA (SASDA)
SITE 16 – HOSPITAL INCINERATORS
SITE 17 – HAZARDOUS MATERIALS/SOLVENT STORAGE AREA (BUILDING 31)
SITE 18 – SOLVENT STORAGE AREA (BUILDING 33)
SITE 19 – SOLVENT STORAGE AREA (BUILDING 36)
SITE 20 – AREA A WEAPONS CENTER
SITE 21 – BERTH 16
SITE 22 – PIER 33
SITE 23 – FUEL FARM
SITE 24 – CENTRAL PAINT ACCUMULATION AREA (BUILDING 174)
SITE 25 – LOWER SUBASE-CLASSIFIED MATERIALS INCINERATOR

APPROXIMATE BOUNDARY OF SITE 20

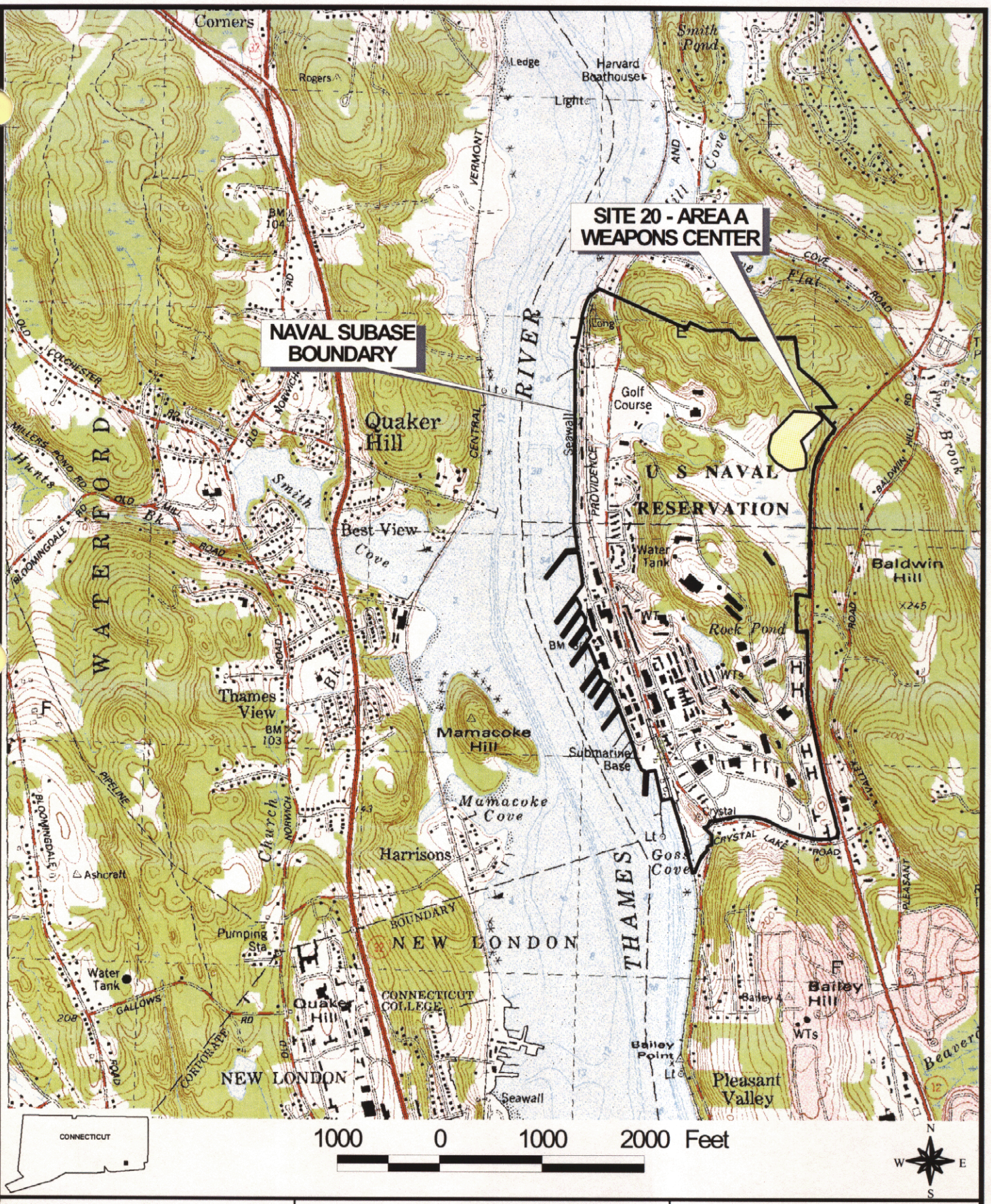
FILE: F:\FEDERAL\DOD\NAVY\29600\90\CAD\SITE-20\DRAFT FINAL\FIG1-1.DWG

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

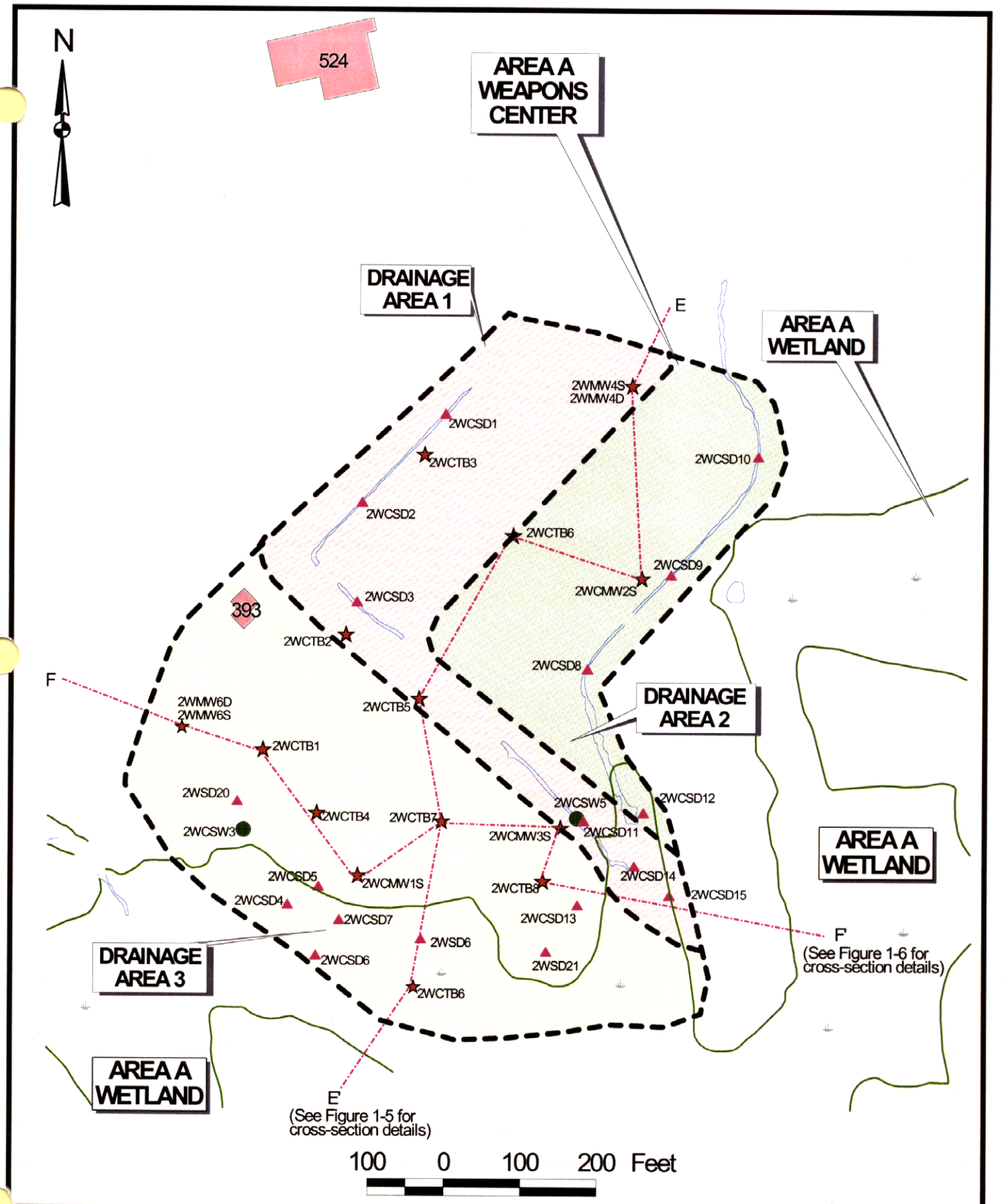
SITE 20 – AREA A WEAPONS CENTER
NAVAL SUBMARINE BASE
NEW LONDON, CONNECTICUT

FIGURE 1-1
BASE MAP

DESIGNED BY	DRAWN BY	DATE	PROJECT NO.	FILE NAME
BCL	BT	6/15/99	29600.90	FIG. 1-1
CHECKED BY	PROJECT MGR.	SCALE	DRAWING NO.	FIGURE
JDR	CEM	AS SHOWN		1-1



EA ENGINEERING, SCIENCE, AND TECHNOLOGY	SITE 20 - AREA A WEAPONS CENTER NAVAL SUBMARINE BASE NEW LONDON, CONNECTICUT				FIGURE 1-2 SITE LOCATION MAP		
PROJECT MGR	DESIGNED BY	DRAWN BY	CHECKED BY	SCALE	DATE	PROJECT No	FILE No
CEM	BT	BT	CEM	AS SHOWN	4/12/99	29600.90	I:\SITE20_GIS\ SITE20.APR



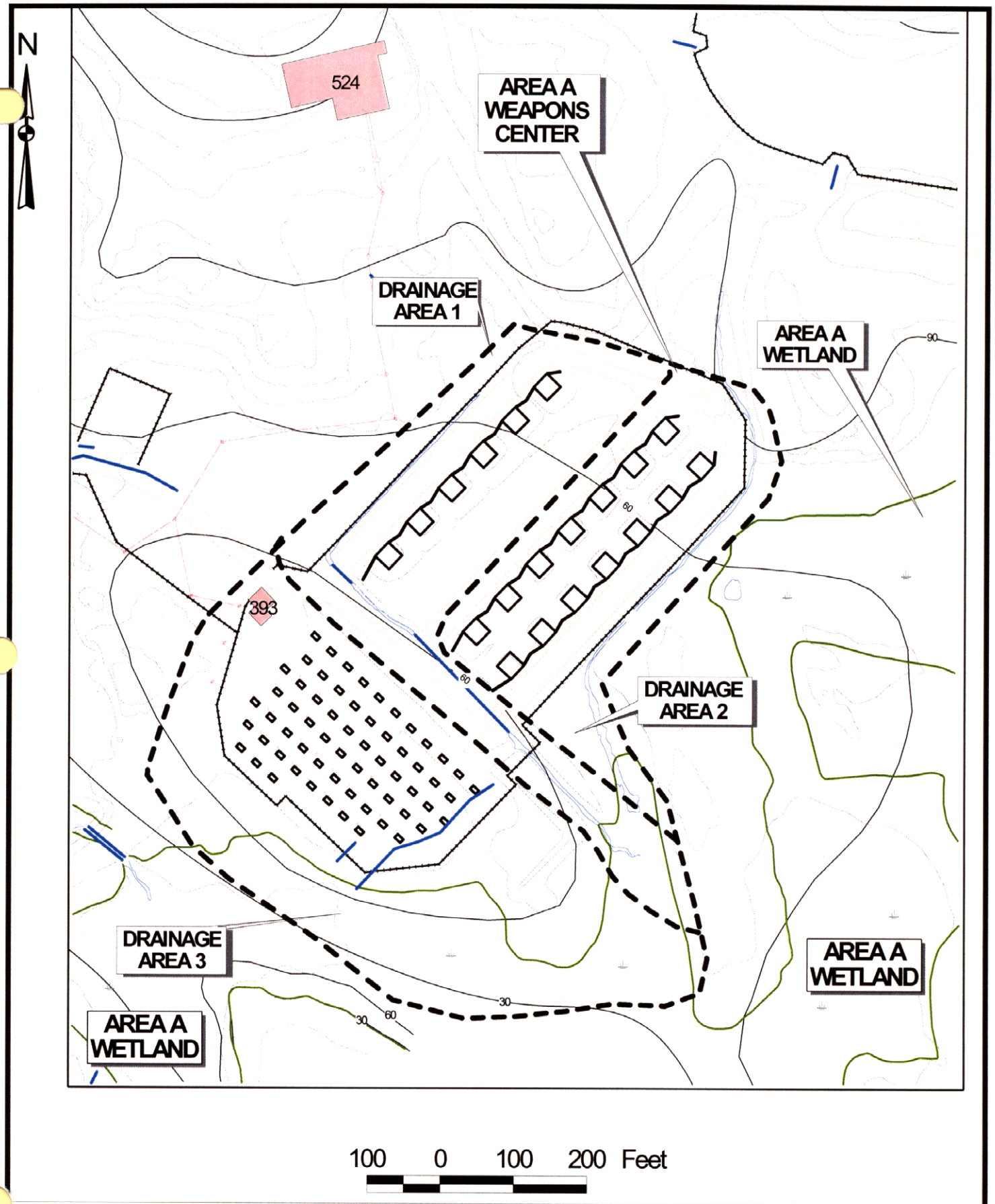
LEGEND:

- Sediment sample
- Soil sample
- Surface water sample
- Wetland
- Building
- Drainage area 1
- Drainage area 2
- Drainage area 3

FIGURE 1-3

DRAINAGE AREA BOUNDARIES AND SAMPLING LOCATIONS

SITE 20 - AREA A WEAPONS CENTER
NAVAL SUBMARINE BASE
NEW LONDON, CONNECTICUT



LEGEND:

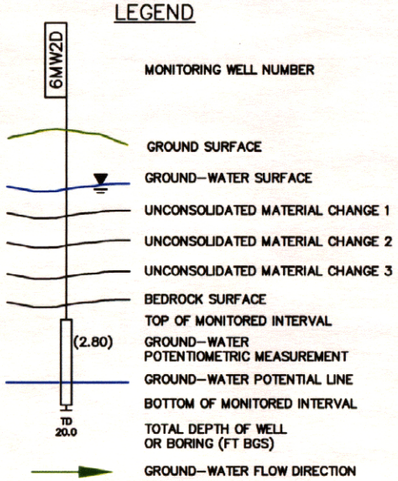
- Electricity line
- Drainage ditch
- Topo contour
- Fence
- Stormwater drainage
- Wetland boundary
- Bedrock contour
- Bunker
- Cross-section line
- Pavement
- Building
- Wetland

FIGURE 1-4

DRAINAGE AREA BOUNDARIES

SITE 20 - AREA A WEAPONS CENTER
NAVAL SUBMARINE BASE
NEW LONDON, CONNECTICUT

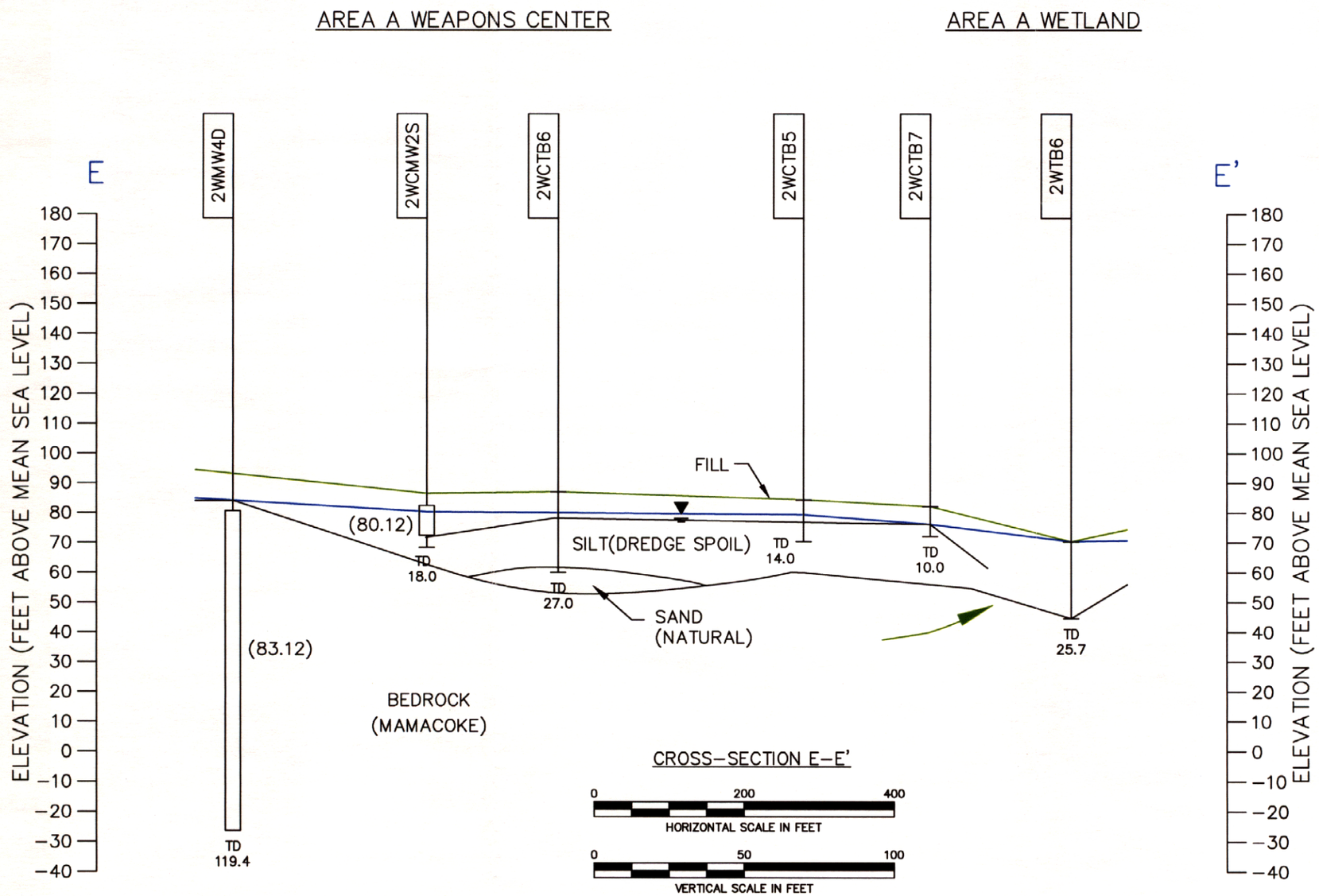
LEGEND



NOTES

1. (WD) MEANS WELL HAS BEEN DESTROYED OR DAMAGED
2. (NL) MEANS WELL COULD NOT BE LOCATED
3. (NT) MEANS WELL WAS NOT TESTED DUE TO ACCESS PROBLEMS
4. GROUND–WATER LEVEL MEASUREMENTS WERE TAKEN 23 AUGUST 1994. GROUND–WATER FLOW DIRECTIONS ARE REPRESENTATIVE OF THESE MEASUREMENTS. SEASONAL VARIABILITY AND TIDAL VARIABILITY NEAR THE THAMES RIVER MAY CAUSE CHANGES IN GROUND–WATER FLOW DIRECTIONS.

Source: base map provided by Brown & Root Environmental, 3/18/99.



FILE: F:\FEDERAL\000\NAVY\29600\90\CAD\SITE-20\DRAFT FINAL\FIG1-5.DWG

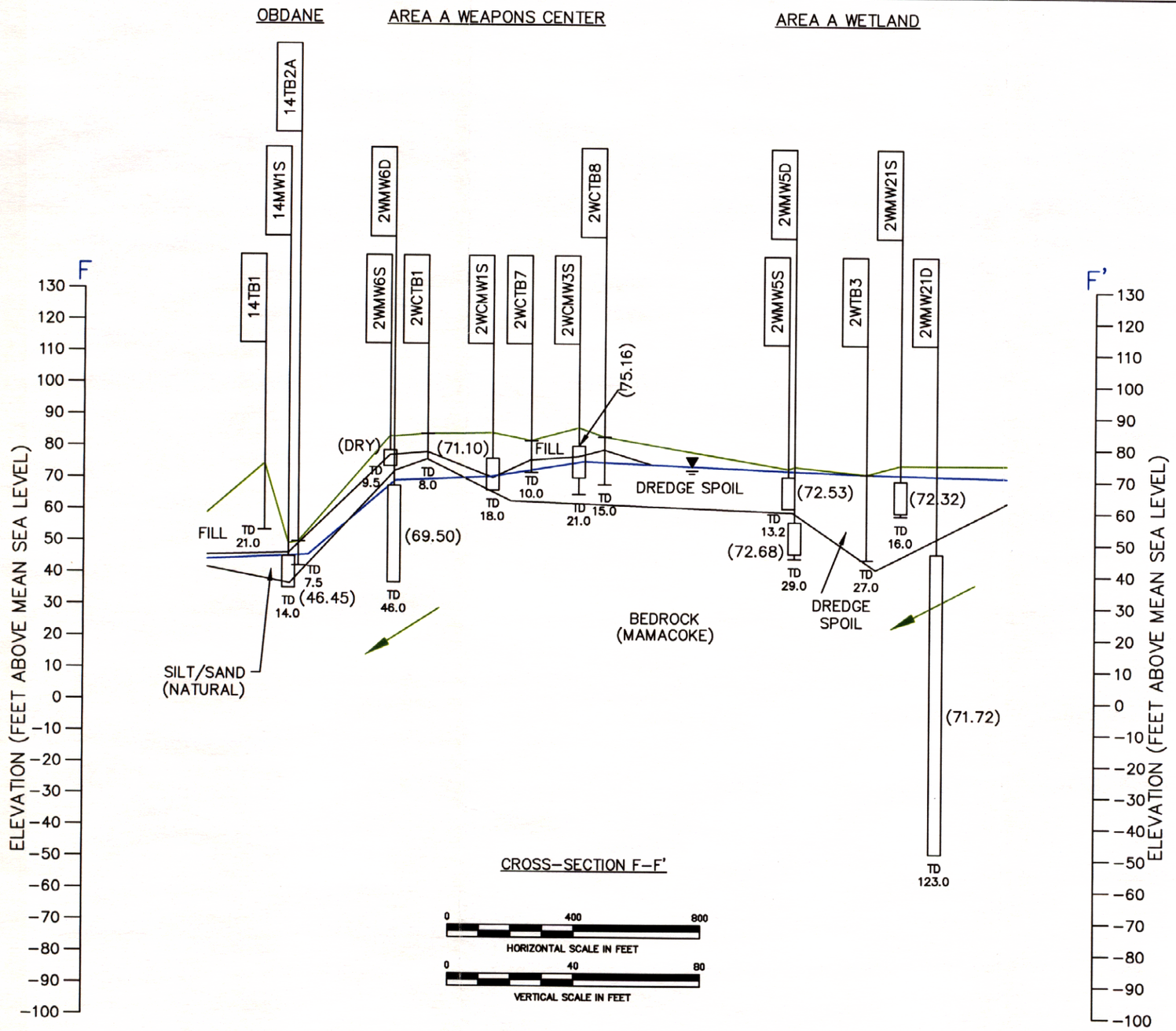
EA ENGINEERING, SCIENCE, AND TECHNOLOGY	SITE 20 – AREA A WEAPONS CENTER NAVAL SUBMARINE BASE NEW LONDON, CONNECTICUT	FIGURE 1–5 CROSS–SECTION E–E'	DESIGNED BY CEM	DRAWN BY BT	DATE 2/16/2000	PROJECT NO. 29600.90	FILE NAME FIG. 1–5
			CHECKED BY CEM	PROJECT MGR. CEM	SCALE AS SHOWN	DRAWING NO.	FIGURE 1–5

LEGEND

- 6MW2D — MONITORING WELL NUMBER
- GROUND SURFACE
- GROUND–WATER SURFACE
- UNCONSOLIDATED MATERIAL CHANGE 1
- UNCONSOLIDATED MATERIAL CHANGE 2
- UNCONSOLIDATED MATERIAL CHANGE 3
- BEDROCK SURFACE
- TOP OF MONITORED INTERVAL
- (2.80) — GROUND–WATER POTENTIOMETRIC MEASUREMENT
- GROUND–WATER POTENTIAL LINE
- BOTTOM OF MONITORED INTERVAL
- TD 20.0 — TOTAL DEPTH OF WELL OR BORING (FT BGS)
- GROUND–WATER FLOW DIRECTION

NOTES

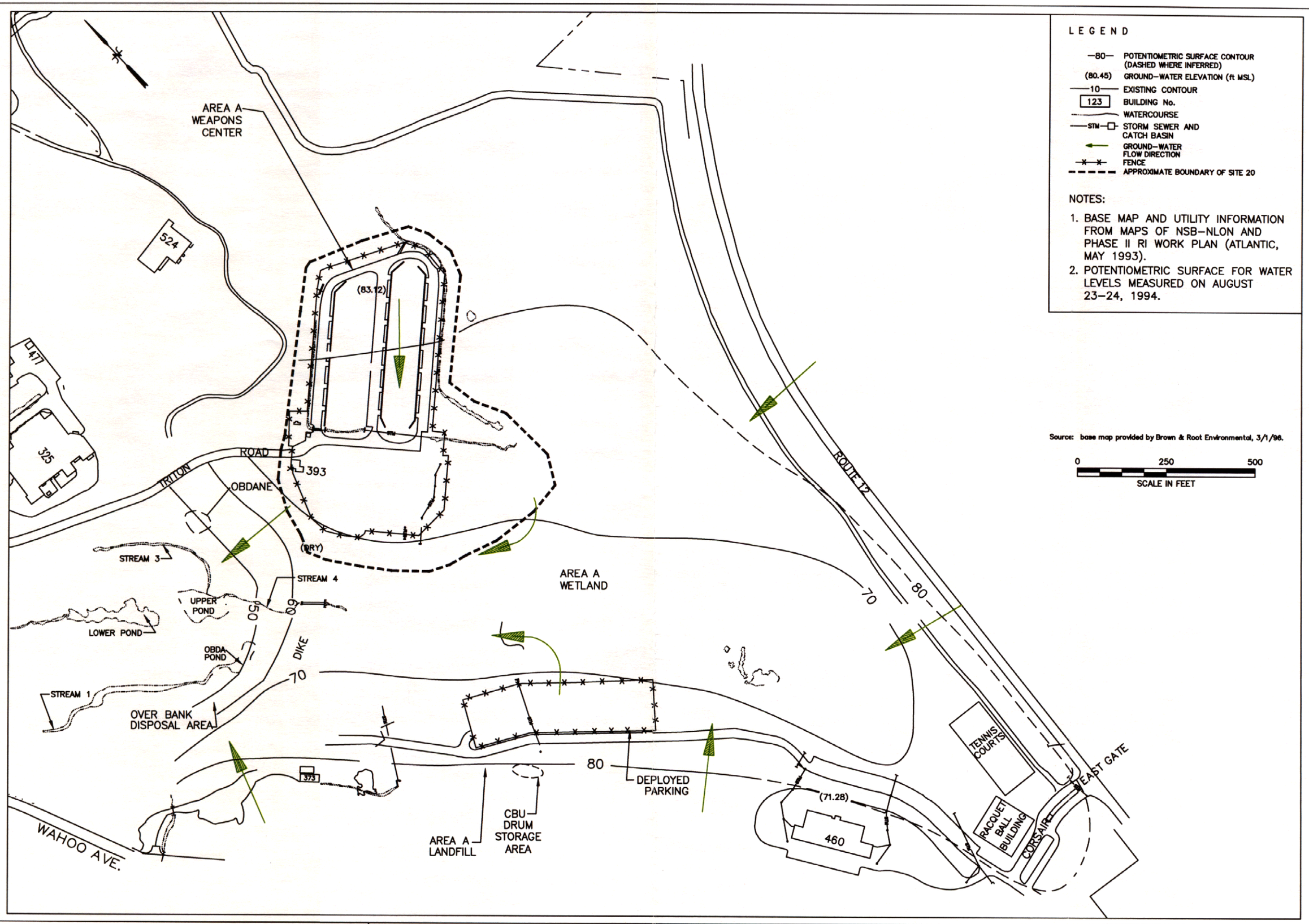
1. (WD) MEANS WELL HAS BEEN DESTROYED OR DAMAGED
2. (NL) MEANS WELL COULD NOT BE LOCATED
3. (NT) MEANS WELL WAS NOT TESTED DUE TO ACCESS PROBLEMS
4. GROUND–WATER LEVEL MEASUREMENTS WERE TAKEN 23 AUGUST 1994. GROUND–WATER FLOW DIRECTIONS ARE REPRESENTATIVE OF THESE MEASUREMENTS. SEASONAL VARIABILITY AND TIDAL VARIABILITY NEAR THE THAMES RIVER MAY CAUSE CHANGES IN GROUND–WATER FLOW DIRECTIONS.



Source: base map provided by Brown & Root Environmental, 3/16/99.

FILE: F:\FEDERAL\DOD\NAVY\29600\90\CAD\SITE-20\DRAFT FINAL\FIG1-6.DWG

EA ENGINEERING, SCIENCE, AND TECHNOLOGY	SITE 20 – AREA A WEAPONS CENTER NAVAL SUBMARINE BASE NEW LONDON, CONNECTICUT	FIGURE 1–6 CROSS–SECTION F–F'	DESIGNED BY CEM	DRAWN BY BT	DATE 2/16/2000	PROJECT NO. 29600.90	FILE NAME FIG. 1–6
			CHECKED BY CEM	PROJECT MGR. CEM	SCALE AS SHOWN	DRAWING NO.	FIGURE 1–6



LEGEND

—80—	POTENTIOMETRIC SURFACE CONTOUR (DASHED WHERE INFERRED)
(80.45)	GROUND-WATER ELEVATION (ft MSL)
—10—	EXISTING CONTOUR
123	BUILDING No.
	WATERCOURSE
—STM—	STORM SEWER AND CATCH BASIN
	GROUND-WATER FLOW DIRECTION
—x—x—	FENCE
- - - -	APPROXIMATE BOUNDARY OF SITE 20

NOTES:

1. BASE MAP AND UTILITY INFORMATION FROM MAPS OF NSB-NLON AND PHASE II RI WORK PLAN (ATLANTIC, MAY 1993).
2. POTENTIOMETRIC SURFACE FOR WATER LEVELS MEASURED ON AUGUST 23-24, 1994.

Source: base map provided by Brown & Root Environmental, 3/1/96.

0 250 500
SCALE IN FEET

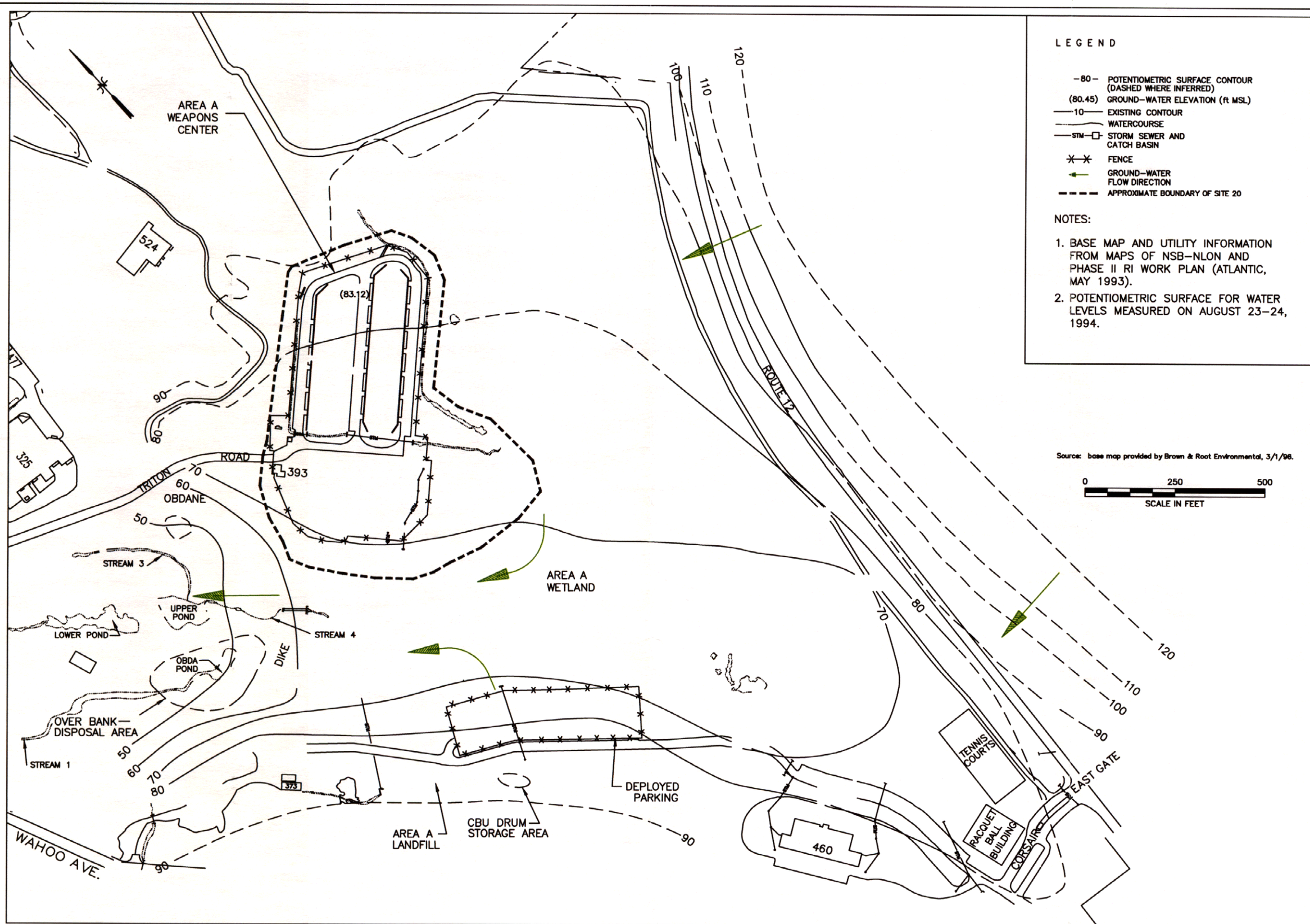
FILE: F:\FEDERAL\DOD\NAVY\29600\90\CAD\SITE-20\DRAFT FINAL\FIG1-7.DWG

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

SITE 20 – AREA A WEAPONS CENTER
NAVAL SUBMARINE BASE
NEW LONDON, CONNECTICUT

FIGURE 1-7
SHALLOW OVERBURDEN SURFACE MAP

DESIGNED BY	DRAWN BY	DATE	PROJECT NO.	FILE NAME
CEM	BT	2/16/2000	29600.90	FIG. 1-7
CHECKED BY	**PROJECT MGR.**	**SCALE**	**DRAWING NO.**	**FIGURE**
CEM	CEM	AS SHOWN		1-7



FILE: F:\FEDERAL\DOD\NAVY\29600\90\CAD\SITE-20\DRAFT FINAL\FIG1-8.DWG

EA ENGINEERING, SCIENCE, AND TECHNOLOGY	SITE 20 – AREA A WEAPONS CENTER NAVAL SUBMARINE BASE NEW LONDON, CONNECTICUT	FIGURE 1-8 BEDROCK SURFACE MAP	DESIGNED BY CEM	DRAWN BY BT	DATE 2/16/2000	PROJECT NO. 29600.90	FILE NAME FIG. 1-8
			CHECKED BY CEM	PROJECT MGR. CEM	SCALE AS SHOWN	DRAWING NO.	FIGURE 1-8

TABLE 1-1 SUMMARY OF SAMPLING AND ANALYTICAL PROGRAM – PHASE II REMEDIAL INVESTIGATION SITE 20 – AREA A WEAPONS CENTER, NAVAL SUBMARINE BASE, NEW LONDON, CONNECTICUT

Sample ID	Sample Depth (ft below ground surface)	Analysis									
		Target Compound List				Target Analyte List Metals[a]		TCLP[b]	Dioxin[c]	Engineering[d]	Radiological[e]
		Volatiles	Semivolatiles	Pesticides	PCB	Total	Dissolved				
ROUND 1 – SOIL											
2WCMW1S-0002	0-2	●	●			●					
2WCMW3S-1618	16-18	●	●	●	●	●					
2WCMW3S-1618-D[f]	16-18	●	●	●	●	●					
2WCTB1-0002	0-2	●	●	●	●	●					
2WCTB2-0002	0-2	●	●	●	●	●					
2WCTB2-0002-D[g]	0-2	●	●	●	●	●					
2WCTB3-0406	4-6	●	●			●					
2WCTB4-0204	2-4	●	●	●	●	●					
2WCTB5-0608	6-8	●	●			●		●			
2WCTB6-0810	8-10	●	●			●					
2WCTB7-0810	8-10	●	●	●	●	●					
2WCTB8-1012.6	10-12.6	●	●	●	●	●					
ROUND 1 – GROUND WATER											
2WCGW1S	---	●	●			●	●				
2WCGW1S-D[h]	---	●	●			●	●				
2WCGW2S	---	●	●			●	●				
2WCGW3S	---	●	●			●	●				
2WCGW4D	---	●	●			●	●				●

(a) Target Analyte List metals plus boron. Water samples were also analyzed for hardness.
(b) Toxicity Characteristic Leaching Procedure (TCLP) for metals only.
(c) Dioxin analyses includes dioxins and dibenzofurans as specified in U.S. Environmental Protection Agency Contract Laboratory Protocol Statement of Work DFLM01.0.
(d) Engineering characteristics for sediments include grain size distribution, moisture content, specific gravity, organic content, carbon exchange capacity, pH, and total organic carbon content.
(e) Radiological analyses include gross alpha and beta and complete gamma spectrum analyses.
(f) 2WCMW3S-1618-D is a field duplicate of 2WCMW3S-1618.
(g) 2WCTB2-0002-D is a field duplicate of 2WCTB2-0002.
(h) 2WCGW1S-D is a field duplicate of 2WCGW1S.

NOTE: PCB = Polychlorinated biphenyls.
● Indicates samples analyzed at a fixed base laboratory.
Dashes (---) indicate no depth specified, ground-water sample.

Sample ID	Sample Depth (ft below ground surface)	Analysis									
		Target Compound List				Target Analyte List Metals[a]		TCLP[b]	Dioxin[c]	Engineering[d]	Radiological[e]
		Volatiles	Semivolatiles	Pesticides	PCB	Total	Dissolved				
ROUND 1 – SEDIMENT											
2WCSD1	0-1	●	●	●	●	●					
2WCSD2	0-1		●			●		●			
2WCSD3	0-1	●	●	●	●	●					
2WCSD4	0-1	●	●	●	●	●					
2WCSD5	0-1	●	●	●	●	●				●	
2WCSD6	0-1		●			●					
2WCSD7	0-1	●	●	●	●	●					
2WCSD8	0-1		●			●					
2WCSD9	0-1		●			●					
2WCSD10	0-1		●			●					
2WCSD11	0-1	●	●	●	●	●			●	●	
2WCSD12	0-1		●			●					
2WCSD13	0-1		●			●					
2WCSD14	0-1		●			●					
2WCSD14-D[i]	0-1		●			●					
2WCSD15	0-1		●			●					
ROUND 1 – SURFACE WATER											
2WCSW3	Surface	●	●	●	●	●	●				
2WCSW5	Surface	●	●	●	●	●					
ROUND 2 – GROUND WATER											
2WCGW1S-2	---	●	●			●	●				
2WCGW2S-2	---	●	●			●	●				
2WCGW3S-2	---	●	●			●	●				
2WCGW4D-2	---	●	●			●	●				●

(i) 2WCSD14-D is a field duplicate of 2WCSD14.

2. DEVELOPMENT OF REMEDIAL GOALS

2.1 INTRODUCTION AND DESCRIPTION OF THE EVALUATION PROCESS

The purpose of this chapter is to assemble pertinent information that will be used in the screening of technologies, and in the development and evaluation of remedial alternatives for Site 20 in Chapters 3 and 4, respectively. Specific goals of this chapter are as follows:

- Identify federal, state, and local ARARs (Section 2.2)
- Identify COCs and develop PRGs for soil and sediment to be addressed by the site remedy (Section 2.3)
- Compare site data to PRGs (Section 2.4)
- Define the Area of Attainment (Section 2.5) to be addressed by the remedial actions
- Establish RAOs to protect human health and the environment (Section 2.6)
- Identify GRAs to meet these objectives (Section 2.7).

This information will be used by the Navy, EPA, and CTDEP in development of the Record of Decision for Site 20.

2.2 APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

The Department of Defense's Installation Restoration Program complies with CERCLA standards, including a comparison of alternative site remedies to ARARs. The selected remedial action for the site must satisfy all ARARs unless specific waivers have been granted.

The NCP (40 CFR Part 300) specifies procedures to be employed in identifying, removing, or remedying releases of hazardous substances. In particular, the NCP specifies procedures for deciding the appropriate type and extent of remedial action at the site to effectively mitigate and minimize the threat to, and provide adequate protection of, human health and the environment.

The national goal of remedy selection is to protect human health and the environment, to maintain protection over time, and to minimize untreated waste (40 CFR 300.430 of the NCP [55 FR 8846]). The remedial alternative must attain ARARs under federal environmental laws and state environmental or facility siting laws or provide grounds for invoking one of the waivers permitted under the statute.

CERCLA Section 121, codified at 40 CFR Part 300.400(e), states that removal or remedial actions conducted entirely onsite do not require federal, state, or local permits. However, any substantive, non-administrative requirements of statutes and regulations that include permitting requirements must be complied with or waived.

2.2.1 Definition of Applicable or Relevant and Appropriate Requirements

EPA defines "applicable" and "relevant and appropriate" in the revised NCP, codified at 40 CFR 300.5 (1994) and has incorporated these definitions in its CERCLA Compliance with Other Laws Manual (Interim Final EPA/540/G-89/006, Part II EPA/540/G-89/009). Site remediation must comply with ARARs, except where waived according to Section 121(d) of CERCLA.

A requirement under CERCLA/SARA, as amended, may be either applicable or relevant and appropriate to a site-specific remedial action, but not both.

- **Applicable Requirements**—These cleanup standards are standards of control, and other substantive federal and state environmental and facility siting requirements, criteria, or limitations promulgated under federal or state law that specifically address a hazardous substance, pollutant, chemical, remedial action, location, or other circumstances at a CERCLA site.

- **Relevant and Appropriate Requirements**—These cleanup standards are standards of control, and other substantive federal and state environmental and facility siting requirements, criteria, or limitations promulgated under federal or state law. Although not directly applicable to a hazardous substance, pollutant, chemical, remedial action, location, or other circumstance at a CERCLA site, these requirements address problems or situations sufficiently similar to those encountered at a CERCLA site that their use is well suited to the particular site. In some circumstances, a requirement may be relevant, but not appropriate, for the site-specific conditions.

2.2.2 Classifications of Applicable or Relevant and Appropriate Requirements

ARARs are classified into one of the following three functional groups:

1. **Chemical-Specific**—Health- or risk-based numerical values or methodologies that establish cleanup levels or discharge limits for particular chemicals. A typical example of chemical-specific ARARs includes the remediation standards for soil.

2. **Location-Specific**—Requirements that restrict remedial actions based on the characteristics of the site or its immediate environs. Typical examples of location-specific ARARs include federal/state wetlands protection requirements.

3. **Action-Specific**—Requirements that set controls or restrictions on the design, implementation, or performance levels of activities related to the management of hazardous substances, pollutants, or chemicals. A typical example of action-specific ARARs includes hazardous waste generator/handling requirements.

To be consistent with the NCP definition of ARARs and changes made by SARA, federal requirements and State of Connecticut requirements were considered during the identification of ARARs.

2.2.3 To Be Considered Guidance

Federal and state guidance documents or advisories do not have the status of ARARs and are not enforceable. However, they may be considered when developing remedies that will be protective of human health and the environment.

2.2.4 Circumstances in Which Applicable or Relevant and Appropriate Requirements May Be Waived

To comply with CERCLA, a remedy must either meet all identified ARAR standards or qualify for a waiver. Pursuant to Section 300.430(f)(3), there are several criteria under which an ARAR may be waived, if the standard cannot be attained.

CERCLA Section 121(d)(4) identifies six criteria for waivers of ARARs. One of the six, related to fund balancing, is not applicable to Department of Defense projects. The other five criteria are as follows:

1. The remedial action selected is only part of a total remedial action that will attain such level or standard of control when completed.

2. Compliance with such requirements at the facility will result in greater risk to human health and the environment than alternate options.

3. Compliance with such requirements is technically impracticable.

4. The remedial action selected will attain a standard of performance that is equivalent to that required under the otherwise applicable standard, requirement, criteria, or limitation, through use of another method or approach.

5. With respect to a state standard, requirement, criteria, or limitation, the state has not consistently applied (or showed the intention to consistently apply) the standard, requirement, criteria, or limitation in similar circumstances at other remedial sites.

2.2.5 Identification of Applicable or Relevant and Appropriate Requirements

The following sections summarize the specific federal, state, and local ARARs for the remedial actions that may be taken at Site 20. Each ARAR has been chosen for its potential applicability, or relevance and appropriateness in accordance with the procedures identified in the *CERCLA Compliance with Other Laws Manual* (Office of Solid Waste and Emergency Response [OSWER] Directive 9234.1-01 [EPA 1988a]) and *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA* (OSWER Directive 9355.3-01 [EPA 1988b]). A summary of the chemical-, location-, and action-specific ARARs for Site 20 is presented in Table 2-1. Alternative-specific ARAR tables are presented in Chapter 4.

2.2.5.1 Chemical-Specific Applicable or Relevant and Appropriate Requirements

Chemical-specific requirements are established using health- or risk-based numerical values or methodologies that establish cleanup levels or discharge limits in environmental media for specific substances or pollutants. The following potential chemical-specific ARARs were considered for soil and sediment at Site 20:

- CTDEP Remediation Standard Regulations (RSRs) for soil only (Connecticut General Statutes [CGS] 22a-133k, Regulations of Connecticut State Agencies [RCSA] 22a-13k-1 through k-3).

Chemical-specific ARARs are described below and summarized in Table 2-1.

Connecticut Department of Environmental Protection Remediation Standard Regulations for Soil

Sections 22a-133k-1 through 22a-133k-3 of the CTDEP regulations provide remediation standards for soil. Similar standards are not established for sediment. In order to protect human health, these regulations set distinct chemical-specific soil remediation standards based on residential (RDEC) or industrial/commercial (ICDEC) land use. The regulations stipulate that, "Direct Exposure Criteria for substances other than PCBs do not apply to inaccessible soil," where "inaccessible soil" is defined as polluted soil, which is more than 4 ft below ground surface (bgs), 2 ft below a paved surface, or below a building or other permanent structure.

RDEC are more stringent than ICDEC, but are not applicable where an Environmental Land Use Restriction (ELUR), which prevents use of the property for residential purposes, exists or will be implemented in conjunction with the selected remedial action. Even where an ELUR is implemented, CTDEP RSRs stipulate that remedial measures must ensure that COCs are less than ICDEC in the first 2 ft if the soil is paved or covered by a building, or in the first 4 ft of exposed soil. The regulations consider soil conditions to be in compliance with Direct Exposure Criteria: (1) when the 95 percent upper confidence limit (UCL) for the mean of all soil samples collected at the site is less than or equal to the numerical criterion for a given chemical, and

(2) when no individual samples are more than twice that numerical criterion (Section 22a-133k-2[e]).

The CTDEP regulations use PMC to ensure that there is minimal potential for movement of COCs from soil into ground water. PMC are established based on ground-water classification, chemical class (inorganic, organic, TPH, and PCB), and type of analysis (mass or Synthetic Precipitation Leaching Procedure [SPLP]/TCLP extraction). For substances other than inorganics or PCBs, the results of mass analyses are compared directly to the corresponding PMC listed in Appendix B of the Connecticut regulations. For inorganics and PCBs, the PMC are based on TCLP or SPLP analyses instead of mass analyses. Section 22a-133k-2(c)(2)(D) specifies that in ground water classified as GB for substances other than petroleum hydrocarbons, the results of a TCLP or SPLP analysis may be compared to the Ground-Water Protection Criteria (Appendix C of the regulations) multiplied by 10, or by another site-specific dilution factor, provided no non-aqueous phase liquids are present. A site-specific dilution factor is calculated in accordance with the procedure provided in Section 22a-133k-2(c)(2)(E)(ii).

The CTDEP regulations require that soil above the seasonal high water table in an area classified GB be remediated to levels that do not exceed the applicable PMC. Under Section 22a-133k-2(e)(2), compliance with PMC is achieved when:

- (A)(i) not less than 20 samples of soil located above the water table have been used to characterize the distribution and concentration of the COCs at the site or remaining at the site following remediation, (ii) the release area has not been remediated by means of excavation and removal of polluted soil, (iii) the 95 percent UCL of the arithmetic mean of all the soil sample results is equal to or less than the PMC or all the samples results are equal to or less than the applicable Direct Exposure Criteria, and (iv) no single sample result exceeds twice the PMC

- (B)(i) less than 20 samples of soil located above the water table have been used to characterize the distribution and concentration of the COCs remaining at the site following remediation, (ii) the site has not been remediated by means of excavation and removal of polluted soil, and (iii) the results of samples from the site for the COCs are equal to or less than the PMC

- (C)(i) the site has been remediated by means of excavation and removal of polluted soil, (ii) a representative sampling program consisting of samples of soil located above the water table has been used to characterize the distribution and concentration of the COCs at the site following excavation and removal, and (iii) the results of samples from the site for such substances are equal to or less than the PMC.

PMC do not apply to "environmentally isolated soil," which includes soil located beneath a building or other permanent structure that would prevent the migration of pollutants. An ELUR

must be in effect to ensure soil will not be exposed to infiltration of water from demolition of the building or other structure.

2.2.5.2 Location-Specific Applicable or Relevant and Appropriate Requirements

Location-specific ARARs may affect or restrict remedial and site activities. Location-specific ARARs are described below and summarized in Table 2-1. Generally, location-specific requirements serve to protect individual site characteristics, resources, and specific environmental features associated with unique or sensitive areas, such as wetlands, threatened or endangered species habitat, fragile ecosystems, or historic sites. State- and federally-regulated wetlands are present on and adjacent to Site 20. Remedial strategies should minimize impacts to the wetlands. Actions that have an adverse effect on the wetland will be mitigated in coordination with the local inland wetlands agency, CTDEP, and EPA. The following potential location-specific ARARs were considered for soil and sediment at Site 20:

- Federal Clean Water Act, Dredge and Fill Criteria, Section 404 (40 CFR Part 230 and CFR Parts 320-323; 33 USC 1344)
- Executive Order 11990 RE: Protection of Wetlands (40 CFR Part 6, Appendix A)
- Fish and Wildlife Coordination Act (16 USC Part 661 *et seq.* 40 CFR 122.49)
- Connecticut Inland Wetlands and Watercourses Act (1997) (CGS Sections 22a-37 through 45, RCSA Sections 22a-39-1 through 15)

Clean Water Act, Dredge and Fill Criteria, Section 404 (40 CFR 230 Part 230 and CFR Parts 320-323; 33 USC 1344)

Several regulations promulgated under the Clean Water Act may apply when considering remedial alternatives that involve direct discharges to surface water, indirect discharge to a publicly-owned treatment works, or dredge and fill activity. The Federal Water Pollution Control Act, as amended by the Clean Water Act, seeks to restore and maintain the chemical, physical, and biological integrity of the Nation's waters (40 CFR 101[a]).

Clean Water Act Section 404 regulates the discharge of dredged or fill material into waters of the United States. Remedial actions at Site 20 should be conducted such that potential adverse impacts to the adjacent Area A wetlands are minimized to the extent practicable. Impacts to wetlands may require mitigation/restoration.

Executive Order 11990 RE: Protection of Wetlands (40 CFR Part 6, Appendix A)

Executive Order 11990 requires that construction or management actions cannot adversely affect wetlands. These practices are only allowed if no practicable alternatives exist or the action includes all practicable measures to minimize harm to the wetlands. This Order also directs all

Federal agencies to minimize the destruction, loss, or degradation of wetlands and to enhance their natural value.

Fish and Wildlife Coordination Act (16 USC Part 661 *et seq.* 40 CFR 122.49)

The purpose of the Fish and Wildlife Coordination Act in relation to remedial actions is to protect fish and wildlife when such actions would result in the control or structural modification of a natural stream, body of water, wetlands, floodplain, or floodprone areas. The statute requires Federal agencies to take into consideration the effect that water-related projects would have upon fish and wildlife and then take action to prevent loss or damage to these resources. Consultation with the Fish and Wildlife Service or Connecticut's Bureau of Natural Resources is required if alteration of the water would occur as a result of offsite remedial actions. However, consultation is recommended for onsite actions. The consultation will help develop measures to prevent, mitigate, or compensate for loss to fish and wildlife.

Connecticut Inland Wetlands and Watercourses Act (1997) (CGS Sections 22a-37 through 45, RCSA Sections 22a-39-1 through 15)

The Connecticut Inland Wetlands and Watercourses Act may be applicable where remedial actions will result in alteration or use of a wetland or watercourses. The Connecticut Inland Wetlands and Watercourses Act was established for the preservation and protection of wetlands and watercourses from random, unnecessary, undesirable, and unregulated uses, and disturbance or destruction. All remedial activities in wetlands or watercourses involving filling, excavating, dredging, clear cutting, clearing, or grading, or any other alteration or use of a wetland or watercourse not specifically permitted by Section 22a-40 and otherwise defined as a regulated activity by these regulations will meet the substantive requirements of these regulations.

2.2.5.3 Action-Specific Applicable or Relevant and Appropriate Requirements

Action-specific ARARs set controls or restrictions on the design, implementation, and performance levels of activities related to the management of hazardous substances, pollutants, or chemicals. Remedial alternatives for Site 20 are developed and evaluated in Chapter 4. Federal and state laws that need to be considered when planning and conducting soil or sediment remediation include the following:

- Federal Clean Water Act, National Pollutant Discharge Elimination System (NPDES), Section 402 (40 CFR 122-125; 33 USC 1342)

- Connecticut Hazardous Waste Management Regulations (RCSA 22a-449[c]100-102 and 104)

- State of Connecticut Water Quality Standards (CGS Section 22a-426) and Water Pollution Control (RCSA Sections 22a-430-1 through 8 and Section 22a-430b)

- Connecticut Air Pollution Control (RCSA Section 22a-174-18b).

Action-specific ARARs are described below and summarized in Table 2-1.

Clean Water Act, National Pollutant Discharge Elimination System Program, Section 402 (40 CFR 122-125; 13 USC 1342)

The NPDES permit program is authorized under Clean Water Act Section 402 (regulated at 40 CFR Part 122). Discharges of wastewater to surface water must comply with substantive NPDES requirements. Designated toxic pollutants are listed in 40 CFR 401.14, General Provisions for Effluent Guidelines and Standards. Toxic pollutants are subject to effluent limitations arising from the application of the best available technology economically achievable for the application class, or point source category, and must comply with water quality standards. NPDES requirements are applicable to any remedial action that may result in a discharge of pollutants to a surface body of water. Although onsite CERCLA actions do not require permits, the substantive NPDES permit requirements for point-source discharges, including effluent limitations and monitoring requirements, are still applicable.

Connecticut Hazardous Waste Management Regulations (RCSA 22a-449[c]100-102 and 104)

Connecticut is delegated to administer the Federal RCRA statute through its state regulations. Connecticut Hazardous Waste Management Regulations (RCSA Section 22a-449[c]) incorporate by reference the essential sections of the CFR covering RCRA. As such, they regulate various waste management activities to promote resource conservation and to protect human health and the environment. Connecticut Hazardous Waste Management Regulations are applicable to a CERCLA action when the COCs are listed in the regulations or exhibit hazardous waste characteristics. Identification of regulated wastes is based on characteristics of ignitability, corrosivity, reactivity, or toxicity as defined in RCSA Section 22a-449(c)101. Where characteristic hazardous wastes are present, Connecticut stipulates that the wastes and associated contaminated media must either be capped or treated, or removed and disposed of in a permitted hazardous waste landfill. No COCs at Site 20 have been determined to exhibit hazardous waste characteristics. Any movement of contaminated soil or sediment at the site will require testing of the material to determine that characteristic hazardous waste is not present. If hazardous waste is identified, it will be handled and remediated under these standards.

State of Connecticut Water Quality Standards (CGS Section 22a-426) and Water Pollution Control (RCSA Sections 22a-430-1 through 8 and Section 22a-430b)

The Connecticut Water Quality Standards were adopted in accordance with CGS Section 22a-426. The Surface Water Quality Standards became effective on 15 May 1992. The Ground-

Water Quality Standards became effective on 12 April 1996. Connecticut Water Quality Standards will be applicable where remedial actions at Site 20 result in a discharge of treated water to surface or ground water. Discharge limits are set under the Connecticut Water Pollution Control regulations (RCSA Sections 22a-430-1 through 8) for discharge to surface water to ensure that discharges do not result in non-compliance in the receiving waterbody with descriptive or numeric criteria for specific pollutants applicable to that surface water's classification. The specific surface water discharge limit may allow a designated zone of influence based on available dilution.

Connecticut Air Pollution Control (RCSA Section 22a-174-18b)

The Connecticut Air Pollution Control contains standards for fugitive dust and odors form excavation and restoration activities. As a result of these regulations, dust and odor control measures will be instituted during excavation and restoration activities.

2.2.5.4 Other Guidance To Be Considered

Federal and state guidance documents or criteria that are not generally enforceable, but are advisory, do not have the status of potential ARARs. Guidance documents or advisories to be considered in determining the necessary level of cleanup for protection of human health or the environment may be used where no specific ARARs exist for a chemical or situation, or where such ARARs are not sufficient to afford protection. The following To Be Considered guidance was identified for Site 20:

- Cancer Slope Factors and Reference Dose
- Connecticut Guidelines for Soil Erosion and Sediment Control.

Cancer Slope Factors and Reference Dose

The Cancer Slope Factors and Reference Dose are guidance values used to evaluate potential carcinogenic and non-carcinogenic hazards caused by exposure to contaminants. The preferred source of cancer slope factors and reference doses are the Integrated Risk Information System. Information in the Integrated Risk Information System supercedes all other sources. If information is not available in the Integrated Risk Information System, other sources should be consulted. Additional sources of information are EPA's Health Affects Summary Tables, Agency for Toxic Substances and Disease Registry toxicological profiles, and the EPA's National Center for Environmental Assessment.

Connecticut Guidelines for Soil Erosion and Sediment Control

The Connecticut Guidelines for Soil Erosion and Sediment Control were prepared by the Connecticut Council on Soil and Water Conservation as a technical and administrative guidance for the development, adoption, and implementation of an erosion and sediment control program. These guidelines may affect remedial actions that impact wetland and/or aquatic resources.

2.3 PRELIMINARY REMEDIATION GOALS

The methodology used to derive PRGs is discussed in the following sections. Identification of COCs followed separate paths for soil and sediment. Analytical data for soil were compared to Connecticut RSRs. Those exceeding RSRs were selected as COCs. COCs which exceeded EPA's risk targets for exposure to soils in the HHRA performed in the RI were also identified as COCs. COCs in sediment were identified by comparison to Region III Risk-Based Concentrations (RBCs) because there are no state standards for sediment and there were no quantitative risks calculated for sediment in the RI HHRA. All COCs identified in soil and sediment were carried through an HHRA (Figure 2-1). Risk-based PRGs were developed for those COCs with risks exceeding EPA's risk targets. COCs which did not exceed background values were not remediated.

2.3.1 Connecticut Department of Environmental Protection Hazardous Waste Management Regulations and Resource Conservation and Recovery Act Constituents of Concern

None of the potential COCs identified at Site 20 exhibit RCRA hazardous waste characteristics for ignitability, corrosivity, or activity. The maximum concentration of any of the chemicals identified did not exceed the regulatory level for toxicity; consequently, no COCs were identified based on RCRA hazardous waste characteristics.

2.3.2 Connecticut Department of Environmental Protection Remediation Standards Constituents of Concern

Site 20 soil data were compared to the State of Connecticut's remediation standards for direct exposure and pollutant mobility (Appendix Table A-1). Validated analytical data from the RI were used for this comparison. Direct Exposure Criteria for residential exposure were used to conservatively evaluate potential exposure to the soil at the site. The chemicals reported at maximum concentrations (Table A-2) exceeding the RDEC include the following: benz(a)anthracene and benzo(b)fluoranthene. No maximum chemical concentrations exceeded ICDEC.

To address concerns regarding migration of chemicals from soil to ground water, site soil data were also compared to Connecticut remediation standards for pollutant mobility. Ground water at Site 20 is classified as GB. The chemicals reported at maximum concentrations exceeding the GB PMC (Table A-3) include the following: benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and chrysene.

No federal or state criteria have been promulgated to address potential exposure to chemicals in sediment.

For surface water, a qualitative analysis of risk associated with the site data was conducted using Connecticut Water Quality Standards for aquatic life and human health, which are similar to federal Ambient Water Quality Criteria. The only chemical reported at a maximum exceeding the state Ambient Water Quality Criteria for the consumption of organisms and/or water and organisms was arsenic. Surface water at Site 20 consists of drainage ditches which are recharged from shallow ground water and surface runoff. However, the drainage ditches do not provide a habitat capable of supporting ecological receptors. Thus, Ambient Water Quality Criteria for consumption of organisms or water are not appropriate or applicable.

Analytical results for inorganic chemicals in soil were also compared to site-specific background soil concentrations (Atlantic 1995). Inorganic chemicals listed in Table 2-2 had at least one sample with concentrations exceeding site-specific background concentrations.

2.3.2.1 Preliminary Remediation Goals Based on Connecticut Remediation Standard Regulations

PRGs for COCs in soil were first developed using chemical-specific ARARs. Applicable soil remediation criteria for Site 20 are the State of Connecticut RDEC, ICDEC, and PMC (Class GB ground-water area) (Appendix A).

RDEC are more stringent than ICDEC, however, ICDEC are permissible as long as ELURs are established and maintained as a component of the selected remedy. Under the industrial scenario, an ELUR would be required that prohibits future residential use of Site 20. As a result, the RDEC will not be considered for the current industrial use scenario. Under the Connecticut RSRs, an ELUR cannot be established until a deed is created for the parcel. Because there are currently no deeds for NSB NLON, the ELUR would be recorded on the Base Master Plan. The boundaries of Site 20 would be surveyed and recorded on the Base Master Plan and any subsequent land transfer documents as required by applicable federal, state, and local requirements and the ROD.

The Connecticut regulations stipulate that soil conditions are in compliance with Direct Exposure Criteria when: (1) the 95 percent UCL for the mean of all soil samples collected at the site is less than or equal to the numerical criterion established for a given COC, and (2) no individual samples are more than twice that numerical criterion (Section 22a-133k-2[e]). The regulations stipulate that, "Direct Exposure Criteria for substances other than PCBs do not apply to inaccessible soil provided an ELUR is in effect." Inaccessible soil is defined as soil that is more than 4 ft bgs, 2 ft below a paved surface, or below a building or other permanent structure. For purposes of this FS, shallow soil is defined as less than 4 ft bgs and deep soil is defined as greater than 4 ft bgs.

PMC are used to ensure that there is minimal potential for migration of COCs from soil into ground water. The regulations require that soil above the seasonal high water table in an area classified GB be remediated to levels that do not exceed the applicable PMC. The PMC are

applied, similar to exposure criteria, on the basis of the 95 percent UCL and no samples exceeding twice the criterion, with the additional condition that results of at least 20 samples be used in the calculation of the mean. Where less than 20 samples are available, as at Site 20, none of the samples may exceed the criterion.

2.3.3 Human Health Risk-Based Preliminary Remediation Goals

PRGs were derived for all COCs identified in site soil and sediment. COCs in soil were identified based on risks calculated in the RI HHRA. For sediments, COCs were identified as those exceeding EPA Region III RBCs established for soils. For identified COCs, carcinogenic and non-carcinogenic risks were calculated for potential current and future exposures to COCs in site soil and sediment. For COCs with risks exceeding EPA risk target levels of 10^{-6} for carcinogens and HI = 1.0 for non-carcinogens, PRGs were derived which correspond to target risk levels of 10^{-6}, 10^{-5}, and 10^{-4} for carcinogens, and HI = 1.0 for non-carcinogens.

2.3.3.1 Selection of Constituents of Concern

Soil

COCs were identified in soils based on the results of the HHRA conducted as part of the RI at Site 20 (Brown & Root 1997). Appendix F of the RI presents the risk assessment results for exposures to soils for full-time employees, construction workers, and resident adults and children. Cumulative HIs did not exceed EPA's risk target of 1.0 for any exposure scenarios. Therefore, there are no non-carcinogenic COCs identified in soil at Site 20. Cumulative cancer risks exceed EPA's risk target of 10^{-6} for exposure to soil for full-time employees and residents. Individual chemicals with risks exceeding 10^{-6} were arsenic and benzo(a)pyrene for full-time employees and arsenic, benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and dibenz(a,h)anthracene for potential future residents. Therefore, these are the COCs identified for soils at Site 20, and are shown in Table 2-3. Maximum measured concentrations of arsenic exceeded background. Therefore, arsenic is retained as a COC in soil.

Sediment

There were no quantitative risks calculated for exposures to sediments at Site 20 in the RI (Brown & Root 1997). COCs in sediment were selected by screening maximum measured concentrations in sediment at Site 20 against EPA Region III RBCs (U.S. EPA 1999). Maximum measured concentrations were compared to both industrial and residential soil RBCs. Those which exceeded industrial RBCs were identified as COCs for the construction worker and full-time employee, and those which exceeded residential RBCs were selected as COCs for potential future residents. RBCs for carcinogens and $1/10^{th}$ RBCs for non-carcinogens were used as the screening values. This analysis is presented in Appendix B.1. The COCs identified for sediment are arsenic, benzo(a)pyrene, and dibenz(a,h)anthracene for construction workers and full-time employees. The COCs identified for sediment for future potential residents are antimony,

arsenic, cadmium, chromium, manganese, benz(a)anthracene, benzo(a)pyrene, benzo(b) fluoranthene, dibenz(a,h)anthracene, and indeno(1,2,3-c,d)pyrene. These are shown in Table 2-3.

2.3.3.2 Derivation of Risk-Based Preliminary Remediation Goals

Risk-based PRGs are proposed cleanup levels which are based on human health risks, and are intended to be protective of human health. The methodology used to derive PRGs for soil and sediment at Site 20 are described in the following sections.

Risk Calculations

Human health risks were calculated for exposures to COCs identified in soil and sediment for the following receptors: construction worker, full-time employee, resident adult, and resident child. Exposure pathways evaluated were incidental ingestion of soil, dermal absorption of soil, inhalation of soil particulates, incidental ingestion of sediment, and dermal absorption of sediment. Risks were calculated using Reasonable Maximum Exposure assumptions. These values are shown in Table B.2-1. Exposure point concentrations were derived as the 95 percent UCL of the mean. The derivation of the 95 percent UCL of the mean as well as all equations used to calculate intakes and risk are presented in Appendix B.2. Toxicity values used are presented in Table B.2-2.

Risks for full-time employees were based on exposure to soil 0-4 ft bgs, and residential risks were based on exposure to total soil. Risks for construction workers, full-time employees, and residents were based on exposure to all sediment samples. The summary of the data analysis is presented in Table B.2-3. Included in the data summary table are mean, maximum, and 95 percent UCL calculations.

2.3.3.3 Risk Results

Sediment

The results of the risk assessment conducted to evaluate potential human health risks resulting from potential exposures to sediment at Site 20 are presented in Appendix B.2.1. Cumulative non-cancer HIs for all receptors were below EPA's risk target of HI = 1.0. Therefore, there are no concerns for potential risks resulting from exposures to non-carcinogens in sediment at Site 20. Cumulative cancer risks for construction workers were below EPA's risk target of 10^{-6}. Therefore, no risks exist for construction workers at Site 20, and no PRGs need to be derived for this receptor. Cumulative cancer risks for full-time employees were 4.9×10^{-6}. Arsenic and benzo(a)pyrene have individual cancer risks exceeding 10^{-6} (1.47×10^{-6}, 3.0×10^{-6}). Therefore, PRGs will be calculated for these two COCs for exposures to sediment for full-time employees. Cumulative cancer risk estimates for potential future residents were 1.8×10^{-5}. Individual cancer risk estimates exceeded 10^{-6} for arsenic, benzo(a)pyrene, and dibenz(a,h)anthracene. Therefore, PRGs will be developed for residential exposures to these three COCs in sediment.

Soil

The results of the risk assessment conducted to evaluate potential human health risks resulting from potential exposures to soil at Site 20 are presented in Appendix B.2.2. Cumulative non-cancer HIs for all receptors were below EPA's risk target of HI = 1.0. Therefore, there are no concerns for potential risks resulting from exposures to non-carcinogens in soil at Site 20. Cumulative cancer risk estimates for full-time employees were 5.6×10^{-6}. Individual cancer risks exceeded 10^{-6} for arsenic only. Therefore, PRGs will be derived to be protective of potential full-time employees exposed to arsenic in surface soil at Site 20. Cumulative cancer risk estimates for potential future residents were 1.4×10^{-5}. Individual cancer risks exceeded 10^{-6} for arsenic, benzo(a)pyrene, and dibenz(a,h)anthracene only. Therefore, PRGs will be derived for these three COCs to be protective for potential future residents exposed to these COCs in 0-10 ft bgs soil at Site 20.

2.3.3.4 Human Health Risk-Based Preliminary Remediation Goals

PRGs are risk-based concentrations in media of concern which correspond to a given human health risk level. At Site 20, soil and sediment are the media of concern for which risk-based PRGs were derived using the following equation:

PRG = Reasonable Maximum Exposure Point Concentrations • Target Risk Level/Calculated Risk Value.

Risk-based PRGs were derived for all COCs which had human health risk estimates exceeding 10^{-6} or HIs exceeding 1.0 for soil and sediment at Site 20. There were no COCs in soil or sediment with HIs exceeding 1.0, therefore, no PRGs were developed for non-carcinogens (Appendixes B.2.1 and B.2.2). For carcinogens, PRGs were derived to correspond to risk levels of 10^{-6}, 10^{-5}, and 10^{-4}. No non-carcinogenic PRGs were developed.

Appendix B.2.1 shows that cumulative cancer risks for exposures to sediment exceed 10^{-6} for full-time employees and residents only, therefore, there were no PRGs derived for construction worker exposures. PRGs were derived for arsenic and benzo(a)pyrene in sediment for full-time employees and are shown in Table 2-4. PRGs were derived for potential future residents for arsenic, benzo(a)pyrene, and dibenz(a,h)anthracene as shown in Table 2-4.

Appendix B.2.2 shows that cumulative cancer risks for exposures to shallow soil exceed 10^{-6} for full-time employees for arsenic and benzo(a)pyrene. Therefore, industrial PRGs were derived for these two COCs in shallow soil at Site 20 as shown in Table 2-5A. Cumulative cancer risks exceeded 10^{-6} for exposure to total soil for potential future residents for arsenic, benzo(a)pyrene, and dibenz(a,h)anthracene. Therefore, residential PRGs were derived for these three COCs for total soil at Site 20 (Table 2-5A). For comparison, Table 2-5A also presents sample information, including number of samples, number of detects, maximum concentrations, and 95 percent UCL of the mean calculated for the HHRA. EPA methodology for calculating the 95 percent UCL of

the mean utilized the Shapiro-Wilk test for normality, one-half detection limit for non-detects, and averaging of duplicate samples. Also presented are CTDEP ICDEC, RDEC, and PMC.

Table 2-5B presents risk-based PRGs in comparison to CTDEP remediation standards and sample information. In this case, sample data include 95 percent UCL of the mean calculated on the arithmetic mean and the maximum measured concentration in any sample regardless of whether it was a duplicate sample, in accordance with CTDEP requirements.

2.3.4 Ecological Risk Results

The Phase II RI ecological risk assessment evaluated risk to ecological receptors at Site 20. Site 20, as described in Section 1.7, consists primarily of impervious surfaces (buildings and paving) with some maintained grass. This land use is of low habitat value, and use of the area by terrestrial ecological receptors is limited. The drainage ditches do not provide a habitat capable of supporting aquatic receptors. Therefore, although the conservative screening analysis identified COCs that could potentially represent risk, a refined assessment shows that since there are no receptors, the potential risk is negligible.

2.3.4.1 Ecological Risk-Based Preliminary Remediation Goals

Since onsite risk to ecological receptors has been determined to be negligible, quantitative PRGs for ecological risk were not necessary. However, recognizing that the drainage flows into Area A Wetland, a remedial goal to minimize potential future overland transport of COCs from the three drainage areas in the Area A Wetland and the Area A Downstream watercourses is recommended.

2.3.5 Accommodations of Preliminary Remediation Goals and Applicable or Relevant and Appropriate Requirements

Remedial alternatives for Site 20 will address Connecticut RSRs as well as site-specific risks. Risk-based PRGs address COCs identified through the HHRA in soil and sediment. For the Connecticut Direct Exposure Criteria and the risk-based PRGs, the standards differ between the two land use scenarios and their associated receptors. The PRGs for current industrial land use and its associated receptors (i.e., full-time employees and construction workers) are less stringent than the PRGs associated with the primary receptor under the future residential land use scenario (i.e., future residents). PMC are based on ground-water classification (GB at Site 20) rather than site use.

Site 20 will continue as an industrial site. However, potential residential use of the site is also considered as a conservative measure. Therefore, soil PRGs were selected to comply with numerical soil cleanup standards established by the State of Connecticut for the protection of

human health, that is, PMC, ICDEC, and RDEC for the current and potential future land use. Risk-based PRGs for full-time employees, construction workers, and residents were also determined. Site sample values are compared to all these PRGs in the following sections.

2.4 COMPARISON OF ANALYTICAL DATA TO PRELIMINARY REMEDIATION GOALS

Soil and sediment PRGs developed using the HHRA and federal and state chemical-specific ARARs for the COCs at Site 20 are summarized by land use scenario and media (Tables 2-4, 2-5A, and 2-5B). For the current industrial scenario, data were compared to PMC, ICDEC, and HHRA 10^{-5} risk-based PRGs for the full-time employee. For the future residential scenario, data were compared to PMC, RDEC, and HHRA 10^{-5} risk-based PRGs for the future resident. The concentrations of the COCs in soil and sediment samples that exceed PRGs are presented in Figure 2-2 and Tables 2-6 and 2-7. These are discussed in the following sections. Analytical data are presented in Appendix C.

2.4.1 Current Industrial Land Use Scenario

Shallow Soil

With respect to Connecticut RSRs, two COCs (benz[a]anthracene and benzo[b]fluoranthene) exceeded PRGs in shallow soil (Table 2-6). The maximum detected concentrations of benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and chrysene were greater than their respective PMC in one shallow soil sample (2WCTB2). The 95 percent UCL for benzo(b)fluoranthene also slightly exceeded the PMC (Table 2-5A). The number of samples (7) that were analyzed from Site 20 was less than 20, as specified in the Connecticut regulations as representative for PMC. Consequently, the regulations require that no samples contain COC concentrations above the PMC. No individual samples contained COC concentrations that exceeded the ICDEC[1].

There were no exceedances of 10^{-5} risk-based PRGs in shallow soil (Table 2-6).

Total Soil

The COCs in deep soil were below the seasonal high water table, therefore, the PMC do not apply. No individual samples in deep soil contained COC concentrations that exceeded the ICDEC. Risk-based PRGs for full-time employees are only applicable to shallow soil because employees do not contact deep soil.

1. Benzo(a)pyrene at 2WCTB2 (1.8 mg/kg) did not exceed twice the ICDEC or RDEC (1 mg/kg) as required by the RSRs to identify an exceedance (Table 2-6).

Sediment

There were no exceedances of 10^{-5} PRGs.

2.4.2 Future Residential Land Use Scenario

Shallow Soil

Shallow soil analytical results were compared to Connecticut RSRs. Four COCs (benz[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, and chrysene) exceeded PRGs in shallow soil (Table 2-6). The maximum detected concentrations of these four COCs were greater than their respective PMC in 1 shallow soil sample (2WCTB2). The 95 percent UCL for benzo(b)fluoranthene also slightly exceeded the PMC (Table 2-5B). The number of samples (7) that were analyzed from Site 20 was less than 20, as specified in the Connecticut regulations as representative for PMC. Consequently, the regulations require that no samples contain COC concentrations above the PMC. The maximum detected concentrations of benz(a)anthracene and benzo(b)fluoranthene were twice their respective RDECs in 1 shallow soil sample (2WCTB2). The 95 percent UCL for benz(a)anthracene did not exceed the RDEC (Table 2-5B).

Total Soil

Total soil analytical results were compared to risk-based PRGs. No individual samples in deep soil contained COC concentrations that exceeded RDEC. Arsenic marginally exceeded 10^{-5} PRGs in two locations (2WCTB3 and 2WCTB5).

Sediment

Benzo(a)pyrene was detected at a concentration marginally exceeding the 10^{-5} PRGs at one location (2WCSD3).

2.5 AREA OF ATTAINMENT

There is no present or planned residential use at Site 20, and extensive ground surface of the three drainage areas is covered either by paving material or buildings. In addition to other remedial actions evaluated in subsequent sections, an ELUR can prohibit future residential use of the area without further actions to achieve compliance with residential PRGs. Because there are no deeds currently for NSB NLON, the ELUR would instead be recorded on the Base Master Plan. Furthermore, there will be a requirement written into the ELUR and the Record of Decision that, if the site was ever sold or leased, upon creation of the deed or lease, the ELUR would be recorded in accordance with the applicable federal, state, and local standards.

The remedial alternatives developed in Chapter 4 will address COC concentrations that exceed Connecticut RSRs and 10^{-5} risk-based PRGs in soil as well as 10^{-5} risk-based PRGs in sediment. Specific areas (Tables 2-6 and 2-7) where COC concentrations exceeded PRGs for current

industrial and future residential land use scenarios, and for which remedial alternatives will be developed, are summarized below:

- ***More Stringent of RSRs or 10^{-5} Risk-Based PRGs in Soils and 10^{-5} Risk-Based PRGs in Sediment***

  — **Current Industrial Land Use**

  - **Drainage Area 1**—Soil with PAH (benz[a]anthracene, benzo[a]pyrene, benzo[b] fluoranthene, and chrysene) concentrations in excess of PMC is located at 2WCTB2 from 0 to 2 ft under pavement (Figure 2-2). No sediment concentrations exceed 10^{-5} risk-based PRGs.

  - **Drainage Area 2**—No soil concentrations exceed PMC, ICDEC, or 10^{-5} risk-based PRGs, nor do sediment concentrations exceed 10^{-5} risk-based PRGs.

  - **Drainage Area 3**—No soil concentrations exceed PMC, ICDEC, or 10^{-5} risk-based PRGs, nor do sediment concentrations exceed 10^{-5} risk-based PRGs.

  — **Future Residential Land Use**

  - **Drainage Area 1**—Sediment with PAH (benzo[a]pyrene) concentrations in excess of 10^{-5} risk-based PRGs is located at 2WCSD3 from 0 to 1 ft bgs. Soil with PAH concentrations in excess of PMC (chrysene and benzo[a]pyrene) and in excess of both PMC and RDEC (benz[a]anthracene and benzo[b]fluoranthene) is located at 2WCTB2 from 0 to 2 ft under pavement. Soil with arsenic concentrations in excess of 10^{-5} risk-based PRGs is located at 2WCTB3 from 4 to 6 ft under pavement, and at 2WCTB5 from 6 to 8 ft (Figure 2-2).

  - **Drainage Area 2**—No soil concentrations exceed PMC, RDEC, or 10^{-5} risk-based PRGs, nor do sediment concentrations exceed 10^{-5} risk-based PRGs.

  - **Drainage Area 3**—No soil concentrations exceed PMC, RDEC, or 10^{-5} risk-based PRGs, nor do sediment concentrations exceed 10^{-5} risk-based PRGs.

2.6 REMEDIAL ACTION OBJECTIVES

RAOs were developed for Site 20 based upon the results of the RI (Brown & Root 1997) and the comparisons of site data to PRGs (Section 2.4). These RAOs are used in Chapter 4 to develop and evaluate remedial alternatives for the protection of human health and the environment.

In order to develop remedial alternatives to address impacted soil and sediment, RAOs are developed that will prevent or eliminate the complete exposure pathways associated with the unacceptable risks. Numerical cleanup goals are based on Connecticut RSRs and risk-based PRGs (Tables 2-4, 2-5A, and 2-5B). The primary exposure routes of concern for human health include the incidental ingestion of and direct contact with impacted soil and sediment. The RAOs developed for Site 20 at NSB NLON are as follows:

- Minimize potential human exposure to COCs above Connecticut RSRs in soil and risk-based PRGs in soil and sediment under the current industrial and future residential land use scenarios

- Minimize the potential migration of COCs above PMC in soil into ground water

- Minimize potential future overland transport of COCs from the three drainage areas into the Area A Wetland and the Area A Downstream watercourses.

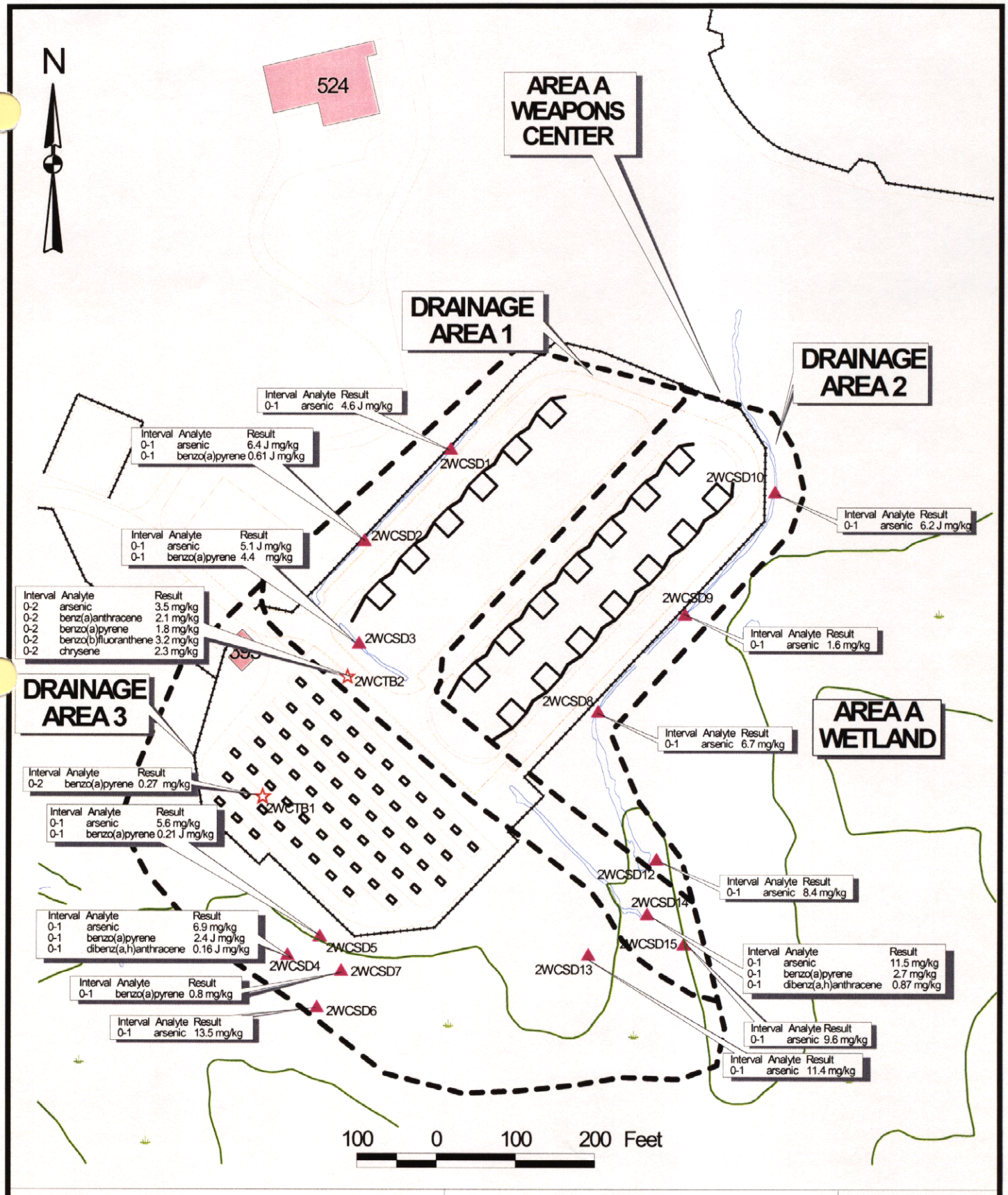
2.7 GENERAL RESPONSE ACTIONS

GRAs describe those actions that may satisfy the RAOs presented in Section 2.6. GRAs typically can include treatment, containment, and institutional controls, or combinations of these options. For Site 20, the GRAs will address the RAOs by minimizing human exposure to COCs, controlling COC migration, or reducing COC concentrations in soil and sediment.

The following GRAs will be considered:

- No action (required for consideration by the NCP as a comparative baseline)
- Institutional controls for soil and sediment
- Soil and sediment containment
- Source area removal
- *In situ* soil and sediment treatment
- *Ex situ* soil and sediment treatment
- Disposal.

The GRAs have been developed to screen the universe of technologies and process options that have demonstrated promise in remediation of sites similar to the conditions at Site 20. Various innovative/emerging technologies were examined in addition to traditionally accepted remedial action technologies. The identified GRAs and technologies include institutional control measures, containment actions, source removal, and *in situ/ex situ* treatment actions (Table 2-8). For remedial alternatives that include soil excavation, disposal options are also included in the GRAs.



LEGEND:

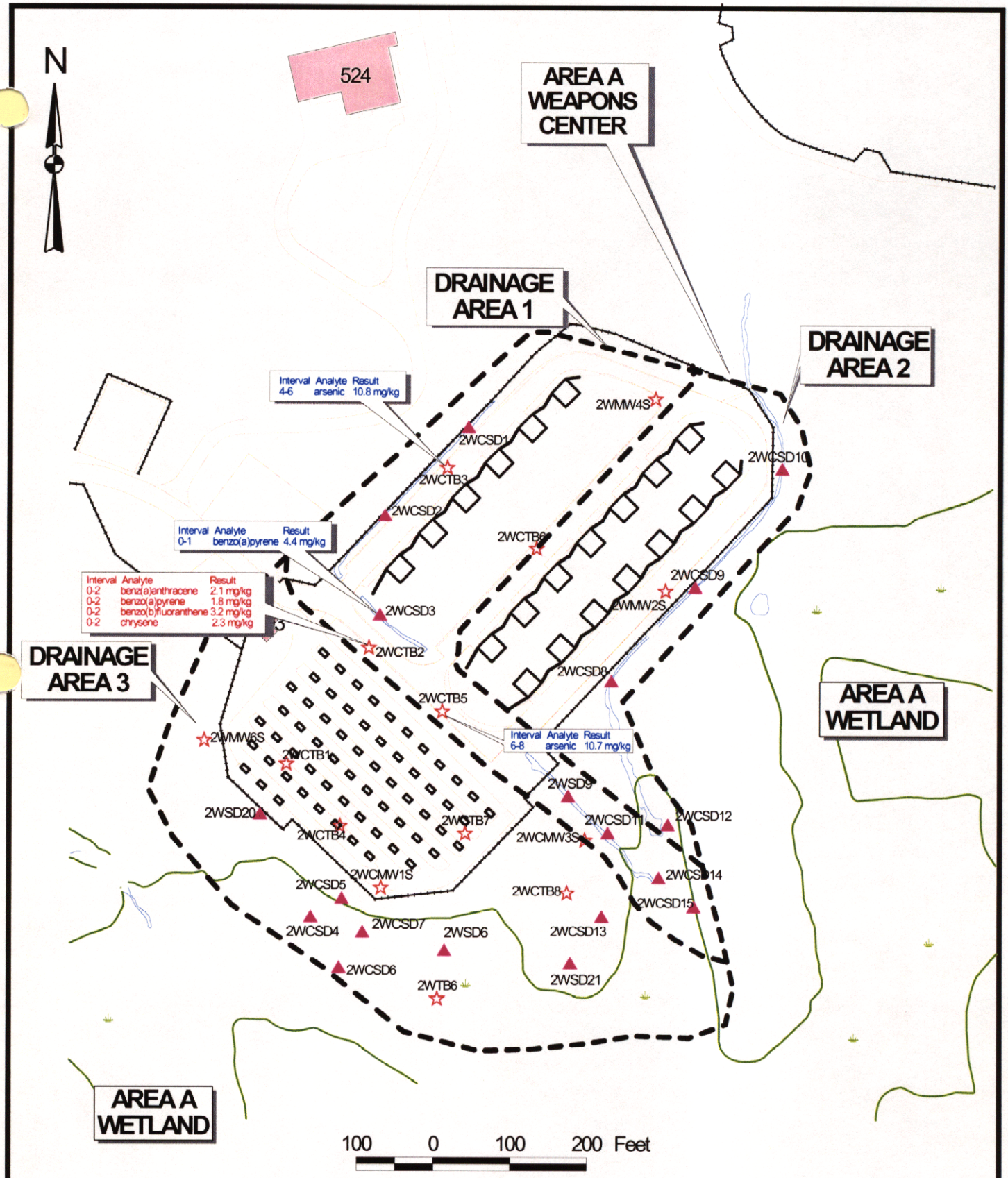
- Soil sample
- Sediment sample
- Building
- Bunker
- Fence
- Pavement
- Drainage ditch

Note: The depth intervals are measured in feet.

FIGURE 2-1

REPORTED CONCENTRATIONS OF POTENTIAL CONSTITUENTS OF CONCERN

SITE 20 - AREA A WEAPONS CENTER
NAVAL SUBMARINE BASE
NEW LONDON, CONNECTICUT



LEGEND:

- Sediment sample
- Soil sample
- Building
- Wetland
- Bunker
- Fence
- Pavement
- Drainage ditch

NOTE: The depth intervals are measured in feet.
Blue text denotes exceedance for the future residential land use scenario only.
Red text denotes exceedance for the current industrial and future residential land use scenarios.

FIGURE 2-2

REPORTED CONCENTRATIONS OF CONSTITUENTS OF CONCERN EXCEEDING 10^{-5} RISK-BASED PRELIMINARY REMEDIATION GOALS FOR SEDIMENT AND THE MORE STRINGENT OF 10^{-5} RISK-BASED PRELIMINARY REMEDIATION GOALS OR REMEDIATION STANDARD REGULATIONS FOR SOIL

SITE 20 - AREA A WEAPONS CENTER
NAVAL SUBMARINE BASE

NEW LONDON, CONNECTICUT

TABLE 2-1 SUMMARY OF CHEMICAL-, LOCATION-, AND ACTION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS AND TO BE CONSIDERED GUIDANCE FOR SITE 20 – AREA A WEAPONS CENTER, NAVAL SUBMARINE BASE, NEW LONDON, CONNECTICUT

Regulator	Requirement	Citation	Status
Chemical-Specific			
Federal	Cancer Slope Factors and Reference Dose	Integrated Risk Information System	To Be Considered
State of Connecticut	Remediation Standard Regulations	Connecticut General Statutes (CGS) 22a-133k; Regulations of Connecticut State Agencies (RCSA) 22a-133k -1 through 3	Applicable
Location-Specific			
Federal	Clean Water Act, Section 404 Dredge and Fill Criteria	33 United States Code (USC) 1344; 40 Code of Federal Regulations (CFR) Part 230 and 33 CFR Parts 320-323	Applicable
	Executive Order 11990 RE: Protection of Wetlands	Executive Order 11990, 40 CFR Part 6, Appendix A	Applicable
	Fish and Wildlife Coordination Act	16 USC Part 661 *et seq.* 40 CFR 122.49	Applicable
State of Connecticut	Inland Wetlands and Watercourses Act	CGS Sections 22a-37 through 45, RCSA Sections 22a-39-1 through 15	Applicable
Action-Specific			
Federal	Clean Water Act, Section 402, National Pollutant Discharge Elimination System	33 USC 1342; 40 CFR 122-125	Applicable
State of Connecticut	Connecticut Hazardous Waste Management: Treatment, Storage, or Disposal Facility Standards	RCSA Section 22a-449(c) 104	Applicable
	Hazardous Waste Management: Generator and Handler Requirements, Listing, and Identification	RCSA Sections 22a-449(c) 100-101	Applicable
	Hazardous Waste Management: Generator Standards	RCSA Section 22a-449(c) 102	Applicable
	Connecticut Water Quality Standards	CGS Section 22a-426	Applicable
	Connecticut Guidelines for Soil Erosion and Sediment Control	Connecticut Council on Soil and Water Conservation	To Be Considered
	Water Pollution Control	RCSA Sections 22a-430-1 through 8 and Section 22a-430b	Applicable
	Air Pollution Control	RCSA Section 22a-174-18b	Relevant and Appropriate

TABLE 2-2 BACKGROUND SOIL CONCENTRATIONS AT SITE 20 – AREA A WEAPONS CENTER, NAVAL SUBMARINE BASE, NEW LONDON, CONNECTICUT

Analyte	Background Concentration (mg/kg)
Aluminum	17,600.00
Antimony	2.05
Arsenic	3.60
Barium	57.20
Beryllium	0.72
Cadmium	0.24
Calcium	499.00
Chromium	21.50
Cobalt	8.00
Copper	25.60
Iron	17,200.00
Lead	17.50
Magnesium	3,650.00
Manganese	188.00
Nickel	5.95
Potassium	2,580.00
Silver	0.39
Sodium	20.50
Vanadium	35.10
Zinc	31.30

NOTE: Data from Atlantic (1995).
The site-specific background value is the highest value detected from among all the background soil samples collected from 0 to 4 ft in April 1995.

TABLE 2-3 SUMMARY OF POTENTIAL CONSTITUENTS OF CONCERN AT SITE 20 – AREA A WEAPONS CENTER, NAVAL SUBMARINE BASE, NEW LONDON, CONNECTICUT

Matrix	CTDEP Hazardous Waste Management Regulations	CTDEP Remediation Standards	Human Health Risk-Based Screening Values
Soil	None identified	Benzo(a)pyrene Benz(a)anthracene Benzo(b)fluoranthene Chrysene	Benzo(a)pyrene Benz(a)anthracene Benzo(b)fluoranthene Dibenz(a,h)anthracene Arsenic
Sediment	None identified	No applicable screening criteria	Arsenic Antimony Cadmium Chromium Manganese Vanadium Benzo(a)pyrene Benz(a)anthracene Benzo(b)fluoranthene Indeno(1,2,3-cd)pyrene Dibenz(a,h)anthracene
Surface Water		No applicable screening criteria	Arsenic

NOTE: CTDEP = Connecticut Department of Environmental Protection.

TABLE 2-4 PRELIMINARY REMEDIATION GOALS FOR CONSTITUENTS OF CONCERN IN SEDIMENT AT SITE 20 – AREA A WEAPONS CENTER NAVAL SUBMARINE BASE, NEW LONDON, CONNECTICUT

Receptor	Analyte	Samples Detected	Samples Analyzed	Maximum Concentration (mg/kg)	UCL (mg/kg)[a]	GB Pollutant Mobility Criteria (mg/kg)[b]	Industrial/ Commercial Direct Exposure Criteria (mg/kg)[b]	Residential Direct Exposure Criteria (mg/kg)[b]	10^{-5} Risk-Based PRG (mg/kg)[c]	10^{-4} Risk-Based PRG (mg/kg)[c]
Full-Time Employee	Arsenic	13	13	13.5	8.68	---	10.0	10.0	58.88	588.78
	Benzo(a)pyrene	11	13	4.4	3.99	1.0	1.0	1.0	13.07	130.67
Future Resident	Arsenic	13	13	13.5	8.68	---	10.0	10.0	19.27	192.70
	Benzo(a)pyrene	11	13	4.4	3.99	1.0	1.0	1.0	4.08	40.83
	Dibenz(a,h)anthracene	4	13	0.83	0.49	1.0	1.0	1.0	4.08	40.83

(a) Where the calculated 95 percent UCL exceeds the maximum measured value, the maximum value is used for comparison to risk-based PRGs.
(b) State of Connecticut Remediation Standard Regulations Connecticut General Statutes 22a-133k; Regulations of Connecticut State Agencies 22a-133k-1 through k-3. Not used in screening of sediment data. Presented as potential benchmarks for cleanup negotiation.
(c) See Appendix B.2 for calculations.

NOTE: UCL = 95 percent Upper Confidence Limit of mean.
PRG = Preliminary Remediation Goals.
Dashes (---) indicate that value is not applicable.

TABLE 2-5A PRELIMINARY REMEDIATION GOALS FOR CONSTITUENTS OF CONCERN IN SOIL AT SITE 20 – AREA A WEAPONS CENTER, NAVAL SUBMARINE BASE, NEW LONDON, CONNECTICUT

Receptor	Analyte	Samples Detected	Samples Analyzed	Maximum Concentration (mg/kg)	UCL (mg/kg)[a]	GB Pollutant Mobility Criteria (mg/kg)[b]	Industrial/Commercial Direct Exposure Criteria (mg/kg)[b]	Residential Direct Exposure Criteria (mg/kg)[b]	10^{-5} Risk-Based PRG (mg/kg)[c]	10^{-4} Risk-Based PRG (mg/kg)[c]
Full-Time Employee (surface soil 0-4 ft below ground surface)[d]										
	Arsenic	4	7	6.4	9.87	---	10.0	10.0	**19.65**	**196.54**
	Benzo(a)pyrene	4	7	1.55	1.55	1.0	1.0	1.0	**6.51**	**65.14**
Future Resident (total soil)[e]										
	Arsenic	10	13	10.8	6.78	---	10.0	10.0	**9.62**	**96.16**
	Benzo(a)pyrene	10	13	1.55	0.97	1.0	1.0	1.0	**2.04**	**20.40**
	Dibenz(a,h)anthracene	3	13	0.51	0.30	1.0	1.0	1.0	**2.04**	**20.40**

(a) Where the calculated 95 percent UCL exceeds the maximum measured value, the maximum value is used for comparison to standards.
(b) State of Connecticut Remediation Standard Regulations Connecticut General Statutes 22a-133k; Regulations of Connecticut State Agencies 22a-133k-1 through k-3. Detected constituent of concern maximum value must be twice the Direct Exposure Criteria and/or the UCL greater than the Direct Exposure Criteria to define an exceedance. Detected constituent of concern value must be greater than the Pollutant Mobility Criteria to define an exceedance.
(c) See Appendix B.2 for calculations.
(d) Risk-based PRGs for the full-time employee were calculated using soil data from 0 to 4 ft below ground surface (used transformed 95 percent UCL and average of the maximum sample and duplicate concentrations).
(e) Risk-based PRGs for the future resident were calculated using total soil data (used transformed 95 percent UCL and average of the maximum sample and duplicate concentrations).

NOTE: UCL = 95 percent Upper Confidence Limit of mean.
PRG = Preliminary Remediation Goals.
Dashes (---) indicate that value is not applicable.
Values in bold represent applicable criteria for that receptor.

TABLE 2-5B CONNECTICUT REMEDIATION STANDARD REGULATIONS PRELIMINARY REMEDIATION GOALS FOR CONSTITUENTS OF CONCERN IN SOIL AT SITE 20 – AREA A WEAPONS CENTER, NAVAL SUBMARINE BASE, NEW LONDON, CONNECTICUT

Receptor	Analyte	Samples Detected	Samples Analyzed	Maximum Concentration (mg/kg)	UCL (mg/kg)[a]	GB Pollutant Mobility Criteria (mg/kg)[b]	Industrial/Commercial Direct Exposure Criteria (mg/kg)[b]	Residential Direct Exposure Criteria (mg/kg)[b]	10^{-5} Risk-Based PRG (mg/kg)[c]	10^{-4} Risk-Based PRG (mg/kg)[c]
CTDEP Remediation Standards – GB Pollutant Mobility Criteria[b] (soil above water table)[d]										
	Benz(a)anthracene	4	7	2.1	0.78	**1.0**	7.8	1.0	---	---
	Benzo(a)pyrene	4	7	1.8	0.80	**1.0**	1.0	1.0	---	---
	Benzo(b)fluoranthene	4	7	3.2	1.32	**1.0**	7.8	1.0	---	---
	Chrysene[e]	4	7	2.3	0.88	**1.0**	780	84	6,256	62,568
CTDEP Remediation Standards – Direct Exposure Criteria[b] (soil 0-15 ft below ground surface)[f]										
	Benz(a)anthracene	8	13	2.1	0.48	1.0	**7.8**	**1.0**	---	---
	Benzo(a)pyrene	10	13	1.8	0.47	1.0	**1.0**	**1.0**	---	---
	Benzo(b)fluoranthene	8	13	3.2	0.77	1.0	**7.8**	**1.0**	---	---
	Chrysene[e]	8	13	2.3	0.55	1.0	**780**	**84**	2,040	20,405

(a) Where the calculated 95 percent UCL exceeds the maximum measured value, the maximum value is used for comparison to standards.
(b) State of Connecticut Remediation Standard Regulations Connecticut General Statutes 22a-133k; Regulations of Connecticut State Agencies 22a-133k-1 through k-3. Detected constituent of concern maximum value must be twice the Direct Exposure Criteria and/or the UCL greater than the Direct Exposure Criteria to define an exceedance. Detected constituent of concern value must be greater than the Pollutant Mobility Criteria to define an exceedance.
(c) See Appendix B.2 for calculations.
(d) Soil concentrations above the water table were compared to the Pollutant Mobility Criteria (used 95 percent UCL of arithmetic mean and maximum concentration).
(e) Not a human health constituent of concern. Risk-based PRGs are calculated as a benchmark that will be used during negotiations for the actual cleanup values.
(f) Soil data from 0 to 15 ft below ground surface were compared to the Direct Exposure Criteria (used 95 percent UCL of arithmetic mean and maximum concentration).

NOTE: UCL = 95 percent Upper Confidence Limit of mean.
PRG = Preliminary Remediation Goals.
CTDEP = Connecticut Department of Environmental Protection.
Dashes (---) indicate that value is not applicable.
Values in bold represent applicable criteria for that receptor.

TABLE 2-6 LOCATIONS OF CONSTITUENTS OF CONCERN FOR SOIL EXCEEDING PRELIMINARY REMEDIATION GOALS AT SITE 20 – AREA A WEAPONS CENTER, NAVAL SUBMARINE BASE, NEW LONDON, CONNECTICUT

Depth	Location	Parameter	Concentration (mg/kg)	Qual	PMC (mg/kg)	ICDEC[a] (mg/kg)	RDEC[a] (mg/kg)	Industrial 10^{-5} PRG (mg/kg)	Residential 10^{-5} PRG (mg/kg)	Exceedance[b]	Scenario
0-2	2WCTB2	Benz(a)anthracene	2.1		1	7.8	1	---	---	1,3	I,R
		Benzo(a)pyrene	1.8		1	1	1	6.5	2.0	1	I,R
		Benzo(b)fluoranthene	3.2		1	7.8	1	---	---	1,3	I,R
		Chrysene	2.3		1	780	84	6,520	2,040	1	I,R
4-6	2WCTB3	Arsenic	10.8		---	10	10	19.65	9.62	5	R
6-8	2WCTB5	Arsenic	10.7		---	10	10	19.65	9.62	5	R

(a) Detected constituent of concern value must be twice the criteria to define an exceedance.
(b) Exceedance categories: 1 = Pollutant Mobility Criteria (PMC); 2 = Industrial/Commercial Direct Exposure Criteria (ICDEC); 3 = Residential Direct Exposure Criteria (RDEC); 4 = Industrial Preliminary Remediation Goal (PRG); 5 = Residential PRG.
(1) Industrial PRGs (full-time employee) were compared to soil data from 0 to 4 ft below ground surface.
(2) Residential PRGs (future resident) were compared to soil data from 0 to 10 ft below ground surface.
(3) Soil concentrations above the water table were compared to the PMC; and soil data from 0 to 15 ft below ground surface were compared to the Direct Exposure Criteria.

NOTE: J = Estimated concentration below detection limit.
I = Retained for Current Industrial Scenario. Exceedance of PMC, ICDEC, or industrial PRG.
R = Retained for Future Residential Scenario. Exceedance of PMC, RDEC, or residential PRG.
Dashes (---) indicate that value has not been determined.

TABLE 2-7 LOCATIONS OF CONSTITUENTS OF CONCERN FOR SEDIMENT EXCEEDING PRELIMINARY REMEDIATION GOALS AT SITE 20 – AREA A WEAPONS CENTER, NAVAL SUBMARINE BASE, NEW LONDON, CONNECTICUT

Depth	Location	Parameter	Concentration (mg/kg)	Qual	PMC (mg/kg)	ICDEC[a] (mg/kg)	RDEC[a] (mg/kg)	Industrial 10^{-5} PRG (mg/kg)	Residential 10^{-5} PRG (mg/kg)	Exceedance[b,c]	Scenario
0-1	2WCSD3	Benzo(a)pyrene	4.4		1	1	1	13.1	4.1	2	R

(a) Detected constituent of concern value must be twice the criteria to define an exceedance.
(b) Exceedance categories: 1 = Industrial Preliminary Remediation Goal (PRG); 2 = Residential PRG.
(c) Sediment data were not compared to the State of Connecticut Remediation Standard Regulations Connecticut General Statutes 22a-133k; Regulations of Connecticut State Agencies 22a-133k-1 through k-3. Not used in screening of sediment data. Presented as potential cleanup benchmarks.

NOTE: PMC = Pollutant Mobility Criteria.
ICDEC = Industrial/Commercial Direct Exposure Criteria.
RDEC = Residential Direct Exposure Criteria.
R = Retained for Future Residential Scenario. Exceedance of residential PRG.

TABLE 2-8 GENERAL RESPONSE ACTIONS AND ASSOCIATED REMEDIAL TECHNOLOGIES FOR SITE 20 – AREA A WEAPONS CENTER NAVAL SUBMARINE BASE, NEW LONDON, CONNECTICUT

General Response Actions	Exposure Pathways or Remedial Goals Addressed by Technologies	Remedial Technology Types and Process Options
No Action	None.	None
Institutional Controls	To mitigate potential human exposure to constituents of concern.	Monitoring Site Use Restrictions
Containment Actions	To reduce the potential for offsite migration of constituents of concern via ground water, soil erosion, or overland runoff. Also may be used in conjunction with other remedial technologies.	Capping Surface Water Run-Off Controls
Source Removal	To eliminate onsite risks associated with source areas and to reduce the migration of constituents of concern.	Excavation
In Situ Treatment Actions for Soil	To achieve Preliminary Remediation Goals in-place, and to reduce risks associated with constituents of concern in soil and sediment.	**Biological Treatment** • Monitored natural attenuation • Aerobic bioremediation • Bioventing • Biosparging • Anaerobic bioremediation • Phytoremediation **Physical/Chemical Treatment** • Soil flushing • Soil vapor extraction • Electrokinetic remediation • Chemical fixation/solidification • Reduction/oxidation • Vitrification

General Response Actions	Exposure Pathways or Remedial Goals Addressed by Technologies	Remedial Technology Types and Process Options
Ex Situ Soil Treatment Actions	To remediate soil and sediment excavated from a site prior to final disposal.	**Biological Treatment** • Bioslurry • Land farming • Biopile • Composting **Physical/Chemical Treatment** • Chemical fixation/solidification • Thermoplastic stabilization/solidification • Soil washing/solvent extraction • Chemical reduction/oxidation • Soil vapor extraction treatment cell • Dewatering • Size separation • Crushing/grinding/shredding • Thermal desorption • Incineration • Vitrification
Ex Situ Vapor Treatment Actions	Required as part of any remedial action generating an offgas.	Discharge to atmosphere Thermal/catalytic oxidation Biofiltration Carbon adsorption
Disposal	Required as part of any remedial action involving excavation.	Onsite consolidation Engineered disposal cell Treatment, storage, and disposal facility

3. IDENTIFICATION AND SCREENING OF TECHNOLOGY TYPES AND PROCESS OPTIONS

In this chapter, the GRAs developed to represent technologies suitable for impacted soil and sediment are assembled and screened for use at Site 20. The technologies are evaluated against the short-term and long-term aspects of three broad criteria: effectiveness, implementability, and cost. This screening step is used to identify the technologies to be retained for further consideration as remedial action alternatives for Site 20.

3.1 IDENTIFICATION AND SCREENING OF TECHNOLOGIES

The first step in a technology screening for site remediation is to examine a variety of available remedial technologies and to identify those technologies that warrant further consideration based on the applicability of the technology for the site-specific conditions and COC types. Various technologies are screened in this chapter for their ability to address the COCs in soil and sediment at Site 20. The primary focus of this screening evaluation is on the effectiveness and implementability of each option, with less emphasis on cost. A brief description of each evaluation criterion is presented as follows.

Effectiveness—The effectiveness evaluation is focused on the following elements:

- Potential effectiveness of process options in handling the estimated areas or volumes of media and in meeting the RAOs
- Potential impacts to human health and the environment during the construction and implementation phases
- Reliability and proven effectiveness of the process with respect to the COCs and the site-specific conditions.

Implementability—The implementability evaluation includes both the technical and institutional (administrative) feasibility of implementing each technology or process option. This initial technology screening eliminates technology types or process options that are clearly ineffective or unworkable at the site. These institutional aspects include the following:

- Potential for obtaining regulatory approval
- Availability of necessary equipment and skilled workers to implement the technology
- Availability of treatment, storage, and disposal services
- Time required for implementation
- Ability to achieve the applicable remediation standards within a reasonable timeframe.

Cost—Preliminary cost estimates for the remedial technologies are presented in Chapter 4 as part of each of the remedial alternatives developed from the technologies retained in this chapter. For this screening evaluation, a qualitative cost analysis has been presented only if costs were uncommonly prohibitive or if other process options within the same technology type were comparably effective and implementable.

3.1.1 Institutional Controls

Institutional controls affect site management and/or activities occurring at the site. Institutional controls do not physically alter conditions at the site and do not reduce the toxicity, mobility, or volume of COCs at the site. Rather, institutional controls are used to limit the potential for exposure to COCs, primarily through restrictions to land use, water use, or site access. Depending upon the site-specific conditions, institutional controls can be used alone or in conjunction with other remedial actions.

3.1.1.1 Monitoring

Monitoring involves the collection of environmental samples to evaluate temporal trends in the quality of environmental media and receptors. Monitoring regimens can include continuous, daily, weekly, monthly, quarterly, semi-annual, annual, or less frequent monitoring.

- **Effectiveness**—Monitoring is an effective technique to evaluate the long-term trends of site COCs and/or treatment technology performance. At Site 20, monitoring could include collection and analysis of soil, sediment, and potentially surface water (wetlands and drainage swales). A monitoring program would present no adverse effects for human health or the environment.

- **Implementability**—A monitoring program is implementable at Site 20. The required services are readily available and the existing monitoring well network could be used or expanded, as necessary. If needed, the installation of additional monitoring wells would be readily implementable.

Environmental monitoring is a standard, effective, and implementable method for evaluating COC trends as well as the effectiveness of a remedial action. Therefore, monitoring will be retained for further consideration.

3.1.1.2 Site Use Restrictions

Site use restrictions include property access controls, deed restrictions, and limitations on future site development. Control of site access can be accomplished through installation of fencing, markers, and/or warning signs. Deed restrictions can be used to control future construction and/or residential use of the site. Deed restrictions can include zoning limitations, physical

limitations on the size and weight of improvements, and installation prohibitions (e.g., preventing excavation or well installations).

- **Effectiveness**—ELURs that limit subsurface construction activities and prevent residential reuse of the property would be effective for reducing the potential for exposure to COCs at Site 20. Because Site 20 is an active military base, access is restricted to authorized personnel, contractors, and visitors. Site 20 security will continue to be effective for protecting non-site workers so long as the base remains active and land use restrictions are recorded on the Base Master Plan.

- **Implementability**—Under the State Remediation Standards, an ELUR cannot be established until a deed is created for the parcel. Because there are currently no deeds for NSB NNLON, the ELUR would instead be recorded on the Base Master Plan. Furthermore, there would be a requirement written into the ELUR and the Record of Decision that, if the site was ever sold or leased, upon the creation of the deed or lease, the ELUR would be recorded in accordance with the applicable federal, state, and local standards. Physical barriers and/or notices are not required because Site 20 is located on an active military base.

Site access is currently restricted to authorized personnel by base security. An ELUR (construction and land use limitations) would be effective and implementable for preventing exposure to COCs in soil and sediment. Therefore, ELURs will be retained for further consideration at Site 20.

3.1.2 Containment

Containment technologies control human and/or ecological exposure to COCs by preventing the migration of COCs and/or preventing direct contact with impacted media. Soil containment technologies include capping of surface soil and surface water run-off controls to prevent direct contact and the migration of soil particles during precipitation events.

3.1.2.1 Capping

Capping technologies are used to prevent direct exposure to surface soil, to control soil erosion, to control soil vapor emissions, and to restrict precipitation infiltration into the subsurface. A low permeability cap constructed of single or multiple layers is installed over an impacted area. Materials typically used for capping include asphalt, concrete, soil, clay, and/or synthetic membranes.

- **Effectiveness**—Capping is an established technology that would be effective for preventing direct contact with and potential migration of COCs in soil. Capping would not be effective for impacted sediment within the drainage swales or in areas adjacent to

the Area A wetlands due to the periodic saturated conditions that may mobilize COCs and/or compromise the integrity of a cover system.

- **Implementability**—Much of the impacted soil at Site 20 is already paved with concrete or asphalt that prevents exposure to soil COCs and limits infiltration of precipitation and run-off. Additional capping could be implementable for soil but not for sediment.

Since the largest quantity of impacted material is sediment, and since capping would not be effective for sediment remediation, this technology will not be retained for further consideration.

3.1.2.2 Surface Water Run-Off Control

Surface water run-off control can include the use of dense plant growth, dikes, berms, channels, and other ditches to control run-on, run-off, erosion, and precipitation infiltration.

- **Effectiveness**—In general, surface water run-off control technologies are effective for reducing COC migration as stormwater run-off and in reducing infiltration of precipitation to the subsurface. Site 20 already contains a stormwater conveyance system.

- **Implementability**—An engineered stormwater conveyance system is already in-place at Site 20. The required materials and services are readily available for cleaning of the existing stormwater conveyance system.

Currently, an engineered stormwater conveyance system is already in-place at Site 20. Therefore, this technology will not be retained for further consideration.

3.1.3 Source Removal

Source removal technologies are used to physically remove impacted media to remediate areas exhibiting the highest COC concentrations. Mechanical excavation is used to remove source area soil, which is then either treated onsite or transported offsite for treatment/disposal at a licensed facility.

3.1.3.1 Excavation

Excavation can involve removal of all impacted soil or sediment from a site or the selective removal of a source area "hot spot." A backhoe, or similar type excavator, is used to perform the excavation. Excavated material could be placed directly onto trucks for offsite treatment/ disposal or, if onsite treatment is performed, into a staging area prior to treatment.

- **Effectiveness**—Excavation is a well-proven and highly effective method for removing impacted material from a site. Similarly, selective excavation is highly effective for the removal of well-defined, localized volumes of impacted material. Excavation options must be combined with other treatment and/or disposal options. Excavation of saturated soil or sediment may require subsequent dewatering prior to treatment/disposal. Confirmatory sampling would be conducted to verify the effectiveness of excavation.

- **Implementability**—The required services and equipment for excavation are readily available. Excavation of all impacted soil and sediment would not be implementable at Site 20 due to the existing pavement and buildings. Selective excavation of localized volumes of soil and sediment (including within drainage swales) would be implementable. The ongoing activities at Site 20 may also limit the amount of excavation that can be performed. Disturbed pavement would have to be repaired. Excavation within the adjacent wetlands may require additional mitigation/restoration efforts. Various engineering controls (e.g., dust suppression) and the use of personal protective equipment would be required during excavation.

- **Cost**—Because of the existing surface cover (buildings and pavement), the cost for excavation would likely be prohibitive except for limited-area removal actions. Excavation of saturated soil/sediment would increase costs due to additional dewatering, treatment, and disposal requirements. Excavation within wetland areas would have additional mitigation costs in order to restore the disturbed portion of the wetland.

Whole-site excavation would not be implementable due to site conditions and use. Therefore, whole site excavation will not be retained for further consideration. Selective excavation of impacted soil and sediment would be effective and implementable when combined with a subsequent treatment or disposal technology. Therefore, selective excavation will be retained for further consideration.

3.1.4 *In Situ* Treatment Actions

In situ treatment actions are technologies that can treat impacted material in-place without the need for excavation.

3.1.4.1 Monitored Natural Attenuation

Natural attenuation pertains to the reduction of COC concentrations through naturally-occurring physical, chemical, and biological processes. Organic COCs can be attenuated by physical, chemical, and biological processes in all media. In general, inorganic elements or compounds can be attenuated by physical and chemical (e.g., oxidation/reduction) processes in the subsurface zone and by physical, chemical, and biological (e.g., plant uptake, biodegradation, etc.) processes in surface areas. The primary remediation mechanisms for COC attenuation include dispersion, diffusion, volatilization, and intrinsic biodegradation.

With knowledge of the subsurface conditions and physical characteristics of the COCs, the extent of physical attenuation can be predicted with reasonable accuracy. Biological attenuation processes (i.e., intrinsic bioremediation) are less predictable because they depend upon site-specific conditions (such as the presence of appropriate micro-organisms, oxygen content, temperature, pH, nutrient availability, as well as the COC phase [i.e., dissolved, absorbed]) with respect to the types of COCs at the site. Hydrocarbon compounds (e.g., TPHs) can be attenuated biologically under aerobic conditions. Although a slower process, chlorinated COCs also can be attenuated biologically, preferably under anaerobic conditions.

Monitored natural attenuation is not a "no action" technology. Monitored natural attenuation typically requires pre-design investigations to evaluate the potential effectiveness as well as long-term monitoring to demonstrate the continued effectiveness over time. EPA's guidance for the use of monitored natural attenuation for the remediation of soil and ground water is contained in the OSWER interim final document entitled *Use of Monitored Natural Attenuation at Superfund, RCRA Corrective Action, and Underground Storage Tank Sites* (OSWER 9200.4-17, 13 September 1997). The EPA document is not intended to provide detailed technical guidance on evaluating monitored natural attenuations; rather, it provides a framework of expectations and EPA policies for evaluating and implementing monitored natural attenuation at a site.

Natural attenuation typically requires extensive monitoring to ensure that the predicted natural processes are occurring. Further, natural attenuation remedies may take longer than engineered remedies to correct a problem. Scientific data, site characterization data, and predictive modeling are necessary to demonstrate that natural processes are sufficient to reduce risk under the timeframe required. Under the use of monitored natural attenuation, there should be a readily available contingent remedy for the site, in the event that natural attenuation processes do not reduce the risk within the required timeframe.

- **Effectiveness**—The primary attenuation mechanism for organic COCs in soil and sediment (i.e., the PAHs at Site 20) would be intrinsic bioremediation. Organic and inorganic COCs in soil and sediment would also be attenuated through physical/chemical mechanisms such as oxidation/reduction. Monitored natural attenuation would have to be combined with another action (e.g., institutional controls) to address site risks (e.g., direct contact) in the short-term. Monitored natural attenuation is unlikely to be effective for mitigating the specific types of PAHs at Site 20 due to their high molecular weight (i.e., PAH concentrations would not be reduced to acceptable levels within a reasonable timeframe).

- **Implementability**—The required services/equipment to implement and evaluate monitored natural attenuation processes are readily available. The existing monitoring well network could be used or readily modified/expanded, as necessary. Due to the recalcitrance of the site-specific PAHs to biodegradation, as well as the persistence of inorganic chemicals in soil and sediment, natural attenuation of Site 20 COC concentrations would not occur within a reasonable timeframe.

Monitored natural attenuation would not be effective for mitigating the specific types of PAHs and inorganic COCs in soil and sediment at Site 20. The high molecular weight PAHs at Site 20 contain multiple molecular rings and are anticipated to be slow to degrade under natural conditions. Therefore, this technology will not be retained for further consideration.

3.1.4.2 Aerobic Bioremediation

In situ aerobic bioremediation can be applied to degrade certain organic compounds by employing intrinsic (naturally occurring), aerobic (oxygen using) bacteria that will use the COCs as their carbon source. Typically, this technology is applied to petroleum compounds, although it can also be used effectively to mitigate other VOCs and SVOCs, including chlorinated compounds. The main advantage of *in situ* bioremediation is that COCs in the subsurface can be treated without excavation and the COCs are degraded in-place rather than transferred to another media requiring subsequent treatment/disposal. Typically, a combination of oxygen (as compressed air or hydrogen peroxide) and potentially other nutrients (e.g., nitrogen and phosphorus) are injected into the vadose zone. This promotes the growth of the natural subsurface bacterial population that can degrade the target COCs. The end result of aerobic bioremediation is the metabolism of organic COCs into carbon dioxide, water, and new biomass (bacteria).

- **Effectiveness**—In general, this technology can be effective for reducing TPH, VOC, and SVOC concentrations. However, at Site 20, the effectiveness of this technology may be limited due to the specific types of PAHs in sediment and soil. The high molecular weight PAHs at Site 20 are likely to be recalcitrant to biodegradation. The effectiveness of aerobic bioremediation at Site 20 can also vary depending upon site-specific conditions; therefore, a treatability study would be required. This technology would not be effective for the inorganic COCs at Site 20.

- **Implementability**—The required services and equipment are available and the installation and operation of injection wells are implementable. The treatment zone would likely be difficult to control due to mass transfer limitations (i.e., ensuring that the injected air/nutrients reach the micro-organisms) in a complex hydrogeologic region. The nature of the subsurface material (fill) may create preferential flow channels for the injected nutrients, thereby leaving some areas untreated. Skilled operators would be required to maintain an *in situ* aerobic bioremediation system. Coordination with federal and state regulators would be required for injecting nutrients into the subsurface. Due to the recalcitrance of the site-specific PAHs, this technology is unlikely to achieve remediation goals within a reasonable timeframe.

An *in situ* aerobic biodegradation system may have limited effectiveness for mitigating the specific type of PAHs at Site 20 and would not be effective for the inorganic COC. In addition, it may be difficult to implement and operate within the constructed fill material beneath the Weapons Center. Finally, considering that the soil and sediment volume requiring remediation is relatively small, this technology will not be retained for further consideration.

Bioventing

Bioventing stimulates *in situ* biodegradation of organic COCs in the vadose zone by providing oxygen to existing soil micro-organisms. In contrast to soil vapor extraction (SVE), bioventing uses low air flow rates (either injection or extraction) to provide only enough oxygen to sustain microbial activity. In this manner, volatilization effects are minimized in favor of *in situ* biodegradation. In addition to degradation of adsorbed COCs, VOCs are biodegraded as vapors moving slowly through biologically active soil.

- **Effectiveness**—Although bioventing is typically used for remediating TPH and benzene, toluene, ethylbenzene, and total xylenes, it can also be effective for treating some PAHs. However, the particular types of PAHs at Site 20 are of high molecular weight and are likely to be slow to degrade. For the bioventing process to be successful, the soil must have a low moisture content because an excessively high moisture content may cause poor distribution of oxygen and reduce the air permeability of the soil. Bioventing cannot treat organic COCs below the ground-water table. Therefore, this technology would have a limited area of application within the Weapons Center due to a shallow water table in some areas of the site (Figures 1-4 and 1-5) and would not be effective in the wetland areas or within most of the drainage swales due to the frequently saturated conditions. Although much of the impacts to soil and sediment are shallow, injection wells screened so close to the surface would likely have a very limited radius of influence and may not significantly increase the oxygen content of that region. Bioventing is not effective for inorganic COCs.

- **Implementability**—The required services and equipment are readily available. Pilot testing prior to full-scale remediation may be required depending upon site-specific conditions. However, this technology would have limited application due to the shallow ground-water table (generally 0-4 ft bgs). Additional monitoring may be required to ensure that there is not an adverse buildup of vapors in the buildings/bunkers associated with the injection of air into the subsurface.

Bioventing will not be implementable or effective due to the high ground-water table and/or saturated conditions, the anticipated slow degradation of the specific types of PAHs in soil and sediment, and the limited extent of COCs at the site. Bioventing is also not effective for inorganic COCs. Therefore, this technology will not be retained for further consideration.

Biosparging

Biosparging stimulates *in situ* biodegradation of organic COCs in ground water and saturated soil/sediment by providing oxygen to micro-organisms already present in the subsurface. In contrast to aquifer air sparging, biosparging utilizes low air injection rates to provide only enough oxygen to sustain microbial activity in the saturated zone. In this manner, volatilization effects are minimized in favor of *in situ* biodegradation.

- **Effectiveness**—In general, this technology can be effective for the biodegradation of organic COC concentrations under saturated conditions. However, many of the impacted areas at Site 20 are shallow (Figures 2-1 and 2-2). The effectiveness of biosparging at Site 20 may vary depending upon site-specific conditions such as the permeability of the impacted soil and sediment. Biosparging can be somewhat effective for treating some PAHs, although the specific high molecular weight PAHs at Site 20 are likely to be slow to degrade. Biosparging would not be effective for the inorganic COCs at Site 20.

- **Implementability**—The required services and equipment are readily available. Pilot testing prior to full-scale remediation may be required. Additional monitoring may be required to ensure that there is not an adverse buildup of vapors in the buildings/bunkers associated with the injection of air into the subsurface.

Biosparging would have limited effectiveness at Site 20 because of the shallow depth of COCs, the anticipated slow degradation of the specific types of PAHs in soil and sediment, and the limited extent of COCs at the site. Therefore, this technology will not be retained for further consideration.

3.1.4.3 Anaerobic Bioremediation

In situ anaerobic bioremediation is an innovative technology designed to biodegrade chlorinated organic compounds by employing intrinsic (naturally occurring), anaerobic (little or no oxygen) micro-organisms. The main advantages of *in situ* bioremediation are that chlorinated COCs in saturated material can be treated without excavation and that the COCs are degraded rather than transferred to another media requiring treatment or disposal. Typically, an organic substrate (e.g., sodium benzoate and acetate) is injected into the subsurface, which micro-organisms will then consume as a carbon source and, in the process, reduce the concentration of dissolved oxygen in ground water. Under this low oxygen environment, the micro-organisms will then begin to utilize the chlorinated COCs as an oxygen substitute (i.e., terminal electron acceptor). The completed end result of anaerobic bioremediation is the breakdown of chlorinated organic COCs into carbon dioxide, water, innocuous salts, and biomass.

- **Effectiveness**—*In situ* anaerobic bioremediation is an innovative technology. Its effectiveness is not well-proven and a treatability study would likely be required to evaluate its effectiveness under site-specific conditions. This technology may be

effective for remediating low level, residual contamination of organic COCs in soil and sediment, in conjunction with a source removal action. However, intermediate PAH degradation products (metabolites) may display toxicity. Complete mineralization of PAHs is slow and intermediates may remain for substantial periods of time. Anaerobic bioremediation would not be effective for treating inorganic COCs. Because much of the impacted areas are in shallow soil/sediment, it may be difficult to sustain anaerobic conditions. The effectiveness of this process would be evaluated through a long-term monitoring program.

- **Implementability**—The required services and materials are available. The treatment zone would likely be difficult to control due to mass transfer limitations (ensuring that the injected compounds reach the micro-organisms) in a complex hydrogeologic region (fill material may cause preferential flow pathways that leave some areas untreated). Operation of the injection wells would require coordination with federal and state regulators, particularly for the injection of nutrients that may affect wetland areas or water quality. Skilled operators would be required to maintain an *in situ* anaerobic bioremediation system.

Anaerobic bioremediation would be difficult to implement and would have limited effectiveness for the specific COCs at Site 20, particularly within the shallow areas of soil and sediment. Finally, considering that the soil and sediment volume requiring remediation is relatively small, this technology will not be retained for further consideration.

3.1.4.4 Phytoremediation

Phytoremediation is a remedial approach based on the naturally occurring processes in soil and ground water that uses plants to remove, transfer, and destroy COCs. These *in situ* processes include enhanced rhizosphere biodegradation, phytodegradation, phytoextraction, phytovolatilization, and hydraulic pumping. Applicable to dissolved organic and inorganic compounds, phytoremediation is designed to remove the COCs from soil or ground water to prevent continued and/or future COC migration.

Phytoremediation is applicable for treating a wide variety of COCs and is well suited for sites with shallow soil, streams, and ground water. Phytoremediation is also feasible for sites with impacts spread over a large area. The application of phytoremediation for cleanup of PAHs, metals, crude oil, solvents, explosives, landfill leachates, and pesticides has been proven effective. In general, it is potentially applicable to COCs that are soluble in water and those that require carbon or energy for their transformation.

Phytoextraction relies on the uptake of COCs from the soil and their translocation into aboveground plant tissue (trees, shrubs, herbs, and grasses), which is harvested and treated. Phytovolatilization involves the uptake of water and the organic COCs by the plant or tree; and then the transfer of the COCs into the leaves where it evaporates or volatilizes into the

atmosphere. Hydraulic pumping takes place when tree roots extend toward the water table and form a dense root mass that absorbs large quantities of water. The capillary action induced by the roots can control the hydraulic gradient and decrease the tendency of surface COCs to sink toward ground water and into drinking water. Another benefit of phytoremediation is that the plants help to control surface erosion and reduce infiltration and leaching by increasing evapotranspiration.

- **Effectiveness**—At the current stage of development, this process is best suited for sites with widely dispersed COCs at low concentrations where only treatment of soil at the surface (i.e., within the root zone) is required. This technology may be effective for some PAHs and inorganics in shallow soil or sediment at Site 20 but would not be effective for areas of deeper impacts. Phytoremediation is an innovative technology. It is not well-proven and a treatability study would be required to evaluate its effectiveness under site-specific conditions. Additional monitoring would be required to evaluate vegetative growth and COC uptake.

- **Implementability**—Phytoremediation is not implementable for impacted soil at Site 20 because the surface area is mostly paved or covered by buildings and other structures. Phytoremediation of sediment within the drainage swales is not implementable because the site stormwater management system would be adversely affected by the introduced vegetative growth. Phytoremediation may be implementable for sediment within the adjacent wetlands; however, the area is already vegetated and recurring alterations to the vegetative cover (e.g., harvesting and replanting) may adversely impact the wetland. Furthermore, the invasive species of reed already present within the wetland would likely overcome an introduced plant species used for the uptake of COCs.

Phytoremediation may be effective for PAHs and inorganic COCs in shallow soil and sediment. However, this technology would not be implementable at Site 20 due to the existing surface cover (pavement, buildings) over impacted soil, the use of the drainage swales for stormwater drainage, and the existing conditions of the wetlands area. Therefore, this technology will not be retained for further consideration.

3.1.4.5 Soil Flushing

Soil flushing involves extraction of COCs from soil using water or other suitable aqueous solutions. Although additives such as acids and chelating agents have had some commercial use for full-scale *ex situ* soil washing projects, they have not been demonstrated for *in situ* applications. Leached COCs are typically recovered from the underlying ground water by pump-and-treat methods. Site-specific conditions must be carefully considered to address the possible spread of COCs.

The target COC group for soil flushing is inorganics, including radioactive contaminants. The technology can be used to treat VOCs, SVOCs, fuels, and pesticides, but it may be less cost-effective than alternative technologies for these COC types. The addition of environmentally compatible surfactants may be used to increase the effective solubility of some organic compounds; however, the flushing solution may alter the physical/chemical properties of the soil system. The technology offers the potential for recovery of metals and can mobilize a wide range of organic and inorganic COCs from coarse-grained soils.

- **Effectiveness**—*In situ* soil flushing is an emerging technology and may be effective for the PAHs and inorganics in soil at Site 20. A treatability study would be required to evaluate its potential effectiveness for the site-specific COCs and hydrogeologic conditions. Soil flushing must be combined with a containment or recovery technology in order to control mobilized COCs. Injected solutions and mobilized COCs would be transported to ground water, or potentially to the adjacent wetlands through preferential flow paths rather than staying within the designed treatment/recovery zone. Soil flushing may have little or no effectiveness for impacted sediment due to the already saturated conditions for that media.

- **Implementability**—The required services and equipment are available. Ground-water extraction and treatment would be required to recover mobilized COCs. Injection of an aqueous solution to mobilize COCs would require coordination with federal and state regulators. The use of aqueous solutions other than water may adversely impact the adjacent wetland area.

In situ soil flushing may be effective and implementable for COCs in soil at Site 20; however, a treatability study would be required to confirm the effectiveness of this technology for addressing the site-specific COCs and hydrogeologic conditions. In general, soil flushing is less cost-effective than alternative technologies for addressing PAHs. Soil flushing may mobilize PAHs in soil to the adjacent wetlands and/or ground water, where no PAH impacts have been identified. Therefore, this technology will not be retained for further consideration.

3.1.4.6 Soil Vapor Extraction

SVE involves the vacuum extraction of soil gas located within the vadose zone by disrupting the subsurface VOC equilibrium and creating a driving force for transferring VOCs from soil to soil gas (which will then be captured by the SVE system). Removal of VOCs from the soil is contingent upon the ground-water table. The heterogeneity and permeability of the soil matrix as well as the volatility characteristics of the target COC limit the application of the SVE system. A benefit of SVE is that the increased oxygen concentrations in the unsaturated zone can promote the biodegradation of organic compounds.

- **Effectiveness**—The target contaminant groups for *in situ* SVE are VOCs and some fuels. SVE would not be effective for recovering the primary COCs at Site 20 (PAHs) due to their low volatility. SVE would not be effective for the inorganic COCs. The likely heterogeneous soil matrix beneath the Weapons Center would reduce the effectiveness of an SVE system by creating preferential flow paths that leave some areas untreated.

- **Implementability**—The required services and equipment are available. However, an SVE system would not be implementable at Site 20 due to the high ground-water table. The low volatility of the target PAHs would necessitate higher SVE flow rates, which may result in a localized increase in the ground-water table and introduction of ground water into the SVE system. SVE would not be implementable to treat impacted sediment due to the periodically saturated conditions.

SVE would not be effective for volatilizing and recovering the COCs at Site 20 (PAHs and inorganics). SVE would also not be implementable due to the shallow ground-water table and/or periodically saturated conditions. Therefore, this technology will not be retained for further consideration.

3.1.4.7 Electrokinetic Remediation

Electrokinetics is an innovative technology that separates and extracts heavy metals, radionuclides, and some organic COCs from saturated or unsaturated soil, sludge, and sediment. A low intensity direct current is applied across electrode pairs that have been implanted in the ground on each side of the impacted soil mass. The electrical current causes electro-osmosis and ion migration, which move the aqueous phase COCs in the subsurface from one electrode to the other. COCs in the aqueous phase or COCs desorbed from the soil surface are transported towards respective electrodes depending on their charge. The COCs may then be extracted to a recovery system or deposited at the electrode. Surfactants and complexing agents can be used to increase solubility and assist in the movement of the COCs. Also, reagents may be introduced at the electrodes to enhance COC-removal rates. Electrokinetics can also be used to slow or prevent migration of COCs by configuring cathodes and anodes in a manner that causes COCs to flow toward the center of an impacted area of soil ("electrokinetic fencing"). Site characteristics that are necessary for effective application of electrokinetic remediation include soil with very low hydraulic conductivity (i.e., silts or clays), low ionic conditions, and water-soluble COCs.

- **Effectiveness**—Experience with this technology is limited to bench- and pilot-scale tests, with the exception of a metal removal process that has been commercially operated by a single vendor in Europe and recently licensed in the United States. Electrokinetic remediation is effective only in soils with very low hydraulic conductivity (i.e., silts or clays) and at low ionic conditions. The average hydraulic conductivity of the soil (i.e., sand and gravel fill material) is not anticipated to significantly impair the effectiveness of electrokinetic remediation at Site 20. Limited performance data from this vendor illustrate the potential for achieving removals greater than 90 percent for some COCs

(e.g., copper, lead, zinc, arsenic, cadmium, chromium, and nickel). This technology is not applicable for elevated concentrations of the primary COCs (e.g., organic PAHs) at Site 20.

- **Implementability**—The required vendors, equipment, and services are limited for the installation and operation of an electrokinetic remediation system. The electrode spacing and duration of remediation is site-specific. The process requires adequate soil moisture in the vadose zone, so the addition of a conducting pore fluid may be required (particularly due to a tendency for soil drying near the anode). Specially designed pore fluids also are added to enhance the migration of target COCs. The pore fluids are added at either the anode or cathode, depending on the desired effects. Injection of an aqueous solution to mobilize COCs would require coordination with federal and state agencies. Injection of surfactants or complexing agents may adversely impact the adjacent wetland areas if not properly recovered. Mobilization of COCs from soil may adversely impact ground water if not properly recovered.

- **Cost**—This is an innovative technology with little full-scale application data. Costs for implementing this technology are uncertain, although are likely to be less cost-effective than other options for small soil/sediment volumes.

This technology is not applicable for the primary COCs at Site 20 (PAHs) and is not likely to be cost-effective considering the small volume to be addressed. Therefore, this technology will not be retained for further consideration.

3.1.4.8 Chemical Fixation/Solidification

Chemical fixation/solidification changes the physical and chemical characteristics of the impacted media in order to immobilize COCs. Metals are commonly remediated by *ex situ* solidification with pozzolans or other additives. This technology has been adapted to *in situ* applications through the use of various proprietary augers that provide concurrent reagent delivery and mixing. *In situ* treatment will likely have a cost advantage over *ex situ* applications for larger volumes and for depths greater than 10 ft. However, this technology has been only occasionally selected for Superfund use, largely because of concerns with long-term reliability.

- **Effectiveness**—*In situ* chemical fixation/solidification is an innovative technology and the long-term effectiveness is not certain. A treatability study may be required to evaluate the effectiveness for the site-specific COCs and hydrogeologic conditions (e.g., selection of proper reagents and quantities). In general, the target COC type for this technology is inorganics. This technology would have limited effectiveness for the primary COCs at Site 20 (PAHs). Fixation/solidification may be effective for limiting the mobility of inorganic COCs, but would not reduce risks from direct exposure (additional protections may be required to prevent direct contact).

- **Implementability**—The required services and equipment are available. Delivery of fixation/solidification reagents to the subsurface would require coordination with federal and state agencies. Fixation/solidification of wetlands sediment may adversely impact that habitat. Implementation of this technology may not be cost-effective for much of the shallow impacts to soil and sediment in comparison to other remedial technologies. Few impacts to deep soil/sediment were identified at Site 20 (Figures 2-1 and 2-2).

Chemical fixation/solidification would have limited effectiveness for the primary COCs at Site 20 (PAHs) and would not be cost-effective in comparison to other remedial technologies given the shallow extent of soil/sediment impacts, the limited volumes, and the low concentrations to be addressed. Therefore, this technology will not be retained for further consideration.

3.1.4.9 *In Situ* Reduction/Oxidation

Reduction/oxidation (redox) reactions chemically convert hazardous chemicals to non-hazardous or less toxic compounds that are more stable, less mobile, and/or inert. Redox reactions involve the transfer of electrons from one compound to another. Specifically, one reactant is oxidized (loses electrons) and one is reduced (gains electrons). The oxidizing agents most commonly used for treatment of hazardous chemicals are ozone, hydrogen peroxide, hypochlorites, chlorine, and chlorine dioxide. The reducing agents most commonly used are sulfur dioxide, sulfide salts, and ferrous sulfate. *Ex situ* chemical redox is a full-scale, well-established technology used for disinfection of drinking water and wastewater, and it is a common treatment for cyanide wastes. Enhanced *in situ* systems are now being used more frequently to treat COCs in soil.

- **Effectiveness**—The target COC group for chemical redox is inorganics (i.e., metals). The technology can also be used, but may be less effective against non-halogenated VOCs and SVOCs, fuel hydrocarbons, and pesticides. Potential persistence of the reagents and/or chemical by-products of the redox reactions may be undesirable in the subsurface. This technology is more typically applied to the *ex situ* treatment of water; however, the *in situ* application for soil is an innovative/emerging technology. Some redox reagents would require additional safety precautions for site/remediation workers (e.g., ozone and chlorine compounds).

- **Implementability**—The equipment and vendors necessary to perform *in situ* reduction/oxidation are available. A treatability study will be required to identify parameters such as water content, alkaline metals, oil/grease, and humus content in soil and total organic halides that could affect processing time and cost. Injection of redox reagents, particularly within wetlands sediment, would require coordination with federal and state agencies. Some redox reagents should not be used for *in situ* applications of this technology due to potential adverse impacts to the environment (e.g., chlorine compounds).

- **Cost**—Costs can greatly vary depending upon the type of redox reagent used (e.g., ozone would have to be generated onsite as needed and would require specialized equipment and skilled operators).

In situ reduction/oxidation provides limited effectiveness for the primary COCs at Site 20 (PAHs) and undesirable by-products may remain after treatment. Therefore, this technology will not be retained for further consideration.

3.1.4.10 *In Situ* Vitrification

In situ vitrification is a solidification technique where a high-power electrical current is passed between electrodes to melt soil into a glass-like matrix. COCs are immobilized within this vitrified mass. This technology is commercially available and has been successfully used at two Superfund sites, one of which was impacted with metals. A hood can be used to capture volatile metals (e.g., lead, mercury, and arsenic) that may be partially vaporized during operations. Vitrification is best suited for wastes that are difficult to treat, such as mixtures of organics, metals, and radionuclides.

- **Effectiveness**—*In situ* vitrification is an effective method for immobilizing and/or oxidizing COCs in soil and sediment. Although *in situ* vitrification would be effective for PAHs and inorganics at Site 20, this technology is better suited for wastes that are difficult to treat with conventional remediation technologies and/or that pose exceptional risks.

- **Implementability**—The equipment and vendors necessary to perform *in situ* vitrification are available. This technology would be difficult to implement for sediment due to the water content of the media. The shallow water table may also complicate implementation for some areas of impacted soil at Site 20. Operation of the high-power electrical equipment within the bunker area would require precautions with respect to the storage of torpedoes as well as other ongoing site operations. Vitrification of sediment within the wetland areas may adversely impact that habitat.

- **Cost**—*In situ* vitrification is typically cost-prohibitive except for very limited soil volumes. Although the volumes of impacted soil and sediment are low at Site 20, the costs of this technology are not warranted for addressing the low COC concentrations and the low site risks at Site 20.

In situ vitrification would be difficult to implement and would not be cost-effective for the low COC concentrations and low risks at Site 20. Therefore, this technology will not be retained for further consideration.

3.1.5 *Ex Situ* Soil Treatment Actions

Ex situ soil treatment actions are technologies that may be applicable for treatment of COCs in excavated soil or sediment (Section 3.1.3.1).

3.1.5.1 Bioslurry

Slurry-phase biological treatment involves the controlled treatment of excavated soil in a bioreactor. The excavated soil is first processed to physically separate stones and rubble. The soil is then mixed with water to a predetermined concentration dependent upon the concentration of the COCs, the rate of biodegradation, and the physical nature of the soil. Some processes pre-wash the soil to concentrate the COCs. Clean sand may then be discharged, leaving only impacted fines and wastewater to biotreat. Typically, the slurry contains from 10 to 40 percent solids by weight. The soil is maintained in suspension in a reactor vessel and mixed with nutrients and oxygen. If necessary, an acid or alkali may be added to control pH. Micro-organisms also may be added if a suitable population is not present. When biodegradation is complete, the soil slurry is dewatered. Dewatering devices that may be used include clarifiers, pressure filters, vacuum filters, sand drying beds, or centrifuges. Bioslurry can treat a variety of organic compounds in excavated soil such as explosives, petroleum hydrocarbons, petro-chemicals, solvents, pesticides, wood preservatives, and other organic chemicals. Bioreactors are favored over *in situ* biological techniques for heterogeneous soil, low permeability soil, or when faster treatment times are required.

- **Effectiveness**—Bioslurry can be effective for treating SVOCs in excavated soil and sediment although the specific types of PAHs at Site 20 are likely to be recalcitrant to biodegradation. Bioslurry would not be effective for inorganic COCs.

- **Implementability**—The required equipment and services to setup and operate a bioslurry reactor are available. Skilled personnel would be required to operate the bioslurry reactor. The type of subsurface material at Site 20 (fill material) may complicate the process. Sorting and additional handling of the excavated soil may be required. Due to the limited space available at Site 20, an offsite location may be required to stage excavated material and to setup a bioslurry reactor.

- **Cost**—Costs may be high depending on the amount of sorting, handling, and dewatering required for the excavated soil/sediment.

Bioslurry reactors may have limited effectiveness for the specific types of PAHs at Site 20 and would not be effective for inorganics. Bioslurry reactors also could not be implemented onsite due to limited available space. A bioslurry is not likely to be cost-effective as compared to other options such as offsite disposal due to the limited volume and low concentrations/risks. Therefore, this technology will not be retained for further consideration.

3.1.5.2 Land Farming

Land farming is a full-scale bioremediation technology in which impacted soil, sediment, or sludge are applied onto the ground and periodically turned or tilled for aeration. Although land farming is usually performed in-place, some land farming systems incorporate liners or other methods to control leaching of COCs, which require excavation and placement of impacted soil. Soil conditions are often controlled to optimize the rate of COC degradation. Conditions normally controlled include: moisture content (usually by irrigation or spraying); oxygen level (by mixing the soil using tilling or aerating); nutrients, primarily nitrogen and phosphorus (by fertilizing); pH (increased slightly by adding lime); and soil bulking (by adding soil amendments and by mixing using tilling, etc.).

- **Effectiveness**—Land farming can be effective for treating PAHs in excavated soil or sediment. Because lighter, more volatile hydrocarbons such as gasoline are treated very successfully by processes that use their volatility (i.e., soil vapor [vacuum] extraction and bioventing), the use of aboveground bioremediation is usually limited to heavier hydrocarbons. Typically, the higher molecular weight compounds, such as the PAHs at Site 20, result in a slower degradation rate. The lesser-controlled conditions under land farming may increase the time to remediate some COCs as compared to other engineered bioremediation systems. A treatability study may be required to evaluate the effectiveness for site-specific soil and COCs. Land farming would not be effective for inorganic COCs.

- **Implementability**—The required equipment and vendors are available. A large, open area is required for land farming. This could not be conducted onsite because Site 20 is active and is mostly paved or contains buildings/bunkers. The type of subsurface material at Site 20 (fill material) may complicate the process. Pre-sorting of the excavated soil may be required prior to land farming.

Land farming would not be effective for inorganics and may have limited effectiveness for the specific types of PAHs at Site 20. The required space to conduct land farming is not readily available. In addition, the volume expected from selective excavation is too small to make this cost-effective. Therefore, this technology will not be retained for further consideration.

3.1.5.3 Biopile

Soil biopiles are utilized for the enhancement of *ex situ* biodegradation of organic COCs in excavated soil. Excavated soil is stockpiled in an engineered disposal cell. If required, the treatment area may be covered or contained with an impermeable liner to minimize the risk of COCs leaching from the pile. Some techniques involve continuous spray application of a nutrient solution into the soil and collection and recycle of the drainage from the soil pile. The drainage itself may be treated in a bioreactor before recycling. Vendors have developed proprietary nutrient and additive formulations and methods for incorporating the formulation into

the soil to stimulate biodegradation. The formulations are usually modified for site-specific conditions. Biopiles and biotreatment cells commonly have an air distribution system buried under the soil to pass air through the soil either by vacuum or by positive pressure. The biopiles in this case can be up to 20 ft high. Biopiles may be covered with plastic to control run-off, evaporation, and volatilization and to promote solar heating. If there are VOCs in the soil that will volatilize into the air stream, the air leaving the soil may be treated to remove or destroy the VOCs before they are discharged to the atmosphere.

- **Effectiveness**—Biopiles can be effective for reducing non-halogenated SVOCs in excavated soil and sediment. However, the specific types of high molecular weight PAHs at Site 20 may be recalcitrant to biodegradation. Biopiles would not be effective for inorganic COCs in excavated soil or sediment.

- **Implementability**—The required equipment and services are readily available. The type of subsurface material at Site 20 (fill material) may complicate the process. Due to the limited space and ongoing operations at Site 20, an offsite location would likely be required to setup and operate a biopile.

Biopiles may have limited effectiveness for treating the specific types of PAHs in excavated soil or sediment at Site 20. In addition, the volume expected from selective excavation is anticipated to be too small to make this cost-effective. Therefore, this technology will not be retained for further consideration.

3.1.5.4 Composting

Composting is a controlled biological process by which biodegradable hazardous materials are converted by micro-organisms to innocuous, stabilized byproducts, typically at elevated temperatures in the range 50-55°C (120-130°F). The increased temperatures result from heat produced by micro-organisms during the degradation of the organic material in the waste. In most cases, this is achieved by the use of indigenous micro-organisms. Soils are excavated and mixed with bulking agents and organic amendments, such as wood chips, and animal and vegetative wastes, to enhance the porosity of the mixture to be decomposed. Maximum degradation efficiency is achieved by maintaining moisture content, pH, oxygenation, temperature, and the carbon-to-nitrogen ratio.

There are three process designs used in composting: aerated static pile composting (compost is formed into piles and aerated with blowers or vacuum pumps), mechanically agitated in-vessel composting (compost is placed in a reactor vessel where it is mixed and aerated), and windrow composting (compost is placed in long piles known as windrows and periodically mixed with mobile equipment). Windrow composting has the potential to be the most cost-effective composting alternative. If VOCs or SVOCs are present in soil, off-gas control may be required.

- **Effectiveness**—The composting process can be effective for mitigating elevated levels of organic COCs such as PAHs in excavated soil and sediment; however, the specific high molecular weight PAHs at Site 20 may be slow to degrade. Composting would not be effective for inorganic COCs.

- **Implementability**—The required equipment and services are readily available. The type of subsurface material at Site 20 (fill material) may complicate composting. A large, open area is required for composting. This could not be conducted onsite because Site 20 is active and mostly paved or contains buildings/bunkers. An offsite location would have to be identified.

- **Cost**—This technology is more expensive than utilizing comparable technologies, such as biopiles. Other cost considerations include the need for a large area (0.5 acre or larger) for placement of windrows, specialized equipment for turning of the windrows, and leachate collection and treatment for discharge from the windrow.

Composting may have limited effectiveness for the specific types of PAHs at Site 20 and would not be effective for inorganic COCs. The open space required for composting is not readily available at NSB NNLON. Finally, the volume expected from selective excavation is too small to make this technology cost-effective in comparison to other treatment/disposal options. Therefore, this technology will not be retained for further consideration.

3.1.5.5 Chemical Fixation/Solidification

As for *in situ* fixation/stabilization (Section 3.1.4.8), *ex situ* fixation/stabilization physically binds or encloses COCs within a stabilized mass (solidification), or chemical reactions are induced between the stabilizing agent and COCs to reduce their mobility (stabilization). *Ex situ* fixation/stabilization, however, typically requires disposal of the resultant material. Stabilized soil can sometimes be used to backfill the excavated area.

- **Effectiveness**—*Ex situ* fixation/stabilization has limited effectiveness against PAHs but would be effective for reducing the mobility of inorganic COCs in excavated soil and sediment. A treatability study would likely be required to determine the reagent types and quantities.

- **Implementability**—The required equipment and services are available. The stabilized soil could be tested to see if it is acceptable for use as backfill for the excavated area. Otherwise, an offsite permitted disposal facility would have to be used. Due to the limited available space at Site 20, an offsite location may be needed to conduct *ex situ* fixation/solidification.

Ex situ chemical fixation/solidification has limited effectiveness against PAHs. Therefore, this technology will not be retained for further consideration.

3.1.5.6 Thermoplastic Stabilization/Solidification

Thermoplastic stabilization/solidification is a process in which soil is mixed with asphalt, bitumen, paraffin, polyethylene, or other organic polymers and heated to form a stable solid. Thermoplastic stabilization/solidification requires disposal or re-use of the resultant materials.

- **Effectiveness**—Thermoplastic stabilization/solidification is an effective process for immobilizing most COCs in excavated material. This technology would be effective for immobilizing the PAHs and inorganic COCs in excavated soil or sediment. Depending on the moisture content of the excavated material, dewatering may be required to make this technology effective.

- **Implementability**—The required equipment and services are available. An acceptable re-use (e.g., asphalt paving) or licensed offsite disposal facility would have to be located. The type of subsurface material at Site 20 (fill material) may complicate this process. Due to the ongoing operations at Site 20, an offsite location would likely be required to conduct *ex situ* thermoplastic stabilization/solidification. Excavated material may need to be shipped out-of-state for treatment if a permit from the State of Connecticut cannot be obtained for treatment at an offsite facility. The excavated material would require waste characterization sampling in order to determine whether this technology is appropriate.

- **Cost**—Unless a beneficial re-use is available for the resultant product (i.e., asphalt or other solid matrix), this technology can be cost-prohibitive. This technology may not be cost-effective for small volumes of excavated material (e.g., as compared to other options such as offsite disposal).

Thermoplastic stabilization/solidification is an effective process for immobilizing COCs in excavated soil or sediment. Applications of this technology, such as asphalt batching, may also be implementable, depending on the volume of material to be treated and the results of waste characterization samples. Therefore, this technology will be retained for further consideration.

3.1.5.7 Soil Washing/Solvent Extraction

Soil washing is a water- or solvent-based process for scrubbing excavated soil to remove organic and inorganic COCs. The process removes COCs from soil in one of two ways: by dissolving or suspending the COCs in the wash solution (which is later treated by conventional wastewater treatment methods), or by concentrating the COCs into a smaller volume of soil through particle size separation, gravity separation, and attrition scrubbing (similar to those techniques used in sand and gravel operations).

- **Effectiveness**—This technology can clean a wide range of SVOCs, fuels, and inorganics from coarse-grained soils. Solvent extraction is generally least effective on very high molecular weight organic and very hydrophilic substances. Therefore, the effectiveness

of this technology for the high molecular weight PAHs at Site 20 is uncertain (a treatability study would be required).

- **Implementability**—The equipment and services are available; however, commercialization of the process is not yet extensive. Skilled personnel would be required to operate the soil washing equipment. Additional safety measures and handling requirements would be needed to protect remediation and site workers from potential risks associated with dermal contact and air emissions from the solvent extraction process. Residual toxicity may result in the treated material due to remaining traces of solvent. Due to the ongoing operations at Site 20, an offsite location would likely be required to conduct *ex situ* soil washing. Solvent extraction is often used in conjunction with other treatment technologies such as incineration or solidification/stabilization.

- **Cost**—The use of solvents/detergents/emulsifiers and the additional safety and handling requirements can make this technology more expensive than other *ex situ* treatment technologies.

Soil washing can be an effective technology for treatment of COCs in excavated soil or sediment although the effectiveness for the specific types of PAHs at Site 20 is uncertain. In addition, the volume expected from selective excavation is too small to make this technology cost-effective compared to other treatment/disposal options. The small volume and low COC concentrations do not warrant the cost and potential risks associated with soil washing/solvent extraction processes. Therefore, this technology will not be retained for further consideration.

3.1.5.8 Chemical Reduction/Oxidation

Ex situ redox reactions chemically convert hazardous COCs to non-hazardous or less toxic compounds that are more stable, less mobile, and/or inert. Redox reactions involve the transfer of electrons from one compound to another. Specifically, one reactant is oxidized (loses electrons) and one is reduced (gains electrons). The oxidizing agents most commonly used for treatment of hazardous COCs are ozone, hydrogen peroxide, hypochlorites, chlorine, and chlorine dioxide. The reducing agents most commonly used are sulfur dioxide, sulfide salts, and ferrous sulfate. Chemical redox is a full-scale, well-established technology used for disinfection of drinking water and wastewater, and it is a common treatment for cyanide wastes. Enhanced systems are now being used more frequently to treat COCs in excavated soil.

- **Effectiveness**—The technology has limited effectiveness for PAHs. Although better established as a drinking water or wastewater treatment technology, chemical redox remains an innovative/emerging technology for the treatment of hazardous wastes in excavated soil/sediment. A treatability study may be required to evaluate the effectiveness for site-specific COCs and soil/sediment types. Redox chemical residuals, or by-products from the redox reaction, may be undesirable.

- **Implementability**—The equipment and services to perform *ex situ* redox reactions in soil are available. Due to the ongoing operations at Site 20, an offsite location would likely be required to conduct *ex situ* chemical redox. Additional safety measures would be required to protect remediation and site workers from potential risks associated with dermal contact and air emissions from redox reagents.

- **Cost**—This technology may be more expensive than other similar *ex situ* treatment methods (e.g., stabilization/solidification).

Ex situ chemical reduction/oxidation may have limited effectiveness for the specific PAHs at Site 20. The process may also leave undesirable by-products in the treated soil. The volume expected from selective excavation is too small to make this technology cost-effective compared to other treatment/disposal options. Therefore, this technology will not be retained for further consideration.

3.1.5.9 Soil Vapor Extraction Treatment Cell

Ex situ SVE is a full-scale technology in which soil is excavated and placed over a network of aboveground piping to which a vacuum is applied to encourage volatilization of organics. The process includes a system for handling off-gas. Advantages over *in situ* SVE (Section 3.1.4.6) are that the excavation process forms an increased number of vapor transport pathways, shallow ground water no longer limits the process, leachate collection is possible, and treatment is more uniform and easily monitored.

- **Effectiveness**—This technology is most effective for VOC in excavated soil; therefore, *ex situ* SVE would have low effectiveness for volatilizing the high molecular weight PAHs (SVOCs) identified in Site 20 soil and sediment. This technology would not be effective for inorganic COCs.

- **Implementability**—The required equipment and services are available. Due to the limited space and ongoing operations at Site 20, an offsite location would likely be required to operate an *ex situ* SVE treatment cell.

Ex situ SVE would not be effective for the COCs at Site 20. Therefore, this technology will not be retained for further consideration.

3.1.5.10 Dewatering

Dewatering of excavated soil involves the removal of free water from wet material through use of passive gravity-driven stockpiling or mechanical expression using a filter press or centrifuge. Dewatering can be used to reduce the disposal weight/volume or as a pre-treatment method for excavated soil.

- **Effectiveness**—Dewatering is an effective technology for soil/sediment pre-treatment if used in conjunction with other *ex situ* treatment and/or disposal methods.

- **Implementability**—The required equipment and services are readily available. Due to the limited space and ongoing operations at Site 20, an offsite location may be required to dewater large volumes of soil or sediment. Decanted water may require treatment prior to discharge.

Dewatering is an effective pre-treatment technology for excavated soil and sediment. Therefore, this technology will be retained for further consideration, if required as part of an alternative that includes excavation of saturated soil/sediment.

3.1.5.11 Size Separation

The concept of reducing the volume of soil impacts through the use of particle size separation is based on the finding that most organic and inorganic COCs tend to bind, either chemically or physically, to clay, silt, and organic soil particles. The silt and clay, in turn, are attached to sand and gravel particles by physical processes, primarily compaction and adhesion. Washing processes that separate the fine (small) clay and silt particles from the coarser sand and gravel soil particles effectively separate and concentrate the COCs into a smaller volume of soil that can be further treated or disposed. Gravity separation is effective for removing high or low specific gravity particles such as heavy metal-containing compounds (lead, radium oxide, etc.). Attrition scrubbing removes adherent COC films from coarser particles. The clean, larger fraction can be returned to the site for continued use.

- **Effectiveness**—Size separation can be an effective technology for reducing the volume of material to be treated, if used in conjunction with other *ex situ* treatment and/or disposal methods. However, the anticipated volume of excavated soil and sediment for Site 20 will be too small to warrant use of this technology.

- **Implementability**—The required equipment and services are readily available. Due to the limited space and ongoing operations at Site 20, an offsite location would likely be required to conduct *ex situ* size separation.

The anticipated volume of excavated soil and sediment for Site 20 will be too small to warrant use of size separation. Therefore, this technology will not be retained for further consideration.

3.1.5.12 Crushing/Grinding/Shredding

Crushing, grinding, and/or shredding of excavated soil involves the use of heavy-duty equipment to reduce the disposal volume and/or as a pre-treatment method for excavated soil.

- **Effectiveness**—Crushing, grinding, and/or shredding are effective technologies for soil pre-treatment if used in conjunction with other *ex situ* soil treatment and/or disposal methods. However, the anticipated volume of excavated soil and sediment for Site 20 will be too small to warrant use of this technology.

- **Implementability**—The equipment and services are readily available. Due to the limited space and ongoing operations at Site 20, an offsite location would likely be required to conduct *ex situ* crushing/grinding/shredding.

The anticipated volume of excavated soil and sediment for Site 20 will be too small to warrant use of crushing, grinding, or shredding technologies. Therefore, this option will not be retained for further consideration.

3.1.5.13 Thermal Desorption

Low temperature thermal desorption is a physical separation process and is not designed to destroy organics. Excavated wastes are heated to volatilize water and organic chemicals. A carrier gas or vacuum system transports the vapors to a gas treatment system. The bed temperatures and residence times designed into these systems will volatilize selected COCs but will typically not oxidize them. Thermal desorption is a full-scale technology that has been proven successful for remediating petroleum hydrocarbon in different types of soil. COC destruction efficiencies in the afterburners of these units are greater than 95 percent. Treated soil retains its physical properties and ability to support biological activity if backfilled.

Two common thermal desorption designs are the rotary dryer and thermal screw. Rotary dryers are horizontal cylinders that can be indirect- or direct-fired. The dryer is normally inclined and rotated. For the thermal screw units, screw conveyors or hollow augers are used to transport the medium through an enclosed trough. Hot oil or steam circulates through the auger to indirectly heat the medium. All thermal desorption systems require treatment of the off-gas to remove particulates and COCs. Particulates are removed by conventional equipment, such as wet scrubbers or fabric filters. COCs are removed through condensation followed by carbon adsorption, or they are destroyed in a secondary combustion chamber or a catalytic oxidizer. Most of these units are transportable. Soil throughput rates are typically 15-20 tons per hour for sandy soils and less than 7 tons per hour for clay soil when more than 10 percent of the material passes a 200-mesh screen. Units with capacities ranging from 25 to 50 tons per hour require four or five trailers for transport and 2 days for setup.

- **Effectiveness**—Low temperature thermal desorption can be effective for treating halogenated and non-halogenated VOCs and fuels in excavated soil or sediment. However, this technology would have less effectiveness for the PAHs (SVOCs) at Site 20. This technology would not be effective for inorganics.

- **Implementability**—The required equipment and services are available. Many vendors offer low temperature thermal desorption units mounted on a single trailer. Dewatering may be necessary to achieve acceptable soil moisture content levels. Depending on the type of fill material beneath Site 20, pre-sorting may also be required. Due to the limited space and ongoing operations at Site 20, an offsite location would likely be required to conduct low temperature thermal desorption. Air emission controls may be required to protect remediation and site workers.

Thermal desorption is less effective for PAHs and is not effective for inorganic COCs. In addition, the volume expected from selective excavation is too small to make this technology cost-effective in comparison to other treatment/disposal options. Therefore, this technology will not be retained for further consideration.

3.1.5.14 Incineration

Incineration employs high temperature oxidation under controlled conditions to destroy organic compounds in solid waste streams. The most common thermal destruction technologies for the treatment of hazardous wastes include liquid injection, rotary kiln, fluidized bed, and multiple hearth incineration. The technology that is chosen depends on the types of waste streams and COCs to be treated. Air pollution control measures are necessary for reducing emissions to the atmosphere. Residual ash requires separate disposal.

- **Effectiveness**—Incineration is a highly effective, final treatment for waste streams, such as soil or sediment, containing organic compounds. Depending upon the process application and the types of compounds being treated, over 99.99 percent destruction of organic compounds can typically be achieved. Burn tests would be required to confirm the destruction of the COCs to regulated levels. Air pollution control equipment can reduce potentially harmful emissions to the atmosphere. Although emission controls can be implemented, an onsite incinerator may pose risks to site workers and the local community.

- **Implementability**—The required equipment and services are available offsite. Coordination with federal and state regulators would be required for incineration of hazardous compounds. Onsite incineration of hazardous materials is unlikely to be implementable due to potential risks to site workers and likely public resistance. Offsite permitted facilities would have to be identified for incineration of excavated materials and disposal of the residual ash. Volatile metals such as arsenic may limit the implementation of this technology because they can leave the combustion unit with the flue gases or in the bottom ash.

Incineration is highly effective for destroying organic COCs but would not be effective for inorganics. The volume expected from selective excavation is too small to make this technology cost-effective in comparison to other treatment/disposal options. Incineration is better used for

wastes that are difficult to treat through conventional methods or that pose higher risks. Therefore, this technology will not be retained for further consideration.

3.1.5.15 Vitrification

Ex situ vitrification is a solidification technique where an electrical current is passed between electrodes to melt soil and incorporate COCs into a vitrified product. A hood can be used to capture volatile metals (e.g., mercury, lead, and arsenic) which may be partially vaporized during operations. Vitrification is best suited for wastes that are difficult to treat, such as mixtures of organics and metals, or for highly toxic wastes.

- **Effectiveness**—*Ex situ* vitrification is a highly effective method for immobilizing and/or oxidizing COCs in soil or sediment.

- **Implementability**—The required equipment and services are available but are somewhat limited due to the specialized equipment and skilled operators that are required. Dewatering of the excavated soil may be necessary prior to vitrification. Due to the limited space and ongoing operations at Site 20, an offsite location would likely be required to conduct *ex situ* vitrification. A disposal method would have to be identified for the vitrified mass.

- **Cost**—*Ex situ* vitrification is a complex, high-energy technology and would be more expensive than other *ex situ* solidification/stabilization technologies.

Ex situ vitrification is usually reserved for highly toxic wastes (e.g., radiological or mixed wastes). The small volume anticipated from excavation at Site 20, the low site risks, and low COC concentrations do not warrant this type of technology. Therefore, this technology will not be retained for further consideration.

3.1.6 *Ex Situ* Treatment Methods for Vapor

Ex situ vapor treatment technologies may be applicable for removal or destruction of COCs in vapor that has been extracted from the subsurface or COCs present in the off-gas from another treatment unit. No technologies have been retained which would generate off-gas vapors; therefore, *ex situ* vapor treatment technologies have not been retained.

3.1.7 Soil/Sediment Disposal

Soil/sediment disposal is a necessary component of remedial alternatives that include excavation (Section 3.1.3.1). Final disposal technologies for excavated materials include both onsite and offsite options.

3.1.7.1 Onsite Consolidation

Consolidation includes the excavation and deposition of wastes from different areas into one onsite location in order to minimize space and closure requirements.

- **Effectiveness**—Consolidation can be an effective method for reducing space and closure requirements from soil and sediment excavated from Site 20. This technology needs to be implemented in conjunction with a capping technology to be effective.

- **Implementability**—This option is not implementable because Site 20 does not have an area available for disposal of wastes.

This technology is not implementable at Site 20 due to onsite space limitations. Also, the volume expected from selective excavation is too small to make this a worthwhile option. Therefore, this option will not be retained for further consideration.

3.1.7.2 Engineered Disposal Cell

This option involved the disposal of wastes (e.g., excavated soil) or fill material into an on-property disposal cell. The disposal cell is designed to contain the materials through the use of low permeability liners/caps and leachate collection, if necessary.

- **Effectiveness**—An engineered disposal cell can be an effective method for containing soil and sediment excavated from Site 20. This technology needs to be implemented in conjunction with a capping technology to be effective.

- **Implementability**—This option is not implementable because Site 20 does not have an area available for disposal of wastes.

An onsite, engineered disposal cell is not implementable at Site 20 due to space limitations. Also, the volume expected from selective excavation is too small to make this a worthwhile alternative. Therefore, this option will not be retained for further consideration.

3.1.7.3 Treatment, Storage, and Disposal Facility

This option involves the disposal of waste materials (e.g., excavated soil or fill) at a permitted offsite landfill or treatment, storage, and disposal facility.

- **Effectiveness**—An offsite landfill or treatment, storage, and disposal facility would be an effective method for final disposal of soil and sediment excavated from Site 20.

- **Implementability**—This option is readily implementable providing an offsite landfill or treatment, storage, and disposal facility is identified that will accept soil and sediment from Site 20.

An offsite landfill or treatment, storage, and disposal facility would be an effective and implementable method for final disposal of impacted soil and sediment excavated from Site 20. Therefore, this option will be retained for further consideration for areas in which selective excavation was retained.

3.2 SUMMARY OF TECHNOLOGY TYPE AND PROCESS OPTION EVALUATION

Based on the screening of remedial technologies, certain technologies that were not effective or implementable at Site 20 have been eliminated from further consideration. The technologies that were retained will be used as a resource to develop remedial alternatives in Chapter 4. Table 3-1 summarizes the remedial technologies/approaches that were retained at the conclusion of the technology screenings presented in this chapter.

TABLE 3-1 SUMMARY OF INITIAL SCREENING OF TECHNOLOGIES AND PROCESS OPTIONS FOR SITE 20 – AREA A WEAPONS CENTER, NAVAL SUBMARINE BASE, NEW LONDON, CONNECTICUT

General Response Action	Remedial Technology	Process Option	Screening Comments
No Action	None	Not Applicable	Retained for consideration as required by the National Contingency Plan.
Institutional Controls	Monitoring	Monitoring of Impacted Environmental Media	Soil and sediment monitoring retained for consideration.
	Access/Use Restrictions	Physical Barriers or Notices	Not retained – access is already controlled by existing site fencing and base security.
		Land Use Restrictions	Retained for consideration.
Containment	Capping	Single Layer Cap/ Multilayer Cap	Not retained – impacted soil is already paved and capping would not be effective or implementable for drainage swale sediment.
	Surface Water Control	Revegetation/Diversion/ Collection	Not retained – a stormwater management system is already in-place.
Source Removal	Soil Excavation	Mechanical Excavation	Selective excavation retained for consideration.
In Situ Treatment	Natural Attenuation	Monitored Natural Attenuation	Not retained – the high molecular weight PAHs are recalcitrant to natural degradation.
	Biological	Aerobic Bioremediation	Not retained – may have limited effectiveness for the specific PAHs and would be difficult to implement and control in the shallow soil/sediment.
		Bioventing	Not retained – not implementable and limited effectiveness for the specific PAHs and due to the shallow ground-water table.
		Biosparging	Not retained – not effective for the specific PAHs and not implementable for the shallow impacts.
		Anaerobic Bioremediation	Not retained – intermediate metabolites may display toxicity, PAHs would be slow to degrade, and the treatment system would be difficult to control.
		Phytoremediation	Not retained – impacted soil is located below pavement, not implementable in drainage swale, and limited implementability in wetlands area.
	Physical/Chemical	Soil Flushing	Not retained – less cost-effective than other technologies and may mobilize COCs to ground water.
		Soil Vapor Extraction	Not retained – not effective for PAHs and difficult to implement due to shallow ground-water table.
		Electrokinetic Remediation	Not retained – not effective for PAHs, not cost-effective, and not a proven technology for inorganics.
		Chemical Fixation/ Solidification	Not retained – limited effectiveness for PAHs and not cost-effective.
		Oxidation/Reduction	Not retained – limited effectiveness for PAHs, may generate undesirable by-products, and may adversely impact wetland area.
		Vitrification	Not retained – not warranted for the COC types and concentrations at Site 20.

NOTE: Shading indicates technologies/options that are not retained for further consideration.
COCs = Constituents of concern.
PAHs = Polycyclic aromatic hydrocarbons.

General Response Action	Remedial Technology	Process Option	Screening Comments
Ex Situ Treatment (assuming soil/sediment excavation)	Biological	Bioslurry	Not retained – not cost-effective compared to other *ex situ* options.
		Land Farming	Not retained – limited effectiveness for the specific PAHs, required area not available, and not cost-effective compared to other *ex situ* options.
		Biopile	Not retained – limited effectiveness for the specific PAHs and not cost-effective compared to other *ex situ* options.
		Composting	Not retained – limited effectiveness for the specific PAHs, required area not available, and not cost-effective compared to other *ex situ* options.
	Physical/Chemical	Chemical Fixation Solidification	Not retained – limited effectiveness for PAHs.
		Thermoplastic Solidification/ Stabilization	Asphalt batching retained for consideration depending on the results of the waste characterization samples and the total volume excavated.
		Soil Washing/Solvent Extraction	Not retained – uncertain effectiveness for PAHs, not cost-effective for small volumes, not warranted for low risks, and residual toxicity may result.
		Chemical Reduction/ Oxidation	Not retained – limited effectiveness for PAHs, not cost-effective compared to other *ex situ* options, and residual by-products may result.
		Soil Vapor Extraction Treatment Cell	Not retained – not effective for site COCs.
		Dewatering	Retained for consideration, as needed during excavation of soil/sediment.
		Size Separation	Not retained – not warranted for small volumes of excavated soil/sediment.
		Crushing-Grinding-Shredding	Not retained – not warranted for small volumes of excavated soil/sediment.
	Thermal	Thermal Desorption	Not retained – limited effectiveness for PAHs and not cost-effective for small volumes.
		Incineration (pyrolysis)	Not retained – not cost-effective – not warranted by the COC types and concentrations.
		Vitrification	Not retained – not cost-effective – not warranted by the COC types and concentrations.
Disposal (assuming soil/sediment excavation)	Onsite	Onsite Consolidation	Not retained – not warranted by small volume, no area available at Site 20.
		Engineered Disposal Cell	Not retained – not warranted by small volume, no area available at Site 20.
	Offsite	Treatment, Storage, and Disposal Facility	Retained for consideration for disposal of excavated soil and sediment.

4. DEVELOPMENT AND DETAILED ANALYSIS OF REMEDIAL ALTERNATIVES

In this chapter, technologies retained from the initial screening (Chapter 3) are assembled into remedial action alternatives (Section 4.1). A detailed analysis of each of these individual remedial alternatives, with respect to the NCP evaluation criteria (which are discussed in Section 4.2), is presented in Section 4.3. The alternatives have been developed to meet RAOs and PRGs under the current industrial and future residential land use scenarios. A comparative analysis of the remedial alternatives, with respect to the NCP evaluation criteria, is presented in Section 4.4. A summary of the comparative analysis is provided in Section 4.5.

4.1 DEVELOPMENT OF REMEDIAL ALTERNATIVES

As outlined in Section 2.6 and Section 2.7, RAOs and GRAs for Site 20 were developed to minimize potential human exposure to elevated COC concentrations in soil and sediment, and to minimize the potential migration of COCs to ground water or downgradient areas. The primary COCs in the soil and sediment in the three drainage areas of concern at this site, based on the Connecticut RSRs and 10^{-5} risk-based PRGs for the current industrial and future residential land use scenarios, are:

- **Drainage Area 1**
  - — Sediment: Benzo(a)pyrene
  - — Shallow soil: Benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, and dibenz(a,h)anthracene
  - — Deep soil: Arsenic.

From the technologies retained from the preliminary screening in Chapter 3, the following potential remedial alternatives were developed for treatment of the COCs in the soil and sediment of the three drainage areas at this site (Table 4-1):

- Alternative 1: No Action
- Alternative 2: Institutional Controls and Monitoring
- Alternative 3a: Selective Excavation, Asphalt Batching or Offsite Disposal, and Institutional Controls and Monitoring (More Stringent of RSRs or Industrial 10^{-5} Risk-Based PRG Scenario for Soil and Industrial 10^{-5} Risk-Based PRGs for Sediment)

- Alternative 3b: Selective Excavation, and Asphalt Batching or Offsite Disposal (More Stringent of RSRs or Residential 10^{-5} Risk-Based PRG Scenario for Soil and Residential 10^{-5} Risk-Based PRGs for Sediment).

The monitoring component of Alternatives 2 and 3a include 5-year reviews for as long as COCs are present above acceptable concentrations. Detailed descriptions of these remedial alternatives are provided in Section 4.3.

4.2 DESCRIPTION OF EVALUATION CRITERIA

Pursuant to EPA guidance, remedial alternatives are examined for adherence to nine criteria, as specified in the NCP. These criteria are as follows:

1. Overall Protection of Human Health and the Environment
2. Compliance with ARARS
3. Long-Term Effectiveness and Permanence
4. Reduction of Toxicity, Mobility, and Volume through Treatment
5. Short-Term Effectiveness
6. Implementability
7. Cost
8. State Acceptance
9. Community Acceptance.

The last two evaluation criteria, State Acceptance and Community Acceptance, are not formally addressed until the Record of Decision is prepared. In order to facilitate a detailed evaluation of remedial alternatives in this FS, the following rationale were applied to the remaining seven criteria:

1. Overall Protection of Human Health and the Environment

   - Reduction of risks
   - Preservation of natural resources

2. Compliance with ARARs

   - Compliance with chemical-specific, action-specific, and location-specific ARARs, as well as other To Be Considered guidances

3. Long-Term Effectiveness and Permanence

   - Magnitude of residual risk
   - Adequacy and reliability of controls

4. Reduction of Toxicity, Mobility, and Volume through Treatment

   - Treatment processes used and materials treated
   - Amount of hazardous materials destroyed or treated
   - Degree of expected reductions in toxicity, mobility, and volume
   - Degree to which treatment is irreversible
   - Type and quantity of residuals remaining after treatment

5. Short-Term Effectiveness

   - Protection of community and workers during remedial actions
   - Environmental impacts
   - Duration of time required to achieve RAOs

6. Implementability

   - Ability to construct and operate the technology
   - Availability and reliability of prospective technologies
   - Ease of undertaking additional remedial actions, if necessary
   - Ability to monitor effectiveness of remedy
   - Ability to obtain approvals from other agencies and coordination with those agencies
   - Availability of equipment and specialists and offsite treatment, storage, and disposal services

7. Cost[1]

   - Capital costs
   - Operation and maintenance (O&M) costs
   - 30-year net present worth costs.

4.3 INDIVIDUAL EVALUATIONS OF REMEDIAL ALTERNATIVES

The remedial alternatives which were outlined in Section 4.1 are evaluated individually in this section, with respect to the NCP evaluation criteria which were outlined in Section 4.2. Specific details concerning the individual characteristics of each of these alternatives will discussed in Subsections 4.3.1 through 4.3.3. A comparative analysis of the remedial alternatives is presented in Section 4.4.

1. Costs developed in this FS are based on 1999 dollars and are rounded to the nearest $100. Present worth costs are calculated using a 5 percent discount rate and a 2 percent inflation rate over a hypothetical 30-year period of performance.

4.3.1 Alternative 1 – No Action

Pursuant to Section 300.430(e)(3)(ii)(6) of the revised NCP, the No Action alternative is developed as a baseline for comparison against the other remedial alternatives.

4.3.1.1 Description

The No Action alternative includes no current or future remedial actions, institutional controls, or monitoring. Impacted soil and sediment would be left in-place and the identified potential risks to human health would not be addressed. This alternative is required for consideration under the NCP as a baseline comparison with other alternatives.

4.3.1.2 Evaluation

Overall Protection of Human Health and the Environment

The No Action alternative would not be protective of human health or the environment because the identified risk at Site 20 would not be addressed. Cancer risks for the future resident scenario (Reasonable Maximum Exposure conditions) were greater than the CTDEP acceptable cumulative risk level of 1×10^{-6}. The main contributor to the carcinogenic risk in Site 20 was associated with the incidental ingestion of benzo(a)pyrene in soil and sediment. The Phase II RI (Brown & Root 1997) states that ecological receptors, if present in the area, would potentially be at risk. Further evaluation noted in this FS that there are no risks to potential ecological onsite or offsite receptors due to limitations in available habitat. However, it is recognized that migration of Site 20 COCs has the potential to affect receptors in adjacent areas.

Compliance with Applicable or Relevant and Appropriate Requirements

The No Action alternative would not comply with chemical-specific ARARs (Table 4-2) because no action would be taken to address COCs concentrations exceeding Connecticut RSRs and risk-based PRGs. Although natural attenuation processes would reduce some COC concentrations over time, no specialized monitoring would be conducted under the No Action alternative to verify that COCs are being naturally attenuated at acceptable rates. There are no federal or state location-specific or action-specific ARARs as per Tables 4-3 and 4-4.

Long-Term Effectiveness and Permanence

The No Action alternative would not be effective in the long-term because no remedial activities or institutional controls would be enacted for the long-term management of elevated COC concentrations or for reduction of the potential risks for full time employees, construction workers, and future residents. Due to the vital base operations, it is unlikely that Site 20 would be transferred for residential re-use. However, if residential re-use was allowed, no protective measures would be in place under the No Action alternative. RAOs would not be achieved in the long-term.

Reduction of Toxicity, Mobility, or Volume through Treatment

No treatment is specified under the No Action alternative. No other controls would be implemented to address the toxicity, mobility, or volume of COCs in soil and sediment. Although natural attenuation processes would occur over time, no monitoring would be conducted to verify that the toxicity, mobility, and volume of COCs are being reduced at acceptable rates.

Short-Term Effectiveness

Because no remedial actions are specified under the No Action alternative, there would be no increased risks to human health or the environment from implementation of this alternative. Similarly, the No Action alternative would not generate additional onsite or offsite adverse environmental impacts. None of the RAOs would be achieved.

Implementability

In a technical sense, the No Action alternative would be readily implementable because no remedial actions are specified. Also, this alternative would not interfere or limit future remedial actions, if necessary. However, in an administrative sense, the No Action alternative will not be implementable because RAOs would not be achieved. In addition, because contamination will remain onsite, 5-year reviews would be mandatory.

Cost

Capital, O&M, and total 30-year net present worth costs associated with Alternative 1 (Appendix D) are as follows:

Estimated capital costs:	$0
30-year present worth of O&M:	$142,544
30-year net present worth costs:	$142,544

4.3.2 Alternative 2 – Institutional Controls and Monitoring

4.3.2.1 Description

Alternative 2 would address the RAOs through the following remedial components:

- ELURs to prevent exposure to COCs in soil and sediment and to prevent residential use of the site
- Tiered monitoring
- 5-year reviews.

An ELUR will meet the RAOs for the current industrial use, and would prevent residential re-use of the site. Descriptions of the individual components under this remedial alternative are as follows.

Environmental Land Use Restriction

Institutional controls will be implemented to prevent/control future contact with elevated concentrations of COCs in soil and sediment. Under the State Remediation Standards, ELURs cannot be established until a deed is created for the parcel. Because there are no deeds currently for NSB NLON, the ELUR would instead be recorded on the Base Master Plan. Furthermore, there will be a requirement written into the ELUR and the Record of Decision that if the site is ever sold or leased, upon creation of the deed or lease, the ELUR would be recorded in accordance with applicable federal, state, and local standards. The ELUR, recorded in the Base Master Plan and in any future property transfer documents, would: (1) prevent future human contact with COCs in soil and sediment that exceed Connecticut RSRs and risk-based PRGs, (2) prevent removal of asphalt over areas where COCs in soil exceed PMC, and (3) specify the use of personal protective equipment for maintenance work within the drainage ditches.

ELURs would cover the extent of Site 20 and would be maintained for as long as COCs are present above Connecticut RSRs and/or risk-based PRGs. Unless additional remediation is undertaken, Site 20 could not be redeveloped for residential land use.

Tiered Monitoring

A tiered monitoring program would be conducted to demonstrate that COC concentrations are stable or decreasing and that COCs in soil and sediment are not adversely impacting the environment (particularly downgradient areas via transport of impacted sediment in drainage ditches). The tiered monitoring program would include surface water and sediment sampling on an annual basis until sufficient time dependent data have been collected. It is anticipated that soil sampling will be required less frequently than sediment sampling because the site is largely paved and the primary migration route for COCs at Site 20 is via the drainage channels that are included in the sediment monitoring program. Once baseline conditions have been established, it is anticipated the frequency of monitoring may be reduced to coincide with the 5-year reviews. Samples would be analyzed for PAHs and inorganics. Ground-water sampling will be considered as part of the separate FS for the ground-water operable unit at NSB NLON.

Five-Year Reviews

In accordance with CERCLA Section 121(c), the Navy, EPA, and CTDEP would conduct 5-year reviews as long as COCs remain onsite above concentrations that allow for unrestricted use and unlimited exposure. Under Alternative 2, 5-year reviews would be required because COC concentrations above the Connecticut RSRs and/or the risk-based PRGs would remain in soil and sediment. The 5-year reviews would focus on compliance with the ELUR, the future

site use (anticipated to remain an active Naval base), and would evaluate the site status through site visits and data from the tiered monitoring program to determine whether further action is warranted.

4.3.2.2 Evaluation

Overall Protection of Human Health and the Environment

Alternative 2 would be protective of human health through ELUR, limitation of site access, and monitoring. No significant ecological risks were identified for Site 20. ELUR would be protective of human health by preventing future human exposure to COCs in sediment and by requiring construction workers to wear personal protective equipment. The ELUR would also be protective of the environment by maintaining the site pavement, thereby limiting the potential for the migration of COCs in soil above the PMC. Due to the critical operations at the Area A Weapons Center, it is unlikely that the property would be transferred for residential re-use. However, if unacceptable COC concentrations are still present during a property transfer, then carrying over the ELUR as part of a deed restriction would protect human health.

The 5-year reviews would protect human health and the environment by ensuring that an ELUR remains effective with respect to the site conditions over time. Data from the tiered monitoring program would be used to demonstrate that the site poses no unacceptable risks to human health or the environment in the future.

Compliance with Applicable or Relevant and Appropriate Requirements

Alternative 2 would not achieve chemical-specific ARARs (Table 4-5) but would comply with the location-specific and action-specific ARARs identified for Site 20 (Tables 4-6 and 4-7). Various COCs were reported in soil at concentrations exceeding Connecticut PMC and RDEC. The ELUR would address sediment and soil contamination above RSRs but would not address exceedances of PMC.

Long-Term Effectiveness and Permanence

Although elevated COC concentrations would remain, Alternative 2 would be effective in the long-term for addressing human health risks. ELURs, permanently recorded in the Base Master Plan and in any future property transfer documents, would be effective in the long-term for preventing human exposure to COCs in soil and sediment by limiting construction worker's and full-time employee's activities at the site and by disallowing residential redevelopment of the site. Institutional controls would also be effective in the long-term by limiting site access, by requiring appropriate personal protective equipment for site workers during maintenance work within drainage ditches, and by maintaining the existing pavement which may reduce the potential for future COC migration from soil to ground water. Alternative 2 is not as effective at addressing PMC in the impacted media as other alternatives evaluated.

The 5-year reviews would provide long-term effectiveness by ensuring that an ELUR remains in place to protect human health and the environment over time. In addition, the tiered monitoring program would be effective for evaluating the nature and extent of COCs and would ensure that no change in risk status occurs without notification. Monitoring would also be effective to verify the continued absence of any COC migration from the soil and sediment that may adversely impact potential onsite or offsite ecological receptors.

Reduction of Toxicity, Mobility, and Volume through Treatment

Alternative 2 does not include treatment to reduce the toxicity, mobility, and volume of COCs identified at Site 20.

Short-Term Effectiveness

Alternative 2 would provide short-term effectiveness in reducing human health risks through the implementation of an ELUR. By limiting access to the affected soil/sediment, potential risk of COC exposure for construction workers and full-time employees would be minimized/ eliminated. Institution of site re-use restrictions would also immediately prevent residential redevelopment of the property, thereby protecting human health. Alternative 2 is not effective in addressing pollutant mobility in the contaminated media.

Implementability

In a technical sense, Alternative 2 would be readily implementable because the required monitoring can be conducted without difficulty. Also, this alternative would not interfere or limit future remedial actions, if necessary. Administratively, Alternative 2 would require implementation of an ELUR that is recorded on the Base Master Plan and any future property transfer documents.

Cost

Capital, O&M, and total 30-year net present worth costs associated with Alternative 2 are as follows:

Estimated capital costs:	$12,000
30-year present worth of O&M:	$246,100
30-year net present worth costs:	$258,100

Cost estimates for this alternative are based on the implementation of an ELUR, a tiered monitoring program, and conducting 5-year reviews. Detailed cost estimates are provided in Appendix D.

4.3.3 Alternative 3 – Selective Excavation, and Asphalt Batching or Offsite Disposal (and Institutional Controls and Monitoring for Industrial Land Use Scenario) (More Stringent of Remediation Standard Regulations or 10^{-5} Risk-Based Preliminary Remediation Goals for Soil, and 10^{-5} Risk-Based Preliminary Remediation Goals for Sediment Scenario)

4.3.3.1 Description

Alternative 3 would address the RAOs through the following remedial components:

- Selective excavation of COCs in soil and sediment
- Offsite disposal or asphalt batching of excavated soil and sediment
- Institutional Controls, Monitoring, and 5-Year Review (industrial land use scenario).

The more stringent of two soil cleanup criteria, RSRs or 10^{-5} risk-based PRGs, and one sediment cleanup criteria (10^{-5} risk-based PRGs), provide cleanup goals for soil and sediment in Alternative 3, based on site use. Therefore, this alternative was evaluated with respect to the two options for potential land usage (industrial and residential), with these variations presented as Alternatives 3a and 3b. Alternative 3a is designed to remove the COCs in soil and sediment to meet the current industrial land use scenario, and Alternative 3b similarly designed to meet the future residential land use scenario. The two alternatives vary in treatment schemes, with Alternative 3a including an ELUR, tiered monitoring, and 5-year reviews, because COCs exceeding residential criteria may still be present after treatment. Alternative 3b ensures that the site would no longer contain COCs in the soil above the more stringent of RSRs or 10^{-5} risk-based PRGs, and in the sediment above 10^{-5} risk-based PRGs. The two scenarios for this alternative are described in the following subsections and are depicted in Figures 4-1 and 4-2.

Selective Excavation, and Asphalt Batching or Offsite Disposal

The treatment scheme for Alternative 3 involves excavation of soil and sediment found to contain COCs in concentrations exceeding the media-specific cleanup goals, and removal of the affected soil and sediment from Site 20. The affected soil and sediment would be excavated and temporarily stockpiled onsite and screened for PAHs using a photoionization detector. Confirmatory soil and sediment samples would be collected from the bottom and sidewalls of the excavation and sent to a laboratory for PAHs and inorganic analyses to confirm that material exceeding the media-specific cleanup goals has been removed. At least 5 samples will be taken at each excavation location (one from the bottom and each sidewall of the excavation) and one sample per 10 ft along the drainage swale. In addition, one sample per five truckloads of the stockpile that is to be disposed (100 yd^3) would be collected for waste characterization. The excavated area would then be backfilled with clean fill and the drainage swales would be regraded. Disturbed asphalt would be repaired.

The excavated soil would either be disposed at an offsite, licensed disposal facility or treated using thermoplastic stabilization/solidification (i.e., asphalt batching), depending on the actual total volume that is excavated (i.e., cost effectiveness) and the results of the waste characterization samples (i.e., determination that the material can be accepted by an asphalt batching facility). For purposes of this study, asphalt batching is used to represent an appropriate method of thermoplastic stabilization/solidification, and the soil treatment costs presented are for asphalt batching. Due to the ongoing operations at Site 20, soil treatment would likely require an offsite treatment facility, and may require transport of affected soil out-of-state if the necessary Connecticut permitting is not implementable. Safety precautions would be taken during excavation, loading, and transporting activities in order to minimize fugitive dust emissions.

Alternative 3a

Under Alternative 3a, the following areas would be included in the selective excavation to achieve the more stringent of industrial RSRs (PMC and ICDEC) or 10^{-5} risk-based PRGs for soil and the 10^{-5} risk-based PRGs for sediment (Figure 4-1):

- **Drainage Area 1**—Soil with PAH (benz[a]anthracene, benzo[a]pyrene, benzo[b] fluoranthene, and chrysene) concentrations in excess of PMC is located at 2WCTB2 from 0 to 2 ft bgs (under pavement). No sediment concentrations exceed 10^{-5} risk-based PRGs.

- **Drainage Area 2**—No soil concentrations exceed PMC, ICDEC, or 10^{-5} risk-based PRGs, nor do sediment concentrations exceed 10^{-5} risk-based PRGs.

- **Drainage Area 3**—No soil concentrations exceed PMC, ICDEC, or 10^{-5} risk-based PRGs, nor do sediment concentrations exceed 10^{-5} risk-based PRGs.

Based on the locations and depths of COCs in the soil and sediment, it is anticipated that an approximate total of 2 yd^3 of soil and sediment would be removed to achieve compliance with this alternative's cleanup goals for soil and sediment under the current industrial land use scenario. Under Alternative 3a, if confirmatory samples indicate that COCs are left in-place above residential cleanup goals, then an ELUR, a monitoring program, and 5-year reviews would also be implemented. An ELUR may also be required if some impacted soil cannot be removed due to the proximity of buildings or other structures.

Alternative 3b

Under Alternative 3b, the following areas would be included in the selective excavation to achieve the more stringent of residential RSRs (PMC and RDEC) or 10^{-5} risk-based PRGs for soil, and the 10^{-5} risk-based PRGs for sediment (Figure 4-2):

- **Drainage Area 1**—Sediment with PAH (benzo[a]pyrene) concentrations in excess of 10^{-5} risk-based PRGs is located at 2WCSD3 from 0 to 1 ft bgs. Soil with PAH

concentrations in excess of PMC (chrysene and benzo[a]pyrene) and in excess of both PMC and RDEC (benz[a]anthracene and benzo[b]fluoranthene) is located at 2WCTB2 from 0 to 2 ft bgs (under pavement). Soil with arsenic concentrations in excess of 10^{-5} risk-based PRGs is located at 2WCTB3 from 4 to 6 ft bgs (under pavement), and at 2WCTB5 from 6 to 8 ft.

- **Drainage Area 2**—No soil concentrations exceed PMC, RDEC, or 10^{-5} risk-based PRGs, nor do sediment concentrations exceed 10^{-5} risk-based PRGs.

- **Drainage Area 3**—No soil concentrations exceed PMC, RDEC, or 10^{-5} risk-based PRGs, nor do sediment concentrations exceed 10^{-5} risk-based PRGs.

Based on the locations and depths of COCs in soil/sediment, it is anticipated that a total of approximately 199 yd^3 of soil/sediment would be removed under Alternative 3b to achieve compliance with this alternative's cleanup goals for soil and sediment under the future residential land use scenario. If, during confirmatory sampling, it is determined that some impacted material cannot be removed due to the proximity to buildings or other structures, then ELURs (disallowing residential re-use of the site), a tiered monitoring, and/or a 5-year review program would be implemented. The individual components of the evaluation of this remedial alternative are described below and are depicted in Figures 4-1 and 4-2.

4.3.3.2 Evaluation

Overall Protection of Human Health and the Environment

Alternative 3 (both scenarios 3a and 3b) would be protective of human health and the environment primarily through the selective removal of soil containing COC concentrations above the more stringent of RSRs or 10^{-5} risk-based PRGs from the site, and of sediment above 10^{-5} risk-based PRGs from the site. Impacted soil would be excavated and subject to offsite disposal and/or treatment, thereby minimizing/eliminating the identified risks at Site 20. However, if some impacted material cannot be removed due to the proximity to buildings or other structures, then Institutional Controls and Monitoring would also be implemented to minimize remaining risks from such locations. Confirmatory sampling would be conducted during excavation activities to verify that cleanup goals were achieved. By following safety precautions during excavation and transportation of the affected soil, and disposal/treatment at an authorized and regulated treatment, storage, or disposal facility, human health and the environment are protected.

Alternative 3a would achieve both Connecticut RSRs and 10^{-5} risk-based PRGs for soil and 10^{-5} risk-based PRGs for soil for industrial use. Under Alternative 3a, if COCs remain above residential land use goals, this alternative would protect human health through implementation of an ELUR (disallowing residential re-use of the site), a tiered monitoring program, and 5-year reviews. Data from the tiered monitoring program would be used to verify that the site poses no unacceptable risks to human health or the environment in the future.

Compliance with Applicable or Relevant and Appropriate Requirements

Alternative 3 would comply with the cleanup goals identified for Site 20 (Tables 4-8 through 4-13). Alternatives 3a and 3b would both achieve chemical-specific ARARs (Tables 4-8 and 4-11) by means of selective excavation of affected soil and sediment, however, Alternative 3a may require additional protective measures for compliance. Alternative 3a may result in COCs remaining in sediment and soil at concentrations above residential chemical-specific ARARs; however, an ELUR, a tiered monitoring program, and 5-year reviews would be implemented to address the associated risks. Both Alternatives 3a and 3b would be conducted in accordance with location-specific (Tables 4-9 and 4-12) and action-specific (Tables 4-10 and 4-13) ARARs. Coordination with federal and state agencies would be required to meet wetlands protection ARARs pertaining to excavation within the Area A Wetland.

Long-Term Effectiveness and Permanence

Selective excavation would provide an effective and permanent remedy for risks at Site 20 which are associated with the identified COC concentrations above the Alternative 3 cleanup goals because the impacted soil and sediment would be removed from the site. Post-excavation sampling would be conducted to confirm the effectiveness of excavation for achieving these goals. Excavation of affected soil also minimizes/eliminates potential for migration of COCs to ground water. Offsite treatment/disposal of the affected soil would provide reliable long-term mitigation of risks from COCs at Site 20. Disposal and/or treatment of the affected soil at a properly authorized facility would provide long-term human health and environmental protection.

If potential future residential risks are to be addressed in Alternative 3a, ELURs recorded in the Base Master Plan and in any future property transfer documents would provide long-term effectiveness in preventing potential human contact with residual COCs in soil/sediment above residential cleanup goals. The ELUR would disallow residential redevelopment of the property. Alternative 3a would also include 5-year reviews and a monitoring program that would be effective in the long-term for verifying that the remedy continues to protect human health and the environment over time.

Reduction of Toxicity, Mobility, and Volume through Treatment

Selective excavation would remove the toxicity, mobility, and volume of COCs from impacted soil and sediment at Site 20. Depending on the volume of material excavated and the results of waste characterization sampling, the excavated soil/sediment would either be disposed or treated through thermoplastic stabilization/solidification (i.e., asphalt batching) at an offsite permitted facility. Offsite disposal at a licensed landfill would contain the impacted material but would not satisfy the NCP's preference for treatment of COCs. Stabilization/solidification through asphalt batching would satisfy the NCP's preference for treatment of the impacted material. By mixing the affected soil and sediment with asphaltic material, the COCs would be immobilized.

Stabilization/solidification would not reduce the toxicity of the COCs; however, stabilization within the asphalt would mitigate the migration risks from the COCs. Mixing with asphalt would increase the volume of affected material to be handled.

Short-Term Effectiveness

Alternatives 3a and 3b would involve the excavation and treatment via asphalt batching or offsite disposal of contaminated material. Exposure of construction workers to the contaminated material can be minimized by the use of personal protective material, engineering controls, and safety controls. In addition, during excavation, transportation, and disposal of contaminated material, dust and erosion control measures should be conducted. The remedial activities are not expected to have an adverse impact on either the community or the environment. However, to ensure spillage does not occur during excavation, transportation, and disposal of contaminated material, care must be taken. This is especially important since treatment or disposal will require offsite transport of material.

Implementability

Alternative 3 would be reasonably implementable but with some difficulties due to ongoing base operations and existing surface cover. Due to vital base operations, excavation activities must not significantly impede access to and from Site 20. Excavation could not be conducted under bunkers. Disturbed asphalt would have to be repaired. The required equipment and services are readily available for selective excavation and offsite disposal under this alternative.

Coordination with regulatory agencies would be required to address excavation activities conducted adjacent to wetland areas. If the soil/sediment treatment is to be asphalt batching, the type of subsurface material at Site 20 (fill material) may complicate this process. An acceptable re-use of the treated material (e.g., asphalt paving) would also need to be identified. Due to the ongoing operations at Site 20, an offsite location would likely be required to conduct the stabilization/solidification (i.e., asphalt batching). If offsite disposal was chosen as the treatment, a licensed offsite disposal facility would have to be located.

Cost

Alternative 3a

Capital costs for Alternative 3a primarily consist of excavation, asphalt batching/offsite disposal, site restoration, and institutional controls. If required (i.e., if COCs remain onsite above residential cleanup goals), O&M costs would primarily include tiered monitoring and 5-year reviews. Details of cost estimates are provided in Appendix D.

The costs outlined below assume the excavated materials are sent offsite for asphalt batching:

Estimated capital costs:	$32,400
30-year present worth of O&M:	$185,400
30-year net present worth costs:	$217,800

The costs outlined below assume the excavated materials are sent offsite for disposal (landfill):

Estimated capital costs:	$32,300
30-year present worth of O&M:	$185,400
30-year net present worth costs:	$217,700

Alternative 3b

Capital costs for Alternative 3b primarily consist of excavation, asphalt batching/offsite disposal, and site restoration. No O&M costs are anticipated to be associated with Alternative 3b. Details of cost estimates are provided in Appendix D.

The costs outlined below assume the excavated materials are sent offsite for asphalt batching:

Estimated capital costs:	$63,300
30-year present worth of O&M:	$0
30-year net present worth costs:	$63,300

The costs outlined below assume the excavated materials are sent offsite for disposal (landfill):

Estimated capital costs:	$81,200
30-year present worth of O&M:	$0
30-year net present worth costs:	$81,200

4.4 COMPARATIVE ANALYSIS OF REMEDIAL ALTERNATIVES

This section presents the second and final step of the Detailed Analysis of Alternatives. Here, the remedial alternatives, which were evaluated individually using the NCP evaluation criteria in Section 4.3, are compared to each other for their relative effectiveness for each of those criteria, in order to facilitate the decision-making process. As outlined in Section 4.2, two of the nine NCP criteria (State Acceptance and Community Acceptance) will be evaluated as part of the Record of Decision.

A general cost comparison of the feasible remedial alternatives is presented in Table 4-1. A summary of the following comparative analysis is presented in Table 4-14.

4.4.1 Overall Protection of Human Health and the Environment

Alternative 3 would be more protective of human health and the environment than Alternatives 1 and 2. Alternative 3a is somewhat less protective than Alternative 3b since it relies on the long-term maintenance of institutional controls both under the scenario of the base remaining active and under the circumstances of a base closure. Alternative 3b is the most protective since it permanently removes contamination to residential levels.

Alternative 1 would not be protective of human health or the environment because the potential risks to site employees, construction workers, and future residents would not be addressed. Also, since no monitoring would be performed, potential migration of COCs would not be detected.

Alternative 2 would be protective of human health and the environment through implementation of an ELUR, a tiered monitoring program, and 5-year reviews. The ELUR, recorded in the Base Master Plan and in any future property transfer documents, would: (1) prevent future human contact with COCs in soil that exceed Connecticut RSRs and risk-based PRGs and with COCs in sediment that exceed 10^{-5} risk-based PRGs, (2) prevent removal of asphalt over areas where COCs in soil exceed PMC, and (3) specify the use of personal protective equipment for maintenance work within the drainage ditches. Data from the tiered monitoring program would be used to demonstrate that the site poses no unacceptable risks to human health or the environment in the future (e.g., COC concentrations are stable or decreasing, and COCs are not adversely impacting downgradient areas). The 5-year reviews would protect human health and the environment by ensuring that an ELUR remains effective with respect to the site conditions over time.

Alternative 3 would be protective of human health and the environment through excavation of soil which contains COC concentrations above the more stringent of Connecticut RSRs or 10^{-5} risk-based PRGs and of sediment which contains COC concentrations above 10^{-5} risk-based PRGs. Offsite asphalt batching or landfill disposal of excavated soil and sediment would complete the elimination/minimization of the associated risk from Site 20. Confirmatory sampling would be conducted during excavation activities to demonstrate that remaining COC concentrations, if detectable, in the soil and sediment are within acceptable levels.

The residential scenario of Alternative 3 may be slightly more protective of human health than the industrial scenario because stricter cleanup goals for soil may be used (i.e., the more stringent of PMC/RDEC or 10^{-5} risk-based PRGs, rather than the more stringent of PMC/ICDEC or 10^{-5} risk-based PRGs) associated with the site's potential land usage. However, Site 20 is anticipated to remain for industrial use; therefore, the industrial scenarios of these alternatives would be equally protective with the inclusion of ELUR to prevent residential re-use.

4.4.2 Compliance with Applicable or Relevant and Appropriate Requirements

Alternative 1 would not comply with the established ARARs or risk-based PRGs. Alternative 2 would not achieve chemical-specific ARARs but would comply with the location-specific and action-specific ARARs identified for Site 20. Alternative 3 (both industrial and residential land use scenarios) would comply with ARARs and risk-based PRGs.

Alternative 1 (No Action) would not comply with the chemical-specific ARARs because no institutional controls or remediation activities are specified to address COCs above Connecticut RSRs and risk-based PRGs. Alternative 2 would not remediate soil or sediment to achieve these criteria, but instead would mitigate the associated risks through institutional controls (i.e., ELUR) and monitoring. Alternative 3 would comply with the chemical-specific ARARs and risk-based PRGs through selective excavation of elevated COC concentrations in soil and sediment.

Alternatives 2 and 3 would be conducted in accordance with location- and action-specific ARARs. No location- or action-specific ARARs were identified for Alternative 1.

4.4.3 Long-Term Effectiveness and Permanence

Alternative 3 would provide long-term effectiveness for achieving RAOs. Alternative 1 would not be effective in the long-term and would not achieve RAOs. Alternative 2 would provide limited effectiveness against human health risks but does not fully address pollutant mobility.

Alternative 1 would not be effective in the long-term because no remedial components or institutional controls would be enacted for the long-term management of risks or elevated COC concentrations.

The ELURs specified under Alternatives 2, and 3a, and recorded in the Base Master Plan and in any future property transfer documents, would be effective for long-term mitigation of the unacceptable risks at Site 20 by controlling human exposure to COCs in soil/sediment, and by addressing COCs in soil above the PMC by preventing removal of the asphalt. Institutional controls would also be effective in the long-term by limiting site access and construction activities, and requiring appropriate personal protective equipment for site workers during maintenance work within the drainage ditches. The tiered monitoring program would provide long-term effectiveness in evaluating the nature and extent of COCs over time. The 5-year reviews would be effective in the long-term by verifying that the institutional controls continue to protect human health and the environment.

Alternative 3 would provide a permanent removal of the identified COCs in soil and sediment to concentrations below this alternative's cleanup goals. The residential scenario of Alternative 3 may remove more soil and sediment than the industrial scenario due to the lower cleanup criteria associated with the industrial scenario. Asphalt batching/offsite disposal is an effective long-term method for treating/disposing the excavated materials. Post-excavation sampling would be conducted to confirm the effectiveness of excavation for achieving PRGs. If elevated COCs are

left in-place under the industrial scenario of Alternative 3 (i.e., COCs above residential standards but achieving industrial standards), then additional monitoring would be conducted to confirm the long-term effectiveness of the remedial action.

4.4.4 Reduction of Toxicity, Mobility, and Volume through Treatment

Under Alternative 3, asphalt batching may be used to treat the excavated soil and/or sediment, depending on the actual volume of material removed and the results of waste characterization sampling. Asphalt batching would greatly reduce the mobility of COCs in excavated soil and/or sediment but would not reduce the toxicity or volume of the COCs (although the associated risks would be mitigated). If asphalt batching is not used under these alternatives, then the excavated soil and/or sediment would be disposed at an offsite, licensed facility. This would not satisfy the NCP preference for treatment of COCs; however, it can be an acceptable disposal option for small volumes of impacted soil/sediment.

Alternatives 1 and 2 do not include soil and/or sediment treatment.

4.4.5 Short-Term Effectiveness

Alternative 1 would not provide short-term effectiveness. Because no remedial actions or institutional controls are specified, Alternative 1 would not achieve RAOs. Alternative 2 would be effective in addressing human health risks through ELUR and monitoring but would not address pollutant mobility threats. Alternative 3 would also be immediately effective for addressing site risks through excavation of soil containing COCs above the more stringent of Connecticut RSRs or 10^{-5} risk-based PRGs, and of sediment containing COCs above 10^{-5} risk-based PRGs.

Alternatives 1 and 2 would not present new risks to human health or the environment once implemented. Due to the disturbance of impacted soil/sediment and the potential disturbance to wetland areas, Alternative 3 would require proper excavation/construction and engineering practices (e.g., dust control and personal protective equipment) to minimize potential risks to site workers, the community, and the environment.

4.4.6 Implementability

In a technical sense, Alternative 1 would be easiest to implement (because it includes no remedial actions) and Alternative 3 would be implementable but with some difficulties, due to ongoing base operations and existing surface cover. Due to the vital base operations, excavation activities must be managed so as not to significantly impede access to and from Site 20. Excavation cannot be conducted below the bunkers onsite. Disturbed pavement areas will require repairs.

In an administrative sense, Alternative 1 cannot be implemented because it does not achieve RAOs. The administrative implementability of Alternative 3 is more difficult than for Alternative 2 because additional coordination and planning is required to avoid disturbances of ongoing site operations, and to conduct remedial actions within wetland areas. Administrative requirements under Alternative 2 primarily include establishing an ELUR and institution of a monitoring program.

The required equipment and services are readily available onsite to implement Alternatives 2 and 3. The excavation of the relatively small volume of soil and sediment necessary for Alternative 3 is not anticipated to require an extended construction period. If determined to be necessary, additional remedial actions would be easily implemented for this alternative.

4.4.6 Cost

The following cost estimates are based upon a preliminary review of the anticipated requirements for each alternative, as presented in Section 4.3. The cost estimates are based upon approximate design specifications, costs incurred from similar operations, and vendor quotes, where possible. In some cases, assumptions were required for unknown elements (e.g., exact volume of soil that would be removed, disposal cost, etc.). The preliminary cost estimates are anticipated to be between -50 and +30 percent of the actual costs for completing the remedial actions. Therefore, the costs portrayed are to be used as an order of magnitude comparison. More accurate cost estimates can be obtained during the remedial design phase subsequent to the Record of Decision. For the purpose of this FS, cost estimates are compared over a hypothetical 30-year performance assuming a 5 percent interest rate and a 2 percent inflation rate. Detailed cost estimates are presented in Appendix D, and are summarized in Table 4-1.

The total 30-year Present Worth Costs are highest for Alternative 2 ($258,100). Although Alternative 2 presents a substantially lower capital cost than any scenario or option of Alternative 3, the O&M cost associated with Alternative 2 (and therefore the 30-year present worth of O&M costs) is considerably higher due to the greater sampling effort needed as a result of the impacted soil and sediment remaining onsite. Capital costs for Alternative 2 ($12,000) include only administrative efforts for implementation of an ELUR and a monitoring program.

The total 30-year present worth for Alternative 1 is $142,544. Although there is no capital cost, a substantial O&M cost is required for sampling and 5-year reviews required as a result of impacted soil and sediment remaining onsite.

Among the various land use scenarios and disposal options of Alternative 3, the lowest 30-year Present Worth Cost ($63,300) is presented by the asphalt batching option of Alternative 3b (residential land use scenario). Both disposal options of Alternative 3b present substantially lower 30-year Present Worth Costs ($81,200 for landfilling) than either disposal option of the industrial scenario of Alternative 3 ($217,800 for asphalt batching, and $217,700 for landfilling). This cost difference between the land use scenarios is primarily because removal of affected soil

and sediment which exceed residential cleanup goals (Alternative 3b) negates the need for continued monitoring and the associated O&M costs. Alternative 3a (and Alternative 2) include a tiered monitoring program and 5-year reviews by the Navy, EPA, and CTDEP.

The capital costs also vary between the land use scenarios and between the disposal options of Alternative 3. Higher capital costs are accrued in the residential versus the industrial scenarios of Alternative 3, primarily due to the increased soil and sediment volume to be remediated in the residential scenario. In addition, for the residential scenario of Alternative 3, the cost of offsite landfilling is slightly higher than the cost of asphalt batching of the 199 yd^3 of impacted soil and sediment. Due to the lower volume of material requiring treatment and/or disposal for the industrial scenario of Alternative 3, the cost of asphalt batching per ton increases (over the cost per ton for Alternative 3b), resulting in this treatment option being more costly than the landfilling option.

4.5 SUMMARY OF REMEDIAL ALTERNATIVES

Based on the results of the RI, Site 20 is characterized by relatively low concentrations of COCs, limited COC mobility, and low risks. The potential remedial alternatives that were developed for soil and sediment remediation at Site 20 and a summary of their analyses follow:

- Alternative 1: No Action

  Alternative 1 would not protect human health and the environment, and would not meet ARARs.

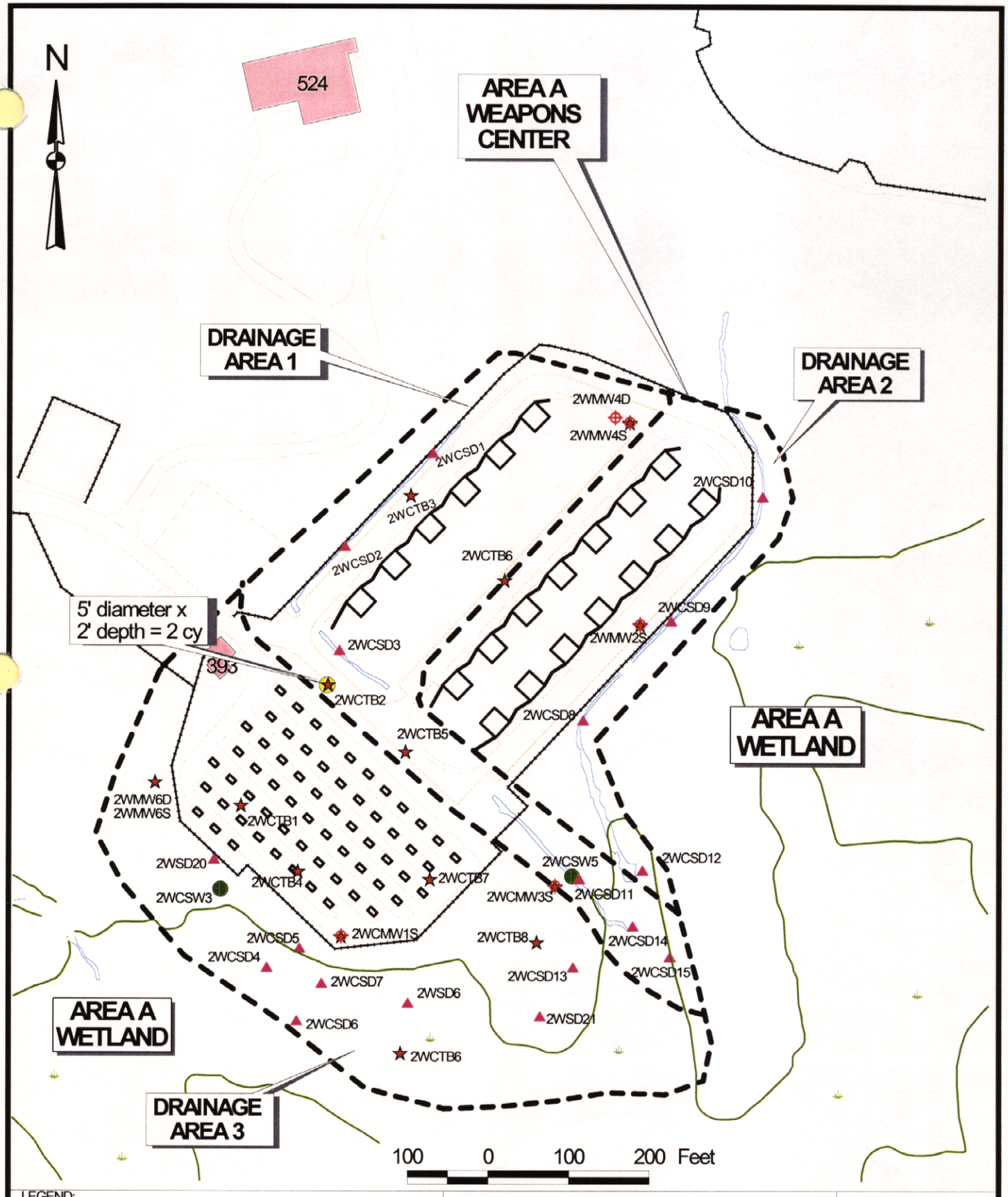
- Alternative 2: Institutional Controls and Monitoring

  Although Alternative 2 would result in COCs remaining in soil and/or sediment at concentrations above Connecticut RSRs and risk-based PRGs, the ELUR and monitoring program would mitigate the associated risks of exposure. The potential for COC migration at Site 20 would still exist under Alternative 2, but would be monitored by the tiered monitoring program. This alternative presents the highest 30-year Present Worth Cost.

- Alternative 3a: Selective Excavation, Asphalt Batching or Offsite Disposal, and Institutional Controls and Monitoring (More Stringent of RSRs or Industrial 10^{-5} Risk-Based PRG Scenario for Soil and Industrial 10^{-5} Risk-Based PRGs for Sediment)

- Alternative 3b: Selective Excavation, and Asphalt Batching or Offsite Disposal (More Stringent of RSRs or Residential 10^{-5} Risk-Based PRG Scenario for Soil and Residential 10^{-5} Risk-Based PRGs for Sediment).

  Alternative 3, for both industrial and residential land use scenarios, achieves compliance with federal and state ARARs at its cleanup goal for soil (the more stringent of RSRs or 10^{-5} risk-based PRGs) and for sediment (10^{-5} risk-based PRGs) through removal of the soil and/or sediment of concern from Site 20, and disposal of the impacted material offsite (and institutional controls and monitoring for the industrial scenarios). Potential COC exposure and migration risks are mitigated under the residential land use scenario of this alternative, while the potential COC exposure risks are mitigated under the industrial land use scenario. Institutional controls and monitoring under the industrial scenario reduce migration potential through monitoring. The asphalt batching option of the residential land use scenario of this alternative (Alternative 3b) presents the lowest 30-year Present Worth Cost of all alternatives presented except Alternative 1.



LEGEND:

- Sediment sample
- Soil sample
- Surface water sample
- Existing monitoring well
- Building
- Wetland
- Bunker
- Fence
- Pavement
- Drainage ditch
- Excavation limit

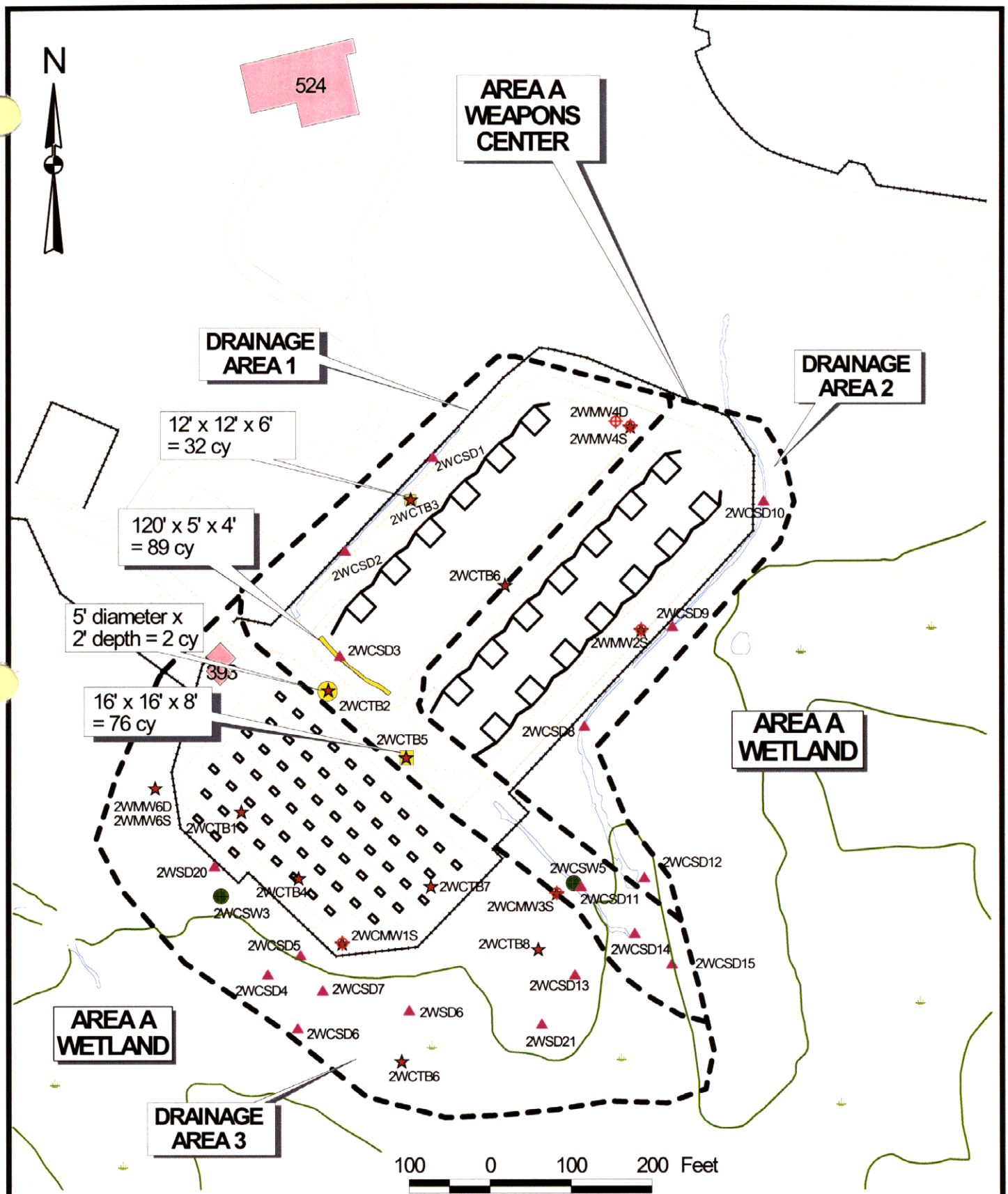
Note: Excavation limits not to scale. cy = cubic yard.

FIGURE 4-1

AREAS OF PROPOSED SELECTIVE EXCAVATION FOR ALTERNATIVE 3a (INDUSTRIAL LAND USE SCENARIO)

SITE 20 - AREA A WEAPONS CENTER
NAVAL SUBMARINE BASE

NEW LONDON, CONNECTICUT



LEGEND:

- Sediment sample
- Soil sample
- Surface water sample
- Existing monitoring well
- Building
- Wetland
- Bunker
- Fence
- Pavement
- Drainage ditch
- Excavation limit

Note: Excavation limits not to scale. cy = cubic yard.

FIGURE 4-2

AREAS OF PROPOSED SELECTIVE EXCAVATION FOR ALTERNATIVE 3b (RESIDENTIAL LAND USE SCENARIO)

SITE 20 - AREA A WEAPONS CENTER
NAVAL SUBMARINE BASE

NEW LONDON, CONNECTICUT

TABLE 4-1 SUMMARY OF COSTS FOR ALTERNATIVES 1 THROUGH 3
SITE 20 - AREA A WEAPONS CENTER, NAVAL SUBMARINE BASE, NEW LONDON, CONNECTICUT

Alternative	Industrial Scenario		Residential Scenario	
	Asphalt Batching	Landfill	Asphalt Batching	Landfill
Alternative 1: No Further Action[a]				
Capital Costs	$0	$0	$0	$0
30-Year Present Worth of O&M	$142,544	$142,544	$142,544	$142,544
30-Year Present Worth Costs	**$142,544**	**$142,544**	**$142,544**	**$142,544**
Alternative 2: Institutional Controls and Monitoring				
Capital Costs	$12,000	$12,000	$12,000	$12,000
30-Year Present Worth of O&M	$246,100	$246,100	$246,100	$246,100
30-Year Present Worth Costs	**$258,100**	**$258,100**	**$258,100**	**$258,100**
Alternative 3: 10^{-5} Risk-Based PRG Scenario for Sediment/More Stringent of RSRs or 10^{-5} Risk-Based PRG Scenario for Soil				
Volume of Soil to be Excavated	2	2 samples	199	28 samples
Hits/Locations	1 soil		3 soil and 1 sediment	
Capital Costs	$32,400	$32,300	$63,300	$81,200
30-Year Present Worth of O&M	$185,400	$185,400	$0	$0
30-Year Present Worth Costs	**$217,800**	**$217,700**	**$63,300**	**$81,200**

(a) Costs associated with Alternative 1 are based sampling and 5-year review costs as hazardous chemicals will remain onsite above regulatory levels.

NOTE: Industrial Scenario includes Excavation, Asphalt Batching or Landfill Disposal, Institutional Controls, and Monitoring. Residential Scenario includes Excavation, and Asphalt Batching or Landfill Disposal.

TABLE 4-2 ASSESSMENT OF CHEMICAL-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS AND TO BE CONSIDERED GUIDANCE FOR ALTERNATIVE 1 – NO ACTION SITE 20 – AREA A WEAPONS CENTER, NAVAL SUBMARINE BASE, NEW LONDON, CONNECTICUT

Requirement	Citation	Status	Synopsis of Requirement	Action to Be Taken to Attain Relevant and Appropriate Requirement
FEDERAL				
Cancer Slope Factors		To Be Considered	These are guidance values used in risk assessment to evaluate the potential carcinogenic or non-carcinogenic hazard caused by exposure to contaminants.	The No Action Alternative would provide no protection from risk posed by contaminants in the soil and sediment.
Reference Dose		To Be Considered	These are guidance values used in risk assessment to evaluate the potential carcinogenic or non-carcinogenic hazard caused by exposure to contaminants.	The No Action Alternative would provide no protection from risk posed by contaminants in the soil and sediment.
STATE OF CONNECTICUT				
Remediation Standard Regulations	CGS 22a-133k; RCSA 22a-133k-1 through 3	Applicable	These regulations establish direct exposure and pollutant mobility criteria for contaminated soils based on either industrial or residential uses of the site. Requirements are based on ground water in the area being classified by the state as a GB.	The No Action Alternative does not satisfy state standards for either site remediation nor for sufficient engineering controls to prevent risk to human health and the environment.

NOTE: CGS = Connecticut General Statutes.
RCSA = Regulations of Connecticut State Agencies.

TABLE 4-3 ASSESSMENT OF LOCATION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS AND TO BE CONSIDERED GUIDANCE FOR ALTERNATIVE 1 – NO ACTION SITE 20 – AREA A WEAPONS CENTER, NAVAL SUBMARINE BASE, NEW LONDON, CONNECTICUT

Requirement	Citation	Status	Synopsis of Requirement	Action to Be Taken to Attain Applicable or Relevant and Appropriate Requirement
FEDERAL				
There are no federal location-specific applicable or relevant and appropriate requirements.				
STATE OF CONNECTICUT				
There are no state location-specific applicable or relevant and appropriate requirements.				

TABLE 4-4 ASSESSMENT OF ACTION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS AND TO BE CONSIDERED GUIDANCE FOR ALTERNATIVE 1 – NO ACTION SITE 20 – AREA A WEAPONS CENTER, NAVAL SUBMARINE BASE, NEW LONDON, CONNECTICUT

Requirement	Citation	Status	Synopsis of Requirement	Action to Be Taken to Attain Applicable or Relevant and Appropriate Requirement
FEDERAL				
There are no federal action-specific applicable or relevant and appropriate requirements.				
STATE OF CONNECTICUT				
There are no state action-specific applicable or relevant and appropriate requirements.				

TABLE 4-5 ASSESSMENT OF CHEMICAL-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS AND TO BE CONSIDERED GUIDANCE FOR ALTERNATIVE 2 – INSTITUTIONAL CONTROLS AND MONITORING SITE 20 – AREA A WEAPONS CENTER, NAVAL SUBMARINE BASE, NEW LONDON, CONNECTICUT

Requirement	Citation	Status	Synopsis of Requirement	Action to Be Taken to Attain Applicable or Relevant and Appropriate Requirement
FEDERAL				
Cancer Slope Factors		To Be Considered	These are guidance values used in risk assessment to evaluate the potential carcinogenic or non-carcinogenic hazard caused by exposure to contaminants.	The alternative would limit exposure to contaminants in the soil and sediment through institutional controls.
Reference Dose		To Be Considered	These are guidance values used in risk assessment to evaluate the potential carcinogenic or non-carcinogenic hazard caused by exposure to contaminants.	The alternative would limit exposure to contaminants in the soil and sediment through institutional controls.
STATE OF CONNECTICUT				
Remediation Standard Regulations	CGS 22a-133k; RCSA 22a-133k-1 through 3	Applicable	These regulations establish direct exposure and pollutant mobility criteria for contaminated soils based on either industrial or residential uses of the site. Requirements are based on ground water in the area being classified by the state as a GB.	Land use controls would limit direct exposure to contaminated soil to acceptable levels under industrial use. The alternative does not meet residential use standards.

NOTE: CGS = Connecticut General Statutes.
RCSA = Regulations of Connecticut State Agencies.

TABLE 4-6 ASSESSMENT OF LOCATION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS AND TO BE CONSIDERED GUIDANCE FOR ALTERNATIVE 2 – INSTITUTIONAL CONTROLS AND MONITORING SITE 20 – AREA A WEAPONS CENTER, NAVAL SUBMARINE BASE, NEW LONDON, CONNECTICUT

Requirement	Citation	Status	Synopsis of Requirement	Action to Be Taken to Attain Applicable or Relevant and Appropriate Requirement
FEDERAL				
Clean Water Act, Section 404	33 USC 1344; 40 CFR Part 230 and 33 CFR Parts 320-323	Applicable	These rules regulate the discharge of dredge and fill materials in wetlands and navigable waters. Such discharges are not allowed if practicable alternatives are available.	Remedial action includes potential monitoring activities within contaminated wetlands and ditches. Measures will be taken to minimize adverse effects and to replace or restore protected wetland functions and values.
Executive Order 11990 RE: Protection of Wetlands	Executive Order 11990, 40 CFR Part 6, Appendix A	Applicable	This Order requires federal agencies to take action to avoid adversely impacting wetlands wherever possible, to minimize wetlands destruction and to preserve the values of wetlands, and to prescribe procedures to implement the policies and procedures of this Executive Order.	Remedial action includes potential monitoring activities within contaminated wetlands and ditches. However, measures to minimize adverse effects and to replace or restore protected wetland functions and values will be considered and incorporated into any plan or action wherever feasible.
Fish and Wildlife Coordination Act	16 USC Part 661 *et. seq.*, 40 CFR 122.49	Applicable	This Order protects fish and wildlife when federal actions result in control or structural modification of a natural stream or body of water.	Appropriate agencies would be consulted prior to implementation to find ways to minimize adverse effects to fish and wildlife from potential monitoring activities within contaminated wetlands and waterways.
STATE OF CONNECTICUT				
Inland Wetlands and Watercourses	CGS 22a-37 through 45, RCSA 22a-39-1 through 15	Applicable	These rules regulate all activities in wetlands and watercourses.	Remedial action includes potential monitoring activities within contaminated wetlands and watercourses. The substantive requirements of the Connecticut standards will be met to address any alteration of wetlands and watercourses.

NOTE: USC = United States Code.
CFR = Code of Federal Regulations.
CGS = Connecticut General Statutes.
RCSA = Regulations of Connecticut State Agencies.

TABLE 4-7 ASSESSMENT OF ACTION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS AND TO BE CONSIDERED GUIDANCE FOR ALTERNATIVE 2 – INSTITUTIONAL CONTROLS AND MONITORING SITE 20 – AREA A WEAPONS CENTER, NAVAL SUBMARINE BASE, NEW LONDON, CONNECTICUT

Requirement	Citation	Status	Synopsis	Evaluation/Action to be Taken to Attain Applicable or Relevant and Appropriate Requirement
FEDERAL				
Clean Water Act, Section 402, National Pollution Discharge Elimination System	33 USC 1342; 40 CFR 122 through 125	Applicable	These standards govern the protection of surface water sources.	Standards will be used to evaluate monitoring results to determine if further remedial action is required to protect resources.
STATE OF CONNECTICUT				
Hazardous Waste Management: Generator and Handler Requirements, Listing, and Identification	RCSA 22a-449(c) 100-101	Applicable	Connecticut is delegated to administer the Federal Resource Conservation and Recovery Act statute through its state regulations. These sections establish standards for listing and identification of hazardous waste. The standards of 40 CFR 260-261 are incorporated by reference.	Hazardous waste determinations will be performed on all contaminated material generated during monitoring activities to determine that levels of regulated constituents do not exceed applicable limits. Any contaminated materials which exceed applicable limits will be managed in accordance with requirements of these regulations, if necessary.
Hazardous Waste Management: Treatment, Storage, or Disposal Facility Standards	RCSA 22a-449 (c) 104	Applicable	This section establishes standards for treatment, storage, and disposal facilities. The standards of 40 CFR 264 are incorporated by reference.	Any hazardous waste which is temporarily stored on this site as part of the remedy will be managed in accordance with the requirements of this section.
Connecticut Guidelines for Soil Erosion and Sediment Control	Connecticut Council on Soil and Water Conservation	To Be Considered	Technical and administrative guidance for development, adoption, and implementation of erosion and sediment control program.	Guidelines will be followed to protect wetland and aquatic resources.
Water Quality Standards	CGS 22a-426	Applicable	Connecticut's Water Quality Standards establish specific numeric criteria, designated uses, and anti-degradation policies for ground water and surface water.	Standards will be used to evaluate monitoring results to determine if further remedial action is required to protect resources.

NOTE: USC = United States Code.
CFR = Code of Federal Regulations.
RCSA = Regulations of Connecticut State Agencies.
CGS = Connecticut General Statutes.

TABLE 4-8 ASSESSMENT OF CHEMICAL-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS AND TO BE CONSIDERED GUIDANCE FOR ALTERNATIVE 3a – SELECTIVE EXCAVATION, ASPHALT BATCHING OR OFFSITE DISPOSAL, AND INSTITUTIONAL CONTROLS AND MONITORING (INDUSTRIAL SCENARIO) SITE 20 – AREA A WEAPONS CENTER, NAVAL SUBMARINE BASE, NEW LONDON, CONNECTICUT

Requirement	Citation	Status	Synopsis of Requirement	Action to Be Taken to Attain Applicable or Relevant and Appropriate Requirement
FEDERAL				
Cancer Slope Factors		To Be Considered	These are guidance values used in risk assessment to evaluate the potential carcinogenic or non-carcinogenic hazard caused by exposure to contaminants.	The alternative would eliminate exposure to contaminants in the sediment and soil to industrial standards through excavation and offsite disposal. Institutional controls would prevent residential exposure.
Reference Dose		To Be Considered	These are guidance values used in risk assessment to evaluate the potential carcinogenic or non-carcinogenic hazard caused by exposure to contaminants.	The alternative would eliminate exposure to contaminants in the sediment and soil to industrial standards through excavation and offsite disposal. Institutional controls would prevent residential exposure.
STATE OF CONNECTICUT				
Remediation Standard Regulations	CGS 22a-133k; RCSA 22a-133k-1 through 3	Applicable	These regulations establish direct exposure and pollutant mobility criteria for contaminated soils based on either industrial or residential uses of the site. Requirements are based on ground water in the area being classified by the state as a GB.	The alternative would eliminate exposure to contaminants in the soil to industrial standards through excavation and offsite disposal. The alternative meets residential use standards through institutional controls. This alternative would eliminate exposure to soils with contaminants at concentrations that exceed the GB pollutant mobility criteria.

NOTE: CGS = Connecticut General Statutes.
RCSA = Regulations of Connecticut State Agencies.

TABLE 4-9 ASSESSMENT OF LOCATION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS AND TO BE CONSIDERED GUIDANCE FOR ALTERNATIVE 3a – SELECTIVE EXCAVATION, ASPHALT BATCHING OR OFFSITE DISPOSAL, AND INSTITUTIONAL CONTROLS AND MONITORING (INDUSTRIAL SCENARIO) SITE 20 – AREA A WEAPONS CENTER, NAVAL SUBMARINE BASE, NEW LONDON, CONNECTICUT

Requirement	Citation	Status	Synopsis of Requirement	Action to Be Taken to Attain Applicable or Relevant and Appropriate Requirement
FEDERAL				
Clean Water Act, Section 404	33 USC 1344; 40 CFR Part 230 and 33 CFR Parts 320-323	Applicable	These rules regulate the discharge of dredge and fill materials in wetlands and navigable waters. Such discharges are not allowed if practicable alternatives are available.	Remedial action includes excavation of soil and sediment from the contaminated wetlands and ditches and replacement/restoration with uncontaminated material. Measures will be taken to minimize adverse effects and to replace or restore protected wetland functions and values.
Executive Order 11990 RE: Protection of Wetlands	Executive Order 11990, 40 CFR Part 6, Appendix A	Applicable	This Order requires federal agencies to take action to avoid adversely impacting wetlands wherever possible, to minimize wetlands destruction and preserve the values of wetlands, and to prescribe procedures to implement the policies and procedures of this Executive Order.	Remedial action includes excavation of soil and sediment from the contaminated wetlands and ditches and replacement/restoration with uncontaminated material. However, measures to minimize adverse effects and to replace or restore protected wetland functions and values will be considered and incorporated into any plan or action wherever feasible.
Fish and Wildlife Coordination Act	16 USC Part 661 *et. seq.*, 40 CFR 122.49	Applicable	This Order protects fish and wildlife when federal actions result in control or structural modification of a natural stream or body of water.	Appropriate agencies would be consulted prior to implementation to find ways to minimize adverse effects to fish and wildlife from excavating and restoring the contaminated wetlands and waterways.
STATE OF CONNECTICUT				
Inland Wetlands and Watercourses	CGS 22a-37 through 45, RCSA 22a-39-1 through 15	Applicable	These rules regulate activities in wetlands and watercourses.	This alternative proposes to excavate soil and sediment from the contaminated wetlands and watercourses and to restore the areas using uncontaminated material. The substantive requirements of the Connecticut standards will be met to address the alteration of wetlands and watercourses.

NOTE: USC = United States Code.
CFR = Code of Federal Regulations.
CGS = Connecticut General Statutes.
RCSA = Regulations of Connecticut State Agencies.

TABLE 4-10 ASSESSMENT OF ACTION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS AND TO BE CONSIDERED GUIDANCE FOR ALTERNATIVE 3a – SELECTIVE EXCAVATION, ASPHALT BATCHING OR OFFSITE DISPOSAL, AND INSTITUTIONAL CONTROLS AND MONITORING (INDUSTRIAL SCENARIO) SITE 20 – AREA A WEAPONS CENTER, NAVAL SUBMARINE BASE, NEW LONDON, CONNECTICUT

Requirement	Citation	Status	Synopsis	Evaluation/Action to be Taken to Attain Applicable or Relevant and Appropriate Requirement
FEDERAL				
Clean Water Act, Section 402 National Pollution Discharge Elimination System	33 USC 1342; 40 CFR 122 through 125	Applicable	These standards govern the discharge of water into surface waters.	Ground water and surface water removed from excavations, along with water from the sediment/soil dewatering process, will be treated, if necessary, to meet discharge criteria according to substantive requirements of National Pollution Discharge Elimination System if the discharge occurs onsite. Standards will also be used to evaluate monitoring results to determine if further remedial action is required to protect resources.
STATE OF CONNECTICUT				
Water Pollution Control	RCSA 22a-430-1 through 8	Applicable	These rules regulate water discharge to surface water.	Surface water and ground water removed from excavations, along with water from the sediment/soil dewatering process, will be treated, if necessary, in compliance with these regulations if the discharge occurs onsite.
Water Quality Standards	CGS 22a-426	Applicable	Connecticut's Water Quality Standards establish specific numeric criteria, designated uses, and anti-degradation policies for ground water and surface water.	Surface water and ground water removed from excavations, along with water from the sediment/soil dewatering process, will be treated, if necessary, in a manner which is consistent with the anti-degradation policy in the Water Quality Standards if the discharge occurs onsite. Standards will also be used to evaluate monitoring results to determine if further remedial action is required to protect resources.

NOTE: USC = United States Code.
CFR = Code of Federal Regulations.
RCSA = Regulations of Connecticut State Agencies.
CGS = Connecticut General Statutes.

Requirement	Citation	Status	Synopsis	Evaluation/Action to be Taken to Attain Applicable or Relevant and Appropriate Requirement
Hazardous Waste Management: Generator and Handler Requirements, Listing and Identification	RCSA 22a-449(c)-100-101	Applicable	Connecticut is delegated to administer the Federal Resource Conservation and Recovery Act statute through its state regulations. These sections establish standards for listing and identification of hazardous waste. The standards of 40 CFR 260-261 are incorporated by reference.	Hazardous waste determinations will be performed on contaminated soils/sediments excavated to determine that levels of regulated constituents do not exceed applicable limits. Any contaminated soils/sediments which exceed applicable limits will be managed in accordance with requirements of these regulations, if necessary. Also, wastes produced from surface water, ground water, and dewatering treatment will be tested to determine whether levels of certain regulated constituents exceed Toxicity Characteristic Leaching Procedure limits.
Hazardous Waste Management: Generator Standards	RCSA 22a-449(c)-102	Applicable	This section establishes standards for various classes of generators. The standards of 40 CFR 262 are incorporated by reference.	Surface water, ground water, and dewatering treatment residues (spent filtration media and activated carbon) could contain high concentrations of regulated constituents. Although the residues are not expected to fail hazardous characteristics, substantive requirements of these regulations will be met.
Hazardous Waste Management: Treatment, Storage, or Disposal Facility Standards	RCSA 22a-449(c)-104	Applicable	This section establishes standards for treatment, storage, and disposal facilities. The standards of 40 CFR 264 are incorporated by reference.	Any hazardous waste which is treated or temporarily stored onsite as part of the remedy will be managed in accordance with the requirements of this section.
Air Pollution Control	RCSA 22a-174-18b	Applicable	These regulations require permits to construct and operate specified types of emission sources and contain emission standards that must be met prior to issuance of a permit. Pollutant abatement controls may be required. Specific standards pertain to fugitive dust (18b).	Emission standards for fugitive dust from excavation and restoration operations will be met with dust control measures. Emissions will be managed to comply with these standards.
Connecticut Guidelines for Soil Erosion and Sediment Control	Connecticut Council on Soil and Water Conservation	To Be Considered	Technical and administrative guidance for development, adoption, and implementation of erosion and sediment control program.	Guidelines will be followed to protect wetland and aquatic resources.

TABLE 4-11 ASSESSMENT OF CHEMICAL-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS AND TO BE CONSIDERED GUIDANCE FOR ALTERNATIVE 3b – SELECTIVE EXCAVATION AND ASPHALT BATCHING OR OFFSITE DISPOSAL (RESIDENTIAL SCENARIO) SITE 20 – AREA A WEAPONS CENTER, NAVAL SUBMARINE BASE, NEW LONDON, CONNECTICUT

Requirement	Citation	Status	Synopsis of Requirement	Action to Be Taken to Attain Applicable or Relevant and Appropriate Requirement
FEDERAL				
Cancer Slope Factors		To Be Considered	These are guidance values used in risk assessment to evaluate the potential carcinogenic or non-carcinogenic hazard caused by exposure to contaminants.	The alternative would eliminate exposure to contaminants in the sediment and soil through excavation and offsite disposal.
Reference Dose		To Be Considered	These are guidance values used in risk assessment to evaluate the potential carcinogenic or non-carcinogenic hazard caused by exposure to contaminants.	The alternative would eliminate exposure to contaminants in the sediment and soil through excavation and offsite disposal.
STATE				
Remediation Standard Regulations	CGS 22a-133k; RCSA 22a-133k–1 through 3	Applicable	These regulations establish direct exposure and pollutant mobility criteria for contaminated soils based on either industrial or residential used of the site. Requirements are based on ground water in the area being classified by the state as a GB.	The alternative would eliminate exposure to contaminants in the soil through excavation and offsite disposal. The alternative meets residential use standards. This alternative would eliminate exposure to soils with contaminants at concentrations that exceed the GB pollutant mobility criteria.

NOTE: CGS = Connecticut General Statutes.
RCSA = Regulations of Connecticut State Agencies.

TABLE 4-12 ASSESSMENT OF LOCATION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS AND TO BE CONSIDERED GUIDANCE FOR ALTERNATIVE 3b – SELECTIVE EXCAVATION AND ASPHALT BATCHING OR OFFSITE DISPOSAL (RESIDENTIAL SCENARIO) SITE 20 – AREA A WEAPONS CENTER, NAVAL SUBMARINE BASE, NEW LONDON, CONNECTICUT

Requirement	Citation	Status	Synopsis of Requirement	Action to Be Taken to Attain Applicable or Relevant and Appropriate Requirement
FEDERAL				
Clean Water Act, Section 404	33 USC 1344; 40 CFR Part 230 and 33 CFR Parts 320-323	Applicable	These rules regulate the discharge of dredge and fill materials in wetlands and navigable waters. Such discharges are not allowed if practicable alternatives are available.	Remedial action includes excavation of soil and sediment from the contaminated wetlands and ditches and replacement/restoration with uncontaminated material. Measures will be taken to minimize adverse effects and to replace or restore protected wetland functions and values.
Executive Order 11990 RE: Protection of Wetlands	Executive Order 11990, 40 CFR Part 6, Appendix A	Applicable	This Order requires federal agencies to take action to avoid adversely impacting wetlands wherever possible, to minimize wetlands destruction and to preserve the values of wetlands, and to prescribe procedures to implement the policies and procedures of this Executive Order.	Remedial action includes excavation of soil and sediment from the contaminated wetlands and ditches and replacement/ restoration with uncontaminated material. However, measures to minimize adverse effects and to replace or restore protected wetland functions and values will be considered and incorporated into any plan or action wherever feasible.
Fish and Wildlife Coordination Act	16 USC Part 661 *et. seq.*, 40 CFR 122.49	Applicable	This Order protects fish and wildlife when federal actions result in control or structural modification of a natural stream or body of water.	Appropriate agencies would be consulted prior to implementation to find ways to minimize adverse effects to fish and wildlife from excavating and restoring the contaminated wetlands and waterways.
STATE OF CONNECTICUT				
Inland Wetlands and Watercourses	CGS 22a-37 through 45, RCSA 22a-39-1 through 15	Applicable	These rules regulate all activities in wetlands and watercourses.	This alternative proposes to excavate soil and sediment from the contaminated wetlands and watercourses and to restore the areas using uncontaminated material. The substantive requirements of the Connecticut standards will be met to address the alteration of wetlands and watercourses.

NOTE: USC = United States Code.
CFR = Code of Federal Regulations.
CGS = Connecticut General Statutes.
RCSA = Regulations of Connecticut State Agencies.

TABLE 4-13 ASSESSMENT OF ACTION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS AND TO BE CONSIDERED GUIDANCE FOR ALTERNATIVE 3b – SELECTIVE EXCAVATION AND ASPHALT BATCHING OR OFFSITE DISPOSAL (RESIDENTIAL SCENARIO) SITE 20 – AREA A WEAPONS CENTER, NAVAL SUBMARINE BASE, NEW LONDON, CONNECTICUT

Requirement	Citation	Status	Synopsis	Evaluation/Action to be Taken to Attain Applicable or Relevant and Appropriate Requirement
FEDERAL				
Clean Water Act, Section 402, National Pollution Discharge Elimination System	33 USC 1342; 40 CFR 122 through 125	Applicable	These standards govern the discharge of water into surface waters.	Ground water and surface water removed from excavations, along with water from the sediment/soil dewatering process, will be treated, if necessary, to meet discharge criteria according to substantive requirements of National Pollution Discharge Elimination System if the discharge occurs onsite.
STATE OF CONNECTICUT				
Water Pollution Control	RCSA 22a-430-1 through 8	Applicable	These rules regulate water discharge to surface water.	Surface water and ground water removed from excavations, along with water from the sediment/soil dewatering process, will be treated, if necessary, in compliance with these regulations if the discharge occurs onsite.
Water Quality Standards	CGS 22a-426	Applicable	Connecticut's Water Quality Standards establish specific numeric criteria, designated uses, and anti-degradation policies for ground water and surface water.	Surface water and ground water removed from excavations, along with water from the sediment/soil dewatering process, will be treated, if necessary, in a manner which is consistent with the anti-degradation policy in the Water Quality Standards if the discharge occurs onsite.
Hazardous Waste Management: Generator and Handler Requirements, Listing, and Identification	RCSA 22a-449(c) 100-101	Applicable	Connecticut is delegated to administer the Federal Resource Conservation and Recovery Act statute through its state regulations. These sections establish standards for listing and identification of hazardous waste. The standards of 40 CFR 260-261 are incorporated by reference.	Hazardous waste determinations will be performed on all contaminated soils/sediments excavated to determine that levels of regulated constituents do not exceed applicable limits. Any contaminated soils/sediments which exceed applicable limits will be managed in accordance with requirements of these regulations, if necessary. Also, wastes produced from surface water, ground water, and dewatering treatment will be tested to determine whether levels of certain regulated constituents exceed Toxicity Leaching Characteristic Procedure limits.

NOTE: USC = United States Code.
CFR = Code of Federal Regulations.
RCSA = Regulations of Connecticut State Agencies.
CGS = Connecticut General Statutes.

Requirement	Citation	Status	Synopsis	Evaluation/Action to be Taken to Attain Applicable or Relevant and Appropriate Requirement
Hazardous Waste Management: Generator Standards	RCSA 22a-449(c)-102	Applicable	This section establishes standards for various classes of generators. The standards of 40 CFR 262 are incorporated by reference.	Surface water, ground water, and dewatering treatment residues (spent filtration media and activated carbon) could contain high concentrations of regulated constituents. Although the residues are not expected to fail hazardous characteristics, substantive requirements of these regulations will be met.
Hazardous Waste Management: Treatment, Storage, and Disposal Facility Standards	RCSA 22a-449(c)-104	Applicable	This section establishes standards for treatment, storage, and disposal facilities. The standards of 40 CFR 264 are incorporated by reference.	Any hazardous waste which is treated or temporarily stored onsite as part of the remedy will be managed in accordance with the requirements of this section.
Air Pollution Control	RCSA 22a-174-18b	Applicable	These regulations require permits to construct and to operate specified types of emission sources and contain emission standards that must be met prior to issuance of a permit. Pollutant abatement controls may be required. Specific standards pertain to fugitive dust (18b).	Emission standards for fugitive dust from excavation and restoration operations will be met with dust control measures. Emissions will be managed to comply with these standards.
Connecticut Guidelines for Soil Erosion and Sediment Control	Connecticut Council on Soil and Water Conservation	To Be Considered	Technical and administrative guidance for development, adoption, and implementation of erosion and sediment control program.	Guidelines will be followed to protect wetland and aquatic resources.

TABLE 4-14 SUMMARY OF COMPARATIVE ANALYSIS OF REMEDIAL ALTERNATIVES FOR SITE 20 – AREA A WEAPONS CENTER, NAVAL SUBMARINE BASE, NEW LONDON, CONNECTICUT

Criteria	Alternative 1 No Action	Alternative 2 Institutional Controls and Monitoring	Alternative 3a Selective Excavation, Asphalt Batching or Offsite Disposal, and Institutional Controls and Monitoring (Industrial Scenario)	Alternative 3b Selective Excavation and Asphalt Batching or Offsite Disposal (Residential Scenario)
OVERALL PROTECTIVENESS – HUMAN HEALTH				
Exposure to COCs in soil and sediment	Would not address.	Risks addressed through ELUR to prevent exposure to COCs in soil and sediment.	No soil with COCs above the more stringent of industrial RSRs or 10^{-5} risk-based PRGs would remain onsite. No sediment above 10^{-5} risk-based PRGs would remain onsite. ELUR would prevent future residential site use and monitoring would ensure no unnoted increase in potential hazards.	Removal of soil/sediment with COCs above alternative's residential cleanup goals minimizes/eliminates potential exposure and migration of COCs at Site 20, to allow for residential site use.
OVERALL PROTECTIVENESS – ENVIRONMENT				
Potential offsite receptors	Would not address; however, no significant risks to offsite ecological receptors at Site 20 are present.	Would not address; however, no significant risks to offsite ecological receptors at Site 20 are present.	No significant risks to offsite ecological receptors are present or anticipated at Site 20 during implementation of alternative. Removal of soil/sediment quantities with COC concentrations above this alternative's residential cleanup goals would reduce/eliminate potential for COC migration. Proper safety controls would reduce/eliminate potential impact to offsite receptors.	No significant risks to offsite ecological receptors are present or anticipated at Site 20 during implementation of alternative. Removal of soil/sediment quantities with COC concentrations above this alternative's residential cleanup goals would reduce/eliminate potential for COC migration. Proper safety controls would reduce/eliminate potential impact to offsite receptors.
Potential onsite receptors	Would not address; however, no significant risks to onsite ecological receptors at Site 20 are present.	Would not address; however, no significant risks to onsite ecological receptors at Site 20 are present.	No significant risks to onsite ecological receptors are present or anticipated at Site 20 during implementation of alternative. Removal of impacted soil and/or sediment quantities would reduce/eliminate potential for COC migration. Proper safety controls would reduce/eliminate potential for COC migration and potential impact to onsite receptors. ELUR would address COCs in soil/sediment above residential cleanup goals.	No significant risks to onsite ecological receptors are present or anticipated at Site 20 during implementation of alternative. Removal of impacted soil and/or sediment quantities would reduce/eliminate potential for COC migration. Proper safety controls would reduce/eliminate potential for COC migration and potential impact to onsite receptors.

NOTE: COC = Constituents of concern.
ELUR = Environmental land use restriction.
PRG = Preliminary Remediation Goals.

Criteria	Alternative 1 No Action	Alternative 2 Institutional Controls and Monitoring	Alternative 3a Selective Excavation, Asphalt Batching or Offsite Disposal, and Institutional Controls and Monitoring (Industrial Scenario)	Alternative 3b Selective Excavation and Asphalt Batching or Offsite Disposal (Residential Scenario)
COMPLIANCE WITH APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS				
Chemical-specific	Would not achieve because no action specified.	Would not achieve; however, associated risks would be adequately addressed through ELUR.	Would achieve compliance with ICDEC, PMC, and 10^{-5} risk-based PRGs for soil, and with 10^{-5} risk-based PRGs for sediment. ELUR would address COCs in soil/sediment above industrial risk-based PRGs.	Would achieve compliance with RDEC, PMC, and 10^{-5} risk-based PRGs for soil, and with 10^{-5} risk-based PRGs for sediment.
Location-specific	Not applicable because no action specified.	Would be conducted in accordance with requirements.	Would be conducted in accordance with requirements.	Would be conducted in accordance with requirements.
Action-specific	Not applicable because no action specified.	Would be conducted in accordance with requirements.	Would be conducted in accordance with requirements.	Would be conducted in accordance with requirements.
LONG-TERM EFFECTIVENESS AND PERMANENCE				
Magnitude of residual risk	Current risks would remain.	Risks would be adequately addressed through ELUR.	Excavation of COC-containing soil/sediment to industrial cleanup goals minimizes/eliminates residual risk at Site 20. Risks remaining due to COC concentrations above residential cleanup goals would be adequately addressed through ELUR.	Excavation of COC-containing soil/sediment to residential cleanup goals minimizes/eliminates residual risk at Site 20.
Adequacy and reliability of controls	Not applicable because no controls are specified.	Passive strategy. ELUR would be reliable and suitable to control access and activity at the site. Site planned to remain for industrial use for Naval Submarine Base, New London, Connecticut.	Active strategy. Selective excavation and treatment/disposal would be a reliable method to mitigate COCs above this alternative's industrial cleanup goals. ELUR would be reliable and suitable to control access and activity at the site. Site planned to remain for industrial use for Naval Submarine Base, New London, Connecticut.	Active strategy. Selective excavation and treatment/disposal would be a reliable method to mitigate COCs above this alternative's residential cleanup goals.

NOTE: ICDEC = Industrial/Commercial Direct Exposure Criteria.
PMC = Pollutant Mobility Criteria.
RDEC = Residential Direct Exposure Criteria.
RSR = Remediation Standard Regulations.

Criteria	Alternative 1 No Action	Alternative 2 Institutional Controls and Monitoring	Alternative 3a Selective Excavation, Asphalt Batching or Offsite Disposal, and Institutional Controls and Monitoring (Industrial Scenario)	Alternative 3b Selective Excavation and Asphalt Batching or Offsite Disposal (Residential Scenario)
REDUCTION OF TOXICITY, MOBILITY, AND VOLUME THROUGH TREATMENT				
Treatment processes used and materials treated	No treatment included.	No treatment included.	Selected soil/sediment would be excavated and disposed of at an offsite, licensed facility or treated by asphalt batching. The final disposal option will be selected based on the actual volume of material excavated and the results of the waste characterization samples.	Selected soil/sediment would be excavated and disposed of at an offsite, licensed facility or treated by asphalt batching. The final disposal option will be selected based on the actual volume of material excavated and the results of the waste characterization samples.
Hazardous material destroyed or treated	No treatment included. Natural attenuation of COCs in soil and sediment would occur, but would not be verified.	No treatment included. Tiered monitoring would verify that COC concentrations are stable or decreasing.	Soil/sediment with COCs above industrial cleanup goals would be either treated offsite by immobilization (asphalt batching) or disposed in offsite permitted landfill (no destruction or treatment of material).	Soil/sediment with COCs above residential cleanup goals would be either treated offsite by immobilization (asphalt batching) or disposed in offsite permitted landfill (no destruction or treatment of material).
Type and quantity of residuals remaining after treatment	No treatment included. Natural attenuation of COCs in soil and sediment would occur, but would not be verified.	No treatment included. Tiered monitoring would verify that COC concentrations are stable or decreasing.	No residual soil/sediment with COCs above industrial cleanup goals would remain at Site 20. Excavated material would be disposed/treated offsite. Tiered monitoring would verify that COC concentrations are stable or decreasing.	No residual soil/sediment with COCs above residential cleanup goals would remain at Site 20. Excavated material would be disposed/treated offsite.
Degree to which treatment is irreversible	No treatment included.	No treatment included.	Excavation and offsite treatment/ disposal of impacted soil/sediment would be irreversible.	Excavation and offsite treatment/ disposal of impacted soil/sediment would be irreversible.
Statutory preference for treatment	Does not satisfy.	Does not satisfy.	Satisfies, if excavation and asphalt batching is selected.	Satisfies, if excavation and asphalt batching is selected.
SHORT-TERM EFFECTIVENESS				
Protection of site workers	No new risks to site workers.	No new risks to site workers.	Safety controls would address potential risks to site workers during excavation activities and sampling events.	Safety controls would address potential risks to site workers during excavation activities and sampling events.
Protection of community	No new risks to the community.	No new risks to the community.	Engineered safety controls would prevent risks to the community during excavation activities.	Engineered safety controls would prevent risks to the community during excavation activities.

Criteria	Alternative 1 No Action	Alternative 2 Institutional Controls and Monitoring	Alternative 3a Selective Excavation, Asphalt Batching or Offsite Disposal, and Institutional Controls and Monitoring (Industrial Scenario)	Alternative 3b Selective Excavation and Asphalt Batching or Offsite Disposal (Residential Scenario)
Time to achieve remedial goals	Remedial goals would not be achieved.	Although COCs would remain onsite above RSRs and risk-based PRGs, the ELUR would immediately address the associated risks.	Due to the small soil volume specified, selective excavation would be completed within a short time. Institutional controls (including ELUR) would immediately address the risks.	Due to the small soil volume specified, selective excavation would be completed within a short time.
IMPLEMENTABILITY				
Ability to construct and operate	No action specified.	Readily implemented	Moderately impacted by Naval Base activities and schedules.	Moderately impacted by Naval Base activities and schedules.
Ease of conducting other actions, if needed	Other actions readily implementable.	Other actions readily implementable.	Other actions readily implementable.	Other actions readily implementable.
Ability to monitor effectiveness	No monitoring included.	Effectiveness readily verified through monitoring and 5-year reviews.	Confirmatory sampling to verify effectiveness of excavation at removing soil/sediment of concern. Effectiveness readily verified through monitoring and 5-year reviews.	Confirmatory sampling to verify effectiveness of excavation at removing soil/sediment of concern.
Ability to obtain approvals and coordinate with other agencies	Unlikely to receive approval because COCs exceeding Connecticut RSRs and risk-based PRGs and would not be addressed.	Ability to receive regulatory support is uncertain. Although the ELUR and the tiered monitoring program would address site risks, the potential migration of COCs from exposed sediment to the adjacent wetlands would not be addressed.	Likely to receive regulatory approval because impacted soil/sediment would be removed and risks associated with COC concentrations would be mitigated. Would require coordination with regulatory agencies to address potential impacts on wetland during excavation activities. ELUR and the tiered monitoring program would address site risks.	Likely to receive regulatory approval because impacted soil/sediment would be removed and risks associated with COC concentrations would be mitigated. Would require coordination with regulatory agencies to address potential impacts on wetland during excavation activities.
Availability of materials and services	Not applicable because no actions included.	Readily available.	Readily available.	Readily available.
COST				
Capital Cost	$0	$12,000	$32,400 (asphalt batching) $32,300 (landfill)	$63,300 (asphalt batching) $81,200 (landfill)
30-Year Present Worth Operation and Maintenance Cost	$0	$246,100	$185,400 (asphalt batching) $185,400 (landfill)	$0 (asphalt batching) $0 (landfill)
Total 30-Year Net Present Worth Cost[a]	$0	$258,100	$217,800 (asphalt batching) $217,700 (landfill)	$63,300 (asphalt batching) $81,200 (landfill)

(a) Calculated at a 2 percent inflation rate and 5 percent discount rate.

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Appendix A

Connecticut Preliminary Remediation Goal Screening for Soil

TABLE A-1 CONNECTICUT REMEDIATION STANDARD REGULATIONS FOR SOIL AT SITE 20 - AREA A WEAPONS CENTER NAVAL SUBMARINE BASE, NEW LONDON, CONNECTICUT[a]

Parameter	GB Pollutant Mobility Criteria	Industrial/Commercial Direct Exposure Criteria	Residential Direct Exposure Criteria
VOLATILE ORGANIC COMPOUNDS (mg/kg)			
2-Butanone	80	1,000	500
Acetone	140	1,000	500
1,1,1-Trichloroethane	40	1,000	500
Methylene chloride	1	760	82
Tetrachloroethene	1	110	12
Toluene	67	1,000	500
Trichloroethene	1	520	56
SEMIVOLATILE ORGANIC COMPOUNDS (mg/kg)			
2-Methylnaphthalene	98	2,500	474
Acenaphthene	84	2,500	1,000
Acenaphthylene	84	2,500	1,000
Anthracene	400	2,500	1,000
Benzo(a)anthracene	1	7.8	1
Benzo(a)pyrene	1	1	1
Benzo(b)fluoranthene	1	7.8	1
Benzo(g,h,i)perylene	42	2,500	1,000
Benzo(k)fluoranthene	1	78	8.4
Benzoic acid	1,000	2,500	1,000
Bis(2-ethylhexyl)phthalate	11	410	44
Butylbenzyl phthalate	200	2,500	1,000
Carbazole	1	290	31
Chrysene	1	780	84
Di-n-butyl phthalate	140	2,500	1,000
Di-n-octyl phthalate	20	2,500	1,000
Dibenzo(a,h)anthracene	1	1	1
Dibenzofuran	5.6	2,500	270
Diethyl phthalate	1,100	2,500	1,000
Fluoranthene	40	2,500	1,000
Fluorene	56	2,500	1,000
Indeno(1,2,3-cd)pyrene	1	7.8	1
Naphthalene	56	2,500	1,000
Phenanthrene	40	2,500	1,000
Phenol	800	2,500	1,000
Pyrene	40	2,500	1,000
POLYCHLORINATED BIPHENYLS (mg/kg)			
4,4'-DDD	(b)	24	2.6
4,4'-DDE	(b)	17	1.6
4,4'-DDT	(b)	17	1.6
Alpha-chlordane	0.066	2.2	0.49
Endosulfan sulfate	8.4	1,200	410
Endrin	---	610	20
Endrin aldehyde	---	610	20
Gamma-chlordane	0.066	2.2	0.49
Heptachlor	0.013	1.3	0.14
Methoxychlor	8	10,000	340

(a) Criteria obtained from the State of Connecticut Department of Environmental Protection Remediation Standard Regulations (1996).
(b) In review.

TABLE A-1 CONNECTICUT REMEDIATION STANDARD REGULATIONS FOR SOIL
AT SITE 20 - AREA A WEAPONS CENTER
NAVAL SUBMARINE BASE, NEW LONDON, CONNECTICUT[a]

	GB Pollutant Mobility Criteria (TCLP/SPLP) (mg/L)	Industrial/Commercial Direct Exposure Criteria (mg/kg)	Residential Direct Exposure Criteria (mg/kg)
PESTICIDES/INORGANICS			
Aroclor-1260	0.005	10	1
Aluminum	---	---	---
Antimony	0.06	8,200	27
Arsenic	0.5	10	10
Barium	10	140,000	4,700
Beryllium	0.04	2	2
Boron	---	---	---
Cadmium	0.05	1,000	34
Calcium	---	---	---
Chromium, hexavalent	0.5	100	100
Cobalt	22	2,500	1,000
Copper	13	76,000	2,500
Iron	---	---	---
Lead	0.15	1,000	500
Magnesium	---	---	---
Manganese	500	47,000	1,600
Mercury	0.02	610	20
Nickel	1	7,500	1,400
Potassium	---	---	---
Selenium	0.5	10,000	340
Silver	0.36	10,000	340
Sodium	---	---	---
Thallium	0.05	160	5.4
Vanadium	0.5	14,000	470
Zinc	50	610,000	20,000

NOTE: Dashes (---) indicate that no criteria were calculated.
TCLP = Toxicity Characteristic Leaching Procedure.
SPLP = Synthetic Precipitation Leachate Procedure.

TABLE A-2 COMPARISON OF SOIL ANALYTICAL RESULTS TO CONNECTICUT DEPARTMENT OF ENVIRONMENTAL PROTECTION DIRECT EXPOSURE CRITERIA
SITE 20 - AREA A WEAPONS CENTER, NEW LONDON, CONNECTICUT

Parameter	Fraction	Samples	Positive	Minimum	Maximum	Mean	UCL	ICDEC	RDEC	UNITS	Max Exceed 2*ICDEC	Max Exceed 2*RDEC	UCL Exceed ICDEC	UCL Exceed RDEC	COC Retained
ALUMINUM	M	13	13	4,810.00	18,700.00	12,343.85	15,276.29	--	--	MG/KG	N	N	N	N	NO
ANTIMONY	M	11	4	4.70	15.00	8.21	10.59	8,200.00	27.00	MG/KG	N	N	N	N	NO
ARSENIC	M	13	10	0.77	10.80	4.92	7.23	10.00	10.00	MG/KG	N	N	N	N	NO
BARIUM	M	13	13	27.40	131.00	56.12	72.60	140,000.00	4,700.00	MG/KG	N	N	N	N	NO
BERYLLIUM	M	13	12	0.11	1.10	0.53	0.69	2.00	2.00	MG/KG	N	N	N	N	NO
BORON	M	12	4	5.20	51.80	15.10	24.28	--	--	MG/KG	N	N	N	N	NO
CADMIUM	M	13	2	0.21	1.20	0.38	0.54	1,000.00	34.00	MG/KG	N	N	N	N	NO
CALCIUM	M	13	13	758.00	5,050.00	1,996.23	2,674.71	--	--	MG/KG	N	N	N	N	NO
CHROMIUM	M	13	13	5.90	78.70	28.77	43.13	100.00	100.00	MG/KG	N	N	N	N	NO
COBALT	M	13	13	3.70	10.00	6.06	7.24	2,500.00	1,000.00	MG/KG	N	N	N	N	NO
COPPER	M	13	13	6.70	41.40	18.69	25.68	76,000.00	2,500.00	MG/KG	N	N	N	N	NO
IRON	M	13	13	6,540.00	51,600.00	20,201.54	27,610.22	--	--	MG/KG	N	N	N	N	NO
LEAD	M	13	13	2.40	66.10	20.39	33.05	1,000.00	500.00	MG/KG	N	N	N	N	NO
MAGNESIUM	M	13	13	1,660.00	8,450.00	4,556.92	5,883.15	--	--	MG/KG	N	N	N	N	NO
MANGANESE	M	13	13	121.00	423.00	246.77	307.03	47,000.00	1,600.00	MG/KG	N	N	N	N	NO
MERCURY	M	13	2	0.05	0.29	0.10	0.14	610.00	20.00	MG/KG	N	N	N	N	NO
NICKEL	M	13	13	4.40	22.70	13.56	17.69	7,500.00	1,400.00	MG/KG	N	N	N	N	NO
POTASSIUM	M	13	13	849.00	6,300.00	2,852.23	3,890.14	--	--	MG/KG	N	N	N	N	NO
SILVER	M	13	4	0.21	1.90	0.60	0.93	10,000.00	340.00	MG/KG	N	N	N	N	NO
SODIUM	M	13	13	152.00	7,390.00	999.54	2,185.35	--	--	MG/KG	N	N	N	N	NO
VANADIUM	M	13	13	9.80	49.60	29.48	37.83	14,000.00	470.00	MG/KG	N	N	N	N	NO
ZINC	M	13	13	17.80	274.00	64.09	103.90	610,000.00	20,000.00	MG/KG	N	N	N	N	NO
2-METHYLNAPHTHALENE	OS	13	2	38.00	54.00	224.77	286.24	2,500,000.00	474,000.00	UG/KG	N	N	N	N	NO
ACENAPHTHENE	OS	13	2	36.00	140.00	201.23	244.06	2,500,000.00	1,000,000.00	UG/KG	N	N	N	N	NO
ACENAPHTHYLENE	OS	13	1	31.00	31.00	233.15	288.24	2,500,000.00	1,000,000.00	UG/KG	N	N	N	N	NO
ANTHRACENE	OS	13	6	22.00	800.00	175.23	260.02	2,500,000.00	1,000,000.00	UG/KG	N	N	N	N	NO
BENZO(A)ANTHRACENE	OS	13	8	33.00	2,100.00	282.46	480.38	7,800.00	1,000.00	UG/KG	N	**Y**	N	N	**YES**
BENZO(A)PYRENE	OS	13	10	21.00	1,800.00	264.00	473.83	1,000.00	1,000.00	UG/KG	N	N	N	N	NO
BENZO(B)FLUORANTHENE	OS	13	8	27.00	3,200.00	412.85	773.92	7,800.00	1,000.00	UG/KG	N	**Y**	N	N	**YES**
BENZO(G,H,I)PERYLENE	OS	13	6	60.00	960.00	224.15	334.04	2,500,000.00	1,000,000.00	UG/KG	N	N	N	N	NO
BENZO(K)FLUORANTHENE	OS	13	7	24.00	630.00	221.00	314.97	78,000.00	8,400.00	UG/KG	N	N	N	N	NO
BENZOIC ACID	OS	13	7	47.00	480.00	581.31	885.10	2,500,000.00	1,000,000.00	UG/KG	N	N	N	N	NO
BIS(2-ETHYLHEXYL)PHTHALATE	OS	13	2	35.00	360.00	263.85	331.51	410,000.00	44,000.00	UG/KG	N	N	N	N	NO
CARBAZOLE	OS	12	3	31.00	720.00	211.75	271.33	290,000.00	31,000.00	UG/KG	N	N	N	N	NO
CHRYSENE	OS	13	8	42.00	2,300.00	330.15	549.10	780,000.00	84,000.00	UG/KG	N	N	N	N	NO
DI-N-OCTYL PHTHALATE	OS	13	3	29.00	89.00	205.15	269.20	2,500,000.00	1,000,000.00	UG/KG	N	N	N	N	NO
DIBENZO(A,H)ANTHRACENE	OS	13	3	68.00	570.00	227.54	282.68	1,000.00	1,000.00	UG/KG	N	N	N	N	NO
DIBENZOFURAN	OS	13	2	31.00	84.00	210.77	264.63	2,500,000.00	270,000.00	UG/KG	N	N	N	N	NO
DIETHYL PHTHALATE	OS	13	2	28.00	32.00	209.23	273.47	2,500,000.00	1,000,000.00	UG/KG	N	N	N	N	NO
FLUORANTHENE	OS	13	9	32.00	5,700.00	545.00	1,071.91	2,500,000.00	1,000,000.00	UG/KG	N	N	N	N	NO
FLUORENE	OS	13	3	46.00	180.00	198.15	243.14	2,500,000.00	1,000,000.00	UG/KG	N	N	N	N	NO
INDENO(1,2,3-CD)PYRENE	OS	13	7	56.00	760.00	233.23	349.35	7,800.00	1,000.00	UG/KG	N	N	N	N	NO
PHENANTHRENE	OS	13	8	54.00	4,200.00	393.92	771.13	2,500,000.00	1,000,000.00	UG/KG	N	N	N	N	NO
PYRENE	OS	13	9	50.00	4,000.00	489.23	897.76	2,500,000.00	1,000,000.00	UG/KG	N	N	N	N	NO
2-BUTANONE	OV	12	3	5.00	240.00	31.79	74.41	1,000,000.00	500,000.00	UG/KG	N	N	N	N	NO
ACETONE	OV	12	1	3.00	690.00	76.21	200.28	1,000,000.00	500,000.00	UG/KG	N	N	N	N	NO

TABLE A-2 COMPARISON OF SOIL ANALYTICAL RESULTS TO CONNECTICUT DEPARTMENT OF ENVIRONMENTAL PROTECTION DIRECT EXPOSURE CRITERIA
SITE 20 - AREA A WEAPONS CENTER, NEW LONDON, CONNECTICUT

Parameter	Fraction	Samples	Positive	Minimum	Maximum	Mean	UCL	ICDEC	RDEC	UNITS	Max Exceed 2*ICDEC	Max Exceed 2*RDEC	UCL Exceed ICDEC	UCL Exceed RDEC	COC Retained
CARBON DISULFIDE	OV	12	1	2.50	11.00	6.58	8.02	1,000,000.00	500,000.00	UG/KG	N	N	N	N	NO
TOLUENE	OV	12	3	2.00	8.00	5.38	6.85	1,000,000.00	500,000.00	UG/KG	N	N	N	N	NO
TRICHLOROETHENE	OV	12	1	2.50	3.00	6.04	7.39	520,000.00	56,000.00	UG/KG	N	N	N	N	NO
4,4'-DDD	PEST/PCB	8	1	8.50	32.00	20.06	26.07	24,000.00	2,600.00	UG/KG	N	N	N	N	NO
4,4'-DDE	PEST/PCB	8	2	4.00	52.00	20.75	32.93	17,000.00	1,600.00	UG/KG	N	N	N	N	NO
4,4'-DDT	PEST/PCB	8	1	8.50	24.00	19.06	23.82	17,000.00	1,600.00	UG/KG	N	N	N	N	NO
AROCLOR-1260	PEST/PCB	8	1	50.00	50.00	190.63	250.52	10,000.00	1,000.00	UG/KG	N	N	N	N	NO
ENDRIN	PEST/PCB	8	2	8.50	11.00	17.75	23.96	610,000.00	20,000.00	UG/KG	N	N	N	N	NO
ENDRIN ALDEHYDE	PEST/PCB	7	2	6.40	7.00	17.34	25.31	610,000.00	20,000.00	UG/KG	N	N	N	N	NO
HEPTACHLOR	PEST/PCB	8	1	2.80	2.80	8.69	11.77	1,300.00	140.00	UG/KG	N	N	N	N	NO

NOTE: UCL = 95% Upper Confidence Limit. M = Metals. OS = Organic Semivolatiles. PEST/PCB = Pesticides and/or polychlorinated biphenyls. COC = Constituents of concern.
ICDEC = Industrial/Commercial Direct Exposure Criteria. RDEC = Residential Direct Exposure Criteria. Dashes (--) indicate that value has not been determined.
Maximum must not be more than twice the ICDEC/RDEC. UCL must not exceed ICDEC/RDEC.
Direct Exposure Criteria do not apply to soil at depth greater than 15 ft. Therefore, only soil less than 15 ft is evaluated.

TABLE A-3 COMPARISON OF SOIL ANALYTICAL RESULTS TO CONNECTICUT DEPARTMENT OF ENVIRONMENTAL PROTECTION GB POLLUTANT MOBILITY CRITERIA
SITE 20 - AREA A WEAPONS CENTER, NEW LONDON, CONNECTICUT

Parameter	Fraction	Samples	Positive	Minimum	Maximum	Mean	UCL	PMC	UNITS	Max Exceeded PMC	UCL Exceeded PMC	COC Retained
ALUMINUM	M	7	7	4,810.00	18,700.00	9,901.43	14,421.37	--	MG/KG	N	N	NO
ANTIMONY	M	5	4	4.70	15.00	7.02	12.58	--	MG/KG	N	N	NO
ARSENIC	M	7	4	0.77	6.40	2.49	4.58	--	MG/KG	N	N	NO
BARIUM	M	7	7	27.40	131.00	60.53	94.94	--	MG/KG	N	N	NO
BERYLLIUM	M	7	6	0.11	1.10	0.45	0.75	--	MG/KG	N	N	NO
CADMIUM	M	7	2	0.21	1.20	0.45	0.78	--	MG/KG	N	N	NO
CALCIUM	M	7	7	758.00	2,080.00	1,431.57	1,929.84	--	MG/KG	N	N	NO
CHROMIUM	M	7	7	5.90	25.40	14.77	21.25	--	MG/KG	N	N	NO
COBALT	M	7	7	3.70	10.00	6.09	8.32	--	MG/KG	N	N	NO
COPPER	M	7	7	6.70	28.00	13.63	20.29	--	MG/KG	N	N	NO
IRON	M	7	7	6,540.00	51,600.00	18,631.43	33,166.60	--	MG/KG	N	N	NO
LEAD	M	7	7	2.40	53.70	14.89	31.79	--	MG/KG	N	N	NO
MAGNESIUM	M	7	7	1,660.00	6,910.00	3,467.14	5,086.88	--	MG/KG	N	N	NO
MANGANESE	M	7	7	121.00	423.00	258.57	371.72	--	MG/KG	N	N	NO
NICKEL	M	7	7	4.40	20.90	9.91	15.11	--	MG/KG	N	N	NO
POTASSIUM	M	7	7	1,170.00	6,300.00	2,361.43	4,051.46	--	MG/KG	N	N	NO
SILVER	M	7	1	0.21	1.90	0.56	1.15	--	MG/KG	N	N	NO
SODIUM	M	7	7	152.00	314.00	226.71	281.00	--	MG/KG	N	N	NO
VANADIUM	M	7	7	9.80	46.10	22.90	34.41	--	MG/KG	N	N	NO
ZINC	M	7	7	17.80	274.00	72.49	156.63	--	MG/KG	N	N	NO
BARIUM - TCLP	M-TCLP	2	2	0.08	0.25	0.17	0.33	10.00	MG/L	N	N	NO
2-METHYLNAPHTHALENE	OS	7	2	38.00	54.00	207.43	332.97	98,000.00	UG/KG	N	N	NO
ACENAPHTHENE	OS	7	2	36.00	140.00	163.71	228.84	84,000.00	UG/KG	N	N	NO
ACENAPHTHYLENE	OS	7	1	31.00	31.00	223.00	335.69	84,000.00	UG/KG	N	N	NO
ANTHRACENE	OS	7	4	22.00	800.00	177.57	335.67	400,000.00	UG/KG	N	N	NO
BENZO(A)ANTHRACENE	OS	7	4	110.00	2,100.00	387.14	779.31	1,000.00	UG/KG	**Y**	N	**YES**
BENZO(A)PYRENE	OS	7	4	120.00	1,800.00	402.86	799.98	1,000.00	UG/KG	**Y**	N	**YES**
BENZO(B)FLUORANTHENE	OS	7	4	160.00	3,200.00	581.43	1,316.88	1,000.00	UG/KG	**Y**	**Y**	**YES**
BENZO(G,H,I)PERYLENE	OS	7	3	96.00	960.00	278.00	492.15	42,000.00	UG/KG	N	N	NO
BENZO(K)FLUORANTHENE	OS	7	3	120.00	630.00	266.43	432.76	1,000.00	UG/KG	N	N	NO
BENZOIC ACID	OS	7	2	81.00	102.00	769.00	1,304.63	1,000,000.00	UG/KG	N	N	NO
BIS(2-ETHYLHEXYL)PHTHALATE	OS	7	1	35.00	35.00	254.29	393.76	11,000.00	UG/KG	N	N	NO
CARBAZOLE	OS	6	3	31.00	720.00	178.50	306.43	1,000.00	UG/KG	N	N	NO
CHRYSENE	OS	7	4	150.00	2,300.00	441.43	878.17	1,000.00	UG/KG	**Y**	N	**YES**
DI-N-OCTYL PHTHALATE	OS	7	1	89.00	89.00	232.00	331.22	20,000.00	UG/KG	N	N	NO
DIBENZO(A,H)ANTHRACENE	OS	7	2	170.00	570.00	237.14	331.91	1,000.00	UG/KG	N	N	NO
DIBENZOFURAN	OS	7	2	31.00	84.00	181.43	283.55	5,600.00	UG/KG	N	N	NO
FLUORANTHENE	OS	7	4	170.00	5,700.00	854.29	1,895.12	56,000.00	UG/KG	N	N	NO
FLUORENE	OS	7	3	46.00	180.00	158.00	226.43	56,000.00	UG/KG	N	N	NO
INDENO(1,2,3-CD)PYRENE	OS	7	4	86.00	760.00	290.86	518.27	1,000.00	UG/KG	N	N	NO
PHENANTHRENE	OS	7	4	160.00	4,200.00	597.14	1,354.07	40,000.00	UG/KG	N	N	NO
PYRENE	OS	7	4	170.00	4,000.00	718.57	1,524.24	40,000.00	UG/KG	N	N	NO
TOLUENE	OS	6	1	2.00	2.00	4.25	5.90	67,000.00	UG/KG	N	N	NO
4,4'-DDD	PEST/PCB	5	1	8.50	32.00	18.70	29.20	--	UG/KG	N	N	NO
4,4'-DDE	PEST/PCB	5	2	4.00	52.00	19.80	43.28	--	UG/KG	N	N	NO
4,4'-DDT	PEST/PCB	5	1	8.50	24.00	17.10	24.01	--	UG/KG	N	N	NO
AROCLOR-1260	PEST/PCB	5	1	50.00	50.00	171.00	270.60	5.00	UG/KG	N	N	NO
ENDRIN	PEST/PCB	5	2	8.50	11.00	15.00	24.52	--	UG/KG	N	N	NO
ENDRIN ALDEHYDE	PEST/PCB	4	1	7.00	7.00	17.25	30.56	--	UG/KG	N	N	NO
HEPTACHLOR	PEST/PCB	5	1	2.80	2.80	6.91	10.81	13.00	UG/KG	N	N	NO

NOTE: UCL = 95% Upper Confidence Limit. M = Metals. OS = Organic Semivolatiles. PEST/PCB = Pesticides and/or polychlorinated biphenyls.
COC = Constituents of concern. PMC = Pollutant Mobility Criteria. Dashes (--) indicate that value has not been determined.
Only soil concentrations above the water table are compared to PMC

Appendix B

Human Health Risk Assessment Preliminary Remediation Goal Calculations

B.1 Human Health Risk Assessment Screening for Sediment

B.2 Detailed Calculations and Summary Tables

Appendix B.1

Human Health Risk Assessment Screening for Sediment

APPENDIX B.1 HUMAN HEALTH RISK ASSESSMENT SCREENING FOR SEDIMENT
SITE 20 - AREA A WEAPONS CENTER, NEW LONDON, CONNECTICUT

Parameter	Analyte Type	Cancerous or Noncancerous	Samples	Positive	Maximum	IRBC	RRBC	UNITS	Max Exceed IRBC	Max Exceed RRBC	COC Retained
ARSENIC	M	C	13	13	13.50	3.80	0.43	MG/KG	Y	Y	YES
BENZO(A)ANTHRACENE	OS	C	13	12	3,400.00	7,800.00	870.00	UG/KG	N	Y	YES
BENZO(A)PYRENE	OS	C	13	10	4,400.00	780.00	87.00	UG/KG	Y	Y	YES
BENZO(B)FLUORANTHENE	OS	C	13	12	4,900.00	7,800.00	870.00	UG/KG	N	Y	YES
BENZO(G,H,I)PERYLENE	OS	C	12	10	3,500.00	6,100,000.00	230,000.00	UG/KG	N	N	NO
BENZO(K)FLUORANTHENE	OS	C	12	5	2,100.00	78,000.00	8,700.00	UG/KG	N	N	NO
BIS(2-ETHYLHEXYL)PHTHALATE	OS	C	12	1	1,100.00	410,000.00	46,000.00	UG/KG	N	N	NO
CARBAZOLE	OS	C	12	3	450.00	290,000.00	32,000.00	UG/KG	N	N	NO
CHRYSENE	OS	C	12	11	4,300.00	780,000.00	87,000.00	UG/KG	N	N	NO
DIBENZO(A,H)ANTHRACENE	OS	C	13	3	830.00	780.00	87.00	UG/KG	Y	Y	YES
INDENO(1,2,3-CD)PYRENE	OS	C	13	12	3,300.00	7,800.00	870.00	UG/KG	N	Y	YES
METHYLENE CHLORIDE	OV	C	5	4	22.00	760,000.00	85,000.00	UG/KG	N	N	NO
TETRACHLOROETHENE	OV	C	5	1	8.00	110,000.00	12,000.00	UG/KG	N	N	NO
TRICHLOROETHENE	OV	C	5	1	22.00	520,000.00	58,000.00	UG/KG	N	N	NO
4,4'-DDD	PEST/PCB	C	5	2	6.60	24,000.00	2,700.00	UG/KG	N	N	NO
4,4'-DDT	PEST/PCB	C	5	3	60.00	17,000.00	1,900.00	UG/KG	N	N	NO
ALPHA-CHLORDANE	PEST/PCB	C	5	1	6.40	16,000.00	1,800.00	UG/KG	N	N	NO
GAMMA-CHLORDANE	PEST/PCB	C	5	1	7.00	16,000.00	1,800.00	UG/KG	N	N	NO
ALUMINUM	M	NC	12	12	16,900.00	200,000.00	7,800.00	MG/KG	N	Y	NO (1)
ANTIMONY	M	NC	12	2	9.80	82.00	3.10	MG/KG	N	Y	YES
BARIUM	M	NC	12	12	94.10	14,000.00	550.00	MG/KG	N	N	NO
BERYLLIUM	M	NC	13	2	0.75	410.00	16.00	MG/KG	N	N	NO
BORON	M	NC	12	8	39.70	18,000.00	700.00	MG/KG	N	N	NO
CADMIUM	M	NC	12	3	29.50	100.00	3.90	MG/KG	N	Y	YES
CALCIUM	M	NC	12	12	3,290.00	--	--	MG/KG	N	N	NO
CHROMIUM	M	NC	12	11	97.50	610.00	23.00	MG/KG	N	N	YES
COBALT	M	NC	12	12	14.40	12,000.00	470.00	MG/KG	N	N	NO
COPPER	M	NC	12	9	57.20	8,200.00	310.00	MG/KG	N	N	NO
IRON	M	NC	12	12	38,400.00	61,000.00	2,300.00	MG/KG	N	Y	NO (1)
MAGNESIUM	M	NC	12	12	6,140.00	--	--	MG/KG	N	N	NO
MANGANESE	M	NC	12	12	2,640.00	4,100.00	160.00	MG/KG	N	Y	YES
MERCURY	M	NC	12	9	0.60	61.00	2.30	MG/KG	N	N	NO
NICKEL	M	NC	12	12	31.50	4,100.00	160.00	MG/KG	N	N	NO
POTASSIUM	M	NC	12	10	4,020.00	--	--	MG/KG	N	N	NO
SELENIUM	M	NC	12	1	0.67	1,000.00	39.00	MG/KG	N	N	NO
SILVER	M	NC	12	1	1.70	1,000.00	39.00	MG/KG	N	N	NO
SODIUM	M	NC	12	4	1,120.00	--	--	MG/KG	N	N	NO
THALLIUM	M	NC	12	1	0.34	14.00	0.55	MG/KG	N	N	NO
VANADIUM	M	NC	12	12	56.70	1,400.00	55.00	MG/KG	N	Y	YES
ZINC	M	NC	12	11	292.00	61,000.00	2,300.00	MG/KG	N	N	NO
2-METHYLNAPHTHALENE	OS	NC	12	1	31.00	4,100,000.00	160,000.00	UG/KG	N	N	NO
ACENAPHTHENE	OS	NC	12	3	79.00	12,000,000.00	470,000.00	UG/KG	N	N	NO
ACENAPHTHYLENE	OS	NC	12	2	90.00	4,100,000.00	160,000.00	UG/KG	N	N	NO
ANTHRACENE	OS	NC	12	5	400.00	61,000,000.00	2,300,000.00	UG/KG	N	N	NO
BENZOIC ACID	OS	NC	12	7	190.00	820,000,000.00	31,000,000.00	UG/KG	N	N	NO
DIBENZOFURAN	OS	NC	12	2	86.00	820,000.00	31,000.00	UG/KG	N	N	NO
DI-N-BUTYL PHTHALATE	OS	NC	12	1	180.00	20,000,000.00	780,000.00	UG/KG	N	N	NO
DI-N-OCTYL PHTHALATE	OS	NC	12	2	72.00	4,100,000.00	160,000.00	UG/KG	N	N	NO
FLUORANTHENE	OS	NC	12	11	6,900.00	8,200,000.00	310,000.00	UG/KG	N	N	NO
FLUORENE	OS	NC	12	3	140.00	8,200,000.00	310,000.00	UG/KG	N	N	NO
NAPHTHALENE	OS	NC	12	3	160.00	4,100,000.00	160,000.00	UG/KG	N	N	NO
PHENANTHRENE	OS	NC	12	10	2,000.00	4,100,000.00	160,000.00	UG/KG	N	N	NO
PHENOL	OS	NC	12	1	32.00	100,000,000.00	4,700,000.00	UG/KG	N	N	NO
PYRENE	OS	NC	12	11	6,900.00	6,100,000.00	230,000.00	UG/KG	N	N	NO
1,1,1-TRICHLOROETHANE	OV	NC	5	1	13.00	4,100,000.00	160,000.00	UG/KG	N	N	NO
TOLUENE	OV	NC	5	1	4.00	4,100,000.00	1,600,000.00	UG/KG	N	N	NO
ENDOSULFAN SULFATE	PEST/PCB	NC	5	2	7.60	1,200,000.00	47,000.00	UG/KG	N	N	NO
ENDRIN	PEST/PCB	NC	5	3	18.00	61,000.00	2,300.00	UG/KG	N	N	NO
ENDRIN ALDEHYDE	PEST/PCB	NC	5	2	140.00	61,000.00	2,300.00	UG/KG	N	N	NO
METHOXYCHLOR	PEST/PCB	NC	5	1	37.00	1,000,000.00	39,000.00	UG/KG	N	N	NO

Notes: IRBC = Region III Industrial Risk Based Concentrations, RRBC = Region III Residential Risk Based Concentrations (October 1999), COC = Constituents of concern.
M = Metals. OS = Organic Semivolatiles. OV = Organic Volatile. PEST/PCB = Pesticides. NC = Noncancinogen. C = Carcinogen
(1) USEPA Region I does not advocate quantitative evaluation of this chemical.
Maximum concentrations were compared to the Region III Industrial Risk Based Concentrations (October 1999) for the full-time employee and construction worker scenarios and to the Residential Risk Based Concentrations for the future resident scenario. 1/10th of the RBC was used to identify noncarcinogenic COC.

Appendix B.2

Detailed Calculations and Summary Tables

B.2.1 Sediment
B.2.2 Soil

APPENDIX B.2

DETAILED PRELIMINARY REMEDIATION GOAL CALCULATIONS
SITE 20 – AREA A WEAPONS CENTER
NAVAL SUBMARINE BASE, NEW LONDON CONNECTICUT

1. CALCULATE INTAKE OF CHEMICAL FOR EACH EXPOSURE (Exposure parameters listed in Table B.2-1)

Intake via Inhalation (All Scenarios)

$$Intake_{ai} = (C_{ai})(IR)(ET)(EF)(ED)/(BW)(AT)$$

where

$Intake_{ai}$	=	Intake of chemical "I" from air (PM10 or vapor) inhalation (mg/kg/day)
C_{ai}	=	Concentration of chemical "I" in PM10 fraction or air (mg/m^3)
IR	=	Inhalation rate (m^3/hr)
ET	=	Exposure time (hours/day)
EF	=	Exposure frequency (days/year)
ED	=	Exposure duration (year)
BW	=	Body weight (kg)
AT	=	Averaging time (days): For non-carcinogens, AT=ED*365 days/year; For carcinogens, AT = 70yr*365 days/year

Intake via Ingestion of Soil/Sediment

Full-time Employee, Construction Worker, and Future Resident Adult/Child (non-carcinogens):

$$Intake_{si} = (C_{si})(IR)(FI)(EF)(ED)(CF)/(BW)(AT)$$

Future Resident (carcinogens only):

$$IR_{adj} = \frac{(IR_c)(ED_c)}{BW_c} + \frac{(IR_a)(ED_a)}{BW_a}$$

$$Intake_{si} = (C_{si})(IR_{adj})(FI)(EF)(CF)/(AT)$$

where

$Intake_{si}$	=	Intake of chemical "I" from soil or sediment (mg/kg/day)
C_{si}	=	Concentration of chemical "I" in soil or sediment (mg/kg)
IR	=	Ingestion rate (mg/day)
FI	=	Fraction ingested from contaminated source (decimal fraction)
EF	=	Exposure frequency (days/year)
ED	=	Exposure duration (year)
CF	=	Conversion factor (10^{-6} kg/mg)
BW	=	Body weight (kg)
IR_{adj}	=	Age-adjusted rate for a 30- and 9-year future resident

AT	=	Averaging time (days): For non-carcinogens, AT=ED*365 days/year; For carcinogens, AT = 70yr*365 days/year
c	=	Child
a	=	Adult

Dermal Contact with Soil/Sediment

Full-time Employee, Construction Worker, and Future Resident Adult/Child (non-carcinogens):

$$Intake_{si} = (C_{si})(SA)(AF)(ABS)(CF)(EF)(ED) / (BW)(AT)$$

Future Resident (carcinogens only):

$$SA_{adj} = \frac{(SA_c)(ED_c)}{BW_c} + \frac{(SA_a)(ED_a)}{BW_a}$$

$$Intake_{si} = (C_{si})(SA_{adj})(AF)(EF)(ABS)(CF)/(AT)$$

where

$Intake_{si}$	=	Amount of chemical "I" absorbed during contact with soil (mg/kg/day)
C_{si}	=	Concentration of chemical "I" in soil or sediment (mg/kg)
SA	=	Skin surface area available for contact (cm^2/day)
	=	Body surface area (BSA)* fracture exposed (FE)
AF	=	Skin adherence factor (mg/cm^2)
ABS	=	Absorption factor (decimal fraction)
CF	=	Conversion factor (10^{-6} kg/mg)
EF	=	Exposure frequency (days/year)
ED	=	Exposure duration (year)
BW	=	Body weight (kg)
SA_{adj}	=	Age-adjusted rate for a 30- and 9-year future resident
AT	=	Averaging time days: For non-carcinogens, AT = ED*365 days/year; For carcinogens, AT = 70 yr*365/yr
c	=	Child
a	=	Adult

2. CALCULATE RISK OF CHEMICAL FOR EACH EXPOSURE (Toxicity values listed in Table B.2-2)

Carcinogenic Risk

$$ILCR_I = (Intake_I)(CSF_I)$$

where

$ICLR_I$	=	Incremental Lifetime Cancer Risk for chemical "I" (unitless probability)
$Intake_I$	=	Intake of Chemical "I" (mg/kg/day)
CSF_I	=	Cancer Slope Factor of chemical "I" $(mg/kg/day)^{-1}$

Non-Carcinogenic Risk

HQ_I = Intake / RfD_I

where

HQ_I = Hazard Quotient for chemical "I" (unitless)
$Intake_I$ = Intake of chemical "I" (mg/kg/day)
RfD_I = Reference Dose of Chemical "I" (mg/kg/day)

3. SUM THE CANCER AND NON-CANCER RISK OF EACH CHEMICAL

Calculated Risk Value = Inhalation $ILCR_I$ + Dermal $ILCR_I$ + Ingestion $ILCR_I$
Calculated Risk Value = Inhalation HQ_I + Dermal HQ_I + Ingestion HQ_I

4. CALCULATE THE PRELIMINARY REMEDIATION GOAL

PRG = (Exposure Concentration) (Desired Risk Level)/Calculated Risk Value.

For carcinogens: Desired Risk Level = 10^{-4}, 10^{-5}, 10^{-6}
For non-carcinogens: Desired Risk Level = 1.0

If the UCL < Maximum Concentration: Exposure Concentration = UCL
If the UCL > Maximum Concentration: Exposure Concentration = Maximum Concentration.

UPPER CONFIDENCE LIMIT CALCULATIONS (Table B.2-3)

The first step in estimation of the 95UCLM EPC is to determine whether medium-specific environmental data for a COPC is normally or log-normally distributed. For a log-normally distributed COPC in soil, the following steps were carried out to calculate 95UCLM. Because transformation is a necessary step in calculating the upper confidence limit of the arithmetic mean (UCLM) for a log-normal distribution, the data were transformed by using the natural logarithm function (i.e., calculate ln[x], where x is the value from the data set). After transforming the data, 95UCLM for the data set was calculated by calculating the arithmetic mean of the transformed data; calculating standard deviation of the transformed data; determining H-statistic (Gilbert 1987); and calculating 95UCLM using the equation given below:

$$95\,UCLM = e^{(\bar{x} + 0.5\ s^2 + sH\ /\ \sqrt{n-1})}$$

where

95UCLM = 95th percentile upper confidence limit on the mean
e = Constant (base of the natural logarithm; equal to 2.718)
x = Mean of the transformed data
s = Standard deviation of the transformed data
H = H-Statistic
n = Number of samples in the data set

If the statistical test supported the assumption that the data set for a COPC was normally distributed, the following steps were undertaken to calculate 95UCLM (U.S. EPA 1992): (1) calculate the arithmetic mean of the untransformed data, (2) calculate standard deviation of the untransformed data, (3) determine the one-tailed t-statistic (Gilbert 1987), and (4) calculate 95UCLM using the equation given below:

$$95UCLM = (\bar{x} + t\ s\ /\ \sqrt{n}\ )$$

where

95UCLM	=	95th percentile upper confidence limit on the mean
x	=	Mean of the untransformed data
s	=	Standard deviation of the untransformed data
t	=	Student-t statistic
n	=	Number of samples in the data set

REFERENCES

Gilbert, R.O. 1987. Statistical Methods for Environmental Pollutant Monitoring. Van Nostrand Reinhold, New York.

U.S. EPA. 1992. Dermal Exposure Assessment: Principles and Applications. EPA/600/B-91/011F. January.

TABLE B.2-1 EXPOSURE PARAMETERS FOR FULL-TIME EMPLOYEES, CONSTRUCTION WORKERS, AND FUTURE RESIDENTS[a]
SITE 20 – AREA A WEAPONS CENTER, NAVAL SUBMARINE BASE, NEW LONDON CONNECTICUT

Exposure Scenario	Parameter (Units)	Full-Time Employee		Construction Worker		Future Residents			
						Adult		Child	
		RME	CTE	RME	CTE	RME	CTE	RME	CTE
Sediment Ingestion	Exposure Concentration (mg/kg)	95% UCL	95% UCL	95% UCL	95% UCL	95% UCL	95% UCL	95% UCL	95% UCL
	IR = Ingestion Rate (mg/day)	50[b]	25[b]	240[b]	120[b]	50[b]	25[b]	100[b]	50[b]
	EF = Exposure Frequency (day/year)	150	150	120[c]	80[c]	150	150	150	150
	ED = Exposure Duration (year)	25	6[c]	1[c]	1[c]	24[d]	7[d]	6	2
	BW = Body Weight (kg)	70	70	70	70	70	70	15	15
Sediment Dermal Contact	Exposure Concentration (mg/kg)	95% UCL	95% UCL	95% UCL	95% UCL	95% UCL	95% UCL	95% UCL	95% UCL
	BSA = Body Surface Area (cm^2)	20,000[e]	20,000[e]	20,000[e]	20,000[e]	20,000[e]	20,000[e]	6,980[e]	6,980[e]
	FE = Fraction Exposed (feet, forearms, head/hands)[f]	0.19[g]	0.19[g]	0.19[g]	0.19[g]	0.17[g]	0.17[b]	0.19[b]	0.19[b]
	AF = Adherence Factor (mg/cm^2)	1.0[e]	0.2[e]	1.0[e]	0.2[e]	1.0[e]	0.2[e]	1.0[e]	0.2[e]
	EF = Exposure Frequency (day/year)	150	150	120[c]	80[c]	150	150	150	150
	ED = Exposure Duration (year)	25	6[c]	1[c]	1[c]	24[d]	7[d]	6	2
	BW = Body Weight (kg)	70	70	70	70	70	70	15	15
Soil Ingestion	Exposure Concentration (mg/kg)	95% UCL	95% UCL	95% UCL	95% UCL	95% UCL	95% UCL	95% UCL	95% UCL
	IR = Ingestion Rate (mg/day)	100	50	480	240	100	50	200	100
	EF = Exposure Frequency (day/year)	150	150	120[c]	80[c]	150	150	150	150
	ED = Exposure Duration (year)	25	6[c]	1[c]	1[c]	24[d]	7[d]	6	2
	BW = Body Weight (kg)	70	70	70	70	70	70	15	15
Soil Dermal Contact	Exposure Concentration (mg/kg)	95% UCL	95% UCL	95% UCL	95% UCL	95% UCL	95% UCL	95% UCL	95% UCL
	BSA = Body Surface Area (cm^2)	20,000[e]	20,000[e]	20,000[e]	20,000[e]	20,000[e]	20,000[e]	6,980[e]	6,980[e]
	FE = Fraction Exposed (feet, forearms, head/hands)[f]	0.19[g]	0.19[g]	0.19[g]	0.19[g]	0.19[g]	0.19[g]	0.30[g]	0.30[g]
	AF = Adherence Factor (mg/cm^2)	1.0[e]	0.2[e]	1.0[e]	0.2[e]	1.0[e]	0.2[e]	1.0[e]	0.2[e]
	EF = Exposure Frequency (day/year)	150	150	120[c]	80[c]	150	150	150	150
	ED = Exposure Duration (year)	25	6[c]	1[c]	1[c]	24[d]	7[d]	6	2
	BW = Body Weight (kg)	70	70	70	70	70	70	15	15
Inhalation of Dust/Air	PM10 Exposure Concentration (mg/m_3)	1.8E-8 × UCL[c]	1.8E-8 × UCL[c]	9E-8 × UCL[c]	9E-8 × UCL[c]	1.8E-8 × UCL[c]	1.8E-8 × UCL[c]	1.8E-8 × UCL[c]	1.8E-8 × UCL[c]
	IR = Inhalation Rate (m^3/hr)	0.6333[g]	0.633[g]	1.3[g]	1.3[g]	0.833[h]	0.833[h]	0.346[h]	0.346[h]
	ET = Exposure Time (hr/day)	8[b]	8[b]	8[b]	8[b]	24	24	24	24
	EF = Exposure Frequency (day/year)	150	150	120[c]	80[c]	150	150	150	150
	ED = Exposure Duration (year)	25	6[c]	1[c]	1[c]	30	9	6	2
	BW = Body Weight (kg)	70	70	70	70	70	70	15	15

(a) U.S. Environmental Protection Agency (U.S. EPA) Region I. 1994. Risk Updates, Number 2. August (unless otherwise noted).
(b) Professional judgement.
(c) Atlantic. 1992. Phase I Remedial Investigation NSB-NLON. August.
(d) These are age-adjusted values based on the June 1991 Risk Assessment Guidance for Superfund: Volume I – Human Health Evaluation Manual Supplemental Guidance: *Standard Default Exposure Factors*. A 30- and 9-year future resident is evaluated for non-carcinogenic risk.
(e) U.S. EPA. 1992. Risk Assessment Guidance for Superfund: Volume I - Human Health Evaluation Manual – Supplemental Guidance – Dermal Risk Assessment – Interim Guidance. January.
(f) Fraction exposed for workers: feet, forearms, and head. Fraction exposed for residents: feet, forearms, and hands.
(g) U.S. EPA. 1989. Exposure Factors Handbook. August.
(h) 20 m^3/day, 8.3 m^3/day.

NOTE: RME = Reasonable Maximum Exposure; CTE = Central Tendency Exposure; UCL = 95% Upper Confidence Limit of Mean.

TABLE B.2-2 TOXICITY VALUES, SITE 20 – AREA A WEAPONS CENTER NAVAL SUBMARINE BASE, NEW LONDON CONNECTICUT

Chemical	Oral Chronic RfD[a] (mg/kg/d)	Dermal Chronic RfD[b] (mg/kg/d)	Inhalation Chronic RfD[a] (mg/kg/d)	Oral Cancer Slope Factor[a] (1/mg/kg/d)	Inhalation Cancer Slope Factor[a,c] (1/mg/kg/d)	Dermal Cancer Slope Factor[b] (1/mg/kg/d	Absorption Factor[d]
Arsenic	3.00E-04	2.85E-04		1.50E+00	1.51E+01	1.58E+00	0.001
Antimony	4.00E-04	4.00E-05					0.001
Benz(a)anthracene				7.30E-01	3.10E-01		0.01
Benzo(a)pyrene				7.30E+00	3.10E+00		0.01
Benzo(b)fluoranthene				7.30E-01	3.10E-01		0.01
Benzo(k)fluoranthene				7.30E-02	3.10E-02		0.01
Chromium	3.00E-03	3.00E-05					0.001
Cadmium	5.00E-04	2.00E-02			6.30E+00		0.001
Chrysene				7.30E-03	3.10E-03		0.01
Dibenz(a,h)anthracene				7.30E+00	3.10E+00		0.01
Indeno(1,2,3-cd)pyrene				7.30E-01	3.10E-01		0.01
Manganese	2.00E-02	2.00E-02	1.43E-05				0.001
Vanadium	7.00E-03	1.40E-04					0.001

(a) U.S. Environmental Protection Agency's *Integrated Risk Information System* (1999) and the *Health Effects Assessment Summary Tables* (1997).
(b) U.S. Environmental Protection Agency. 1995. Oral Absorption Factors for Oral-to Dermal Extrapolation per Risk Assessment Guidance for Superfund Appendix A, Region III.
(c) Benzo(a)pyrene equivalence used to determine polycyclic aromatic hydrocarbon slope factors.
(d) U.S. Environmental Protection Agency. 1992. *Dermal Exposure Assessment: Principles and Applications.* Interim Report. Where chemical-specific information is not available, dermal absorption factors of 1.0 percent for organics and 0.1 percent for inorganics should be used as defaults in determining the uptake associated with dermal exposure to contaminated soils. *Risk Assessment Guidance for Superfund: Region 4 Bulletins, Human Health Risk Assessment* (Interim Guidance), November 1995.

TABLE B.2-3 CALCULATION OF EXPOSURE POINT CONCENTRATIONS AND 95 PERCENT UPPER CONFIDENCE LIMIT VALUES, SITE 20 – AREA A WEAPONS CENTER NAVAL SUBMARINE BASE, NEW LONDON CONNECTICUT

Matrix	Analyte	N	Normal Distribution Shapiro-Wilk Statistic (W)	p[a]	Lognormal Distribution Shapiro-Wilk Statistic (W)	p[a]	Distribution[b]	Mean Concentration (mg/kg)	0.950 UCL[c]	Maximum Concentration (mg/kg)[c]
Sediment	Arsenic	13	0.9525	0.6360	0.8423	0.0227	Normal	6.76E+00	8.68E+00	1.35E+01
	Antimony	13	0.8361	0.0189	0.9097	0.1814	Lognormal	4.49E+00	6.88E+00	9.80E+00
	Cadmium	13	0.3359	<0.0001	0.6275	0.0001	Assume Lognormal	2.69E+00	4.45E+00	2.95E+01
	Chromium	15	0.9475	0.4861	0.9349	0.3226	Assume Normal	3.73E+01	4.92E+01	9.75E+01
	Manganese	13	0.5410	<0.0001	0.7992	0.0067	Assume Lognormal	4.52E+02	8.94E+02	2.64E+03
	Vanadium	13	0.9215	0.2629	0.8571	0.0353	Normal	3.57E+01	4.39E+01	5.67E+01
	Benz(a)anthracene	13	0.7010	0.0006	0.9071	0.1676	Lognormal	8.04E-01	3.46E+00	3.40E+00
	Benzo(a)pyrene	13	0.6815	0.0004	0.9075	0.1695	Lognormal	9.27E-01	3.99E+00	4.40E+00
	Benzo(b)fluoranthene	13	0.6433	0.0002	0.8398	0.0211	Assume Lognormal	1.18E+00	3.88E+00	4.90E+00
	Dibenz(a,h)anthracene	13	0.7926	0.0056	0.8519	0.0302	Assume Lognormal	3.12E-01	4.89E-01	8.30E-01
	Indeno(1,2,3-c,d)pyrene	13	0.6555	0.0002	0.8961	0.1182	Lognormal	6.54E-01	3.01E+00	3.30E+00
Surface Soil	Arsenic	7	0.8030	0.0439	0.8085	0.0497	Assume Lognormal	2.52E+00	9.87E+00	6.40E+00
	Chrysene	7	0.6889	0.0028	0.868	0.1784	Lognormal	5.30E-01	1.93E+00	1.85E+00
	Benz(a)anthracene	7	0.6637	0.0015	0.9208	0.4754	Lognormal	4.69E-01	1.65E+00	1.70E+00
	Benzo(a)pyrene	7	0.7111	0.0049	0.9227	0.4904	Lognormal	4.63E-01	1.55E+00	1.55E+00
	Benzo(b)fluoranthene	7	0.6256	0.0005	0.8271	0.0750	Lognormal	6.70E-01	3.31E+00	2.75E+00
	Dibenz(a,h)anthracene	7	0.8226	0.0681	0.8719	0.1928	Assume Normal	2.70E-01	3.60E-01	5.10E-01
Total Soil	Arsenic	13	0.8882	0.0921	0.8633	0.0426	Normal	4.91E+00	6.78E+00	1.08E+01
	Chrysene	13	0.5617	<0.0001	0.9301	0.3416	Lognormal	3.79E-01	7.38E-01	1.85E+00
	Benz(a)anthracene	13	0.5755	<0.0001	0.9609	0.7686	Lognormal	3.28E-01	6.78E-01	1.70E+00
	Benzo(a)pyrene	13	06299	<0.0001	0.9305	0.3463	Lognormal	3.06E-01	9.73E-01	1.55E+00
	Benzo(b)fluoranthene	13	0.5127	<0.0001	0.8785	0.0681	Lognormal	4.62E-01	1.07E+00	2.75E+00
	Dibenz(a,h)anthracene	13	0.9055	0.1591	0.8996	0.1319	Assume Normal	2.45E-01	2.98E-01	5.10E-01

(a) If $p < 0.05$, the data do not fit the specific distribution.
(b) If the data fit both a normal and lognormal distribution, a normal distribution was assumed. If the data fit neither a normal nor lognormal distribution, the data were assumed to fit the distribution with the greater W value.
(c) Bold indicates Exposure Point Concentration value. If 95 percent Upper Confidence Limit on the mean exceeds the maximum detected concentration, the maximum is used for the Exposure Point Concentration.

NOTE: N = Total number of samples analyzed.
95% Upper Confidence Limit of the mean (UCL) uses individual sample results that have been transformed by taking their natural logarithm for lognormally distributed data.

Appendix B.2.1

Sediment

APPENDIX B.2.1 DEVELOPMENT OF PRELIMINARY REMEDIATION GOALS FOR SEDIMENT
SITE 20 - AREA A WEAPONS CENTER, NEW LONDON, CONNECTICUT

Risk Scenario	Analyte	Dermal	Ingestion	Inhalation	Total Risk	RME EPC (mg/kg)	Maximum Concentration (mg/kg)	PRG		
Construction Worker		Cancer Risks						1.00E-06	1.00E-05	1.00E-04
	ARSENIC	3.5E-09	2.1E-07	0	2.13E-07	8.68	13.5	---	---	---
	BENZO(A)PYRENE	0	4.69E-07	0	4.69E-07	3.99	4.4	---	---	---
	DIBENZ(A,H)ANTHRACENE	0	5.75E-08	0	5.75E-08	0.49	0.83	---	---	---
	TOTAL	3.49E-09	7.36E-07	0	**7.40E-07**					
		Hazard Index							1.0	
	ARSENIC	0.00054	0.032595	0	0.033138	8.68	13.5		---	
	BENZO(A)PYRENE	0	0	0	0	3.99	4.4		---	
	DIBENZ(A,H)ANTHRACENE	0	0	0	0	0.49	0.83		---	
	TOTAL	0.001	0.033	0.000	**0.033**					
Full-time Employee		Cancer Risks						1.00E-06	1.00E-05	1.00E-04
	ARSENIC	1.1E-07	1.36E-06	0	1.47E-06	8.68	13.5	5.89	58.88	588.78
	BENZO(A)PYRENE	0	3.05E-06	0	3.05E-06	3.99	4.4	1.31	13.07	130.67
	DIBENZ(A,H)ANTHRACENE	0	3.74E-07	0	3.74E-07	0.49	0.83	---	---	---
	TOTAL	1.09E-07	4.79E-06	0	**4.90E-06**					
		Hazard Index							1.0	
	ARSENIC	0.00068	0.008488	0	0.009167	8.68	13.5		---	
	BENZO(A)PYRENE	0	0	0	0	3.99	4.4		---	
	DIBENZ(A,H)ANTHRACENE	0	0	0	0	0.49	0.83		---	
	TOTAL	0.001	0.008	0.000	**0.009**					
Future Resident		Cancer Risks						1.00E-06	1.00E-05	1.00E-04
	ANTIMONY	0	0	0	0	6.88	9.8	---	---	---
	ARSENIC	1.4E-07	4.37E-06	0	4.5E-06	8.68	13.5	1.93	19.27	192.70
	BENZ(A)ANTHRACENE	0	8.33E-07	0	8.33E-07	3.40	3.4	---	---	---
	BENZO(A)PYRENE	0	9.77E-06	0	9.77E-06	3.99	4.4	0.41	4.08	40.83
	BENZO(B)FLUORANTHENE	0	9.49E-07	0	9.49E-07	3.88	4.9	---	---	---
	CADMIUM	0	0	0	0	4.45	29.5	---	---	---
	CHROMIUM	0	0	0	0	49.20	97.5	---	---	---
	DIBENZ(A,H)ANTHRACENE	0	1.2E-06	0	1.2E-06	0.49	0.83	0.41	4.08	40.83
	INDENO(1,2,3-CD)PYRENE	0	7.37E-07	0	7.37E-07	3.01	3.3	---	---	---
	MANGANESE	0	0	0	0	894.00	2640	---	---	---
	VANADIUM	0	0	0	0	43.91	56.7	---	---	---
	TOTAL	1.36E-07	1.79E-05	0	**1.80E-05**					
		Hazard Index							1.0	
	ANTIMONY	3.43E-03	5.05E-03	0	8.48E-03	6.88	9.8		---	
	ARSENIC	0.00061	0.008488	0	0.009096	8.68	13.5		---	
	BENZ(A)ANTHRACENE	0	0	0	0	3.40	3.4		---	
	BENZO(A)PYRENE	0	0	0	0	3.99	4.4		---	
	BENZO(B)FLUORANTHENE	0	0	0	0	3.88	4.9		---	
	CADMIUM	4.44E-06	2.61E-03	0	0.00262	4.45	29.5		---	
	CHROMIUM	0.03280	0.00482	0	0.03760	49.20	97.5			
	DIBENZ(A,H)ANTHRACENE	0	0	0	0	0.49	0.83		---	
	INDENO(1,2,3-CD)PYRENE	0	0	0	0	3.01	3.3		---	
	MANGANESE	0.00089	0.001312	0	0.002204	894.00	2640		---	
	VANADIUM	0.00626	0.001841	0	0.008102	43.91	56.7		---	
	TOTAL	0.044	0.024	0.000	**0.068**					
Future Resident-Child		Hazard Index							1.0	
	ANTIMONY	6.25E-03	4.71E-02	0	5.34E-02	6.88	9.8		---	
	ARSENIC	0.00111	0.079224	0	0.08033	8.68	13.5		---	
	BENZ(A)ANTHRACENE	0	0	0	0	3.40	3.4		---	
	BENZO(A)PYRENE	0	0	0	0	3.99	4.4		---	
	BENZO(B)FLUORANTHENE	0	0	0	0	3.88	4.9		---	
	CADMIUM	8.08E-05	2.44E-02	0	2.45E-02	4.45	29.5		---	
	CHROMIUM	5.96E-02	4.50E-02	0	1.05E-01	49.20	97.5			
	DIBENZ(A,H)ANTHRACENE	0	0	0	0	0.49	0.83		---	
	INDENO(1,2,3-CD)PYRENE	0	0	0	0	3.01	3.3		---	
	MANGANESE	0.00162	0.012247	0	0.01387	894.00	2640		---	
	VANADIUM	0.01139	0.017186	0	0.02858	43.91	56.7		---	
	TOTAL	0.080	0.225	0.000	**0.306**					

NOTE: RME EPC = Reasonable Maximum Exposure - Exposure Point Concentration = 95% Upper confidence level of mean (if less than maximum concentration otherwise RME EPC = maximum concentration). PRG = Preliminary Remediation Goals.
Dashes (---) indicate that the PRG value was not calculated because the cumulative hazard index was <1.0 or the incremental cancer risk was $<10^{6}$.

Appendix B.2.2

Soil

APPENDIX B.2.2 DEVELOPMENT OF PRELIMINARY REMEDIATION GOALS FOR SOIL
SITE 20 - AREA A WEAPONS CENTER, NEW LONDON, CONNECTICUT

Risk Scenario	Analyte	Dermal	Ingestion	Inhalation	Total Risk	RME EPC (mg/kg)	Maximum Concentration (mg/kg)	PRG		
Full-time Employee		Cancer Risks						1.00E-06	1.00E-05	1.00E-04
	ARSENIC	1.242E-07	3.10E-06	2.85E-08	3.26E-06	6.4	6.4	1.97	19.65	196.54
	BENZO(A)PYRENE	0	2.38E-06	9.21E-10	2.38E-06	1.55	1.55	0.65	6.51	65.14
	CHRYSENE	0	2.96E-09	1.14E-12	2.96E-09	1.85	1.85	625.69	6256.86	62568.55
	TOTAL	1.24E-07	5.49E-06	2.94E-08	**5.64E-06**					
		Hazard Index							1.0	
	ARSENIC	0.0007724	0.0193112	0	0.0200836	6.40	6.40		---	
	BENZO(A)PYRENE	0	0	0	0	1.55	1.55		---	
	CHRYSENE	0	0	0	0	1.85	1.85		---	
	TOTAL	0.001	0.019	0.000	**0.020**					
Future Resident		Cancer Risks						1.00E-06	1.00E-05	1.00E-04
	ARSENIC	1.346E-07	6.82E-06	9.27E-08	7.05E-06	6.78	10.8	0.96	9.62	96.16
	BENZO(A)ANTHRACENE	0	3.32E-07	1.90E-10	3.32E-07	0.68	1.7	---	---	---
	BENZO(A)PYRENE	0	4.76E-06	2.73E-09	4.77E-06	0.97	1.55	0.20	2.04	20.40
	BENZO(B)FLUORANTHENE	0	5.24E-07	3.00E-10	5.24E-07	1.07	2.75	---	---	---
	CHRYSENE	0	3.61E-09	2.07E-12	3.62E-09	0.74	1.85	204.05	2040.50	20404.97
	DIBENZO(A,H)ANTHRACENE	0	1.46E-06	8.36E-10	1.46E-06	0.30	0.51	0.20	2.04	20.40
	TOTAL	1.35E-07	1.39E-05	9.68E-08	**1.41E-05**					
		Hazard Index							1.0	
	ARSENIC	0.0005306	0.0132642	0	0.01379476	6.78	10.8		---	
	BENZO(A)ANTHRACENE	0	0	0	0	0.68	1.7		---	
	BENZO(A)PYRENE	0	0	0	0	0.97	1.55		---	
	BENZO(B)FLUORANTHENE	0	0	0	0	1.07	2.75		---	
	CHRYSENE	0	0	0	0	0.74	1.85		---	
	DIBENZO(A,H)ANTHRACENE	0	0	0	0	0.30	0.51		---	
	TOTAL	0.001	0.013	0.000	**0.014**					
Future Resident-child		Hazard Index							1.0	
	ARSENIC	0.0013644	0.1237991	0	0.12516348	6.78	10.8		---	
	BENZO(A)ANTHRACENE	0	0	0	0	0.68	1.7		---	
	BENZO(A)PYRENE	0	0	0	0	0.97	1.55		---	
	BENZO(B)FLUORANTHENE	0	0	0	0	1.07	2.75		---	
	CHRYSENE	0	0	0	0	0.74	1.85		---	
	DIBENZO(A,H)ANTHRACENE	0	0	0	0	0.30	0.51		---	
	TOTAL	0.001	0.124	0.000	**0.125**					

Notes: RME EPC = Reasonable Maximum Exposure - Exposure Point Concentration = 95% Upper confidence level of mean (if less than maximum concentration otherwise RME EPC = maximum concentration). PRG = Preliminary Remediation Goals.
Dashes (---) indicate that the PRG value was not calculated because the cumulative hazard index was <1.0 or the incremental cancer risk was $<10^{6}$.

Appendix C

Summary of Soil and Sediment Analytical Results

C.1 Soil Analytical Results
C.2 Sediment Analytical Results

Appendix C.1

Soil Analytical Results

APPENDIX C.1 SOIL DATA
SITE 20 - AREA A WEAPONS CENTER, NEW LONDON, CONNECTICUT

Area	Location	Top	Bottom	Fraction	Parameter	Value	Qual	Units	SACODE
Drainage Area 1	2WCSD1	0	1	M	ALUMINUM	13,100.00		MG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	M	ANTIMONY	5.10		MG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	M	ARSENIC	4.60	J	MG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	M	BARIUM	53.10		MG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	M	BERYLLIUM	0.62		MG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	M	BORON	16.40	UJ	MG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	M	CADMIUM	0.66	U	MG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	M	CALCIUM	1,170.00		MG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	M	CHROMIUM	18.70		MG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	M	COBALT	6.70		MG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	M	COPPER	16.20		MG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	M	IRON	21,800.00		MG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	M	LEAD	20.40	J	MG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	M	MAGNESIUM	3,430.00		MG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	M	MANGANESE	315.00		MG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	M	MERCURY	0.16	U	MG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	M	NICKEL	13.10		MG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	M	POTASSIUM	1,530.00		MG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	M	SELENIUM	0.99	UJ	MG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	M	SILVER	0.66	U	MG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	M	SODIUM	163.00		MG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	M	THALLIUM	0.33	U	MG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	M	VANADIUM	24.80		MG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	M	ZINC	71.80		MG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OS	1,2,4-TRICHLOROBENZENE	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OS	1,2-DICHLOROBENZENE	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OS	1,3-DICHLOROBENZENE	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OS	1,4-DICHLOROBENZENE	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OS	2,4,5-TRICHLOROPHENOL	1,300.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OS	2,4,6-TRICHLOROPHENOL	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OS	2,4-DICHLOROPHENOL	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OS	2,4-DIMETHYLPHENOL	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OS	2,4-DINITROPHENOL	1,300.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OS	2,4-DINITROTOLUENE	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OS	2,6-DINITROTOLUENE	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OS	2-CHLORONAPHTHALENE	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OS	2-CHLOROPHENOL	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OS	2-METHYLNAPHTHALENE	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OS	2-METHYLPHENOL	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OS	2-NITROANILINE	1,300.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OS	2-NITROPHENOL	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OS	3,3'-DICHLOROBENZIDINE	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OS	3-NITROANILINE	1,300.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OS	4,6-DINITRO-2-METHYLPHENOL	1,300.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OS	4-BROMOPHENYL PHENYL ETHER	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OS	4-CHLORO-3-METHYLPHENOL	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OS	4-CHLOROANILINE	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OS	4-CHLOROPHENYL PHENYL ETHER	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OS	4-METHYLPHENOL	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OS	4-NITROANILINE	1,300.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OS	4-NITROPHENOL	1,300.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OS	ACENAPHTHENE	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OS	ACENAPHTHYLENE	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OS	ANTHRACENE	22.00	J	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OS	BENZO(A)ANTHRACENE	110.00	J	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OS	BENZO(A)PYRENE	120.00	J	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OS	BENZO(B)FLUORANTHENE	160.00	J	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OS	BENZO(G,H,I)PERYLENE	96.00	J	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OS	BENZO(K)FLUORANTHENE	120.00	J	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OS	BENZOIC ACID	81.00	J	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OS	BENZYL ALCOHOL	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OS	BIS(2-CHLOROETHOXY)METHANE	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OS	BIS(2-CHLOROETHYL)ETHER	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OS	BIS(2-CHLOROISOPROPYL) ETHER	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OS	BIS(2-ETHYLHEXYL)PHTHALATE	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OS	BUTYLBENZYL PHTHALATE	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OS	CARBAZOLE	31.00	J	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OS	CHRYSENE	150.00	J	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OS	DI-N-BUTYL PHTHALATE	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OS	DI-N-OCTYL PHTHALATE	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OS	DIBENZO(A,H)ANTHRACENE	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OS	DIBENZOFURAN	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OS	DIETHYL PHTHALATE	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OS	DIMETHYL PHTHALATE	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OS	FLUORANTHENE	310.00	J	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OS	FLUORENE	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OS	HEXACHLOROBENZENE	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OS	HEXACHLOROBUTADIENE	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OS	HEXACHLOROCYCLOPENTADIENE	550.00	UJ	UG/KG	NORMAL

APPENDIX C.1 SOIL DATA
SITE 20 - AREA A WEAPONS CENTER, NEW LONDON, CONNECTICUT

Area	Location	Top	Bottom	Fraction	Parameter	Value	Qual	Units	SACODE
Drainage Area 1	2WCSD1	0	1	OS	HEXACHLOROETHANE	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OS	INDENO(1,2,3-CD)PYRENE	86.00	J	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OS	ISOPHORONE	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OS	N-NITROSO-DI-N-PROPYLAMINE	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OS	N-NITROSODIPHENYLAMINE	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OS	NAPHTHALENE	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OS	NITROBENZENE	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OS	PENTACHLOROPHENOL	1,300.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OS	PHENANTHRENE	160.00	J	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OS	PHENOL	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OS	PYRENE	250.00	J	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OV	1,1,1-TRICHLOROETHANE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OV	1,1,2,2-TETRACHLOROETHANE	17.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OV	1,1,2-TRICHLOROETHANE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OV	1,1-DICHLOROETHANE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OV	1,1-DICHLOROETHENE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OV	1,2-DICHLOROETHANE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OV	1,2-DICHLOROETHENE (TOTAL)	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OV	1,2-DICHLOROPROPANE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OV	2-BUTANONE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OV	2-HEXANONE	17.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OV	4-METHYL-2-PENTANONE	17.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OV	ACETONE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OV	BENZENE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OV	BROMODICHLOROMETHANE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OV	BROMOFORM	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OV	BROMOMETHANE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OV	CARBON DISULFIDE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OV	CARBON TETRACHLORIDE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OV	CHLOROBENZENE	17.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OV	CHLOROETHANE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OV	CHLOROFORM	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OV	CHLOROMETHANE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OV	CIS-1,3-DICHLOROPROPENE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OV	DIBROMOCHLOROMETHANE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OV	ETHYLBENZENE	17.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OV	METHYLENE CHLORIDE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OV	STYRENE	17.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OV	TETRACHLOROETHENE	17.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OV	TOLUENE	2.00	J	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OV	TRANS-1,3-DICHLOROPROPENE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OV	TRICHLOROETHENE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OV	VINYL ACETATE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OV	VINYL CHLORIDE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	OV	XYLENES, TOTAL	17.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	PEST/PCB	4,4'-DDD	32.00	J	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	PEST/PCB	4,4'-DDE	52.00	J	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	PEST/PCB	4,4'-DDT	24.00	J	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	PEST/PCB	ALDRIN	28.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	PEST/PCB	ALPHA-BHC	28.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	PEST/PCB	ALPHA-CHLORDANE	28.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	PEST/PCB	AROCLOR-1016	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	PEST/PCB	AROCLOR-1221	1,100.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	PEST/PCB	AROCLOR-1232	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	PEST/PCB	AROCLOR-1242	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	PEST/PCB	AROCLOR-1248	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	PEST/PCB	AROCLOR-1254	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	PEST/PCB	AROCLOR-1260	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	PEST/PCB	BETA-BHC	28.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	PEST/PCB	DELTA-BHC	28.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	PEST/PCB	DIELDRIN	55.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	PEST/PCB	ENDOSULFAN I	28.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	PEST/PCB	ENDOSULFAN II	55.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	PEST/PCB	ENDOSULFAN SULFATE	55.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	PEST/PCB	ENDRIN	55.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	PEST/PCB	ENDRIN ALDEHYDE	55.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	PEST/PCB	ENDRIN KETONE	55.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	PEST/PCB	GAMMA-BHC (LINDANE)	28.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	PEST/PCB	GAMMA-CHLORDANE	28.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	PEST/PCB	HEPTACHLOR	2.80	J	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	PEST/PCB	HEPTACHLOR EPOXIDE	28.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	PEST/PCB	METHOXYCHLOR	280.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD1	0	1	PEST/PCB	TOXAPHENE	2,800.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD2	0	1	M	ALUMINUM	18,700.00		MG/KG	NORMAL
Drainage Area 1	2WCSD2	0	1	M	ANTIMONY	15.00		MG/KG	NORMAL
Drainage Area 1	2WCSD2	0	1	M	ARSENIC	6.40	J	MG/KG	NORMAL
Drainage Area 1	2WCSD2	0	1	M	BARIUM	85.10		MG/KG	NORMAL
Drainage Area 1	2WCSD2	0	1	M	BERYLLIUM	1.10		MG/KG	NORMAL
Drainage Area 1	2WCSD2	0	1	M	BORON	28.20	UJ	MG/KG	NORMAL

APPENDIX C.1 SOIL DATA
SITE 20 - AREA A WEAPONS CENTER, NEW LONDON, CONNECTICUT

Area	Location	Top	Bottom	Fraction	Parameter	Value	Qual	Units	SACODE
Drainage Area 1	2WCSD2	0	1	M	CADMIUM	1.10	U	MG/KG	NORMAL
Drainage Area 1	2WCSD2	0	1	M	CALCIUM	1,950.00		MG/KG	NORMAL
Drainage Area 1	2WCSD2	0	1	M	CHROMIUM	25.40		MG/KG	NORMAL
Drainage Area 1	2WCSD2	0	1	M	COBALT	10.00		MG/KG	NORMAL
Drainage Area 1	2WCSD2	0	1	M	COPPER	28.00	J	MG/KG	NORMAL
Drainage Area 1	2WCSD2	0	1	M	IRON	51,600.00		MG/KG	NORMAL
Drainage Area 1	2WCSD2	0	1	M	LEAD	53.70	J	MG/KG	NORMAL
Drainage Area 1	2WCSD2	0	1	M	MAGNESIUM	4,160.00		MG/KG	NORMAL
Drainage Area 1	2WCSD2	0	1	M	MANGANESE	423.00		MG/KG	NORMAL
Drainage Area 1	2WCSD2	0	1	M	MERCURY	0.28	U	MG/KG	NORMAL
Drainage Area 1	2WCSD2	0	1	M	NICKEL	20.90		MG/KG	NORMAL
Drainage Area 1	2WCSD2	0	1	M	POTASSIUM	1,740.00		MG/KG	NORMAL
Drainage Area 1	2WCSD2	0	1	M	SELENIUM	1.70	UJ	MG/KG	NORMAL
Drainage Area 1	2WCSD2	0	1	M	SILVER	1.90		MG/KG	NORMAL
Drainage Area 1	2WCSD2	0	1	M	SODIUM	314.00		MG/KG	NORMAL
Drainage Area 1	2WCSD2	0	1	M	THALLIUM	0.56	U	MG/KG	NORMAL
Drainage Area 1	2WCSD2	0	1	M	VANADIUM	31.10		MG/KG	NORMAL
Drainage Area 1	2WCSD2	0	1	M	ZINC	274.00		MG/KG	NORMAL
Drainage Area 1	2WCSD2	0	1	OS	1,2,4-TRICHLOROBENZENE	720.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD2	0	1	OS	1,2-DICHLOROBENZENE	720.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD2	0	1	OS	1,3-DICHLOROBENZENE	720.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD2	0	1	OS	1,4-DICHLOROBENZENE	720.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD2	0	1	OS	2,4,5-TRICHLOROPHENOL	1,700.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD2	0	1	OS	2,4,6-TRICHLOROPHENOL	720.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD2	0	1	OS	2,4-DICHLOROPHENOL	720.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD2	0	1	OS	2,4-DIMETHYLPHENOL	720.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD2	0	1	OS	2,4-DINITROPHENOL	1,700.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD2	0	1	OS	2,4-DINITROTOLUENE	720.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD2	0	1	OS	2,6-DINITROTOLUENE	720.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD2	0	1	OS	2-CHLORONAPHTHALENE	720.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD2	0	1	OS	2-CHLOROPHENOL	720.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD2	0	1	OS	2-METHYLNAPHTHALENE	720.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD2	0	1	OS	2-METHYLPHENOL	720.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD2	0	1	OS	2-NITROANILINE	1,700.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD2	0	1	OS	2-NITROPHENOL	720.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD2	0	1	OS	3,3'-DICHLOROBENZIDINE	720.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD2	0	1	OS	3-NITROANILINE	1,700.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD2	0	1	OS	4,6-DINITRO-2-METHYLPHENOL	1,700.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD2	0	1	OS	4-BROMOPHENYL PHENYL ETHER	720.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD2	0	1	OS	4-CHLORO-3-METHYLPHENOL	720.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD2	0	1	OS	4-CHLOROANILINE	720.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD2	0	1	OS	4-CHLOROPHENYL PHENYL ETHER	720.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD2	0	1	OS	4-METHYLPHENOL	720.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD2	0	1	OS	4-NITROANILINE	1,700.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD2	0	1	OS	4-NITROPHENOL	1,700.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD2	0	1	OS	ACENAPHTHENE	36.00	J	UG/KG	NORMAL
Drainage Area 1	2WCSD2	0	1	OS	ACENAPHTHYLENE	720.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD2	0	1	OS	ANTHRACENE	95.00	J	UG/KG	NORMAL
Drainage Area 1	2WCSD2	0	1	OS	BENZO(A)ANTHRACENE	510.00	J	UG/KG	NORMAL
Drainage Area 1	2WCSD2	0	1	OS	BENZO(A)PYRENE	610.00	J	UG/KG	NORMAL
Drainage Area 1	2WCSD2	0	1	OS	BENZO(B)FLUORANTHENE	820.00		UG/KG	NORMAL
Drainage Area 1	2WCSD2	0	1	OS	BENZO(G,H,I)PERYLENE	720.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD2	0	1	OS	BENZO(K)FLUORANTHENE	630.00	J	UG/KG	NORMAL
Drainage Area 1	2WCSD2	0	1	OS	BENZOIC ACID	102.00	J	UG/KG	NORMAL
Drainage Area 1	2WCSD2	0	1	OS	BENZYL ALCOHOL	720.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD2	0	1	OS	BIS(2-CHLOROETHOXY)METHANE	720.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD2	0	1	OS	BIS(2-CHLOROETHYL)ETHER	720.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD2	0	1	OS	BIS(2-CHLOROISOPROPYL) ETHER	720.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD2	0	1	OS	BIS(2-ETHYLHEXYL)PHTHALATE	1,000.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD2	0	1	OS	BUTYLBENZYL PHTHALATE	720.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD2	0	1	OS	CARBAZOLE	120.00	J	UG/KG	NORMAL
Drainage Area 1	2WCSD2	0	1	OS	CHRYSENE	740.00		UG/KG	NORMAL
Drainage Area 1	2WCSD2	0	1	OS	DI-N-BUTYL PHTHALATE	720.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD2	0	1	OS	DI-N-OCTYL PHTHALATE	720.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD2	0	1	OS	DIBENZO(A,H)ANTHRACENE	240.00	J	UG/KG	NORMAL
Drainage Area 1	2WCSD2	0	1	OS	DIBENZOFURAN	720.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD2	0	1	OS	DIETHYL PHTHALATE	720.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD2	0	1	OS	DIMETHYL PHTHALATE	720.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD2	0	1	OS	FLUORANTHENE	1,400.00		UG/KG	NORMAL
Drainage Area 1	2WCSD2	0	1	OS	FLUORENE	46.00	J	UG/KG	NORMAL
Drainage Area 1	2WCSD2	0	1	OS	HEXACHLOROBENZENE	720.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD2	0	1	OS	HEXACHLOROBUTADIENE	720.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD2	0	1	OS	HEXACHLOROCYCLOPENTADIENE	720.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCSD2	0	1	OS	HEXACHLOROETHANE	720.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD2	0	1	OS	INDENO(1,2,3-CD)PYRENE	500.00	J	UG/KG	NORMAL
Drainage Area 1	2WCSD2	0	1	OS	ISOPHORONE	720.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD2	0	1	OS	N-NITROSO-DI-N-PROPYLAMINE	720.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD2	0	1	OS	N-NITROSODIPHENYLAMINE	720.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD2	0	1	OS	NAPHTHALENE	720.00	U	UG/KG	NORMAL

APPENDIX C.1 SOIL DATA
SITE 20 - AREA A WEAPONS CENTER, NEW LONDON, CONNECTICUT

Area	Location	Top	Bottom	Fraction	Parameter	Value	Qual	Units	SACODE
Drainage Area 1	2WCSD2	0	1	OS	NITROBENZENE	720.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD2	0	1	OS	PENTACHLOROPHENOL	1,700.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD2	0	1	OS	PHENANTHRENE	660.00	J	UG/KG	NORMAL
Drainage Area 1	2WCSD2	0	1	OS	PHENOL	720.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD2	0	1	OS	PYRENE	1,200.00		UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	M	ALUMINUM	9,200.00		MG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	M	ANTIMONY	9.80	U	MG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	M	ARSENIC	3.00		MG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	M	BARIUM	38.80		MG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	M	BERYLLIUM	0.41	J	MG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	M	BORON	11.20	UJ	MG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	M	CADMIUM	0.45	U	MG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	M	CALCIUM	1,330.00		MG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	M	CHROMIUM	10.70		MG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	M	COBALT	3.70		MG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	M	COPPER	9.90		MG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	M	IRON	9,680.00		MG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	M	LEAD	12.30	J	MG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	M	MAGNESIUM	2,350.00		MG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	M	MANGANESE	167.00		MG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	M	MERCURY	0.11	U	MG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	M	NICKEL	7.80		MG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	M	POTASSIUM	1,500.00	J	MG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	M	SELENIUM	0.43	U	MG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	M	SILVER	0.45	U	MG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	M	SODIUM	267.00		MG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	M	THALLIUM	0.22	U	MG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	M	VANADIUM	17.50		MG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	M	ZINC	28.70	J	MG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	M	ALUMINUM	9,560.00		MG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	M	ANTIMONY	6.70	U	MG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	M	ARSENIC	3.50		MG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	M	BARIUM	36.40		MG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	M	BERYLLIUM	0.48		MG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	M	BORON	11.70	UJ	MG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	M	CADMIUM	0.47	U	MG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	M	CALCIUM	1,310.00	U	MG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	M	CHROMIUM	11.70		MG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	M	COBALT	2.70		MG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	M	COPPER	11.30		MG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	M	IRON	9,880.00		MG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	M	LEAD	13.70	J	MG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	M	MAGNESIUM	2,280.00		MG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	M	MANGANESE	172.00		MG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	M	MERCURY	0.12	U	MG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	M	NICKEL	6.80		MG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	M	POTASSIUM	1,310.00	J	MG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	M	SELENIUM	0.42	U	MG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	M	SILVER	0.47	U	MG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	M	SODIUM	268.00		MG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	M	THALLIUM	0.23	U	MG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	M	VANADIUM	18.00		MG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	M	ZINC	30.10	J	MG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OS	1,2,4-TRICHLOROBENZENE	750.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OS	1,2-DICHLOROBENZENE	750.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OS	1,3-DICHLOROBENZENE	750.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OS	1,4-DICHLOROBENZENE	750.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OS	2,4,5-TRICHLOROPHENOL	1,800.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OS	2,4,6-TRICHLOROPHENOL	750.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OS	2,4-DICHLOROPHENOL	750.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OS	2,4-DIMETHYLPHENOL	750.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OS	2,4-DINITROPHENOL	1,800.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OS	2,4-DINITROTOLUENE	750.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OS	2,6-DINITROTOLUENE	750.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OS	2-CHLORONAPHTHALENE	750.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OS	2-CHLOROPHENOL	750.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OS	2-METHYLNAPHTHALENE	750.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OS	2-METHYLPHENOL	750.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OS	2-NITROANILINE	1,800.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OS	2-NITROPHENOL	750.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OS	3,3'-DICHLOROBENZIDINE	750.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OS	3-NITROANILINE	1,800.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OS	4,6-DINITRO-2-METHYLPHENOL	1,800.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OS	4-BROMOPHENYL PHENYL ETHER	750.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OS	4-CHLORO-3-METHYLPHENOL	750.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OS	4-CHLOROANILINE	750.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OS	4-CHLOROPHENYL PHENYL ETHER	750.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OS	4-METHYLPHENOL	750.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OS	4-NITROANILINE	1,800.00	U	UG/KG	NORMAL

APPENDIX C.1 SOIL DATA
SITE 20 - AREA A WEAPONS CENTER, NEW LONDON, CONNECTICUT

Area	Location	Top	Bottom	Fraction	Parameter	Value	Qual	Units	SACODE
Drainage Area 1	2WCTB2	0	2	OS	4-NITROPHENOL	1,800.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OS	ACENAPHTHENE	140.00	J	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OS	ACENAPHTHYLENE	750.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OS	ANTHRACENE	540.00	J	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OS	BENZO(A)ANTHRACENE	1,300.00		UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OS	BENZO(A)PYRENE	1,300.00		UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OS	BENZO(B)FLUORANTHENE	2,300.00		UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OS	BENZO(G,H,I)PERYLENE	770.00		UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OS	BENZO(K)FLUORANTHENE	750.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OS	BENZOIC ACID	3,600.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OS	BENZYL ALCOHOL	750.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OS	BIS(2-CHLOROETHOXY)METHANE	750.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OS	BIS(2-CHLOROETHYL)ETHER	750.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OS	BIS(2-CHLOROISOPROPYL) ETHER	750.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OS	BIS(2-ETHYLHEXYL)PHTHALATE	750.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OS	BUTYLBENZYL PHTHALATE	750.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OS	CARBAZOLE	400.00	J	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OS	CHRYSENE	1,400.00		UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OS	DI-N-BUTYL PHTHALATE	750.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OS	DI-N-OCTYL PHTHALATE	750.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OS	DIBENZO(A,H)ANTHRACENE	450.00	J	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OS	DIBENZOFURAN	84.00	J	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OS	DIETHYL PHTHALATE	750.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OS	DIMETHYL PHTHALATE	750.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OS	FLUORANTHENE	3,200.00		UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OS	FLUORENE	180.00	J	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OS	HEXACHLOROBENZENE	750.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OS	HEXACHLOROBUTADIENE	750.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OS	HEXACHLOROCYCLOPENTADIENE	750.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OS	HEXACHLOROETHANE	750.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OS	INDENO(1,2,3-CD)PYRENE	760.00		UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OS	ISOPHORONE	750.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OS	N-NITROSO-DI-N-PROPYLAMINE	750.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OS	N-NITROSODIPHENYLAMINE	750.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OS	NAPHTHALENE	750.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OS	NITROBENZENE	750.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OS	PENTACHLOROPHENOL	1,800.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OS	PHENANTHRENE	2,400.00		UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OS	PHENOL	750.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OS	PYRENE	2,500.00		UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OS	1,2,4-TRICHLOROBENZENE	1,100.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OS	1,2-DICHLOROBENZENE	1,100.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OS	1,3-DICHLOROBENZENE	1,100.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OS	1,4-DICHLOROBENZENE	1,100.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OS	2,4,5-TRICHLOROPHENOL	2,700.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OS	2,4,6-TRICHLOROPHENOL	1,100.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OS	2,4-DICHLOROPHENOL	1,100.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OS	2,4-DIMETHYLPHENOL	1,100.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OS	2,4-DINITROPHENOL	2,700.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OS	2,4-DINITROTOLUENE	1,100.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OS	2,6-DINITROTOLUENE	1,100.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OS	2-CHLORONAPHTHALENE	1,100.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OS	2-CHLOROPHENOL	1,100.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OS	2-METHYLNAPHTHALENE	1,100.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OS	2-METHYLPHENOL	1,100.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OS	2-NITROANILINE	2,700.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OS	2-NITROPHENOL	1,100.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OS	3,3'-DICHLOROBENZIDINE	1,100.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OS	3-NITROANILINE	2,700.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OS	4,6-DINITRO-2-METHYLPHENOL	2,700.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OS	4-BROMOPHENYL PHENYL ETHER	1,100.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OS	4-CHLORO-3-METHYLPHENOL	1,100.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OS	4-CHLOROANILINE	1,100.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OS	4-CHLOROPHENYL PHENYL ETHER	1,100.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OS	4-METHYLPHENOL	1,100.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OS	4-NITROANILINE	2,700.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OS	4-NITROPHENOL	2,700.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OS	ACENAPHTHENE	1,100.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OS	ACENAPHTHYLENE	1,100.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OS	ANTHRACENE	800.00	J	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OS	BENZO(A)ANTHRACENE	2,100.00		UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OS	BENZO(A)PYRENE	1,800.00		UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OS	BENZO(B)FLUORANTHENE	3,200.00		UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OS	BENZO(G,H,I)PERYLENE	960.00	J	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OS	BENZO(K)FLUORANTHENE	1,100.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OS	BENZOIC ACID	5,400.00	UJ	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OS	BENZYL ALCOHOL	1,100.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OS	BIS(2-CHLOROETHOXY)METHANE	1,100.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OS	BIS(2-CHLOROETHYL)ETHER	1,100.00	U	UG/KG	DUPLICATE

Area	Location	Top	Bottom	Fraction	Parameter	Value	Qual	Units	SACODE
Drainage Area 1	2WCTB2	0	2	OS	BIS(2-CHLOROISOPROPYL) ETHER	1,100.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OS	BIS(2-ETHYLHEXYL)PHTHALATE	400.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OS	BUTYLBENZYL PHTHALATE	1,100.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OS	CARBAZOLE	720.00	J	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OS	CHRYSENE	2,300.00		UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OS	DI-N-BUTYL PHTHALATE	1,100.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OS	DI-N-OCTYL PHTHALATE	1,100.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OS	DIBENZO(A,H)ANTHRACENE	570.00	J	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OS	DIBENZOFURAN	1,100.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OS	DIETHYL PHTHALATE	1,100.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OS	DIMETHYL PHTHALATE	1,100.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OS	FLUORANTHENE	5,700.00		UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OS	FLUORENE	140.00	J	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OS	HEXACHLOROBENZENE	1,100.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OS	HEXACHLOROBUTADIENE	1,100.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OS	HEXACHLOROCYCLOPENTADIENE	1,100.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OS	HEXACHLOROETHANE	1,100.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OS	INDENO(1,2,3-CD)PYRENE	1,000.00	J	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OS	ISOPHORONE	1,100.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OS	N-NITROSO-DI-N-PROPYLAMINE	1,100.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OS	N-NITROSODIPHENYLAMINE	1,100.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OS	NAPHTHALENE	1,100.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OS	NITROBENZENE	1,100.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OS	PENTACHLOROPHENOL	2,700.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OS	PHENANTHRENE	4,200.00		UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OS	PHENOL	1,100.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OS	PYRENE	4,000.00		UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OV	1,1,1-TRICHLOROETHANE	11.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OV	1,1,2,2-TETRACHLOROETHANE	11.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OV	1,1,2-TRICHLOROETHANE	11.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OV	1,1-DICHLOROETHANE	11.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OV	1,1-DICHLOROETHENE	11.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OV	1,2-DICHLOROETHANE	11.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OV	1,2-DICHLOROETHENE (TOTAL)	11.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OV	1,2-DICHLOROPROPANE	11.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OV	2-BUTANONE	11.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OV	2-HEXANONE	11.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OV	4-METHYL-2-PENTANONE	11.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OV	ACETONE	12.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OV	BENZENE	11.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OV	BROMODICHLOROMETHANE	11.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OV	BROMOFORM	11.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OV	BROMOMETHANE	11.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OV	CARBON DISULFIDE	11.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OV	CARBON TETRACHLORIDE	11.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OV	CHLOROBENZENE	11.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OV	CHLOROETHANE	11.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OV	CHLOROFORM	11.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OV	CHLOROMETHANE	11.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OV	CIS-1,3-DICHLOROPROPENE	11.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OV	DIBROMOCHLOROMETHANE	11.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OV	ETHYLBENZENE	11.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OV	METHYLENE CHLORIDE	11.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OV	STYRENE	11.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OV	TETRACHLOROETHENE	11.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OV	TOLUENE	11.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OV	TRANS-1,3-DICHLOROPROPENE	11.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OV	TRICHLOROETHENE	11.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OV	VINYL ACETATE	11.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OV	VINYL CHLORIDE	11.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OV	XYLENES, TOTAL	11.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	OV	1,1,1-TRICHLOROETHANE	11.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OV	1,1,2,2-TETRACHLOROETHANE	11.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OV	1,1,2-TRICHLOROETHANE	11.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OV	1,1-DICHLOROETHANE	11.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OV	1,1-DICHLOROETHENE	11.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OV	1,2-DICHLOROETHANE	11.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OV	1,2-DICHLOROETHENE (TOTAL)	11.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OV	1,2-DICHLOROPROPANE	11.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OV	2-BUTANONE	11.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OV	2-HEXANONE	11.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OV	4-METHYL-2-PENTANONE	11.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OV	ACETONE	11.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OV	BENZENE	11.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OV	BROMODICHLOROMETHANE	11.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OV	BROMOFORM	11.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OV	BROMOMETHANE	11.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OV	CARBON DISULFIDE	11.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OV	CARBON TETRACHLORIDE	11.00	U	UG/KG	DUPLICATE

APPENDIX C.1 SOIL DATA
SITE 20 - AREA A WEAPONS CENTER, NEW LONDON, CONNECTICUT

Area	Location	Top	Bottom	Fraction	Parameter	Value	Qual	Units	SACODE
Drainage Area 1	2WCTB2	0	2	OV	CHLOROBENZENE	11.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OV	CHLOROETHANE	11.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OV	CHLOROFORM	11.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OV	CHLOROMETHANE	11.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OV	CIS-1,3-DICHLOROPROPENE	11.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OV	DIBROMOCHLOROMETHANE	11.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OV	ETHYLBENZENE	11.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OV	METHYLENE CHLORIDE	11.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OV	STYRENE	11.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OV	TETRACHLOROETHENE	11.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OV	TOLUENE	11.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OV	TRANS-1,3-DICHLOROPROPENE	11.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OV	TRICHLOROETHENE	11.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OV	VINYL ACETATE	11.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OV	VINYL CHLORIDE	11.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	OV	XYLENES, TOTAL	11.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	PEST/PCB	4,4'-DDD	37.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	PEST/PCB	4,4'-DDE	4.00	J	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	PEST/PCB	4,4'-DDT	37.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	PEST/PCB	ALDRIN	19.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	PEST/PCB	ALPHA-BHC	19.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	PEST/PCB	ALPHA-CHLORDANE	19.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	PEST/PCB	AROCLOR-1016	370.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	PEST/PCB	AROCLOR-1221	760.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	PEST/PCB	AROCLOR-1232	370.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	PEST/PCB	AROCLOR-1242	370.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	PEST/PCB	AROCLOR-1248	370.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	PEST/PCB	AROCLOR-1254	370.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	PEST/PCB	AROCLOR-1260	370.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	PEST/PCB	BETA-BHC	19.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	PEST/PCB	DELTA-BHC	19.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	PEST/PCB	DIELDRIN	37.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	PEST/PCB	ENDOSULFAN I	19.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	PEST/PCB	ENDOSULFAN II	37.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	PEST/PCB	ENDOSULFAN SULFATE	37.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	PEST/PCB	ENDRIN	11.00	J	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	PEST/PCB	ENDRIN ALDEHYDE	7.00	J	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	PEST/PCB	ENDRIN KETONE	37.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	PEST/PCB	GAMMA-BHC (LINDANE)	19.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	PEST/PCB	GAMMA-CHLORDANE	19.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	PEST/PCB	HEPTACHLOR	19.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	PEST/PCB	HEPTACHLOR EPOXIDE	19.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	PEST/PCB	METHOXYCHLOR	190.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	PEST/PCB	TOXAPHENE	1,900.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB2	0	2	PEST/PCB	4,4'-DDD	37.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	PEST/PCB	4,4'-DDE	7.40	J	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	PEST/PCB	4,4'-DDT	37.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	PEST/PCB	ALDRIN	19.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	PEST/PCB	ALPHA-BHC	19.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	PEST/PCB	ALPHA-CHLORDANE	19.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	PEST/PCB	AROCLOR-1016	370.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	PEST/PCB	AROCLOR-1221	760.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	PEST/PCB	AROCLOR-1232	370.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	PEST/PCB	AROCLOR-1242	370.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	PEST/PCB	AROCLOR-1248	370.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	PEST/PCB	AROCLOR-1254	370.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	PEST/PCB	AROCLOR-1260	370.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	PEST/PCB	BETA-BHC	19.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	PEST/PCB	DELTA-BHC	19.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	PEST/PCB	DIELDRIN	37.00	UJ	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	PEST/PCB	ENDOSULFAN I	19.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	PEST/PCB	ENDOSULFAN II	37.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	PEST/PCB	ENDOSULFAN SULFATE	37.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	PEST/PCB	ENDRIN	14.00	J	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	PEST/PCB	ENDRIN ALDEHYDE	37.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	PEST/PCB	ENDRIN KETONE	37.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	PEST/PCB	GAMMA-BHC (LINDANE)	19.00	UJ	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	PEST/PCB	GAMMA-CHLORDANE	19.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	PEST/PCB	HEPTACHLOR	19.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	PEST/PCB	HEPTACHLOR EPOXIDE	19.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	PEST/PCB	METHOXYCHLOR	190.00	UJ	UG/KG	DUPLICATE
Drainage Area 1	2WCTB2	0	2	PEST/PCB	TOXAPHENE	1,900.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WMW4S	0	2	M	ALUMINUM	4,810.00		MG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	M	ARSENIC	0.77		MG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	M	BARIUM	27.40		MG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	M	BERYLLIUM	0.21	U	MG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	M	CADMIUM	1.20		MG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	M	CALCIUM	758.00	J	MG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	M	CHROMIUM	5.90	J	MG/KG	NORMAL

APPENDIX C.1 SOIL DATA
SITE 20 - AREA A WEAPONS CENTER, NEW LONDON, CONNECTICUT

Area	Location	Top	Bottom	Fraction	Parameter	Value	Qual	Units	SACODE
Drainage Area 1	2WMW4S	0	2	M	COBALT	4.50		MG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	M	COPPER	6.70	J	MG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	M	CYANIDE	1.10	U	MG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	M	IRON	6,540.00		MG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	M	LEAD	3.60	J	MG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	M	MAGNESIUM	1,660.00	J	MG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	M	MANGANESE	121.00		MG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	M	MERCURY	0.10	U	MG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	M	NICKEL	4.40		MG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	M	POTASSIUM	1,170.00		MG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	M	SELENIUM	0.42	UJ	MG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	M	SILVER	1.70	UJ	MG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	M	SODIUM	152.00	J	MG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	M	THALLIUM	0.63	U	MG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	M	VANADIUM	9.80		MG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	M	ZINC	19.60	J	MG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OS	1,2,4-TRICHLOROBENZENE	350.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OS	1,2-DICHLOROBENZENE	350.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OS	1,3-DICHLOROBENZENE	350.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OS	1,4-DICHLOROBENZENE	350.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OS	2,4,5-TRICHLOROPHENOL	1,700.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OS	2,4,6-TRICHLOROPHENOL	350.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OS	2,4-DICHLOROPHENOL	350.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OS	2,4-DIMETHYLPHENOL	350.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OS	2,4-DINITROPHENOL	1,700.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OS	2,4-DINITROTOLUENE	350.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OS	2,6-DINITROTOLUENE	350.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OS	2-CHLORONAPHTHALENE	350.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OS	2-CHLOROPHENOL	350.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OS	2-METHYLNAPHTHALENE	350.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OS	2-METHYLPHENOL	350.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OS	2-NITROANILINE	1,700.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OS	2-NITROPHENOL	350.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OS	3,3'-DICHLOROBENZIDINE	700.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OS	3-NITROANILINE	1,700.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OS	4,6-DINITRO-2-METHYLPHENOL	1,700.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OS	4-BROMOPHENYL PHENYL ETHER	350.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OS	4-CHLORO-3-METHYLPHENOL	350.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OS	4-CHLOROANILINE	350.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OS	4-CHLOROPHENYL PHENYL ETHER	350.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OS	4-METHYLPHENOL	350.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OS	4-NITROANILINE	1,700.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OS	4-NITROPHENOL	1,700.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OS	ACENAPHTHENE	350.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OS	ACENAPHTHYLENE	350.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OS	ANTHRACENE	350.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OS	BENZO(A)ANTHRACENE	350.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OS	BENZO(A)PYRENE	350.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OS	BENZO(B)FLUORANTHENE	350.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OS	BENZO(G,H,I)PERYLENE	350.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OS	BENZO(K)FLUORANTHENE	350.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OS	BENZOIC ACID	1,700.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OS	BENZYL ALCOHOL	350.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OS	BIS(2-CHLOROETHOXY)METHANE	350.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OS	BIS(2-CHLOROETHYL)ETHER	350.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OS	BIS(2-CHLOROISOPROPYL) ETHER	350.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OS	BIS(2-ETHYLHEXYL)PHTHALATE	35.00	J	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OS	BUTYLBENZYL PHTHALATE	350.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OS	CHRYSENE	350.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OS	DI-N-BUTYL PHTHALATE	350.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OS	DI-N-OCTYL PHTHALATE	350.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OS	DIBENZO(A,H)ANTHRACENE	350.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OS	DIBENZOFURAN	350.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OS	DIETHYL PHTHALATE	350.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OS	DIMETHYL PHTHALATE	350.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OS	FLUORANTHENE	350.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OS	FLUORENE	350.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OS	HEXACHLOROBENZENE	350.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OS	HEXACHLOROBUTADIENE	350.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OS	HEXACHLOROCYCLOPENTADIENE	350.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OS	HEXACHLOROETHANE	350.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OS	INDENO(1,2,3-CD)PYRENE	350.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OS	ISOPHORONE	350.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OS	N-NITROSO-DI-N-PROPYLAMINE	350.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OS	N-NITROSODIPHENYLAMINE	350.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OS	NAPHTHALENE	350.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OS	NITROBENZENE	350.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OS	PENTACHLOROPHENOL	1,700.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OS	PHENANTHRENE	350.00	U	UG/KG	NORMAL

APPENDIX C.1 SOIL DATA
SITE 20 - AREA A WEAPONS CENTER, NEW LONDON, CONNECTICUT

Area	Location	Top	Bottom	Fraction	Parameter	Value	Qual	Units	SACODE
Drainage Area 1	2WMW4S	0	2	OS	PHENOL	350.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OS	PYRENE	350.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OV	1,1,1-TRICHLOROETHANE	5.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OV	1,1,2,2-TETRACHLOROETHANE	5.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OV	1,1,2-TRICHLOROETHANE	5.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OV	1,1-DICHLOROETHANE	5.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OV	1,1-DICHLOROETHENE	5.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OV	1,2-DICHLOROETHANE	5.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OV	1,2-DICHLOROETHENE (TOTAL)	5.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OV	1,2-DICHLOROPROPANE	5.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OV	2-BUTANONE	11.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OV	2-HEXANONE	11.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OV	4-METHYL-2-PENTANONE	11.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OV	ACETONE	11.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OV	BENZENE	5.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OV	BROMODICHLOROMETHANE	5.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OV	BROMOFORM	5.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OV	BROMOMETHANE	11.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OV	CARBON DISULFIDE	5.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OV	CARBON TETRACHLORIDE	5.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OV	CHLOROBENZENE	5.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OV	CHLOROETHANE	11.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OV	CHLOROFORM	5.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OV	CHLOROMETHANE	11.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OV	CIS-1,3-DICHLOROPROPENE	5.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OV	DIBROMOCHLOROMETHANE	5.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OV	ETHYLBENZENE	5.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OV	METHYLENE CHLORIDE	5.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OV	STYRENE	5.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OV	TETRACHLOROETHENE	5.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OV	TOLUENE	5.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OV	TRANS-1,3-DICHLOROPROPENE	5.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OV	TRICHLOROETHENE	5.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OV	VINYL ACETATE	11.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OV	VINYL CHLORIDE	11.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	OV	XYLENES, TOTAL	5.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	PEST/PCB	4,4'-DDD	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	PEST/PCB	4,4'-DDE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	PEST/PCB	4,4'-DDT	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	PEST/PCB	ALDRIN	8.50	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	PEST/PCB	ALPHA-BHC	8.50	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	PEST/PCB	ALPHA-CHLORDANE	85.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	PEST/PCB	AROCLOR-1016	85.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	PEST/PCB	AROCLOR-1221	85.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	PEST/PCB	AROCLOR-1232	85.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	PEST/PCB	AROCLOR-1242	85.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	PEST/PCB	AROCLOR-1248	85.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	PEST/PCB	AROCLOR-1254	170.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	PEST/PCB	AROCLOR-1260	50.00	J	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	PEST/PCB	BETA-BHC	8.50	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	PEST/PCB	DELTA-BHC	8.50	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	PEST/PCB	DIELDRIN	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	PEST/PCB	ENDOSULFAN I	8.50	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	PEST/PCB	ENDOSULFAN II	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	PEST/PCB	ENDOSULFAN SULFATE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	PEST/PCB	ENDRIN	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	PEST/PCB	ENDRIN KETONE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	PEST/PCB	GAMMA-BHC (LINDANE)	8.50	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	PEST/PCB	GAMMA-CHLORDANE	85.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	PEST/PCB	HEPTACHLOR	8.50	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	PEST/PCB	HEPTACHLOR EPOXIDE	8.50	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	PEST/PCB	METHOXYCHLOR	85.00	U	UG/KG	NORMAL
Drainage Area 1	2WMW4S	0	2	PEST/PCB	TOXAPHENE	170.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	M	ALUMINUM	6,040.00		MG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	M	ANTIMONY	4.70	J	MG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	M	ARSENIC	1.80	U	MG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	M	BARIUM	27.50	J	MG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	M	BERYLLIUM	0.32	J	MG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	M	BORON	10.60	U	MG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	M	CADMIUM	0.43	J	MG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	M	CALCIUM	863.00	J	MG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	M	CHROMIUM	10.90		MG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	M	COBALT	4.50	J	MG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	M	COPPER	8.60	J	MG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	M	IRON	9,200.00		MG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	M	LEAD	3.50		MG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	M	MAGNESIUM	2,240.00		MG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	M	MANGANESE	137.00		MG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	M	MERCURY	0.11	U	MG/KG	NORMAL

Area	Location	Top	Bottom	Fraction	Parameter	Value	Qual	Units	SACODE
Drainage Area 3	2WCMW1S	0	2	M	NICKEL	5.40	J	MG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	M	POTASSIUM	1,390.00	J	MG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	M	SELENIUM	0.43	U	MG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	M	SILVER	0.43	U	MG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	M	SODIUM	214.00	J	MG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	M	THALLIUM	0.64	U	MG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	M	VANADIUM	13.50	J	MG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	M	ZINC	17.80	J	MG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OS	1,2,4-TRICHLOROBENZENE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OS	1,2-DICHLOROBENZENE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OS	1,3-DICHLOROBENZENE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OS	1,4-DICHLOROBENZENE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OS	2,4,5-TRICHLOROPHENOL	850.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OS	2,4,6-TRICHLOROPHENOL	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OS	2,4-DICHLOROPHENOL	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OS	2,4-DIMETHYLPHENOL	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OS	2,4-DINITROPHENOL	850.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OS	2,4-DINITROTOLUENE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OS	2,6-DINITROTOLUENE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OS	2-CHLORONAPHTHALENE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OS	2-CHLOROPHENOL	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OS	2-METHYLNAPHTHALENE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OS	2-METHYLPHENOL	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OS	2-NITROANILINE	850.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OS	2-NITROPHENOL	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OS	3,3'-DICHLOROBENZIDINE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OS	3-NITROANILINE	850.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OS	4,6-DINITRO-2-METHYLPHENOL	850.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OS	4-BROMOPHENYL PHENYL ETHER	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OS	4-CHLORO-3-METHYLPHENOL	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OS	4-CHLOROANILINE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OS	4-CHLOROPHENYL PHENYL ETHER	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OS	4-METHYLPHENOL	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OS	4-NITROANILINE	850.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OS	4-NITROPHENOL	850.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OS	ACENAPHTHENE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OS	ACENAPHTHYLENE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OS	ANTHRACENE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OS	BENZO(A)ANTHRACENE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OS	BENZO(A)PYRENE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OS	BENZO(B)FLUORANTHENE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OS	BENZO(G,H,I)PERYLENE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OS	BENZO(K)FLUORANTHENE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OS	BENZOIC ACID	1,700.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OS	BENZYL ALCOHOL	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OS	BIS(2-CHLOROETHOXY)METHANE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OS	BIS(2-CHLOROETHYL)ETHER	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OS	BIS(2-CHLOROISOPROPYL) ETHER	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OS	BIS(2-ETHYLHEXYL)PHTHALATE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OS	BUTYLBENZYL PHTHALATE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OS	CARBAZOLE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OS	CHRYSENE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OS	DI-N-BUTYL PHTHALATE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OS	DI-N-OCTYL PHTHALATE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OS	DIBENZO(A,H)ANTHRACENE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OS	DIBENZOFURAN	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OS	DIETHYL PHTHALATE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OS	DIMETHYL PHTHALATE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OS	FLUORANTHENE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OS	FLUORENE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OS	HEXACHLOROBENZENE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OS	HEXACHLOROBUTADIENE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OS	HEXACHLOROCYCLOPENTADIENE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OS	HEXACHLOROETHANE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OS	INDENO(1,2,3-CD)PYRENE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OS	ISOPHORONE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OS	N-NITROSO-DI-N-PROPYLAMINE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OS	N-NITROSODIPHENYLAMINE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OS	NAPHTHALENE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OS	NITROBENZENE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OS	PENTACHLOROPHENOL	850.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OS	PHENANTHRENE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OS	PHENOL	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OS	PYRENE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OV	1,1,1-TRICHLOROETHANE	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OV	1,1,2,2-TETRACHLOROETHANE	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OV	1,1,2-TRICHLOROETHANE	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OV	1,1-DICHLOROETHANE	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OV	1,1-DICHLOROETHENE	11.00	U	UG/KG	NORMAL

APPENDIX C.1 SOIL DATA
SITE 20 - AREA A WEAPONS CENTER, NEW LONDON, CONNECTICUT

Area	Location	Top	Bottom	Fraction	Parameter	Value	Qual	Units	SACODE
Drainage Area 3	2WCMW1S	0	2	OV	1,2-DICHLOROETHANE	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OV	1,2-DICHLOROETHENE (TOTAL)	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OV	1,2-DICHLOROPROPANE	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OV	2-BUTANONE	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OV	2-HEXANONE	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OV	4-METHYL-2-PENTANONE	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OV	ACETONE	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OV	BENZENE	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OV	BROMODICHLOROMETHANE	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OV	BROMOFORM	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OV	BROMOMETHANE	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OV	CARBON DISULFIDE	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OV	CARBON TETRACHLORIDE	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OV	CHLOROBENZENE	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OV	CHLOROETHANE	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OV	CHLOROFORM	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OV	CHLOROMETHANE	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OV	CIS-1,3-DICHLOROPROPENE	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OV	DIBROMOCHLOROMETHANE	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OV	ETHYLBENZENE	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OV	METHYLENE CHLORIDE	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OV	STYRENE	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OV	TETRACHLOROETHENE	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OV	TOLUENE	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OV	TRANS-1,3-DICHLOROPROPENE	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OV	TRICHLOROETHENE	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OV	VINYL ACETATE	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OV	VINYL CHLORIDE	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW1S	0	2	OV	XYLENES, TOTAL	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	M	ALUMINUM	6,360.00		MG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	M	ANTIMONY	5.40	J	MG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	M	ARSENIC	1.90	U	MG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	M	BARIUM	60.80	J	MG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	M	BERYLLIUM	0.23	J	MG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	M	BORON	10.40	U	MG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	M	CADMIUM	0.42	U	MG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	M	CALCIUM	1,870.00	J	MG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	M	CHROMIUM	10.80		MG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	M	COBALT	4.60	J	MG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	M	COPPER	10.80	J	MG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	M	IRON	10,800.00		MG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	M	LEAD	8.30		MG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	M	MAGNESIUM	3,520.00		MG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	M	MANGANESE	257.00		MG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	M	MERCURY	0.10	U	MG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	M	NICKEL	8.40	J	MG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	M	POTASSIUM	2,900.00		MG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	M	SELENIUM	0.42	U	MG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	M	SILVER	0.42	U	MG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	M	SODIUM	213.00	J	MG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	M	THALLIUM	0.62	U	MG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	M	VANADIUM	17.50	J	MG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	M	ZINC	46.50	J	MG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OS	1,2,4-TRICHLOROBENZENE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OS	1,2-DICHLOROBENZENE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OS	1,3-DICHLOROBENZENE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OS	1,4-DICHLOROBENZENE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OS	2,4,5-TRICHLOROPHENOL	840.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OS	2,4,6-TRICHLOROPHENOL	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OS	2,4-DICHLOROPHENOL	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OS	2,4-DIMETHYLPHENOL	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OS	2,4-DINITROPHENOL	840.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OS	2,4-DINITROTOLUENE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OS	2,6-DINITROTOLUENE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OS	2-CHLORONAPHTHALENE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OS	2-CHLOROPHENOL	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OS	2-METHYLNAPHTHALENE	54.00	J	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OS	2-METHYLPHENOL	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OS	2-NITROANILINE	840.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OS	2-NITROPHENOL	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OS	3,3'-DICHLOROBENZIDINE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OS	3-NITROANILINE	840.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OS	4,6-DINITRO-2-METHYLPHENOL	840.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OS	4-BROMOPHENYL PHENYL ETHER	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OS	4-CHLORO-3-METHYLPHENOL	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OS	4-CHLOROANILINE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OS	4-CHLOROPHENYL PHENYL ETHER	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OS	4-METHYLPHENOL	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OS	4-NITROANILINE	840.00	U	UG/KG	NORMAL

APPENDIX C.1 SOIL DATA
SITE 20 - AREA A WEAPONS CENTER, NEW LONDON, CONNECTICUT

Area	Location	Top	Bottom	Fraction	Parameter	Value	Qual	Units	SACODE
Drainage Area 3	2WCTB1	0	2	OS	4-NITROPHENOL	840.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OS	ACENAPHTHENE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OS	ACENAPHTHYLENE	31.00	J	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OS	ANTHRACENE	66.00	J	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OS	BENZO(A)ANTHRACENE	270.00	J	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OS	BENZO(A)PYRENE	270.00	J	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OS	BENZO(B)FLUORANTHENE	270.00	J	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OS	BENZO(G,H,I)PERYLENE	200.00	J	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OS	BENZO(K)FLUORANTHENE	220.00	J	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OS	BENZOIC ACID	1,700.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OS	BENZYL ALCOHOL	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OS	BIS(2-CHLOROETHOXY)METHANE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OS	BIS(2-CHLOROETHYL)ETHER	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OS	BIS(2-CHLOROISOPROPYL) ETHER	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OS	BIS(2-ETHYLHEXYL)PHTHALATE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OS	BUTYLBENZYL PHTHALATE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OS	CARBAZOLE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OS	CHRYSENE	280.00	J	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OS	DI-N-BUTYL PHTHALATE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OS	DI-N-OCTYL PHTHALATE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OS	DIBENZO(A,H)ANTHRACENE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OS	DIBENZOFURAN	31.00	J	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OS	DIETHYL PHTHALATE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OS	DIMETHYL PHTHALATE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OS	FLUORANTHENE	550.00	J	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OS	FLUORENE	85.00	J	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OS	HEXACHLOROBENZENE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OS	HEXACHLOROBUTADIENE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OS	HEXACHLOROCYCLOPENTADIENE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OS	HEXACHLOROETHANE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OS	INDENO(1,2,3-CD)PYRENE	170.00	J	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OS	ISOPHORONE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OS	N-NITROSO-DI-N-PROPYLAMINE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OS	N-NITROSODIPHENYLAMINE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OS	NAPHTHALENE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OS	NITROBENZENE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OS	PENTACHLOROPHENOL	840.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OS	PHENANTHRENE	440.00		UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OS	PHENOL	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OS	PYRENE	560.00		UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OV	1,1,1-TRICHLOROETHANE	10.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OV	1,1,2,2-TETRACHLOROETHANE	10.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OV	1,1,2-TRICHLOROETHANE	10.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OV	1,1-DICHLOROETHANE	10.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OV	1,1-DICHLOROETHENE	10.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OV	1,2-DICHLOROETHANE	10.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OV	1,2-DICHLOROETHENE (TOTAL)	10.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OV	1,2-DICHLOROPROPANE	10.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OV	2-BUTANONE	10.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OV	2-HEXANONE	10.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OV	4-METHYL-2-PENTANONE	10.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OV	ACETONE	6.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OV	BENZENE	10.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OV	BROMODICHLOROMETHANE	10.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OV	BROMOFORM	10.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OV	BROMOMETHANE	10.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OV	CARBON DISULFIDE	10.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OV	CARBON TETRACHLORIDE	10.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OV	CHLOROBENZENE	10.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OV	CHLOROETHANE	10.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OV	CHLOROFORM	10.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OV	CHLOROMETHANE	10.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OV	CIS-1,3-DICHLOROPROPENE	10.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OV	DIBROMOCHLOROMETHANE	10.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OV	ETHYLBENZENE	10.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OV	METHYLENE CHLORIDE	10.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OV	STYRENE	10.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OV	TETRACHLOROETHENE	10.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OV	TOLUENE	10.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OV	TRANS-1,3-DICHLOROPROPENE	10.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OV	TRICHLOROETHENE	10.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OV	VINYL ACETATE	10.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OV	VINYL CHLORIDE	10.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	OV	XYLENES, TOTAL	10.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	PEST/PCB	4,4'-DDD	35.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	PEST/PCB	4,4'-DDE	35.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	PEST/PCB	4,4'-DDT	35.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	PEST/PCB	ALDRIN	18.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	PEST/PCB	ALPHA-BHC	18.00	U	UG/KG	NORMAL

APPENDIX C.1 SOIL DATA
SITE 20 - AREA A WEAPONS CENTER, NEW LONDON, CONNECTICUT

Area	Location	Top	Bottom	Fraction	Parameter	Value	Qual	Units	SACODE
Drainage Area 3	2WCTB1	0	2	PEST/PCB	ALPHA-CHLORDANE	18.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	PEST/PCB	AROCLOR-1016	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	PEST/PCB	AROCLOR-1221	710.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	PEST/PCB	AROCLOR-1232	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	PEST/PCB	AROCLOR-1242	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	PEST/PCB	AROCLOR-1248	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	PEST/PCB	AROCLOR-1254	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	PEST/PCB	AROCLOR-1260	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	PEST/PCB	BETA-BHC	18.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	PEST/PCB	DELTA-BHC	18.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	PEST/PCB	DIELDRIN	35.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	PEST/PCB	ENDOSULFAN I	18.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	PEST/PCB	ENDOSULFAN II	35.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	PEST/PCB	ENDOSULFAN SULFATE	35.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	PEST/PCB	ENDRIN	11.00	J	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	PEST/PCB	ENDRIN ALDEHYDE	35.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	PEST/PCB	ENDRIN KETONE	35.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	PEST/PCB	GAMMA-BHC (LINDANE)	18.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	PEST/PCB	GAMMA-CHLORDANE	18.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	PEST/PCB	HEPTACHLOR	18.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	PEST/PCB	HEPTACHLOR EPOXIDE	18.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	PEST/PCB	METHOXYCHLOR	180.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB1	0	2	PEST/PCB	TOXAPHENE	1,800.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	M	ALUMINUM	11,100.00		MG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	M	ARSENIC	1.60	U	MG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	M	BARIUM	131.00		MG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	M	BERYLLIUM	0.33	J	MG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	M	BORON	10.40	U	MG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	M	CADMIUM	0.42	U	MG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	M	CALCIUM	2,080.00	J	MG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	M	CHROMIUM	21.00		MG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	M	COBALT	8.60	J	MG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	M	COPPER	15.20	J	MG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	M	IRON	20,800.00		MG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	M	LEAD	2.40	J	MG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	M	MAGNESIUM	6,910.00		MG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	M	MANGANESE	390.00		MG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	M	MERCURY	0.10	U	MG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	M	NICKEL	9.40	J	MG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	M	POTASSIUM	6,300.00		MG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	M	SELENIUM	0.42	U	MG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	M	SILVER	0.42	U	MG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	M	SODIUM	264.00	J	MG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	M	THALLIUM	0.63	U	MG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	M	VANADIUM	46.10		MG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	M	ZINC	49.00	J	MG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OS	1,2,4-TRICHLOROBENZENE	340.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OS	1,2-DICHLOROBENZENE	340.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OS	1,3-DICHLOROBENZENE	340.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OS	1,4-DICHLOROBENZENE	340.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OS	2,4,5-TRICHLOROPHENOL	830.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OS	2,4,6-TRICHLOROPHENOL	340.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OS	2,4-DICHLOROPHENOL	340.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OS	2,4-DIMETHYLPHENOL	340.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OS	2,4-DINITROPHENOL	830.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OS	2,4-DINITROTOLUENE	340.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OS	2,6-DINITROTOLUENE	340.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OS	2-CHLORONAPHTHALENE	340.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OS	2-CHLOROPHENOL	340.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OS	2-METHYLNAPHTHALENE	38.00	J	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OS	2-METHYLPHENOL	340.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OS	2-NITROANILINE	830.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OS	2-NITROPHENOL	340.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OS	3,3'-DICHLOROBENZIDINE	340.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OS	3-NITROANILINE	830.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OS	4,6-DINITRO-2-METHYLPHENOL	830.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OS	4-BROMOPHENYL PHENYL ETHER	340.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OS	4-CHLORO-3-METHYLPHENOL	340.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OS	4-CHLOROANILINE	340.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OS	4-CHLOROPHENYL PHENYL ETHER	340.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OS	4-METHYLPHENOL	340.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OS	4-NITROANILINE	830.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OS	4-NITROPHENOL	830.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OS	ACENAPHTHENE	340.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OS	ACENAPHTHYLENE	340.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OS	ANTHRACENE	340.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OS	BENZO(A)ANTHRACENE	340.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OS	BENZO(A)PYRENE	340.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OS	BENZO(B)FLUORANTHENE	340.00	UJ	UG/KG	NORMAL

Area	Location	Top	Bottom	Fraction	Parameter	Value	Qual	Units	SACODE
Drainage Area 3	2WCTB4	2	4	OS	BENZO(G,H,I)PERYLENE	340.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OS	BENZO(K)FLUORANTHENE	340.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OS	BENZOIC ACID	1,700.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OS	BENZYL ALCOHOL	340.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OS	BIS(2-CHLOROETHOXY)METHANE	340.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OS	BIS(2-CHLOROETHYL)ETHER	340.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OS	BIS(2-CHLOROISOPROPYL) ETHER	340.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OS	BIS(2-ETHYLHEXYL)PHTHALATE	490.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OS	BUTYLBENZYL PHTHALATE	340.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OS	CARBAZOLE	340.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OS	CHRYSENE	340.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OS	DI-N-BUTYL PHTHALATE	340.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OS	DI-N-OCTYL PHTHALATE	89.00	J	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OS	DIBENZO(A,H)ANTHRACENE	340.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OS	DIBENZOFURAN	340.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OS	DIETHYL PHTHALATE	340.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OS	DIMETHYL PHTHALATE	340.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OS	FLUORANTHENE	340.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OS	FLUORENE	340.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OS	HEXACHLOROBENZENE	340.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OS	HEXACHLOROBUTADIENE	340.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OS	HEXACHLOROCYCLOPENTADIENE	340.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OS	HEXACHLOROETHANE	340.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OS	INDENO(1,2,3-CD)PYRENE	340.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OS	ISOPHORONE	340.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OS	N-NITROSO-DI-N-PROPYLAMINE	340.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OS	N-NITROSODIPHENYLAMINE	340.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OS	NAPHTHALENE	340.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OS	NITROBENZENE	340.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OS	PENTACHLOROPHENOL	830.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OS	PHENANTHRENE	340.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OS	PHENOL	340.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OS	PYRENE	340.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OV	1,1,1-TRICHLOROETHANE	10.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OV	1,1,2,2-TETRACHLOROETHANE	10.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OV	1,1,2-TRICHLOROETHANE	10.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OV	1,1-DICHLOROETHANE	10.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OV	1,1-DICHLOROETHENE	10.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OV	1,2-DICHLOROETHANE	10.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OV	1,2-DICHLOROETHENE (TOTAL)	10.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OV	1,2-DICHLOROPROPANE	10.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OV	2-BUTANONE	10.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OV	2-HEXANONE	10.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OV	4-METHYL-2-PENTANONE	10.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OV	ACETONE	7.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OV	BENZENE	10.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OV	BROMODICHLOROMETHANE	10.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OV	BROMOFORM	10.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OV	BROMOMETHANE	10.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OV	CARBON DISULFIDE	10.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OV	CARBON TETRACHLORIDE	10.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OV	CHLOROBENZENE	10.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OV	CHLOROETHANE	10.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OV	CHLOROFORM	10.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OV	CHLOROMETHANE	10.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OV	CIS-1,3-DICHLOROPROPENE	10.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OV	DIBROMOCHLOROMETHANE	10.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OV	ETHYLBENZENE	10.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OV	METHYLENE CHLORIDE	10.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OV	STYRENE	10.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OV	TETRACHLOROETHENE	10.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OV	TOLUENE	10.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OV	TRANS-1,3-DICHLOROPROPENE	10.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OV	TRICHLOROETHENE	10.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OV	VINYL ACETATE	10.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OV	VINYL CHLORIDE	10.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	OV	XYLENES, TOTAL	10.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	PEST/PCB	4,4'-DDD	34.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	PEST/PCB	4,4'-DDE	34.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	PEST/PCB	4,4'-DDT	34.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	PEST/PCB	ALDRIN	18.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	PEST/PCB	ALPHA-BHC	18.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	PEST/PCB	ALPHA-CHLORDANE	18.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	PEST/PCB	AROCLOR-1016	340.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	PEST/PCB	AROCLOR-1221	700.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	PEST/PCB	AROCLOR-1232	340.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	PEST/PCB	AROCLOR-1242	340.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	PEST/PCB	AROCLOR-1248	340.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	PEST/PCB	AROCLOR-1254	340.00	U	UG/KG	NORMAL

APPENDIX C.1 SOIL DATA
SITE 20 - AREA A WEAPONS CENTER, NEW LONDON, CONNECTICUT

Area	Location	Top	Bottom	Fraction	Parameter	Value	Qual	Units	SACODE
Drainage Area 3	2WCTB4	2	4	PEST/PCB	AROCLOR-1260	340.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	PEST/PCB	BETA-BHC	18.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	PEST/PCB	DELTA-BHC	18.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	PEST/PCB	DIELDRIN	34.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	PEST/PCB	ENDOSULFAN I	18.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	PEST/PCB	ENDOSULFAN II	34.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	PEST/PCB	ENDOSULFAN SULFATE	34.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	PEST/PCB	ENDRIN	34.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	PEST/PCB	ENDRIN ALDEHYDE	34.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	PEST/PCB	ENDRIN KETONE	34.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	PEST/PCB	GAMMA-BHC (LINDANE)	18.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	PEST/PCB	GAMMA-CHLORDANE	18.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	PEST/PCB	HEPTACHLOR	18.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	PEST/PCB	HEPTACHLOR EPOXIDE	18.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	PEST/PCB	METHOXYCHLOR	180.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB4	2	4	PEST/PCB	TOXAPHENE	1,800.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	M	ALUMINUM	18,200.00		MG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	M	ANTIMONY	24.00	U	MG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	M	ARSENIC	10.80		MG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	M	BARIUM	64.00		MG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	M	BERYLLIUM	0.68		MG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	M	BORON	25.90	J	MG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	M	CADMIUM	0.67	U	MG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	M	CALCIUM	2,700.00		MG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	M	CHROMIUM	78.70		MG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	M	COBALT	6.60		MG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	M	COPPER	41.40		MG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	M	IRON	28,600.00		MG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	M	LEAD	66.10	J	MG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	M	MAGNESIUM	7,170.00		MG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	M	MANGANESE	276.00		MG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	M	MERCURY	0.29		MG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	M	NICKEL	22.70		MG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	M	POTASSIUM	4,560.00	J	MG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	M	SELENIUM	1.30	U	MG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	M	SILVER	1.50		MG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	M	SODIUM	653.00		MG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	M	THALLIUM	0.33	U	MG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	M	VANADIUM	49.60		MG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	M	ZINC	66.70	J	MG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OS	1,2,4-TRICHLOROBENZENE	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OS	1,2-DICHLOROBENZENE	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OS	1,3-DICHLOROBENZENE	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OS	1,4-DICHLOROBENZENE	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OS	2,4,5-TRICHLOROPHENOL	1,300.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OS	2,4,6-TRICHLOROPHENOL	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OS	2,4-DICHLOROPHENOL	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OS	2,4-DIMETHYLPHENOL	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OS	2,4-DINITROPHENOL	1,300.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OS	2,4-DINITROTOLUENE	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OS	2,6-DINITROTOLUENE	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OS	2-CHLORONAPHTHALENE	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OS	2-CHLOROPHENOL	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OS	2-METHYLNAPHTHALENE	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OS	2-METHYLPHENOL	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OS	2-NITROANILINE	1,300.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OS	2-NITROPHENOL	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OS	3,3'-DICHLOROBENZIDINE	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OS	3-NITROANILINE	1,300.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OS	4,6-DINITRO-2-METHYLPHENOL	1,300.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OS	4-BROMOPHENYL PHENYL ETHER	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OS	4-CHLORO-3-METHYLPHENOL	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OS	4-CHLOROANILINE	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OS	4-CHLOROPHENYL PHENYL ETHER	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OS	4-METHYLPHENOL	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OS	4-NITROANILINE	1,300.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OS	4-NITROPHENOL	1,300.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OS	ACENAPHTHENE	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OS	ACENAPHTHYLENE	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OS	ANTHRACENE	30.00	J	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OS	BENZO(A)ANTHRACENE	140.00	J	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OS	BENZO(A)PYRENE	180.00	J	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OS	BENZO(B)FLUORANTHENE	210.00	J	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OS	BENZO(G,H,I)PERYLENE	98.00	J	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OS	BENZO(K)FLUORANTHENE	200.00	J	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OS	BENZOIC ACID	370.00	J	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OS	BENZYL ALCOHOL	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OS	BIS(2-CHLOROETHOXY)METHANE	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OS	BIS(2-CHLOROETHYL)ETHER	550.00	U	UG/KG	NORMAL

Area	Location	Top	Bottom	Fraction	Parameter	Value	Qual	Units	SACODE
Drainage Area 1	2WCTB3	4	6	OS	BIS(2-CHLOROISOPROPYL) ETHER	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OS	BIS(2-ETHYLHEXYL)PHTHALATE	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OS	BUTYLBENZYL PHTHALATE	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OS	CARBAZOLE	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OS	CHRYSENE	220.00	J	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OS	DI-N-BUTYL PHTHALATE	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OS	DI-N-OCTYL PHTHALATE	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OS	DIBENZO(A,H)ANTHRACENE	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OS	DIBENZOFURAN	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OS	DIETHYL PHTHALATE	28.00	J	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OS	DIMETHYL PHTHALATE	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OS	FLUORANTHENE	220.00	J	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OS	FLUORENE	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OS	HEXACHLOROBENZENE	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OS	HEXACHLOROBUTADIENE	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OS	HEXACHLOROCYCLOPENTADIENE	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OS	HEXACHLOROETHANE	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OS	INDENO(1,2,3-CD)PYRENE	110.00	J	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OS	ISOPHORONE	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OS	N-NITROSO-DI-N-PROPYLAMINE	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OS	N-NITROSODIPHENYLAMINE	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OS	NAPHTHALENE	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OS	NITROBENZENE	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OS	PENTACHLOROPHENOL	1,300.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OS	PHENANTHRENE	110.00	J	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OS	PHENOL	550.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OS	PYRENE	310.00	J	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OV	1,1,1-TRICHLOROETHANE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OV	1,1,2,2-TETRACHLOROETHANE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OV	1,1,2-TRICHLOROETHANE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OV	1,1-DICHLOROETHANE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OV	1,1-DICHLOROETHENE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OV	1,2-DICHLOROETHANE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OV	1,2-DICHLOROETHENE (TOTAL)	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OV	1,2-DICHLOROPROPANE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OV	2-BUTANONE	46.00		UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OV	2-HEXANONE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OV	4-METHYL-2-PENTANONE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OV	ACETONE	160.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OV	BENZENE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OV	BROMODICHLOROMETHANE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OV	BROMOFORM	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OV	BROMOMETHANE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OV	CARBON DISULFIDE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OV	CARBON TETRACHLORIDE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OV	CHLOROBENZENE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OV	CHLOROETHANE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OV	CHLOROFORM	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OV	CHLOROMETHANE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OV	CIS-1,3-DICHLOROPROPENE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OV	DIBROMOCHLOROMETHANE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OV	ETHYLBENZENE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OV	METHYLENE CHLORIDE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OV	STYRENE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OV	TETRACHLOROETHENE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OV	TOLUENE	2.00	J	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OV	TRANS-1,3-DICHLOROPROPENE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OV	TRICHLOROETHENE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OV	VINYL ACETATE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OV	VINYL CHLORIDE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB3	4	6	OV	XYLENES, TOTAL	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	M	ALUMINUM	16,000.00		MG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	M	ANTIMONY	22.20	U	MG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	M	ARSENIC	10.70		MG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	M	BARIUM	49.90		MG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	M	BERYLLIUM	0.67	J	MG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	M	BORON	30.70	J	MG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	M	CADMIUM	0.67	U	MG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	M	CALCIUM	3,020.00		MG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	M	CHROMIUM	52.30		MG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	M	COBALT	6.90		MG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	M	COPPER	26.40		MG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	M	IRON	26,700.00		MG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	M	LEAD	22.20	J	MG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	M	MAGNESIUM	6,900.00		MG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	M	MANGANESE	229.00		MG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	M	MERCURY	0.17	U	MG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	M	NICKEL	22.70		MG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	M	POTASSIUM	4,300.00	J	MG/KG	NORMAL

APPENDIX C.1 SOIL DATA
SITE 20 - AREA A WEAPONS CENTER, NEW LONDON, CONNECTICUT

Area	Location	Top	Bottom	Fraction	Parameter	Value	Qual	Units	SACODE
Drainage Area 1	2WCTB5	6	8	M	SELENIUM	1.10	U	MG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	M	SILVER	0.67	U	MG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	M	SODIUM	1,450.00		MG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	M	THALLIUM	0.34	UJ	MG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	M	VANADIUM	46.10		MG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	M	ZINC	67.50	J	MG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OS	1,2,4-TRICHLOROBENZENE	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OS	1,2-DICHLOROBENZENE	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OS	1,3-DICHLOROBENZENE	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OS	1,4-DICHLOROBENZENE	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OS	2,4,5-TRICHLOROPHENOL	1,400.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OS	2,4,6-TRICHLOROPHENOL	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OS	2,4-DICHLOROPHENOL	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OS	2,4-DIMETHYLPHENOL	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OS	2,4-DINITROPHENOL	1,400.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OS	2,4-DINITROTOLUENE	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OS	2,6-DINITROTOLUENE	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OS	2-CHLORONAPHTHALENE	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OS	2-CHLOROPHENOL	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OS	2-METHYLNAPHTHALENE	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OS	2-METHYLPHENOL	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OS	2-NITROANILINE	1,400.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OS	2-NITROPHENOL	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OS	3,3'-DICHLOROBENZIDINE	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OS	3-NITROANILINE	1,400.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OS	4,6-DINITRO-2-METHYLPHENOL	1,400.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OS	4-BROMOPHENYL PHENYL ETHER	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OS	4-CHLORO-3-METHYLPHENOL	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OS	4-CHLOROANILINE	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OS	4-CHLOROPHENYL PHENYL ETHER	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OS	4-METHYLPHENOL	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OS	4-NITROANILINE	1,400.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OS	4-NITROPHENOL	1,400.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OS	ACENAPHTHENE	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OS	ACENAPHTHYLENE	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OS	ANTHRACENE	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OS	BENZO(A)ANTHRACENE	79.00	J	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OS	BENZO(A)PYRENE	100.00	J	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OS	BENZO(B)FLUORANTHENE	200.00	J	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OS	BENZO(G,H,I)PERYLENE	60.00	J	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OS	BENZO(K)FLUORANTHENE	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OS	BENZOIC ACID	480.00	J	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OS	BENZYL ALCOHOL	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OS	BIS(2-CHLOROETHOXY)METHANE	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OS	BIS(2-CHLOROETHYL)ETHER	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OS	BIS(2-CHLOROISOPROPYL) ETHER	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OS	BIS(2-ETHYLHEXYL)PHTHALATE	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OS	BUTYLBENZYL PHTHALATE	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OS	CARBAZOLE	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OS	CHRYSENE	130.00	J	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OS	DI-N-BUTYL PHTHALATE	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OS	DI-N-OCTYL PHTHALATE	29.00	J	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OS	DIBENZO(A,H)ANTHRACENE	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OS	DIBENZOFURAN	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OS	DIETHYL PHTHALATE	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OS	DIMETHYL PHTHALATE	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OS	FLUORANTHENE	160.00	J	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OS	FLUORENE	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OS	HEXACHLOROBENZENE	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OS	HEXACHLOROBUTADIENE	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OS	HEXACHLOROCYCLOPENTADIENE	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OS	HEXACHLOROETHANE	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OS	INDENO(1,2,3-CD)PYRENE	56.00	J	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OS	ISOPHORONE	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OS	N-NITROSO-DI-N-PROPYLAMINE	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OS	N-NITROSODIPHENYLAMINE	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OS	NAPHTHALENE	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OS	NITROBENZENE	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OS	PENTACHLOROPHENOL	1,400.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OS	PHENANTHRENE	97.00	J	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OS	PHENOL	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OS	PYRENE	190.00	J	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OV	1,1,1-TRICHLOROETHANE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OV	1,1,2,2-TETRACHLOROETHANE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OV	1,1,2-TRICHLOROETHANE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OV	1,1-DICHLOROETHANE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OV	1,1-DICHLOROETHENE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OV	1,2-DICHLOROETHANE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OV	1,2-DICHLOROETHENE (TOTAL)	17.00	U	UG/KG	NORMAL

Area	Location	Top	Bottom	Fraction	Parameter	Value	Qual	Units	SACODE
Drainage Area 1	2WCTB5	6	8	OV	1,2-DICHLOROPROPANE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OV	2-BUTANONE	40.00		UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OV	2-HEXANONE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OV	4-METHYL-2-PENTANONE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OV	ACETONE	160.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OV	BENZENE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OV	BROMODICHLOROMETHANE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OV	BROMOFORM	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OV	BROMOMETHANE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OV	CARBON DISULFIDE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OV	CARBON TETRACHLORIDE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OV	CHLOROBENZENE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OV	CHLOROETHANE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OV	CHLOROFORM	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OV	CHLOROMETHANE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OV	CIS-1,3-DICHLOROPROPENE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OV	DIBROMOCHLOROMETHANE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OV	ETHYLBENZENE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OV	METHYLENE CHLORIDE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OV	STYRENE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OV	TETRACHLOROETHENE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OV	TOLUENE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OV	TRANS-1,3-DICHLOROPROPENE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OV	TRICHLOROETHENE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OV	VINYL ACETATE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OV	VINYL CHLORIDE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB5	6	8	OV	XYLENES, TOTAL	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	M	ALUMINUM	14,400.00		MG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	M	ANTIMONY	20.90	U	MG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	M	ARSENIC	9.20		MG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	M	BARIUM	52.40		MG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	M	BERYLLIUM	0.54	J	MG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	M	BORON	16.60	J	MG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	M	CADMIUM	0.62	U	MG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	M	CALCIUM	1,890.00		MG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	M	CHROMIUM	67.50		MG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	M	COBALT	5.60		MG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	M	COPPER	39.30		MG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	M	IRON	23,900.00		MG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	M	LEAD	43.40	J	MG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	M	MAGNESIUM	5,510.00		MG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	M	MANGANESE	198.00		MG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	M	MERCURY	0.19		MG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	M	NICKEL	17.10		MG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	M	POTASSIUM	3,490.00	J	MG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	M	SELENIUM	1.30	U	MG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	M	SILVER	0.81	J	MG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	M	SODIUM	1,150.00		MG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	M	THALLIUM	0.31	UJ	MG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	M	VANADIUM	38.20		MG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	M	ZINC	52.00	J	MG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OS	1,2,4-TRICHLOROBENZENE	480.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OS	1,2-DICHLOROBENZENE	480.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OS	1,3-DICHLOROBENZENE	480.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OS	1,4-DICHLOROBENZENE	480.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OS	2,4,5-TRICHLOROPHENOL	1,200.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OS	2,4,6-TRICHLOROPHENOL	480.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OS	2,4-DICHLOROPHENOL	480.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OS	2,4-DIMETHYLPHENOL	480.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OS	2,4-DINITROPHENOL	1,200.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OS	2,4-DINITROTOLUENE	480.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OS	2,6-DINITROTOLUENE	480.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OS	2-CHLORONAPHTHALENE	480.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OS	2-CHLOROPHENOL	480.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OS	2-METHYLNAPHTHALENE	480.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OS	2-METHYLPHENOL	480.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OS	2-NITROANILINE	1,200.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OS	2-NITROPHENOL	480.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OS	3,3'-DICHLOROBENZIDINE	480.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OS	3-NITROANILINE	1,200.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OS	4,6-DINITRO-2-METHYLPHENOL	1,200.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OS	4-BROMOPHENYL PHENYL ETHER	480.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OS	4-CHLORO-3-METHYLPHENOL	480.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OS	4-CHLOROANILINE	480.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OS	4-CHLOROPHENYL PHENYL ETHER	480.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OS	4-METHYLPHENOL	480.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OS	4-NITROANILINE	1,200.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OS	4-NITROPHENOL	1,200.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OS	ACENAPHTHENE	480.00	U	UG/KG	NORMAL

APPENDIX C.1 SOIL DATA
SITE 20 - AREA A WEAPONS CENTER, NEW LONDON, CONNECTICUT

Area	Location	Top	Bottom	Fraction	Parameter	Value	Qual	Units	SACODE
Drainage Area 1	2WCTB6	8	10	OS	ACENAPHTHYLENE	480.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OS	ANTHRACENE	50.00	J	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OS	BENZO(A)ANTHRACENE	220.00	J	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OS	BENZO(A)PYRENE	260.00	J	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OS	BENZO(B)FLUORANTHENE	370.00	J	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OS	BENZO(G,H,I)PERYLENE	140.00	J	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OS	BENZO(K)FLUORANTHENE	260.00	J	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OS	BENZOIC ACID	300.00	J	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OS	BENZYL ALCOHOL	480.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OS	BIS(2-CHLOROETHOXY)METHANE	480.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OS	BIS(2-CHLOROETHYL)ETHER	480.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OS	BIS(2-CHLOROISOPROPYL) ETHER	480.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OS	BIS(2-ETHYLHEXYL)PHTHALATE	480.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OS	BUTYLBENZYL PHTHALATE	480.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OS	CARBAZOLE	480.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OS	CHRYSENE	320.00	J	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OS	DI-N-BUTYL PHTHALATE	480.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OS	DI-N-OCTYL PHTHALATE	69.00	J	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OS	DIBENZO(A,H)ANTHRACENE	68.00	J	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OS	DIBENZOFURAN	480.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OS	DIETHYL PHTHALATE	32.00	J	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OS	DIMETHYL PHTHALATE	480.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OS	FLUORANTHENE	400.00	J	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OS	FLUORENE	480.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OS	HEXACHLOROBENZENE	480.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OS	HEXACHLOROBUTADIENE	480.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OS	HEXACHLOROCYCLOPENTADIENE	480.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OS	HEXACHLOROETHANE	480.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OS	INDENO(1,2,3-CD)PYRENE	160.00	J	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OS	ISOPHORONE	480.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OS	N-NITROSO-DI-N-PROPYLAMINE	480.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OS	N-NITROSODIPHENYLAMINE	480.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OS	NAPHTHALENE	480.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OS	NITROBENZENE	480.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OS	PENTACHLOROPHENOL	1,200.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OS	PHENANTHRENE	190.00	J	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OS	PHENOL	480.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OS	PYRENE	500.00		UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OV	1,1,1-TRICHLOROETHANE	14.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OV	1,1,2,2-TETRACHLOROETHANE	14.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OV	1,1,2-TRICHLOROETHANE	14.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OV	1,1-DICHLOROETHANE	14.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OV	1,1-DICHLOROETHENE	14.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OV	1,2-DICHLOROETHANE	14.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OV	1,2-DICHLOROETHENE (TOTAL)	14.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OV	1,2-DICHLOROPROPANE	14.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OV	2-BUTANONE	240.00	J	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OV	2-HEXANONE	14.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OV	4-METHYL-2-PENTANONE	14.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OV	ACETONE	690.00		UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OV	BENZENE	14.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OV	BROMODICHLOROMETHANE	14.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OV	BROMOFORM	14.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OV	BROMOMETHANE	14.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OV	CARBON DISULFIDE	14.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OV	CARBON TETRACHLORIDE	14.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OV	CHLOROBENZENE	14.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OV	CHLOROETHANE	14.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OV	CHLOROFORM	14.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OV	CHLOROMETHANE	14.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OV	CIS-1,3-DICHLOROPROPENE	14.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OV	DIBROMOCHLOROMETHANE	14.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OV	ETHYLBENZENE	14.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OV	METHYLENE CHLORIDE	37.00	U	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OV	STYRENE	14.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OV	TETRACHLOROETHENE	14.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OV	TOLUENE	8.00	J	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OV	TRANS-1,3-DICHLOROPROPENE	14.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OV	TRICHLOROETHENE	3.00	J	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OV	VINYL ACETATE	14.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OV	VINYL CHLORIDE	14.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCTB6	8	10	OV	XYLENES, TOTAL	14.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	M	ALUMINUM	15,200.00		MG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	M	ANTIMONY	13.20	U	MG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	M	ARSENIC	4.50		MG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	M	BARIUM	38.50		MG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	M	BERYLLIUM	0.57		MG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	M	BORON	13.10	UJ	MG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	M	CADMIUM	0.52	U	MG/KG	NORMAL

APPENDIX C.1 SOIL DATA
SITE 20 - AREA A WEAPONS CENTER, NEW LONDON, CONNECTICUT

Area	Location	Top	Bottom	Fraction	Parameter	Value	Qual	Units	SACODE
Drainage Area 3	2WCTB7	8	10	M	CALCIUM	1,650.00		MG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	M	CHROMIUM	17.70		MG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	M	COBALT	4.40		MG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	M	COPPER	12.30		MG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	M	IRON	12,100.00		MG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	M	LEAD	5.30	J	MG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	M	MAGNESIUM	3,070.00		MG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	M	MANGANESE	122.00		MG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	M	MERCURY	0.13	U	MG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	M	NICKEL	13.70		MG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	M	POTASSIUM	849.00	J	MG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	M	SELENIUM	0.42	U	MG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	M	SILVER	0.65	J	MG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	M	SODIUM	452.00		MG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	M	THALLIUM	0.26	U	MG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	M	VANADIUM	23.50		MG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	M	ZINC	27.20	J	MG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OS	1,2,4-TRICHLOROBENZENE	420.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OS	1,2-DICHLOROBENZENE	420.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OS	1,3-DICHLOROBENZENE	420.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OS	1,4-DICHLOROBENZENE	420.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OS	2,4,5-TRICHLOROPHENOL	1,000.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OS	2,4,6-TRICHLOROPHENOL	420.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OS	2,4-DICHLOROPHENOL	420.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OS	2,4-DIMETHYLPHENOL	420.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OS	2,4-DINITROPHENOL	1,000.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OS	2,4-DINITROTOLUENE	420.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OS	2,6-DINITROTOLUENE	420.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OS	2-CHLORONAPHTHALENE	420.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OS	2-CHLOROPHENOL	420.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OS	2-METHYLNAPHTHALENE	420.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OS	2-METHYLPHENOL	420.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OS	2-NITROANILINE	1,000.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OS	2-NITROPHENOL	420.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OS	3,3'-DICHLOROBENZIDINE	420.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OS	3-NITROANILINE	1,000.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OS	4,6-DINITRO-2-METHYLPHENOL	1,000.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OS	4-BROMOPHENYL PHENYL ETHER	420.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OS	4-CHLORO-3-METHYLPHENOL	420.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OS	4-CHLOROANILINE	420.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OS	4-CHLOROPHENYL PHENYL ETHER	420.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OS	4-METHYLPHENOL	420.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OS	4-NITROANILINE	1,000.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OS	4-NITROPHENOL	1,000.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OS	ACENAPHTHENE	420.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OS	ACENAPHTHYLENE	420.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OS	ANTHRACENE	420.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OS	BENZO(A)ANTHRACENE	420.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OS	BENZO(A)PYRENE	22.00	J	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OS	BENZO(B)FLUORANTHENE	420.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OS	BENZO(G,H,I)PERYLENE	420.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OS	BENZO(K)FLUORANTHENE	420.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OS	BENZOIC ACID	47.00	J	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OS	BENZYL ALCOHOL	420.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OS	BIS(2-CHLOROETHOXY)METHANE	420.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OS	BIS(2-CHLOROETHYL)ETHER	420.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OS	BIS(2-CHLOROISOPROPYL) ETHER	420.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OS	BIS(2-ETHYLHEXYL)PHTHALATE	420.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OS	BUTYLBENZYL PHTHALATE	420.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OS	CARBAZOLE	420.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OS	CHRYSENE	420.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OS	DI-N-BUTYL PHTHALATE	420.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OS	DI-N-OCTYL PHTHALATE	420.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OS	DIBENZO(A,H)ANTHRACENE	420.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OS	DIBENZOFURAN	420.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OS	DIETHYL PHTHALATE	420.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OS	DIMETHYL PHTHALATE	420.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OS	FLUORANTHENE	420.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OS	FLUORENE	420.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OS	HEXACHLOROBENZENE	420.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OS	HEXACHLOROBUTADIENE	420.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OS	HEXACHLOROCYCLOPENTADIENE	420.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OS	HEXACHLOROETHANE	420.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OS	INDENO(1,2,3-CD)PYRENE	420.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OS	ISOPHORONE	420.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OS	N-NITROSO-DI-N-PROPYLAMINE	420.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OS	N-NITROSODIPHENYLAMINE	420.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OS	NAPHTHALENE	420.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OS	NITROBENZENE	420.00	U	UG/KG	NORMAL

APPENDIX C.1 SOIL DATA
SITE 20 - AREA A WEAPONS CENTER, NEW LONDON, CONNECTICUT

Area	Location	Top	Bottom	Fraction	Parameter	Value	Qual	Units	SACODE
Drainage Area 3	2WCTB7	8	10	OS	PENTACHLOROPHENOL	1,000.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OS	PHENANTHRENE	420.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OS	PHENOL	420.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OS	PYRENE	420.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OV	1,1,1-TRICHLOROETHANE	13.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OV	1,1,2,2-TETRACHLOROETHANE	13.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OV	1,1,2-TRICHLOROETHANE	13.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OV	1,1-DICHLOROETHANE	13.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OV	1,1-DICHLOROETHENE	13.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OV	1,2-DICHLOROETHANE	13.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OV	1,2-DICHLOROETHENE (TOTAL)	13.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OV	1,2-DICHLOROPROPANE	13.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OV	2-BUTANONE	13.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OV	2-HEXANONE	13.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OV	4-METHYL-2-PENTANONE	13.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OV	ACETONE	37.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OV	BENZENE	13.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OV	BROMODICHLOROMETHANE	13.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OV	BROMOFORM	13.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OV	BROMOMETHANE	13.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OV	CARBON DISULFIDE	13.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OV	CARBON TETRACHLORIDE	13.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OV	CHLOROBENZENE	13.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OV	CHLOROETHANE	13.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OV	CHLOROFORM	13.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OV	CHLOROMETHANE	13.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OV	CIS-1,3-DICHLOROPROPENE	13.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OV	DIBROMOCHLOROMETHANE	13.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OV	ETHYLBENZENE	13.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OV	METHYLENE CHLORIDE	13.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OV	STYRENE	13.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OV	TETRACHLOROETHENE	13.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OV	TOLUENE	13.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OV	TRANS-1,3-DICHLOROPROPENE	13.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OV	TRICHLOROETHENE	13.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OV	VINYL ACETATE	13.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OV	VINYL CHLORIDE	13.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	OV	XYLENES, TOTAL	13.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	PEST/PCB	4,4'-DDD	42.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	PEST/PCB	4,4'-DDE	42.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	PEST/PCB	4,4'-DDT	42.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	PEST/PCB	ALDRIN	22.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	PEST/PCB	ALPHA-BHC	22.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	PEST/PCB	ALPHA-CHLORDANE	22.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	PEST/PCB	AROCLOR-1016	420.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	PEST/PCB	AROCLOR-1221	860.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	PEST/PCB	AROCLOR-1232	420.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	PEST/PCB	AROCLOR-1242	420.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	PEST/PCB	AROCLOR-1248	420.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	PEST/PCB	AROCLOR-1254	420.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	PEST/PCB	AROCLOR-1260	420.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	PEST/PCB	BETA-BHC	22.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	PEST/PCB	DELTA-BHC	22.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	PEST/PCB	DIELDRIN	42.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	PEST/PCB	ENDOSULFAN I	22.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	PEST/PCB	ENDOSULFAN II	42.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	PEST/PCB	ENDOSULFAN SULFATE	42.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	PEST/PCB	ENDRIN	42.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	PEST/PCB	ENDRIN ALDEHYDE	6.40	J	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	PEST/PCB	ENDRIN KETONE	42.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	PEST/PCB	GAMMA-BHC (LINDANE)	22.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	PEST/PCB	GAMMA-CHLORDANE	22.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	PEST/PCB	HEPTACHLOR	22.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	PEST/PCB	HEPTACHLOR EPOXIDE	22.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	PEST/PCB	METHOXYCHLOR	220.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCTB7	8	10	PEST/PCB	TOXAPHENE	2,200.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	M	ALUMINUM	9,560.00		MG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	M	ANTIMONY	11.30	U	MG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	M	ARSENIC	3.00		MG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	M	BARIUM	49.40		MG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	M	BERYLLIUM	0.41		MG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	M	BORON	12.20	U	MG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	M	CADMIUM	0.49	U	MG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	M	CALCIUM	1,620.00		MG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	M	CHROMIUM	12.50		MG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	M	COBALT	4.50		MG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	M	COPPER	10.30		MG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	M	IRON	12,900.00		MG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	M	LEAD	6.70		MG/KG	NORMAL

Area	Location	Top	Bottom	Fraction	Parameter	Value	Qual	Units	SACODE
Drainage Area 3	2WCTB8	10	12.6	M	MAGNESIUM	3,870.00		MG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	M	MANGANESE	230.00	J	MG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	M	MERCURY	0.12	U	MG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	M	NICKEL	8.60		MG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	M	POTASSIUM	2,470.00		MG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	M	SELENIUM	0.73	UJ	MG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	M	SILVER	0.49	U	MG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	M	SODIUM	312.00		MG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	M	THALLIUM	0.53	U	MG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	M	VANADIUM	21.80		MG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	M	ZINC	43.10		MG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OS	1,2,4-TRICHLOROBENZENE	360.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OS	1,2-DICHLOROBENZENE	360.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OS	1,3-DICHLOROBENZENE	360.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OS	1,4-DICHLOROBENZENE	360.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OS	2,4,5-TRICHLOROPHENOL	880.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OS	2,4,6-TRICHLOROPHENOL	360.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OS	2,4-DICHLOROPHENOL	360.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OS	2,4-DIMETHYLPHENOL	360.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OS	2,4-DINITROPHENOL	880.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OS	2,4-DINITROTOLUENE	360.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OS	2,6-DINITROTOLUENE	360.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OS	2-CHLORONAPHTHALENE	360.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OS	2-CHLOROPHENOL	360.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OS	2-METHYLNAPHTHALENE	360.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OS	2-METHYLPHENOL	360.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OS	2-NITROANILINE	880.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OS	2-NITROPHENOL	360.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OS	3,3'-DICHLOROBENZIDINE	360.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OS	3-NITROANILINE	880.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OS	4,6-DINITRO-2-METHYLPHENOL	880.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OS	4-BROMOPHENYL PHENYL ETHER	360.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OS	4-CHLORO-3-METHYLPHENOL	360.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OS	4-CHLOROANILINE	360.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OS	4-CHLOROPHENYL PHENYL ETHER	360.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OS	4-METHYLPHENOL	360.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OS	4-NITROANILINE	880.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OS	ACENAPHTHENE	360.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OS	ACENAPHTHYLENE	360.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OS	ANTHRACENE	360.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OS	BENZO(A)ANTHRACENE	33.00	J	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OS	BENZO(A)PYRENE	21.00	J	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OS	BENZO(B)FLUORANTHENE	27.00	J	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OS	BENZO(G,H,I)PERYLENE	360.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OS	BENZO(K)FLUORANTHENE	24.00	J	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OS	BENZOIC ACID	1,800.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OS	BENZYL ALCOHOL	360.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OS	BIS(2-CHLOROETHOXY)METHANE	360.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OS	BIS(2-CHLOROETHYL)ETHER	360.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OS	BIS(2-CHLOROISOPROPYL) ETHER	360.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OS	BIS(2-ETHYLHEXYL)PHTHALATE	360.00	J	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OS	BUTYLBENZYL PHTHALATE	360.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OS	CARBAZOLE	360.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OS	CHRYSENE	42.00	J	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OS	DI-N-BUTYL PHTHALATE	360.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OS	DI-N-OCTYL PHTHALATE	360.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OS	DIBENZO(A,H)ANTHRACENE	360.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OS	DIBENZOFURAN	360.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OS	DIETHYL PHTHALATE	360.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OS	DIMETHYL PHTHALATE	360.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OS	FLUORANTHENE	83.00	J	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OS	FLUORENE	360.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OS	HEXACHLOROBENZENE	360.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OS	HEXACHLOROBUTADIENE	360.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OS	HEXACHLOROCYCLOPENTADIENE	360.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OS	HEXACHLOROETHANE	360.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OS	INDENO(1,2,3-CD)PYRENE	360.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OS	ISOPHORONE	360.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OS	N-NITROSO-DI-N-PROPYLAMINE	360.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OS	N-NITROSODIPHENYLAMINE	360.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OS	NAPHTHALENE	360.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OS	NITROBENZENE	360.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OS	PENTACHLOROPHENOL	880.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OS	PHENANTHRENE	54.00	J	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OS	PHENOL	360.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OS	PYRENE	70.00	J	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OV	1,1,1-TRICHLOROETHANE	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OV	1,1,2,2-TETRACHLOROETHANE	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OV	1,1,2-TRICHLOROETHANE	11.00	U	UG/KG	NORMAL

APPENDIX C.1 SOIL DATA
SITE 20 - AREA A WEAPONS CENTER, NEW LONDON, CONNECTICUT

Area	Location	Top	Bottom	Fraction	Parameter	Value	Qual	Units	SACODE
Drainage Area 3	2WCTB8	10	12.6	OV	1,1-DICHLOROETHANE	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OV	1,1-DICHLOROETHENE	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OV	1,2-DICHLOROETHANE	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OV	1,2-DICHLOROETHENE (TOTAL)	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OV	1,2-DICHLOROPROPANE	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OV	2-BUTANONE	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OV	2-HEXANONE	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OV	4-METHYL-2-PENTANONE	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OV	ACETONE	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OV	BENZENE	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OV	BROMODICHLOROMETHANE	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OV	BROMOFORM	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OV	BROMOMETHANE	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OV	CARBON DISULFIDE	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OV	CARBON TETRACHLORIDE	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OV	CHLOROBENZENE	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OV	CHLOROETHANE	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OV	CHLOROFORM	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OV	CHLOROMETHANE	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OV	CIS-1,3-DICHLOROPROPENE	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OV	DIBROMOCHLOROMETHANE	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OV	ETHYLBENZENE	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OV	METHYLENE CHLORIDE	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OV	STYRENE	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OV	TETRACHLOROETHENE	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OV	TOLUENE	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OV	TRANS-1,3-DICHLOROPROPENE	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OV	TRICHLOROETHENE	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OV	VINYL ACETATE	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OV	VINYL CHLORIDE	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	OV	XYLENES, TOTAL	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	PEST/PCB	4,4'-DDD	36.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	PEST/PCB	4,4'-DDE	36.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	PEST/PCB	4,4'-DDT	36.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	PEST/PCB	ALDRIN	19.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	PEST/PCB	ALPHA-BHC	19.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	PEST/PCB	ALPHA-CHLORDANE	19.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	PEST/PCB	AROCLOR-1016	360.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	PEST/PCB	AROCLOR-1221	740.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	PEST/PCB	AROCLOR-1232	360.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	PEST/PCB	AROCLOR-1242	360.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	PEST/PCB	AROCLOR-1248	360.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	PEST/PCB	AROCLOR-1254	360.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	PEST/PCB	AROCLOR-1260	360.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	PEST/PCB	BETA-BHC	19.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	PEST/PCB	DELTA-BHC	19.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	PEST/PCB	DIELDRIN	36.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	PEST/PCB	ENDOSULFAN I	19.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	PEST/PCB	ENDOSULFAN II	36.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	PEST/PCB	ENDOSULFAN SULFATE	36.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	PEST/PCB	ENDRIN	36.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	PEST/PCB	ENDRIN ALDEHYDE	36.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	PEST/PCB	ENDRIN KETONE	36.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	PEST/PCB	GAMMA-BHC (LINDANE)	19.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	PEST/PCB	GAMMA-CHLORDANE	19.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	PEST/PCB	HEPTACHLOR	19.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	PEST/PCB	HEPTACHLOR EPOXIDE	19.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	PEST/PCB	METHOXYCHLOR	190.00	U	UG/KG	NORMAL
Drainage Area 3	2WCTB8	10	12.6	PEST/PCB	TOXAPHENE	1,900.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	M	ALUMINUM	17,800.00		MG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	M	ANTIMONY	18.80	U	MG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	M	ARSENIC	8.40		MG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	M	BARIUM	51.70		MG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	M	BERYLLIUM	0.84		MG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	M	BORON	51.80		MG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	M	CADMIUM	0.68	U	MG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	M	CALCIUM	5,050.00		MG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	M	CHROMIUM	41.90		MG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	M	COBALT	8.20		MG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	M	COPPER	17.90		MG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	M	IRON	28,000.00		MG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	M	LEAD	17.20		MG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	M	MAGNESIUM	8,450.00		MG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	M	MANGANESE	343.00	J	MG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	M	MERCURY	0.17	U	MG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	M	NICKEL	22.10		MG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	M	POTASSIUM	4,880.00		MG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	M	SELENIUM	1.00	UJ	MG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	M	SILVER	0.68	U	MG/KG	NORMAL

Area	Location	Top	Bottom	Fraction	Parameter	Value	Qual	Units	SACODE
Drainage Area 3	2WCMW3S	16	18	M	SODIUM	7,390.00		MG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	M	THALLIUM	0.42	U	MG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	M	VANADIUM	43.80		MG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	M	ZINC	69.30		MG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	M	ALUMINUM	13,400.00		MG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	M	ANTIMONY	15.70	U	MG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	M	ARSENIC	7.60		MG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	M	BARIUM	38.90		MG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	M	BERYLLIUM	0.60		MG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	M	BORON	39.30	J	MG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	M	CADMIUM	0.47	U	MG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	M	CALCIUM	3,520.00		MG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	M	CHROMIUM	33.10		MG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	M	COBALT	6.80		MG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	M	COPPER	14.90		MG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	M	IRON	21,100.00		MG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	M	LEAD	12.70		MG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	M	MAGNESIUM	6,310.00		MG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	M	MANGANESE	256.00	J	MG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	M	MERCURY	0.12	U	MG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	M	NICKEL	17.80		MG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	M	POTASSIUM	3,610.00		MG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	M	SELENIUM	0.70	UJ	MG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	M	SILVER	0.47	U	MG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	M	SODIUM	5,570.00		MG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	M	THALLIUM	0.32	U	MG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	M	VANADIUM	32.80		MG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	M	ZINC	53.20		MG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OS	1,2,4-TRICHLOROBENZENE	560.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OS	1,2-DICHLOROBENZENE	560.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OS	1,3-DICHLOROBENZENE	560.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OS	1,4-DICHLOROBENZENE	560.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OS	2,4,5-TRICHLOROPHENOL	1,400.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OS	2,4,6-TRICHLOROPHENOL	560.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OS	2,4-DICHLOROPHENOL	560.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OS	2,4-DIMETHYLPHENOL	560.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OS	2,4-DINITROPHENOL	1,400.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OS	2,4-DINITROTOLUENE	560.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OS	2,6-DINITROTOLUENE	560.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OS	2-CHLORONAPHTHALENE	560.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OS	2-CHLOROPHENOL	560.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OS	2-METHYLNAPHTHALENE	560.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OS	2-METHYLPHENOL	560.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OS	2-NITROANILINE	1,400.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OS	2-NITROPHENOL	560.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OS	3,3'-DICHLOROBENZIDINE	560.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OS	3-NITROANILINE	1,400.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OS	4,6-DINITRO-2-METHYLPHENOL	1,400.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OS	4-BROMOPHENYL PHENYL ETHER	560.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OS	4-CHLORO-3-METHYLPHENOL	560.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OS	4-CHLOROANILINE	560.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OS	4-CHLOROPHENYL PHENYL ETHER	560.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OS	4-METHYLPHENOL	560.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OS	4-NITROANILINE	1,400.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OS	ACENAPHTHENE	560.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OS	ACENAPHTHYLENE	560.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OS	ANTHRACENE	560.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OS	BENZO(A)ANTHRACENE	560.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OS	BENZO(A)PYRENE	29.00	J	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OS	BENZO(B)FLUORANTHENE	560.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OS	BENZO(G,H,I)PERYLENE	560.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OS	BENZO(K)FLUORANTHENE	29.00	J	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OS	BENZOIC ACID	77.00	J	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OS	BENZYL ALCOHOL	560.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OS	BIS(2-CHLOROETHOXY)METHANE	560.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OS	BIS(2-CHLOROETHYL)ETHER	560.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OS	BIS(2-CHLOROISOPROPYL) ETHER	560.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OS	BIS(2-ETHYLHEXYL)PHTHALATE	560.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OS	BUTYLBENZYL PHTHALATE	560.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OS	CARBAZOLE	560.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OS	CHRYSENE	560.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OS	DI-N-BUTYL PHTHALATE	560.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OS	DI-N-OCTYL PHTHALATE	560.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OS	DIBENZO(A,H)ANTHRACENE	560.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OS	DIBENZOFURAN	560.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OS	DIETHYL PHTHALATE	560.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OS	DIMETHYL PHTHALATE	560.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OS	FLUORANTHENE	32.00	J	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OS	FLUORENE	560.00	U	UG/KG	NORMAL

Area	Location	Top	Bottom	Fraction	Parameter	Value	Qual	Units	SACODE
Drainage Area 3	2WCMW3S	16	18	OS	HEXACHLOROBENZENE	560.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OS	HEXACHLOROBUTADIENE	560.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OS	HEXACHLOROCYCLOPENTADIENE	560.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OS	HEXACHLOROETHANE	560.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OS	INDENO(1,2,3-CD)PYRENE	560.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OS	ISOPHORONE	560.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OS	N-NITROSO-DI-N-PROPYLAMINE	560.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OS	N-NITROSODIPHENYLAMINE	560.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OS	NAPHTHALENE	560.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OS	NITROBENZENE	560.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OS	PENTACHLOROPHENOL	1,400.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OS	PHENANTHRENE	560.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OS	PHENOL	560.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OS	PYRENE	50.00	J	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OS	1,2,4-TRICHLOROBENZENE	560.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OS	1,2-DICHLOROBENZENE	560.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OS	1,3-DICHLOROBENZENE	560.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OS	1,4-DICHLOROBENZENE	560.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OS	2,4,5-TRICHLOROPHENOL	1,400.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OS	2,4,6-TRICHLOROPHENOL	560.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OS	2,4-DICHLOROPHENOL	560.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OS	2,4-DIMETHYLPHENOL	560.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OS	2,4-DINITROPHENOL	1,400.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OS	2,4-DINITROTOLUENE	560.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OS	2,6-DINITROTOLUENE	560.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OS	2-CHLORONAPHTHALENE	560.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OS	2-CHLOROPHENOL	560.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OS	2-METHYLNAPHTHALENE	560.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OS	2-METHYLPHENOL	560.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OS	2-NITROANILINE	1,400.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OS	2-NITROPHENOL	560.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OS	3,3'-DICHLOROBENZIDINE	560.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OS	3-NITROANILINE	1,400.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OS	4,6-DINITRO-2-METHYLPHENOL	1,400.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OS	4-BROMOPHENYL PHENYL ETHER	560.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OS	4-CHLORO-3-METHYLPHENOL	560.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OS	4-CHLOROANILINE	560.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OS	4-CHLOROPHENYL PHENYL ETHER	560.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OS	4-METHYLPHENOL	560.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OS	4-NITROANILINE	1,400.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OS	ACENAPHTHENE	560.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OS	ACENAPHTHYLENE	560.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OS	ANTHRACENE	560.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OS	BENZO(A)ANTHRACENE	31.00	J	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OS	BENZO(A)PYRENE	280.00	J	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OS	BENZO(B)FLUORANTHENE	29.00	J	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OS	BENZO(G,H,I)PERYLENE	560.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OS	BENZO(K)FLUORANTHENE	560.00	UJ	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OS	BENZOIC ACID	56.00	J	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OS	BENZYL ALCOHOL	560.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OS	BIS(2-CHLOROETHOXY)METHANE	560.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OS	BIS(2-CHLOROETHYL)ETHER	560.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OS	BIS(2-CHLOROISOPROPYL) ETHER	560.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OS	BIS(2-ETHYLHEXYL)PHTHALATE	560.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OS	BUTYLBENZYL PHTHALATE	560.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OS	CARBAZOLE	560.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OS	CHRYSENE	35.00	J	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OS	DI-N-BUTYL PHTHALATE	560.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OS	DI-N-OCTYL PHTHALATE	560.00	UJ	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OS	DIBENZO(A,H)ANTHRACENE	560.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OS	DIBENZOFURAN	560.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OS	DIETHYL PHTHALATE	560.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OS	DIMETHYL PHTHALATE	560.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OS	FLUORANTHENE	45.00	J	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OS	FLUORENE	560.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OS	HEXACHLOROBENZENE	560.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OS	HEXACHLOROBUTADIENE	560.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OS	HEXACHLOROCYCLOPENTADIENE	560.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OS	HEXACHLOROETHANE	560.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OS	INDENO(1,2,3-CD)PYRENE	560.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OS	ISOPHORONE	560.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OS	N-NITROSO-DI-N-PROPYLAMINE	560.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OS	N-NITROSODIPHENYLAMINE	560.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OS	NAPHTHALENE	560.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OS	NITROBENZENE	560.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OS	PENTACHLOROPHENOL	1,400.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OS	PHENANTHRENE	560.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OS	PHENOL	560.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OS	PYRENE	63.00	J	UG/KG	DUPLICATE

APPENDIX C.1 SOIL DATA
SITE 20 - AREA A WEAPONS CENTER, NEW LONDON, CONNECTICUT

Area	Location	Top	Bottom	Fraction	Parameter	Value	Qual	Units	SACODE
Drainage Area 3	2WCMW3S	16	18	OV	1,1,1-TRICHLOROETHANE	17.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OV	1,1,2,2-TETRACHLOROETHANE	17.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OV	1,1,2-TRICHLOROETHANE	17.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OV	1,1-DICHLOROETHANE	17.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OV	1,1-DICHLOROETHENE	17.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OV	1,2-DICHLOROETHANE	17.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OV	1,2-DICHLOROETHENE (TOTAL)	17.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OV	1,2-DICHLOROPROPANE	17.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OV	2-BUTANONE	17.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OV	2-HEXANONE	17.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OV	4-METHYL-2-PENTANONE	17.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OV	ACETONE	17.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OV	BENZENE	17.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OV	BROMODICHLOROMETHANE	17.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OV	BROMOFORM	17.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OV	BROMOMETHANE	17.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OV	CARBON DISULFIDE	11.00	J	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OV	CARBON TETRACHLORIDE	17.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OV	CHLOROBENZENE	17.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OV	CHLOROETHANE	17.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OV	CHLOROFORM	17.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OV	CHLOROMETHANE	17.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OV	CIS-1,3-DICHLOROPROPENE	17.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OV	DIBROMOCHLOROMETHANE	17.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OV	ETHYLBENZENE	17.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OV	METHYLENE CHLORIDE	17.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OV	STYRENE	17.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OV	TETRACHLOROETHENE	17.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OV	TOLUENE	17.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OV	TRANS-1,3-DICHLOROPROPENE	17.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OV	TRICHLOROETHENE	17.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OV	VINYL ACETATE	17.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OV	VINYL CHLORIDE	17.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OV	XYLENES, TOTAL	17.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	OV	1,1,1-TRICHLOROETHANE	17.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OV	1,1,2,2-TETRACHLOROETHANE	17.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OV	1,1,2-TRICHLOROETHANE	17.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OV	1,1-DICHLOROETHANE	17.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OV	1,1-DICHLOROETHENE	17.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OV	1,2-DICHLOROETHANE	17.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OV	1,2-DICHLOROETHENE (TOTAL)	17.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OV	1,2-DICHLOROPROPANE	17.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OV	2-BUTANONE	17.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OV	2-HEXANONE	17.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OV	4-METHYL-2-PENTANONE	17.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OV	ACETONE	30.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OV	BENZENE	17.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OV	BROMODICHLOROMETHANE	17.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OV	BROMOFORM	17.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OV	BROMOMETHANE	17.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OV	CARBON DISULFIDE	6.00	J	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OV	CARBON TETRACHLORIDE	17.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OV	CHLOROBENZENE	17.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OV	CHLOROETHANE	17.00	UJ	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OV	CHLOROFORM	17.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OV	CHLOROMETHANE	17.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OV	CIS-1,3-DICHLOROPROPENE	17.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OV	DIBROMOCHLOROMETHANE	17.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OV	ETHYLBENZENE	17.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OV	METHYLENE CHLORIDE	17.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OV	STYRENE	17.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OV	TETRACHLOROETHENE	17.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OV	TOLUENE	17.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OV	TRANS-1,3-DICHLOROPROPENE	17.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OV	TRICHLOROETHENE	17.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OV	VINYL ACETATE	17.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OV	VINYL CHLORIDE	17.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	OV	XYLENES, TOTAL	17.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	PEST/PCB	4,4'-DDD	56.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	PEST/PCB	4,4'-DDE	56.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	PEST/PCB	4,4'-DDT	56.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	PEST/PCB	ALDRIN	29.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	PEST/PCB	ALPHA-BHC	29.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	PEST/PCB	ALPHA-CHLORDANE	29.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	PEST/PCB	AROCLOR-1016	560.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	PEST/PCB	AROCLOR-1221	1,100.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	PEST/PCB	AROCLOR-1232	560.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	PEST/PCB	AROCLOR-1242	560.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	PEST/PCB	AROCLOR-1248	560.00	U	UG/KG	NORMAL

APPENDIX C.1 SOIL DATA
SITE 20 - AREA A WEAPONS CENTER, NEW LONDON, CONNECTICUT

Area	Location	Top	Bottom	Fraction	Parameter	Value	Qual	Units	SACODE
Drainage Area 3	2WCMW3S	16	18	PEST/PCB	AROCLOR-1254	560.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	PEST/PCB	AROCLOR-1260	560.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	PEST/PCB	BETA-BHC	29.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	PEST/PCB	DELTA-BHC	29.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	PEST/PCB	DIELDRIN	56.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	PEST/PCB	ENDOSULFAN I	29.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	PEST/PCB	ENDOSULFAN II	56.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	PEST/PCB	ENDOSULFAN SULFATE	56.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	PEST/PCB	ENDRIN	56.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	PEST/PCB	ENDRIN ALDEHYDE	56.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	PEST/PCB	ENDRIN KETONE	56.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	PEST/PCB	GAMMA-BHC (LINDANE)	29.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	PEST/PCB	GAMMA-CHLORDANE	29.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	PEST/PCB	HEPTACHLOR	29.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	PEST/PCB	HEPTACHLOR EPOXIDE	29.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	PEST/PCB	METHOXYCHLOR	290.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	PEST/PCB	TOXAPHENE	2,900.00	U	UG/KG	NORMAL
Drainage Area 3	2WCMW3S	16	18	PEST/PCB	4,4'-DDD	56.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	PEST/PCB	4,4'-DDE	56.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	PEST/PCB	4,4'-DDT	56.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	PEST/PCB	ALDRIN	29.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	PEST/PCB	ALPHA-BHC	29.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	PEST/PCB	ALPHA-CHLORDANE	29.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	PEST/PCB	AROCLOR-1016	560.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	PEST/PCB	AROCLOR-1221	1,100.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	PEST/PCB	AROCLOR-1232	560.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	PEST/PCB	AROCLOR-1242	560.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	PEST/PCB	AROCLOR-1248	560.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	PEST/PCB	AROCLOR-1254	560.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	PEST/PCB	AROCLOR-1260	560.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	PEST/PCB	BETA-BHC	29.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	PEST/PCB	DELTA-BHC	29.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	PEST/PCB	DIELDRIN	56.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	PEST/PCB	ENDOSULFAN I	29.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	PEST/PCB	ENDOSULFAN II	56.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	PEST/PCB	ENDOSULFAN SULFATE	56.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	PEST/PCB	ENDRIN	56.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	PEST/PCB	ENDRIN ALDEHYDE	56.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	PEST/PCB	ENDRIN KETONE	56.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	PEST/PCB	GAMMA-BHC (LINDANE)	29.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	PEST/PCB	GAMMA-CHLORDANE	29.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	PEST/PCB	HEPTACHLOR	29.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	PEST/PCB	HEPTACHLOR EPOXIDE	29.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	PEST/PCB	METHOXYCHLOR	290.00	U	UG/KG	DUPLICATE
Drainage Area 3	2WCMW3S	16	18	PEST/PCB	TOXAPHENE	2,900.00	U	UG/KG	DUPLICATE

Appendix C.2

Sediment Analytical Results

APPENDIX C.2 SEDIMENT DATA
SITE 20 - AREA A WEAPONS CENTER, NEW LONDON, CONNECTICUT

Area	Location	Top	Bottom	Fraction	Parameter	Value	Qual	Units	SACODE
Drainage Area 1	2WCSD3	0	1	M	ALUMINUM	8,860.00		MG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	M	ANTIMONY	9.80		MG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	M	ARSENIC	5.10	J	MG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	M	BARIUM	43.30		MG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	M	BERYLLIUM	0.75		MG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	M	BORON	14.70	UJ	MG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	M	CADMIUM	1.00		MG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	M	CALCIUM	1,470.00		MG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	M	CHROMIUM	14.40		MG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	M	COBALT	7.10		MG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	M	COPPER	21.60	J	MG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	M	IRON	38,400.00		MG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	M	LEAD	48.80	J	MG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	M	MAGNESIUM	2,790.00		MG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	M	MANGANESE	141.00		MG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	M	MERCURY	0.15	U	MG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	M	NICKEL	12.60		MG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	M	POTASSIUM	1,410.00		MG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	M	SELENIUM	0.88	UJ	MG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	M	SILVER	1.70		MG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	M	SODIUM	216.00		MG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	M	THALLIUM	0.29	U	MG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	M	VANADIUM	18.90		MG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	M	ZINC	216.00		MG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OS	1,2,4-TRICHLOROBENZENE	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OS	1,2-DICHLOROBENZENE	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OS	1,3-DICHLOROBENZENE	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OS	1,4-DICHLOROBENZENE	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OS	2,4,5-TRICHLOROPHENOL	1,400.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OS	2,4,6-TRICHLOROPHENOL	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OS	2,4-DICHLOROPHENOL	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OS	2,4-DIMETHYLPHENOL	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OS	2,4-DINITROPHENOL	1,400.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OS	2,4-DINITROTOLUENE	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OS	2,6-DINITROTOLUENE	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OS	2-CHLORONAPHTHALENE	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OS	2-CHLOROPHENOL	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OS	2-METHYLNAPHTHALENE	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OS	2-METHYLPHENOL	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OS	2-NITROANILINE	1,400.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OS	2-NITROPHENOL	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OS	3,3'-DICHLOROBENZIDINE	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OS	3-NITROANILINE	1,400.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OS	4,6-DINITRO-2-METHYLPHENOL	1,400.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OS	4-BROMOPHENYL PHENYL ETHER	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OS	4-CHLORO-3-METHYLPHENOL	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OS	4-CHLOROANILINE	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OS	4-CHLOROPHENYL PHENYL ETHER	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OS	4-METHYLPHENOL	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OS	4-NITROANILINE	1,400.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OS	4-NITROPHENOL	1,400.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OS	ACENAPHTHENE	79.00	J	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OS	ACENAPHTHYLENE	47.00	J	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OS	ANTHRACENE	400.00	J	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OS	BENZO(A)ANTHRACENE	3,400.00		UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OS	BENZO(A)PYRENE	4,400.00		UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OS	BENZO(B)FLUORANTHENE	4,900.00		UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OS	BENZO(G,H,I)PERYLENE	3,500.00		UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OS	BENZO(K)FLUORANTHENE	5,100.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OS	BENZOIC ACID	164.00	J	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OS	BENZYL ALCOHOL	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OS	BIS(2-CHLOROETHOXY)METHANE	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OS	BIS(2-CHLOROETHYL)ETHER	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OS	BIS(2-CHLOROISOPROPYL) ETHER	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OS	BIS(2-ETHYLHEXYL)PHTHALATE	1,400.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OS	BUTYLBENZYL PHTHALATE	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OS	CARBAZOLE	450.00	J	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OS	CHRYSENE	4,300.00		UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OS	DI-N-BUTYL PHTHALATE	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OS	DI-N-OCTYL PHTHALATE	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OS	DIBENZO(A,H)ANTHRACENE	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OS	DIBENZOFURAN	86.00	J	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OS	DIETHYL PHTHALATE	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OS	DIMETHYL PHTHALATE	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OS	FLUORANTHENE	6,900.00		UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OS	FLUORENE	140.00	J	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OS	HEXACHLOROBENZENE	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OS	HEXACHLOROBUTADIENE	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OS	HEXACHLOROCYCLOPENTADIENE	570.00	UJ	UG/KG	NORMAL

APPENDIX C.2 SEDIMENT DATA
SITE 20 - AREA A WEAPONS CENTER, NEW LONDON, CONNECTICUT

Area	Location	Top	Bottom	Fraction	Parameter	Value	Qual	Units	SACODE
Drainage Area 1	2WCSD3	0	1	OS	HEXACHLOROETHANE	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OS	INDENO(1,2,3-CD)PYRENE	3,300.00		UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OS	ISOPHORONE	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OS	N-NITROSO-DI-N-PROPYLAMINE	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OS	N-NITROSODIPHENYLAMINE	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OS	NAPHTHALENE	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OS	NITROBENZENE	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OS	PENTACHLOROPHENOL	1,400.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OS	PHENANTHRENE	2,000.00		UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OS	PHENOL	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OS	PYRENE	6,900.00		UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OV	1,1,1-TRICHLOROETHANE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OV	1,1,2,2-TETRACHLOROETHANE	17.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OV	1,1,2-TRICHLOROETHANE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OV	1,1-DICHLOROETHANE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OV	1,1-DICHLOROETHENE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OV	1,2-DICHLOROETHANE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OV	1,2-DICHLOROETHENE (TOTAL)	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OV	1,2-DICHLOROPROPANE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OV	2-BUTANONE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OV	2-HEXANONE	17.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OV	4-METHYL-2-PENTANONE	17.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OV	ACETONE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OV	BENZENE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OV	BROMODICHLOROMETHANE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OV	BROMOFORM	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OV	BROMOMETHANE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OV	CARBON DISULFIDE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OV	CARBON TETRACHLORIDE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OV	CHLOROBENZENE	17.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OV	CHLOROETHANE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OV	CHLOROFORM	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OV	CHLOROMETHANE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OV	CIS-1,3-DICHLOROPROPENE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OV	DIBROMOCHLOROMETHANE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OV	ETHYLBENZENE	17.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OV	METHYLENE CHLORIDE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OV	STYRENE	17.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OV	TETRACHLOROETHENE	17.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OV	TOLUENE	17.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OV	TRANS-1,3-DICHLOROPROPENE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OV	TRICHLOROETHENE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OV	VINYL ACETATE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OV	VINYL CHLORIDE	17.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	OV	XYLENES, TOTAL	17.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	PEST/PCB	4,4'-DDD	6.60	J	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	PEST/PCB	4,4'-DDE	57.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	PEST/PCB	4,4'-DDT	10.00	J	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	PEST/PCB	ALDRIN	29.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	PEST/PCB	ALPHA-BHC	29.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	PEST/PCB	ALPHA-CHLORDANE	29.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	PEST/PCB	AROCLOR-1016	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	PEST/PCB	AROCLOR-1221	1,200.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	PEST/PCB	AROCLOR-1232	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	PEST/PCB	AROCLOR-1242	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	PEST/PCB	AROCLOR-1248	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	PEST/PCB	AROCLOR-1254	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	PEST/PCB	AROCLOR-1260	570.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	PEST/PCB	BETA-BHC	29.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	PEST/PCB	DELTA-BHC	29.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	PEST/PCB	DIELDRIN	57.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	PEST/PCB	ENDOSULFAN I	29.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	PEST/PCB	ENDOSULFAN II	57.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	PEST/PCB	ENDOSULFAN SULFATE	6.80	J	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	PEST/PCB	ENDRIN	57.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	PEST/PCB	ENDRIN ALDEHYDE	57.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	PEST/PCB	ENDRIN KETONE	57.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	PEST/PCB	GAMMA-BHC (LINDANE)	29.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	PEST/PCB	GAMMA-CHLORDANE	29.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	PEST/PCB	HEPTACHLOR	29.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	PEST/PCB	HEPTACHLOR EPOXIDE	29.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	PEST/PCB	METHOXYCHLOR	290.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD3	0	1	PEST/PCB	TOXAPHENE	2,900.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	DIOX	1,2,3,4,6,7,8-HPCDD	0.42	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	DIOX	1,2,3,4,6,7,8-HPCDF	0.13	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	DIOX	1,2,3,4,7,8,9-HPCDF	0.11	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	DIOX	1,2,3,4,7,8-HXCDD	0.27	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	DIOX	1,2,3,4,7,8-HXCDF	0.12	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	DIOX	1,2,3,6,7,8-HXCDD	0.05	U	UG/KG	NORMAL

APPENDIX C.2 SEDIMENT DATA
SITE 20 - AREA A WEAPONS CENTER, NEW LONDON, CONNECTICUT

Area	Location	Top	Bottom	Fraction	Parameter	Value	Qual	Units	SACODE
Drainage Area 1	2WCSD11	0	1	DIOX	1,2,3,6,7,8-HXCDF	0.11	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	DIOX	1,2,3,7,8,9-HXCDD	0.11	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	DIOX	1,2,3,7,8,9-HXCDF	0.06	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	DIOX	1,2,3,7,8-PECDD	0.48	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	DIOX	1,2,3,7,8-PECDF	0.11	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	DIOX	2,3,4,6,7,8-HXCDF	0.13	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	DIOX	2,3,4,7,8-PECDF	0.13	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	DIOX	2,3,7,8-TCDD	0.08	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	DIOX	2,3,7,8-TCDF	0.06	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	DIOX	OCDD	0.56	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	DIOX	OCDF	0.08	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	DIOX	TOTAL HPCDD	0.40	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	DIOX	TOTAL HPCDF	0.10	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	DIOX	TOTAL HXCDD	0.05	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	DIOX	TOTAL HXCDF	0.06	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	DIOX	TOTAL PECDD	0.50	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	DIOX	TOTAL PECDF	0.10	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	DIOX	TOTAL TCDD	0.08	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	DIOX	TOTAL TCDF	0.06	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	M	ALUMINUM	2,560.00		MG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	M	ANTIMONY	3.70	U	MG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	M	ARSENIC	1.40		MG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	M	BARIUM	17.90		MG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	M	BERYLLIUM	0.57	U	MG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	M	BORON	12.30	U	MG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	M	CADMIUM	0.49	U	MG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	M	CALCIUM	680.00	J	MG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	M	CHROMIUM	11.40		MG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	M	COBALT	2.30		MG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	M	COPPER	5.00	U	MG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	M	IRON	6,430.00		MG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	M	LEAD	7.90		MG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	M	MAGNESIUM	1,490.00		MG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	M	MANGANESE	150.00		MG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	M	MERCURY	0.12	U	MG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	M	NICKEL	5.60		MG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	M	POTASSIUM	822.00	U	MG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	M	SELENIUM	0.49	UJ	MG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	M	SILVER	0.49	UJ	MG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	M	SODIUM	28.40	U	MG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	M	THALLIUM	0.25	U	MG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	M	VANADIUM	8.00		MG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	M	ZINC	50.40		MG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OS	1,2,4-TRICHLOROBENZENE	410.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OS	1,2-DICHLOROBENZENE	410.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OS	1,3-DICHLOROBENZENE	410.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OS	1,4-DICHLOROBENZENE	410.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OS	2,4,5-TRICHLOROPHENOL	990.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OS	2,4,6-TRICHLOROPHENOL	410.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OS	2,4-DICHLOROPHENOL	410.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OS	2,4-DIMETHYLPHENOL	410.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OS	2,4-DINITROPHENOL	990.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OS	2,4-DINITROTOLUENE	410.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OS	2,6-DINITROTOLUENE	410.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OS	2-CHLORONAPHTHALENE	410.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OS	2-CHLOROPHENOL	410.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OS	2-METHYLNAPHTHALENE	410.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OS	2-METHYLPHENOL	410.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OS	2-NITROANILINE	990.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OS	2-NITROPHENOL	410.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OS	3,3'-DICHLOROBENZIDINE	410.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OS	3-NITROANILINE	990.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OS	4,6-DINITRO-2-METHYLPHENOL	990.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OS	4-BROMOPHENYL PHENYL ETHER	410.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OS	4-CHLORO-3-METHYLPHENOL	410.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OS	4-CHLOROANILINE	410.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OS	4-CHLOROPHENYL PHENYL ETHER	410.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OS	4-METHYLPHENOL	410.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OS	4-NITROANILINE	990.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OS	4-NITROPHENOL	990.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OS	ACENAPHTHENE	410.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OS	ACENAPHTHYLENE	410.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OS	ANTHRACENE	410.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OS	BENZO(A)ANTHRACENE	410.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OS	BENZO(A)PYRENE	410.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OS	BENZO(B)FLUORANTHENE	410.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OS	BENZO(G,H,I)PERYLENE	410.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OS	BENZO(K)FLUORANTHENE	410.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OS	BENZOIC ACID	77.00	J	UG/KG	NORMAL

Area	Location	Top	Bottom	Fraction	Parameter	Value	Qual	Units	SACODE
Drainage Area 1	2WCSD11	0	1	OS	BENZYL ALCOHOL	410.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OS	BIS(2-CHLOROETHOXY)METHANE	410.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OS	BIS(2-CHLOROETHYL)ETHER	410.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OS	BIS(2-CHLOROISOPROPYL) ETHER	410.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OS	BIS(2-ETHYLHEXYL)PHTHALATE	1,100.00	J	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OS	BUTYLBENZYL PHTHALATE	410.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OS	CARBAZOLE	410.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OS	CHRYSENE	410.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OS	DI-N-BUTYL PHTHALATE	180.00	J	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OS	DI-N-OCTYL PHTHALATE	26.00	J	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OS	DIBENZO(A,H)ANTHRACENE	410.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OS	DIBENZOFURAN	410.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OS	DIETHYL PHTHALATE	410.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OS	DIMETHYL PHTHALATE	410.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OS	FLUORANTHENE	410.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OS	FLUORENE	410.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OS	HEXACHLOROBENZENE	410.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OS	HEXACHLOROBUTADIENE	410.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OS	HEXACHLOROCYCLOPENTADIENE	410.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OS	HEXACHLOROETHANE	410.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OS	INDENO(1,2,3-CD)PYRENE	410.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OS	ISOPHORONE	410.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OS	N-NITROSO-DI-N-PROPYLAMINE	410.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OS	N-NITROSODIPHENYLAMINE	410.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OS	NAPHTHALENE	410.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OS	NITROBENZENE	410.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OS	PENTACHLOROPHENOL	990.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OS	PHENANTHRENE	230.00	J	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OS	PHENOL	32.00	J	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OS	PYRENE	410.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OV	1,1,1-TRICHLOROETHANE	12.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OV	1,1,2,2-TETRACHLOROETHANE	12.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OV	1,1,2-TRICHLOROETHANE	12.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OV	1,1-DICHLOROETHANE	12.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OV	1,1-DICHLOROETHENE	12.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OV	1,2-DICHLOROETHANE	12.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OV	1,2-DICHLOROETHENE (TOTAL)	12.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OV	1,2-DICHLOROPROPANE	12.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OV	2-BUTANONE	12.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OV	2-HEXANONE	12.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OV	4-METHYL-2-PENTANONE	12.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OV	ACETONE	12.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OV	BENZENE	12.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OV	BROMODICHLOROMETHANE	12.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OV	BROMOFORM	12.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OV	BROMOMETHANE	12.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OV	CARBON DISULFIDE	12.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OV	CARBON TETRACHLORIDE	12.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OV	CHLOROBENZENE	12.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OV	CHLOROETHANE	12.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OV	CHLOROFORM	12.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OV	CHLOROMETHANE	12.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OV	CIS-1,3-DICHLOROPROPENE	12.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OV	DIBROMOCHLOROMETHANE	12.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OV	ETHYLBENZENE	12.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OV	METHYLENE CHLORIDE	12.00	J	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OV	STYRENE	12.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OV	TETRACHLOROETHENE	12.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OV	TOLUENE	12.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OV	TRANS-1,3-DICHLOROPROPENE	12.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OV	TRICHLOROETHENE	12.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OV	VINYL ACETATE	12.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OV	VINYL CHLORIDE	12.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	OV	XYLENES, TOTAL	12.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	PEST/PCB	4,4'-DDD	41.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	PEST/PCB	4,4'-DDE	41.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	PEST/PCB	4,4'-DDT	41.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	PEST/PCB	ALDRIN	21.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	PEST/PCB	ALPHA-BHC	21.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	PEST/PCB	ALPHA-CHLORDANE	21.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	PEST/PCB	AROCLOR-1016	410.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	PEST/PCB	AROCLOR-1221	830.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	PEST/PCB	AROCLOR-1232	410.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	PEST/PCB	AROCLOR-1242	410.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	PEST/PCB	AROCLOR-1248	410.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	PEST/PCB	AROCLOR-1254	410.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	PEST/PCB	AROCLOR-1260	410.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	PEST/PCB	BETA-BHC	21.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	PEST/PCB	DELTA-BHC	21.00	UJ	UG/KG	NORMAL

Area	Location	Top	Bottom	Fraction	Parameter	Value	Qual	Units	SACODE
Drainage Area 1	2WCSD11	0	1	PEST/PCB	DIELDRIN	41.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	PEST/PCB	ENDOSULFAN I	21.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	PEST/PCB	ENDOSULFAN II	41.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	PEST/PCB	ENDOSULFAN SULFATE	41.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	PEST/PCB	ENDRIN	10.00	J	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	PEST/PCB	ENDRIN ALDEHYDE	41.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	PEST/PCB	ENDRIN KETONE	41.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	PEST/PCB	GAMMA-BHC (LINDANE)	21.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	PEST/PCB	GAMMA-CHLORDANE	21.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	PEST/PCB	HEPTACHLOR	21.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	PEST/PCB	HEPTACHLOR EPOXIDE	21.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	PEST/PCB	METHOXYCHLOR	210.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCSD11	0	1	PEST/PCB	TOXAPHENE	2,100.00	UJ	UG/KG	NORMAL
Drainage Area 1	2WCSD14	0	1	M	ALUMINUM	18,500.00		MG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	M	ALUMINUM	26,400.00		MG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	M	ANTIMONY	18.40	U	MG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	M	ANTIMONY	17.40	U	MG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	M	ARSENIC	9.00		MG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	M	ARSENIC	11.50		MG/KG	NORMAL
Drainage Area 1	2WCSD14	0	1	M	BARIUM	83.40		MG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	M	BARIUM	103.00		MG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	M	BERYLLIUM	1.70	U	MG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	M	BERYLLIUM	2.30	U	MG/KG	NORMAL
Drainage Area 1	2WCSD14	0	1	M	BORON	26.80	J	MG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	M	BORON	37.50	J	MG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	M	CADMIUM	0.72	U	MG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	M	CADMIUM	0.80	U	MG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	M	CALCIUM	2,900.00	J	MG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	M	CALCIUM	3,250.00	J	MG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	M	CHROMIUM	36.10		MG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	M	CHROMIUM	27.60		MG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	M	COBALT	9.30		MG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	M	COBALT	13.40		MG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	M	COPPER	28.70		MG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	M	COPPER	37.70		MG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	M	IRON	29,000.00		MG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	M	IRON	40,700.00		MG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	M	LEAD	127.00		MG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	M	LEAD	84.60		MG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	M	MAGNESIUM	5,310.00		MG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	M	MAGNESIUM	4,710.00		MG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	M	MANGANESE	954.00		MG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	M	MANGANESE	1,480.00		MG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	M	MERCURY	0.20	U	MG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	M	MERCURY	0.18	U	MG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	M	NICKEL	18.70		MG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	M	NICKEL	25.80		MG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	M	POTASSIUM	3,050.00		MG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	M	POTASSIUM	3,170.00		MG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	M	SELENIUM	1.20	U	MG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	M	SELENIUM	0.97	U	MG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	M	SILVER	0.80	UJ	MG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	M	SILVER	0.72	UJ	MG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	M	SODIUM	169.00	U	MG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	M	SODIUM	162.00	U	MG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	M	THALLIUM	0.36	J	MG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	M	THALLIUM	0.40	U	MG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	M	VANADIUM	45.30		MG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	M	VANADIUM	62.20		MG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	M	ZINC	173.00		MG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	M	ZINC	134.00		MG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	1,2,4-TRICHLOROBENZENE	660.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	1,2,4-TRICHLOROBENZENE	600.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	1,2-DICHLOROBENZENE	600.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	1,2-DICHLOROBENZENE	660.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	1,3-DICHLOROBENZENE	660.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	1,3-DICHLOROBENZENE	600.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	1,4-DICHLOROBENZENE	600.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	1,4-DICHLOROBENZENE	660.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	2,4,5-TRICHLOROPHENOL	1,400.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	2,4,5-TRICHLOROPHENOL	1,600.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	2,4,6-TRICHLOROPHENOL	660.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	2,4,6-TRICHLOROPHENOL	600.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	2,4-DICHLOROPHENOL	660.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	2,4-DICHLOROPHENOL	600.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	2,4-DIMETHYLPHENOL	600.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	2,4-DIMETHYLPHENOL	660.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	2,4-DINITROPHENOL	1,400.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	2,4-DINITROPHENOL	1,600.00	U	UG/KG	DUPLICATE

Area	Location	Top	Bottom	Fraction	Parameter	Value	Qual	Units	SACODE
Drainage Area 1	2WCSD14	0	1	OS	2,4-DINITROTOLUENE	600.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	2,4-DINITROTOLUENE	660.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	2,6-DINITROTOLUENE	600.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	2,6-DINITROTOLUENE	660.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	2-CHLORONAPHTHALENE	600.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	2-CHLORONAPHTHALENE	660.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	2-CHLOROPHENOL	600.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	2-CHLOROPHENOL	660.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	2-METHYLNAPHTHALENE	660.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	2-METHYLNAPHTHALENE	600.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	2-METHYLPHENOL	600.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	2-METHYLPHENOL	660.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	2-NITROANILINE	1,400.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	2-NITROANILINE	1,600.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	2-NITROPHENOL	600.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	2-NITROPHENOL	660.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	3,3'-DICHLOROBENZIDINE	600.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	3,3'-DICHLOROBENZIDINE	660.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	3-NITROANILINE	1,400.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	3-NITROANILINE	1,600.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	4,6-DINITRO-2-METHYLPHENOL	1,600.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	4,6-DINITRO-2-METHYLPHENOL	1,400.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	4-BROMOPHENYL PHENYL ETHER	600.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	4-BROMOPHENYL PHENYL ETHER	660.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	4-CHLORO-3-METHYLPHENOL	600.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	4-CHLORO-3-METHYLPHENOL	660.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	4-CHLOROANILINE	660.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	4-CHLOROANILINE	600.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	4-CHLOROPHENYL PHENYL ETHER	600.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	4-CHLOROPHENYL PHENYL ETHER	660.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	4-METHYLPHENOL	660.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	4-METHYLPHENOL	600.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	4-NITROANILINE	1,400.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	4-NITROANILINE	1,600.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	4-NITROPHENOL	1,600.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	4-NITROPHENOL	1,400.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	ACENAPHTHENE	60.00	J	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	ACENAPHTHENE	70.00	J	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	ACENAPHTHYLENE	65.00	J	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	ACENAPHTHYLENE	74.00	J	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	ANTHRACENE	290.00	J	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	ANTHRACENE	290.00	J	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	BENZO(A)ANTHRACENE	1,900.00		UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	BENZO(A)ANTHRACENE	1,800.00		UG/KG	NORMAL
Drainage Area 1	2WCSD14	0	1	OS	BENZO(A)PYRENE	2,500.00		UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	BENZO(A)PYRENE	2,700.00		UG/KG	NORMAL
Drainage Area 1	2WCSD14	0	1	OS	BENZO(B)FLUORANTHENE	4,400.00		UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	BENZO(B)FLUORANTHENE	4,800.00		UG/KG	NORMAL
Drainage Area 1	2WCSD14	0	1	OS	BENZO(G,H,I)PERYLENE	2,400.00		UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	BENZO(G,H,I)PERYLENE	1,700.00		UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	BENZO(K)FLUORANTHENE	1,800.00		UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	BENZO(K)FLUORANTHENE	2,100.00		UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	BENZOIC ACID	600.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	BENZOIC ACID	190.00	J	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	BENZYL ALCOHOL	600.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	BENZYL ALCOHOL	660.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	BIS(2-CHLOROETHOXY)METHANE	600.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	BIS(2-CHLOROETHOXY)METHANE	660.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	BIS(2-CHLOROETHYL)ETHER	660.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	BIS(2-CHLOROETHYL)ETHER	600.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	BIS(2-CHLOROISOPROPYL) ETHER	660.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	BIS(2-CHLOROISOPROPYL) ETHER	600.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	BIS(2-ETHYLHEXYL)PHTHALATE	780.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	BIS(2-ETHYLHEXYL)PHTHALATE	600.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	BUTYLBENZYL PHTHALATE	52.00	J	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	BUTYLBENZYL PHTHALATE	600.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	CARBAZOLE	660.00		UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	CARBAZOLE	630.00		UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	CHRYSENE	3,200.00		UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	CHRYSENE	2,900.00		UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	DI-N-BUTYL PHTHALATE	660.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	DI-N-BUTYL PHTHALATE	600.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	DI-N-OCTYL PHTHALATE	660.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	DI-N-OCTYL PHTHALATE	600.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	DIBENZO(A,H)ANTHRACENE	790.00		UG/KG	NORMAL
Drainage Area 1	2WCSD14	0	1	OS	DIBENZO(A,H)ANTHRACENE	870.00		UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	DIBENZOFURAN	82.00	J	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	DIBENZOFURAN	87.00	J	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	DIETHYL PHTHALATE	660.00	U	UG/KG	DUPLICATE

APPENDIX C.2 SEDIMENT DATA
SITE 20 - AREA A WEAPONS CENTER, NEW LONDON, CONNECTICUT

Area	Location	Top	Bottom	Fraction	Parameter	Value	Qual	Units	SACODE
Drainage Area 1	2WCSD14	0	1	OS	DIETHYL PHTHALATE	600.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	DIMETHYL PHTHALATE	660.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	DIMETHYL PHTHALATE	600.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	FLUORANTHENE	4,600.00		UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	FLUORANTHENE	5,200.00		UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	FLUORENE	110.00	J	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	FLUORENE	110.00	J	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	HEXACHLOROBENZENE	660.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	HEXACHLOROBENZENE	600.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	HEXACHLOROBUTADIENE	660.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	HEXACHLOROBUTADIENE	600.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	HEXACHLOROCYCLOPENTADIENE	660.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	HEXACHLOROCYCLOPENTADIENE	600.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	HEXACHLOROETHANE	660.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	HEXACHLOROETHANE	600.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	INDENO(1,2,3-CD)PYRENE	2,200.00		UG/KG	NORMAL
Drainage Area 1	2WCSD14	0	1	OS	INDENO(1,2,3-CD)PYRENE	2,400.00		UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	ISOPHORONE	600.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	ISOPHORONE	660.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	N-NITROSO-DI-N-PROPYLAMINE	660.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	N-NITROSO-DI-N-PROPYLAMINE	600.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	N-NITROSODIPHENYLAMINE	660.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	N-NITROSODIPHENYLAMINE	600.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	NAPHTHALENE	600.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	NAPHTHALENE	660.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	NITROBENZENE	600.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	NITROBENZENE	660.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	PENTACHLOROPHENOL	1,600.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	PENTACHLOROPHENOL	1,400.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	PHENANTHRENE	2,300.00		UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	PHENANTHRENE	2,300.00		UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	PHENOL	600.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	PHENOL	660.00	U	UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	PYRENE	4,600.00		UG/KG	DUPLICATE
Drainage Area 1	2WCSD14	0	1	OS	PYRENE	4,000.00		UG/KG	DUPLICATE
Drainage Area 1	2WCSD15	0	1	M	ALUMINUM	16,900.00		MG/KG	NORMAL
Drainage Area 1	2WCSD15	0	1	M	ANTIMONY	6.50	U	MG/KG	NORMAL
Drainage Area 1	2WCSD15	0	1	M	ARSENIC	9.60		MG/KG	NORMAL
Drainage Area 1	2WCSD15	0	1	M	BARIUM	57.80		MG/KG	NORMAL
Drainage Area 1	2WCSD15	0	1	M	BERYLLIUM	1.70	U	MG/KG	NORMAL
Drainage Area 1	2WCSD15	0	1	M	BORON	25.80	J	MG/KG	NORMAL
Drainage Area 1	2WCSD15	0	1	M	CADMIUM	0.82	U	MG/KG	NORMAL
Drainage Area 1	2WCSD15	0	1	M	CALCIUM	1,750.00	J	MG/KG	NORMAL
Drainage Area 1	2WCSD15	0	1	M	CHROMIUM	65.20		MG/KG	NORMAL
Drainage Area 1	2WCSD15	0	1	M	COBALT	4.30		MG/KG	NORMAL
Drainage Area 1	2WCSD15	0	1	M	COPPER	26.00		MG/KG	NORMAL
Drainage Area 1	2WCSD15	0	1	M	IRON	14,700.00		MG/KG	NORMAL
Drainage Area 1	2WCSD15	0	1	M	LEAD	35.10		MG/KG	NORMAL
Drainage Area 1	2WCSD15	0	1	M	MAGNESIUM	5,380.00		MG/KG	NORMAL
Drainage Area 1	2WCSD15	0	1	M	MANGANESE	172.00		MG/KG	NORMAL
Drainage Area 1	2WCSD15	0	1	M	MERCURY	0.52		MG/KG	NORMAL
Drainage Area 1	2WCSD15	0	1	M	NICKEL	16.30		MG/KG	NORMAL
Drainage Area 1	2WCSD15	0	1	M	POTASSIUM	3,920.00		MG/KG	NORMAL
Drainage Area 1	2WCSD15	0	1	M	SELENIUM	1.50	U	MG/KG	NORMAL
Drainage Area 1	2WCSD15	0	1	M	SILVER	0.82	UJ	MG/KG	NORMAL
Drainage Area 1	2WCSD15	0	1	M	SODIUM	334.00	U	MG/KG	NORMAL
Drainage Area 1	2WCSD15	0	1	M	THALLIUM	0.41	U	MG/KG	NORMAL
Drainage Area 1	2WCSD15	0	1	M	VANADIUM	38.10		MG/KG	NORMAL
Drainage Area 1	2WCSD15	0	1	M	ZINC	42.60		MG/KG	NORMAL
Drainage Area 1	2WCSD15	0	1	OS	1,2,4-TRICHLOROBENZENE	690.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD15	0	1	OS	1,2-DICHLOROBENZENE	690.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD15	0	1	OS	1,3-DICHLOROBENZENE	690.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD15	0	1	OS	1,4-DICHLOROBENZENE	690.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD15	0	1	OS	2,4,5-TRICHLOROPHENOL	1,700.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD15	0	1	OS	2,4,6-TRICHLOROPHENOL	690.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD15	0	1	OS	2,4-DICHLOROPHENOL	690.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD15	0	1	OS	2,4-DIMETHYLPHENOL	690.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD15	0	1	OS	2,4-DINITROPHENOL	1,700.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD15	0	1	OS	2,4-DINITROTOLUENE	690.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD15	0	1	OS	2,6-DINITROTOLUENE	690.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD15	0	1	OS	2-CHLORONAPHTHALENE	690.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD15	0	1	OS	2-CHLOROPHENOL	690.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD15	0	1	OS	2-METHYLNAPHTHALENE	690.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD15	0	1	OS	2-METHYLPHENOL	690.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD15	0	1	OS	2-NITROANILINE	1,700.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD15	0	1	OS	2-NITROPHENOL	690.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD15	0	1	OS	3,3'-DICHLOROBENZIDINE	690.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD15	0	1	OS	3-NITROANILINE	1,700.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD15	0	1	OS	4,6-DINITRO-2-METHYLPHENOL	1,700.00	U	UG/KG	NORMAL

Area	Location	Top	Bottom	Fraction	Parameter	Value	Qual	Units	SACODE
Drainage Area 1	2WCSD15	0	1	OS	4-BROMOPHENYL PHENYL ETHER	690.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD15	0	1	OS	4-CHLORO-3-METHYLPHENOL	690.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD15	0	1	OS	4-CHLOROANILINE	690.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD15	0	1	OS	4-CHLOROPHENYL PHENYL ETHER	690.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD15	0	1	OS	4-METHYLPHENOL	690.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD15	0	1	OS	4-NITROANILINE	1,700.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD15	0	1	OS	4-NITROPHENOL	1,700.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD15	0	1	OS	ACENAPHTHENE	690.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD15	0	1	OS	ACENAPHTHYLENE	690.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD15	0	1	OS	ANTHRACENE	51.00	J	UG/KG	NORMAL
Drainage Area 1	2WCSD15	0	1	OS	BENZO(A)ANTHRACENE	160.00	J	UG/KG	NORMAL
Drainage Area 1	2WCSD15	0	1	OS	BENZO(A)PYRENE	690.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD15	0	1	OS	BENZO(B)FLUORANTHENE	350.00	J	UG/KG	NORMAL
Drainage Area 1	2WCSD15	0	1	OS	BENZO(G,H,I)PERYLENE	170.00	J	UG/KG	NORMAL
Drainage Area 1	2WCSD15	0	1	OS	BENZO(K)FLUORANTHENE	690.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD15	0	1	OS	BENZOIC ACID	690.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD15	0	1	OS	BENZYL ALCOHOL	690.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD15	0	1	OS	BIS(2-CHLOROETHOXY)METHANE	690.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD15	0	1	OS	BIS(2-CHLOROETHYL)ETHER	690.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD15	0	1	OS	BIS(2-CHLOROISOPROPYL) ETHER	690.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD15	0	1	OS	BIS(2-ETHYLHEXYL)PHTHALATE	690.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD15	0	1	OS	BUTYLBENZYL PHTHALATE	690.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD15	0	1	OS	CARBAZOLE	690.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD15	0	1	OS	CHRYSENE	250.00	J	UG/KG	NORMAL
Drainage Area 1	2WCSD15	0	1	OS	DI-N-BUTYL PHTHALATE	690.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD15	0	1	OS	DI-N-OCTYL PHTHALATE	690.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD15	0	1	OS	DIBENZO(A,H)ANTHRACENE	690.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD15	0	1	OS	DIBENZOFURAN	690.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD15	0	1	OS	DIETHYL PHTHALATE	690.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD15	0	1	OS	DIMETHYL PHTHALATE	690.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD15	0	1	OS	FLUORANTHENE	270.00	J	UG/KG	NORMAL
Drainage Area 1	2WCSD15	0	1	OS	FLUORENE	690.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD15	0	1	OS	HEXACHLOROBENZENE	690.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD15	0	1	OS	HEXACHLOROBUTADIENE	690.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD15	0	1	OS	HEXACHLOROCYCLOPENTADIENE	690.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD15	0	1	OS	HEXACHLOROETHANE	690.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD15	0	1	OS	INDENO(1,2,3-CD)PYRENE	160.00	J	UG/KG	NORMAL
Drainage Area 1	2WCSD15	0	1	OS	ISOPHORONE	690.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD15	0	1	OS	N-NITROSO-DI-N-PROPYLAMINE	690.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD15	0	1	OS	N-NITROSODIPHENYLAMINE	690.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD15	0	1	OS	NAPHTHALENE	690.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD15	0	1	OS	NITROBENZENE	690.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD15	0	1	OS	PENTACHLOROPHENOL	1,700.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD15	0	1	OS	PHENANTHRENE	140.00	J	UG/KG	NORMAL
Drainage Area 1	2WCSD15	0	1	OS	PHENOL	690.00	U	UG/KG	NORMAL
Drainage Area 1	2WCSD15	0	1	OS	PYRENE	370.00	J	UG/KG	NORMAL
Drainage Area 2	2WCSD10	0	1	M	ALUMINUM	12,200.00		MG/KG	NORMAL
Drainage Area 2	2WCSD10	0	1	M	ANTIMONY	7.80	J	MG/KG	NORMAL
Drainage Area 2	2WCSD10	0	1	M	ARSENIC	6.20	J	MG/KG	NORMAL
Drainage Area 2	2WCSD10	0	1	M	BARIUM	78.80	J	MG/KG	NORMAL
Drainage Area 2	2WCSD10	0	1	M	BERYLLIUM	0.53	J	MG/KG	NORMAL
Drainage Area 2	2WCSD10	0	1	M	BORON	15.90	U	MG/KG	NORMAL
Drainage Area 2	2WCSD10	0	1	M	CADMIUM	0.64	U	MG/KG	NORMAL
Drainage Area 2	2WCSD10	0	1	M	CALCIUM	1,660.00	J	MG/KG	NORMAL
Drainage Area 2	2WCSD10	0	1	M	CHROMIUM	41.40		MG/KG	NORMAL
Drainage Area 2	2WCSD10	0	1	M	COBALT	7.10	J	MG/KG	NORMAL
Drainage Area 2	2WCSD10	0	1	M	COPPER	16.80	J	MG/KG	NORMAL
Drainage Area 2	2WCSD10	0	1	M	IRON	23,800.00		MG/KG	NORMAL
Drainage Area 2	2WCSD10	0	1	M	LEAD	28.00		MG/KG	NORMAL
Drainage Area 2	2WCSD10	0	1	M	MAGNESIUM	4,720.00		MG/KG	NORMAL
Drainage Area 2	2WCSD10	0	1	M	MANGANESE	153.00		MG/KG	NORMAL
Drainage Area 2	2WCSD10	0	1	M	MERCURY	0.27	J	MG/KG	NORMAL
Drainage Area 2	2WCSD10	0	1	M	NICKEL	13.10	J	MG/KG	NORMAL
Drainage Area 2	2WCSD10	0	1	M	POTASSIUM	2,350.00	J	MG/KG	NORMAL
Drainage Area 2	2WCSD10	0	1	M	SELENIUM	0.67	J	MG/KG	NORMAL
Drainage Area 2	2WCSD10	0	1	M	SILVER	0.64	U	MG/KG	NORMAL
Drainage Area 2	2WCSD10	0	1	M	SODIUM	356.00	J	MG/KG	NORMAL
Drainage Area 2	2WCSD10	0	1	M	THALLIUM	0.96	U	MG/KG	NORMAL
Drainage Area 2	2WCSD10	0	1	M	VANADIUM	47.10		MG/KG	NORMAL
Drainage Area 2	2WCSD10	0	1	M	ZINC	40.50	J	MG/KG	NORMAL
Drainage Area 2	2WCSD10	0	1	OS	1,2,4-TRICHLOROBENZENE	510.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD10	0	1	OS	1,2-DICHLOROBENZENE	510.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD10	0	1	OS	1,3-DICHLOROBENZENE	510.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD10	0	1	OS	1,4-DICHLOROBENZENE	510.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD10	0	1	OS	2,4,5-TRICHLOROPHENOL	1,200.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD10	0	1	OS	2,4,6-TRICHLOROPHENOL	510.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD10	0	1	OS	2,4-DICHLOROPHENOL	510.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD10	0	1	OS	2,4-DIMETHYLPHENOL	510.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD10	0	1	OS	2,4-DINITROPHENOL	1,200.00	U	UG/KG	NORMAL

Area	Location	Top	Bottom	Fraction	Parameter	Value	Qual	Units	SACODE
Drainage Area 2	2WCSD10	0	1	OS	2,4-DINITROTOLUENE	510.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD10	0	1	OS	2,6-DINITROTOLUENE	510.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD10	0	1	OS	2-CHLORONAPHTHALENE	510.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD10	0	1	OS	2-CHLOROPHENOL	510.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD10	0	1	OS	2-METHYLNAPHTHALENE	510.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD10	0	1	OS	2-METHYLPHENOL	510.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD10	0	1	OS	2-NITROANILINE	1,200.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD10	0	1	OS	2-NITROPHENOL	510.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD10	0	1	OS	3,3'-DICHLOROBENZIDINE	510.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD10	0	1	OS	3-NITROANILINE	1,200.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD10	0	1	OS	4,6-DINITRO-2-METHYLPHENOL	1,200.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD10	0	1	OS	4-BROMOPHENYL PHENYL ETHER	510.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD10	0	1	OS	4-CHLORO-3-METHYLPHENOL	510.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD10	0	1	OS	4-CHLOROANILINE	510.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD10	0	1	OS	4-CHLOROPHENYL PHENYL ETHER	510.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD10	0	1	OS	4-METHYLPHENOL	510.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD10	0	1	OS	4-NITROANILINE	1,200.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD10	0	1	OS	4-NITROPHENOL	1,200.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD10	0	1	OS	ACENAPHTHENE	510.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD10	0	1	OS	ACENAPHTHYLENE	510.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD10	0	1	OS	ANTHRACENE	510.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD10	0	1	OS	BENZO(A)ANTHRACENE	180.00	J	UG/KG	NORMAL
Drainage Area 2	2WCSD10	0	1	OS	BENZO(A)PYRENE	140.00	J	UG/KG	NORMAL
Drainage Area 2	2WCSD10	0	1	OS	BENZO(B)FLUORANTHENE	350.00	J	UG/KG	NORMAL
Drainage Area 2	2WCSD10	0	1	OS	BENZO(G,H,I)PERYLENE	510.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD10	0	1	OS	BENZO(K)FLUORANTHENE	510.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD10	0	1	OS	BENZOIC ACID	61.00	J	UG/KG	NORMAL
Drainage Area 2	2WCSD10	0	1	OS	BENZYL ALCOHOL	510.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD10	0	1	OS	BIS(2-CHLOROETHOXY)METHANE	510.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD10	0	1	OS	BIS(2-CHLOROETHYL)ETHER	510.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD10	0	1	OS	BIS(2-CHLOROISOPROPYL) ETHER	510.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD10	0	1	OS	BIS(2-ETHYLHEXYL)PHTHALATE	530.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD10	0	1	OS	BUTYLBENZYL PHTHALATE	510.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD10	0	1	OS	CARBAZOLE	510.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD10	0	1	OS	CHRYSENE	660.00		UG/KG	NORMAL
Drainage Area 2	2WCSD10	0	1	OS	DI-N-BUTYL PHTHALATE	510.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD10	0	1	OS	DI-N-OCTYL PHTHALATE	510.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD10	0	1	OS	DIBENZO(A,H)ANTHRACENE	510.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD10	0	1	OS	DIBENZOFURAN	510.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD10	0	1	OS	DIETHYL PHTHALATE	510.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD10	0	1	OS	DIMETHYL PHTHALATE	510.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD10	0	1	OS	FLUORANTHENE	180.00	J	UG/KG	NORMAL
Drainage Area 2	2WCSD10	0	1	OS	FLUORENE	510.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD10	0	1	OS	HEXACHLOROBENZENE	510.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD10	0	1	OS	HEXACHLOROBUTADIENE	510.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD10	0	1	OS	HEXACHLOROCYCLOPENTADIENE	510.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD10	0	1	OS	HEXACHLOROETHANE	510.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD10	0	1	OS	INDENO(1,2,3-CD)PYRENE	86.00	J	UG/KG	NORMAL
Drainage Area 2	2WCSD10	0	1	OS	ISOPHORONE	510.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD10	0	1	OS	N-NITROSO-DI-N-PROPYLAMINE	510.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD10	0	1	OS	N-NITROSODIPHENYLAMINE	510.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD10	0	1	OS	NAPHTHALENE	510.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD10	0	1	OS	NITROBENZENE	510.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD10	0	1	OS	PENTACHLOROPHENOL	1,200.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD10	0	1	OS	PHENANTHRENE	110.00	J	UG/KG	NORMAL
Drainage Area 2	2WCSD10	0	1	OS	PHENOL	510.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD10	0	1	OS	PYRENE	270.00	J	UG/KG	NORMAL
Drainage Area 2	2WCSD12	0	1	M	ALUMINUM	13,700.00		MG/KG	NORMAL
Drainage Area 2	2WCSD12	0	1	M	ANTIMONY	9.40	U	MG/KG	NORMAL
Drainage Area 2	2WCSD12	0	1	M	ARSENIC	8.40		MG/KG	NORMAL
Drainage Area 2	2WCSD12	0	1	M	BARIUM	72.90		MG/KG	NORMAL
Drainage Area 2	2WCSD12	0	1	M	BERYLLIUM	1.20	U	MG/KG	NORMAL
Drainage Area 2	2WCSD12	0	1	M	BORON	30.20	J	MG/KG	NORMAL
Drainage Area 2	2WCSD12	0	1	M	CADMIUM	0.73	U	MG/KG	NORMAL
Drainage Area 2	2WCSD12	0	1	M	CALCIUM	1,800.00	J	MG/KG	NORMAL
Drainage Area 2	2WCSD12	0	1	M	CHROMIUM	50.50		MG/KG	NORMAL
Drainage Area 2	2WCSD12	0	1	M	COBALT	5.30		MG/KG	NORMAL
Drainage Area 2	2WCSD12	0	1	M	COPPER	23.40		MG/KG	NORMAL
Drainage Area 2	2WCSD12	0	1	M	IRON	24,600.00		MG/KG	NORMAL
Drainage Area 2	2WCSD12	0	1	M	LEAD	27.10		MG/KG	NORMAL
Drainage Area 2	2WCSD12	0	1	M	MAGNESIUM	5,080.00		MG/KG	NORMAL
Drainage Area 2	2WCSD12	0	1	M	MANGANESE	168.00		MG/KG	NORMAL
Drainage Area 2	2WCSD12	0	1	M	MERCURY	0.29		MG/KG	NORMAL
Drainage Area 2	2WCSD12	0	1	M	NICKEL	15.50		MG/KG	NORMAL
Drainage Area 2	2WCSD12	0	1	M	POTASSIUM	3,090.00		MG/KG	NORMAL
Drainage Area 2	2WCSD12	0	1	M	SELENIUM	0.73	UJ	MG/KG	NORMAL
Drainage Area 2	2WCSD12	0	1	M	SILVER	0.73	UJ	MG/KG	NORMAL
Drainage Area 2	2WCSD12	0	1	M	SODIUM	209.00	U	MG/KG	NORMAL
Drainage Area 2	2WCSD12	0	1	M	THALLIUM	0.37	U	MG/KG	NORMAL

APPENDIX C.2 SEDIMENT DATA
SITE 20 - AREA A WEAPONS CENTER, NEW LONDON, CONNECTICUT

Area	Location	Top	Bottom	Fraction	Parameter	Value	Qual	Units	SACODE
Drainage Area 2	2WCSD12	0	1	M	VANADIUM	41.50		MG/KG	NORMAL
Drainage Area 2	2WCSD12	0	1	M	ZINC	43.40		MG/KG	NORMAL
Drainage Area 2	2WCSD12	0	1	OS	1,2,4-TRICHLOROBENZENE	560.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD12	0	1	OS	1,2-DICHLOROBENZENE	560.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD12	0	1	OS	1,3-DICHLOROBENZENE	560.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD12	0	1	OS	1,4-DICHLOROBENZENE	560.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD12	0	1	OS	2,4,5-TRICHLOROPHENOL	1,400.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD12	0	1	OS	2,4,6-TRICHLOROPHENOL	560.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD12	0	1	OS	2,4-DICHLOROPHENOL	560.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD12	0	1	OS	2,4-DIMETHYLPHENOL	560.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD12	0	1	OS	2,4-DINITROPHENOL	1,400.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD12	0	1	OS	2,4-DINITROTOLUENE	560.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD12	0	1	OS	2,6-DINITROTOLUENE	560.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD12	0	1	OS	2-CHLORONAPHTHALENE	560.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD12	0	1	OS	2-CHLOROPHENOL	560.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD12	0	1	OS	2-METHYLNAPHTHALENE	560.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD12	0	1	OS	2-METHYLPHENOL	560.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD12	0	1	OS	2-NITROANILINE	1,400.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD12	0	1	OS	2-NITROPHENOL	560.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD12	0	1	OS	3,3'-DICHLOROBENZIDINE	560.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD12	0	1	OS	3-NITROANILINE	1,400.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD12	0	1	OS	4,6-DINITRO-2-METHYLPHENOL	1,400.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD12	0	1	OS	4-BROMOPHENYL PHENYL ETHER	560.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD12	0	1	OS	4-CHLORO-3-METHYLPHENOL	560.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD12	0	1	OS	4-CHLOROANILINE	560.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD12	0	1	OS	4-CHLOROPHENYL PHENYL ETHER	560.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD12	0	1	OS	4-METHYLPHENOL	560.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD12	0	1	OS	4-NITROANILINE	1,400.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD12	0	1	OS	4-NITROPHENOL	1,400.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD12	0	1	OS	ACENAPHTHENE	560.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD12	0	1	OS	ACENAPHTHYLENE	560.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD12	0	1	OS	ANTHRACENE	560.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD12	0	1	OS	BENZO(A)ANTHRACENE	95.00	J	UG/KG	NORMAL
Drainage Area 2	2WCSD12	0	1	OS	BENZO(A)PYRENE	110.00	J	UG/KG	NORMAL
Drainage Area 2	2WCSD12	0	1	OS	BENZO(B)FLUORANTHENE	220.00	J	UG/KG	NORMAL
Drainage Area 2	2WCSD12	0	1	OS	BENZO(G,H,I)PERYLENE	59.00	J	UG/KG	NORMAL
Drainage Area 2	2WCSD12	0	1	OS	BENZO(K)FLUORANTHENE	560.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD12	0	1	OS	BENZOIC ACID	93.00	J	UG/KG	NORMAL
Drainage Area 2	2WCSD12	0	1	OS	BENZYL ALCOHOL	560.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD12	0	1	OS	BIS(2-CHLOROETHOXY)METHANE	560.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD12	0	1	OS	BIS(2-CHLOROETHYL)ETHER	560.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD12	0	1	OS	BIS(2-CHLOROISOPROPYL) ETHER	560.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD12	0	1	OS	BIS(2-ETHYLHEXYL)PHTHALATE	560.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD12	0	1	OS	BUTYLBENZYL PHTHALATE	560.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD12	0	1	OS	CARBAZOLE	560.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD12	0	1	OS	CHRYSENE	190.00	J	UG/KG	NORMAL
Drainage Area 2	2WCSD12	0	1	OS	DI-N-BUTYL PHTHALATE	560.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD12	0	1	OS	DI-N-OCTYL PHTHALATE	560.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD12	0	1	OS	DIBENZO(A,H)ANTHRACENE	560.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD12	0	1	OS	DIBENZOFURAN	560.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD12	0	1	OS	DIETHYL PHTHALATE	560.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD12	0	1	OS	DIMETHYL PHTHALATE	560.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD12	0	1	OS	FLUORANTHENE	190.00	J	UG/KG	NORMAL
Drainage Area 2	2WCSD12	0	1	OS	FLUORENE	560.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD12	0	1	OS	HEXACHLOROBENZENE	560.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD12	0	1	OS	HEXACHLOROBUTADIENE	560.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD12	0	1	OS	HEXACHLOROCYCLOPENTADIENE	560.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD12	0	1	OS	HEXACHLOROETHANE	560.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD12	0	1	OS	INDENO(1,2,3-CD)PYRENE	71.00	J	UG/KG	NORMAL
Drainage Area 2	2WCSD12	0	1	OS	ISOPHORONE	560.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD12	0	1	OS	N-NITROSO-DI-N-PROPYLAMINE	560.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD12	0	1	OS	N-NITROSODIPHENYLAMINE	560.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD12	0	1	OS	NAPHTHALENE	560.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD12	0	1	OS	NITROBENZENE	560.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD12	0	1	OS	PENTACHLOROPHENOL	1,400.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD12	0	1	OS	PHENANTHRENE	120.00	J	UG/KG	NORMAL
Drainage Area 2	2WCSD12	0	1	OS	PHENOL	560.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD12	0	1	OS	PYRENE	210.00	J	UG/KG	NORMAL
Drainage Area 2	2WCSD8	0	1	M	ALUMINUM	12,600.00		MG/KG	NORMAL
Drainage Area 2	2WCSD8	0	1	M	ANTIMONY	4.90	U	MG/KG	NORMAL
Drainage Area 2	2WCSD8	0	1	M	ARSENIC	6.70		MG/KG	NORMAL
Drainage Area 2	2WCSD8	0	1	M	BARIUM	73.20		MG/KG	NORMAL
Drainage Area 2	2WCSD8	0	1	M	BERYLLIUM	1.20	U	MG/KG	NORMAL
Drainage Area 2	2WCSD8	0	1	M	BORON	29.30	J	MG/KG	NORMAL
Drainage Area 2	2WCSD8	0	1	M	CADMIUM	0.63	U	MG/KG	NORMAL
Drainage Area 2	2WCSD8	0	1	M	CALCIUM	2,150.00	J	MG/KG	NORMAL
Drainage Area 2	2WCSD8	0	1	M	CHROMIUM	45.40		MG/KG	NORMAL
Drainage Area 2	2WCSD8	0	1	M	COBALT	5.60		MG/KG	NORMAL
Drainage Area 2	2WCSD8	0	1	M	COPPER	23.60		MG/KG	NORMAL

Area	Location	Top	Bottom	Fraction	Parameter	Value	Qual	Units	SACODE
Drainage Area 2	2WCSD8	0	1	M	IRON	31,200.00		MG/KG	NORMAL
Drainage Area 2	2WCSD8	0	1	M	LEAD	22.60		MG/KG	NORMAL
Drainage Area 2	2WCSD8	0	1	M	MAGNESIUM	4,860.00		MG/KG	NORMAL
Drainage Area 2	2WCSD8	0	1	M	MANGANESE	483.00		MG/KG	NORMAL
Drainage Area 2	2WCSD8	0	1	M	MERCURY	0.18		MG/KG	NORMAL
Drainage Area 2	2WCSD8	0	1	M	NICKEL	13.80		MG/KG	NORMAL
Drainage Area 2	2WCSD8	0	1	M	POTASSIUM	2,640.00		MG/KG	NORMAL
Drainage Area 2	2WCSD8	0	1	M	SELENIUM	0.66	U	MG/KG	NORMAL
Drainage Area 2	2WCSD8	0	1	M	SILVER	0.63	UJ	MG/KG	NORMAL
Drainage Area 2	2WCSD8	0	1	M	SODIUM	163.00	U	MG/KG	NORMAL
Drainage Area 2	2WCSD8	0	1	M	THALLIUM	0.31	U	MG/KG	NORMAL
Drainage Area 2	2WCSD8	0	1	M	VANADIUM	33.40		MG/KG	NORMAL
Drainage Area 2	2WCSD8	0	1	M	ZINC	82.20		MG/KG	NORMAL
Drainage Area 2	2WCSD8	0	1	OS	1,2,4-TRICHLOROBENZENE	530.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD8	0	1	OS	1,2-DICHLOROBENZENE	530.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD8	0	1	OS	1,3-DICHLOROBENZENE	530.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD8	0	1	OS	1,4-DICHLOROBENZENE	530.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD8	0	1	OS	2,4,5-TRICHLOROPHENOL	1,300.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD8	0	1	OS	2,4,6-TRICHLOROPHENOL	530.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD8	0	1	OS	2,4-DICHLOROPHENOL	530.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD8	0	1	OS	2,4-DIMETHYLPHENOL	530.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD8	0	1	OS	2,4-DINITROPHENOL	1,300.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD8	0	1	OS	2,4-DINITROTOLUENE	530.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD8	0	1	OS	2,6-DINITROTOLUENE	530.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD8	0	1	OS	2-CHLORONAPHTHALENE	530.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD8	0	1	OS	2-CHLOROPHENOL	530.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD8	0	1	OS	2-METHYLNAPHTHALENE	530.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD8	0	1	OS	2-METHYLPHENOL	530.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD8	0	1	OS	2-NITROANILINE	1,300.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD8	0	1	OS	2-NITROPHENOL	530.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD8	0	1	OS	3,3'-DICHLOROBENZIDINE	530.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD8	0	1	OS	3-NITROANILINE	1,300.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD8	0	1	OS	4,6-DINITRO-2-METHYLPHENOL	1,300.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD8	0	1	OS	4-BROMOPHENYL PHENYL ETHER	530.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD8	0	1	OS	4-CHLORO-3-METHYLPHENOL	530.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD8	0	1	OS	4-CHLOROANILINE	530.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD8	0	1	OS	4-CHLOROPHENYL PHENYL ETHER	530.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD8	0	1	OS	4-METHYLPHENOL	530.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD8	0	1	OS	4-NITROANILINE	1,300.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD8	0	1	OS	4-NITROPHENOL	1,300.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD8	0	1	OS	ACENAPHTHENE	530.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD8	0	1	OS	ACENAPHTHYLENE	530.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD8	0	1	OS	ANTHRACENE	530.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD8	0	1	OS	BENZO(A)ANTHRACENE	63.00	J	UG/KG	NORMAL
Drainage Area 2	2WCSD8	0	1	OS	BENZO(A)PYRENE	78.00	J	UG/KG	NORMAL
Drainage Area 2	2WCSD8	0	1	OS	BENZO(B)FLUORANTHENE	150.00	J	UG/KG	NORMAL
Drainage Area 2	2WCSD8	0	1	OS	BENZO(G,H,I)PERYLENE	47.00	J	UG/KG	NORMAL
Drainage Area 2	2WCSD8	0	1	OS	BENZO(K)FLUORANTHENE	530.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD8	0	1	OS	BENZOIC ACID	530.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD8	0	1	OS	BENZYL ALCOHOL	530.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD8	0	1	OS	BIS(2-CHLOROETHOXY)METHANE	530.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD8	0	1	OS	BIS(2-CHLOROETHYL)ETHER	530.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD8	0	1	OS	BIS(2-CHLOROISOPROPYL) ETHER	530.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD8	0	1	OS	BIS(2-ETHYLHEXYL)PHTHALATE	530.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD8	0	1	OS	BUTYLBENZYL PHTHALATE	530.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD8	0	1	OS	CARBAZOLE	530.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD8	0	1	OS	CHRYSENE	110.00	J	UG/KG	NORMAL
Drainage Area 2	2WCSD8	0	1	OS	DI-N-BUTYL PHTHALATE	530.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD8	0	1	OS	DI-N-OCTYL PHTHALATE	530.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD8	0	1	OS	DIBENZO(A,H)ANTHRACENE	530.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD8	0	1	OS	DIBENZOFURAN	530.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD8	0	1	OS	DIETHYL PHTHALATE	530.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD8	0	1	OS	DIMETHYL PHTHALATE	530.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD8	0	1	OS	FLUORANTHENE	120.00	J	UG/KG	NORMAL
Drainage Area 2	2WCSD8	0	1	OS	FLUORENE	530.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD8	0	1	OS	HEXACHLOROBENZENE	530.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD8	0	1	OS	HEXACHLOROBUTADIENE	530.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD8	0	1	OS	HEXACHLOROCYCLOPENTADIENE	530.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD8	0	1	OS	HEXACHLOROETHANE	530.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD8	0	1	OS	INDENO(1,2,3-CD)PYRENE	51.00	J	UG/KG	NORMAL
Drainage Area 2	2WCSD8	0	1	OS	ISOPHORONE	530.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD8	0	1	OS	N-NITROSO-DI-N-PROPYLAMINE	530.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD8	0	1	OS	N-NITROSODIPHENYLAMINE	530.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD8	0	1	OS	NAPHTHALENE	530.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD8	0	1	OS	NITROBENZENE	530.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD8	0	1	OS	PENTACHLOROPHENOL	1,300.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD8	0	1	OS	PHENANTHRENE	77.00	J	UG/KG	NORMAL
Drainage Area 2	2WCSD8	0	1	OS	PHENOL	530.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD8	0	1	OS	PYRENE	150.00	J	UG/KG	NORMAL

Area	Location	Top	Bottom	Fraction	Parameter	Value	Qual	Units	SACODE
Drainage Area 2	2WCSD9	0	1	M	ALUMINUM	4,550.00		MG/KG	NORMAL
Drainage Area 2	2WCSD9	0	1	M	ANTIMONY	3.90	U	MG/KG	NORMAL
Drainage Area 2	2WCSD9	0	1	M	ARSENIC	1.60		MG/KG	NORMAL
Drainage Area 2	2WCSD9	0	1	M	BARIUM	56.50		MG/KG	NORMAL
Drainage Area 2	2WCSD9	0	1	M	BERYLLIUM	0.63	U	MG/KG	NORMAL
Drainage Area 2	2WCSD9	0	1	M	BORON	12.90	U	MG/KG	NORMAL
Drainage Area 2	2WCSD9	0	1	M	CADMIUM	0.51	U	MG/KG	NORMAL
Drainage Area 2	2WCSD9	0	1	M	CALCIUM	1,440.00	J	MG/KG	NORMAL
Drainage Area 2	2WCSD9	0	1	M	CHROMIUM	8.00		MG/KG	NORMAL
Drainage Area 2	2WCSD9	0	1	M	COBALT	2.20		MG/KG	NORMAL
Drainage Area 2	2WCSD9	0	1	M	COPPER	6.10	U	MG/KG	NORMAL
Drainage Area 2	2WCSD9	0	1	M	IRON	6,920.00		MG/KG	NORMAL
Drainage Area 2	2WCSD9	0	1	M	LEAD	6.70		MG/KG	NORMAL
Drainage Area 2	2WCSD9	0	1	M	MAGNESIUM	2,630.00		MG/KG	NORMAL
Drainage Area 2	2WCSD9	0	1	M	MANGANESE	79.80		MG/KG	NORMAL
Drainage Area 2	2WCSD9	0	1	M	MERCURY	0.14		MG/KG	NORMAL
Drainage Area 2	2WCSD9	0	1	M	NICKEL	4.70	J	MG/KG	NORMAL
Drainage Area 2	2WCSD9	0	1	M	POTASSIUM	2,150.00		MG/KG	NORMAL
Drainage Area 2	2WCSD9	0	1	M	SELENIUM	0.51	UJ	MG/KG	NORMAL
Drainage Area 2	2WCSD9	0	1	M	SILVER	0.51	UJ	MG/KG	NORMAL
Drainage Area 2	2WCSD9	0	1	M	SODIUM	69.30	U	MG/KG	NORMAL
Drainage Area 2	2WCSD9	0	1	M	THALLIUM	0.26	U	MG/KG	NORMAL
Drainage Area 2	2WCSD9	0	1	M	VANADIUM	17.50		MG/KG	NORMAL
Drainage Area 2	2WCSD9	0	1	M	ZINC	17.30		MG/KG	NORMAL
Drainage Area 2	2WCSD9	0	1	OS	1,2,4-TRICHLOROBENZENE	430.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD9	0	1	OS	1,2-DICHLOROBENZENE	430.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD9	0	1	OS	1,3-DICHLOROBENZENE	430.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD9	0	1	OS	1,4-DICHLOROBENZENE	430.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD9	0	1	OS	2,4,5-TRICHLOROPHENOL	1,000.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD9	0	1	OS	2,4,6-TRICHLOROPHENOL	430.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD9	0	1	OS	2,4-DICHLOROPHENOL	430.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD9	0	1	OS	2,4-DIMETHYLPHENOL	430.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD9	0	1	OS	2,4-DINITROPHENOL	1,000.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD9	0	1	OS	2,4-DINITROTOLUENE	430.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD9	0	1	OS	2,6-DINITROTOLUENE	430.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD9	0	1	OS	2-CHLORONAPHTHALENE	430.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD9	0	1	OS	2-CHLOROPHENOL	430.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD9	0	1	OS	2-METHYLNAPHTHALENE	430.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD9	0	1	OS	2-METHYLPHENOL	430.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD9	0	1	OS	2-NITROANILINE	1,000.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD9	0	1	OS	2-NITROPHENOL	430.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD9	0	1	OS	3,3'-DICHLOROBENZIDINE	430.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD9	0	1	OS	3-NITROANILINE	1,000.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD9	0	1	OS	4,6-DINITRO-2-METHYLPHENOL	1,000.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD9	0	1	OS	4-BROMOPHENYL PHENYL ETHER	430.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD9	0	1	OS	4-CHLORO-3-METHYLPHENOL	430.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD9	0	1	OS	4-CHLOROANILINE	430.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD9	0	1	OS	4-CHLOROPHENYL PHENYL ETHER	430.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD9	0	1	OS	4-METHYLPHENOL	430.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD9	0	1	OS	4-NITROANILINE	1,000.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD9	0	1	OS	4-NITROPHENOL	1,000.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD9	0	1	OS	ACENAPHTHENE	430.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD9	0	1	OS	ACENAPHTHYLENE	430.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD9	0	1	OS	ANTHRACENE	430.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD9	0	1	OS	BENZO(A)ANTHRACENE	70.00	J	UG/KG	NORMAL
Drainage Area 2	2WCSD9	0	1	OS	BENZO(A)PYRENE	73.00	J	UG/KG	NORMAL
Drainage Area 2	2WCSD9	0	1	OS	BENZO(B)FLUORANTHENE	160.00	J	UG/KG	NORMAL
Drainage Area 2	2WCSD9	0	1	OS	BENZO(G,H,I)PERYLENE	47.00	J	UG/KG	NORMAL
Drainage Area 2	2WCSD9	0	1	OS	BENZO(K)FLUORANTHENE	430.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD9	0	1	OS	BENZOIC ACID	430.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD9	0	1	OS	BENZYL ALCOHOL	430.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD9	0	1	OS	BIS(2-CHLOROETHOXY)METHANE	430.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD9	0	1	OS	BIS(2-CHLOROETHYL)ETHER	430.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD9	0	1	OS	BIS(2-CHLOROISOPROPYL) ETHER	430.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD9	0	1	OS	BIS(2-ETHYLHEXYL)PHTHALATE	430.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD9	0	1	OS	BUTYLBENZYL PHTHALATE	430.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD9	0	1	OS	CARBAZOLE	430.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD9	0	1	OS	CHRYSENE	130.00	J	UG/KG	NORMAL
Drainage Area 2	2WCSD9	0	1	OS	DI-N-BUTYL PHTHALATE	430.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD9	0	1	OS	DI-N-OCTYL PHTHALATE	430.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD9	0	1	OS	DIBENZO(A,H)ANTHRACENE	430.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD9	0	1	OS	DIBENZOFURAN	430.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD9	0	1	OS	DIETHYL PHTHALATE	430.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD9	0	1	OS	DIMETHYL PHTHALATE	430.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD9	0	1	OS	FLUORANTHENE	100.00	J	UG/KG	NORMAL
Drainage Area 2	2WCSD9	0	1	OS	FLUORENE	430.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD9	0	1	OS	HEXACHLOROBENZENE	430.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD9	0	1	OS	HEXACHLOROBUTADIENE	430.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD9	0	1	OS	HEXACHLOROCYCLOPENTADIENE	430.00	U	UG/KG	NORMAL

Area	Location	Top	Bottom	Fraction	Parameter	Value	Qual	Units	SACODE
Drainage Area 2	2WCSD9	0	1	OS	HEXACHLOROETHANE	430.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD9	0	1	OS	INDENO(1,2,3-CD)PYRENE	49.00	J	UG/KG	NORMAL
Drainage Area 2	2WCSD9	0	1	OS	ISOPHORONE	430.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD9	0	1	OS	N-NITROSO-DI-N-PROPYLAMINE	430.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD9	0	1	OS	N-NITROSODIPHENYLAMINE	430.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD9	0	1	OS	NAPHTHALENE	430.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD9	0	1	OS	NITROBENZENE	430.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD9	0	1	OS	PENTACHLOROPHENOL	1,000.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD9	0	1	OS	PHENANTHRENE	430.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD9	0	1	OS	PHENOL	430.00	U	UG/KG	NORMAL
Drainage Area 2	2WCSD9	0	1	OS	PYRENE	120.00	J	UG/KG	NORMAL
Drainage Area 3	2WCSD13	0	1	M	ALUMINUM	12,200.00		MG/KG	NORMAL
Drainage Area 3	2WCSD13	0	1	M	ANTIMONY	14.60	U	MG/KG	NORMAL
Drainage Area 3	2WCSD13	0	1	M	ARSENIC	11.40		MG/KG	NORMAL
Drainage Area 3	2WCSD13	0	1	M	BARIUM	50.00		MG/KG	NORMAL
Drainage Area 3	2WCSD13	0	1	M	BERYLLIUM	1.30	U	MG/KG	NORMAL
Drainage Area 3	2WCSD13	0	1	M	BORON	26.30	J	MG/KG	NORMAL
Drainage Area 3	2WCSD13	0	1	M	CADMIUM	0.74	U	MG/KG	NORMAL
Drainage Area 3	2WCSD13	0	1	M	CALCIUM	1,230.00	J	MG/KG	NORMAL
Drainage Area 3	2WCSD13	0	1	M	CHROMIUM	53.10		MG/KG	NORMAL
Drainage Area 3	2WCSD13	0	1	M	COBALT	4.80		MG/KG	NORMAL
Drainage Area 3	2WCSD13	0	1	M	COPPER	29.50		MG/KG	NORMAL
Drainage Area 3	2WCSD13	0	1	M	IRON	24,600.00		MG/KG	NORMAL
Drainage Area 3	2WCSD13	0	1	M	LEAD	30.90		MG/KG	NORMAL
Drainage Area 3	2WCSD13	0	1	M	MAGNESIUM	5,020.00		MG/KG	NORMAL
Drainage Area 3	2WCSD13	0	1	M	MANGANESE	160.00		MG/KG	NORMAL
Drainage Area 3	2WCSD13	0	1	M	MERCURY	0.42		MG/KG	NORMAL
Drainage Area 3	2WCSD13	0	1	M	NICKEL	14.00		MG/KG	NORMAL
Drainage Area 3	2WCSD13	0	1	M	POTASSIUM	4,020.00		MG/KG	NORMAL
Drainage Area 3	2WCSD13	0	1	M	SELENIUM	0.96	U	MG/KG	NORMAL
Drainage Area 3	2WCSD13	0	1	M	SILVER	0.74	UJ	MG/KG	NORMAL
Drainage Area 3	2WCSD13	0	1	M	SODIUM	273.00	U	MG/KG	NORMAL
Drainage Area 3	2WCSD13	0	1	M	THALLIUM	0.37	U	MG/KG	NORMAL
Drainage Area 3	2WCSD13	0	1	M	VANADIUM	37.20		MG/KG	NORMAL
Drainage Area 3	2WCSD13	0	1	M	ZINC	40.50		MG/KG	NORMAL
Drainage Area 3	2WCSD13	0	1	OS	1,2,4-TRICHLOROBENZENE	600.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD13	0	1	OS	1,2-DICHLOROBENZENE	600.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD13	0	1	OS	1,3-DICHLOROBENZENE	600.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD13	0	1	OS	1,4-DICHLOROBENZENE	600.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD13	0	1	OS	2,4,5-TRICHLOROPHENOL	1,400.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD13	0	1	OS	2,4,6-TRICHLOROPHENOL	600.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD13	0	1	OS	2,4-DICHLOROPHENOL	600.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD13	0	1	OS	2,4-DIMETHYLPHENOL	600.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD13	0	1	OS	2,4-DINITROPHENOL	1,400.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD13	0	1	OS	2,4-DINITROTOLUENE	600.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD13	0	1	OS	2,6-DINITROTOLUENE	600.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD13	0	1	OS	2-CHLORONAPHTHALENE	600.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD13	0	1	OS	2-CHLOROPHENOL	600.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD13	0	1	OS	2-METHYLNAPHTHALENE	600.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD13	0	1	OS	2-METHYLPHENOL	600.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD13	0	1	OS	2-NITROANILINE	1,400.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD13	0	1	OS	2-NITROPHENOL	600.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD13	0	1	OS	3,3'-DICHLOROBENZIDINE	600.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD13	0	1	OS	3-NITROANILINE	1,400.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD13	0	1	OS	4,6-DINITRO-2-METHYLPHENOL	1,400.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD13	0	1	OS	4-BROMOPHENYL PHENYL ETHER	600.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD13	0	1	OS	4-CHLORO-3-METHYLPHENOL	600.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD13	0	1	OS	4-CHLOROANILINE	600.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD13	0	1	OS	4-CHLOROPHENYL PHENYL ETHER	600.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD13	0	1	OS	4-METHYLPHENOL	600.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD13	0	1	OS	4-NITROANILINE	1,400.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD13	0	1	OS	4-NITROPHENOL	1,400.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD13	0	1	OS	ACENAPHTHENE	600.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD13	0	1	OS	ACENAPHTHYLENE	600.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD13	0	1	OS	ANTHRACENE	600.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD13	0	1	OS	BENZO(A)ANTHRACENE	120.00	J	UG/KG	NORMAL
Drainage Area 3	2WCSD13	0	1	OS	BENZO(A)PYRENE	130.00	J	UG/KG	NORMAL
Drainage Area 3	2WCSD13	0	1	OS	BENZO(B)FLUORANTHENE	140.00	J	UG/KG	NORMAL
Drainage Area 3	2WCSD13	0	1	OS	BENZO(G,H,I)PERYLENE	100.00	J	UG/KG	NORMAL
Drainage Area 3	2WCSD13	0	1	OS	BENZO(K)FLUORANTHENE	120.00	J	UG/KG	NORMAL
Drainage Area 3	2WCSD13	0	1	OS	BENZOIC ACID	600.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD13	0	1	OS	BENZYL ALCOHOL	600.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD13	0	1	OS	BIS(2-CHLOROETHOXY)METHANE	600.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD13	0	1	OS	BIS(2-CHLOROETHYL)ETHER	600.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD13	0	1	OS	BIS(2-CHLOROISOPROPYL) ETHER	600.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD13	0	1	OS	BIS(2-ETHYLHEXYL)PHTHALATE	600.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD13	0	1	OS	BUTYLBENZYL PHTHALATE	600.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD13	0	1	OS	CARBAZOLE	600.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD13	0	1	OS	CHRYSENE	160.00	J	UG/KG	NORMAL

Area	Location	Top	Bottom	Fraction	Parameter	Value	Qual	Units	SACODE
Drainage Area 3	2WCSD13	0	1	OS	DI-N-BUTYL PHTHALATE	600.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD13	0	1	OS	DI-N-OCTYL PHTHALATE	600.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD13	0	1	OS	DIBENZO(A,H)ANTHRACENE	600.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD13	0	1	OS	DIBENZOFURAN	600.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD13	0	1	OS	DIETHYL PHTHALATE	600.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD13	0	1	OS	DIMETHYL PHTHALATE	600.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD13	0	1	OS	FLUORANTHENE	170.00	J	UG/KG	NORMAL
Drainage Area 3	2WCSD13	0	1	OS	FLUORENE	600.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD13	0	1	OS	HEXACHLOROBENZENE	600.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD13	0	1	OS	HEXACHLOROBUTADIENE	600.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD13	0	1	OS	HEXACHLOROCYCLOPENTADIENE	600.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD13	0	1	OS	HEXACHLOROETHANE	600.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD13	0	1	OS	INDENO(1,2,3-CD)PYRENE	99.00	J	UG/KG	NORMAL
Drainage Area 3	2WCSD13	0	1	OS	ISOPHORONE	600.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD13	0	1	OS	N-NITROSO-DI-N-PROPYLAMINE	600.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD13	0	1	OS	N-NITROSODIPHENYLAMINE	600.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD13	0	1	OS	NAPHTHALENE	600.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD13	0	1	OS	NITROBENZENE	600.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD13	0	1	OS	PENTACHLOROPHENOL	1,400.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD13	0	1	OS	PHENANTHRENE	600.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD13	0	1	OS	PHENOL	600.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD13	0	1	OS	PYRENE	270.00	J	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	M	ALUMINUM	15,900.00		MG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	M	ANTIMONY	5.90	U	MG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	M	ARSENIC	6.90		MG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	M	BARIUM	81.10		MG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	M	BERYLLIUM	1.50	U	MG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	M	BORON	39.70		MG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	M	CADMIUM	1.10	J	MG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	M	CALCIUM	2,340.00	J	MG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	M	CHROMIUM	66.30		MG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	M	COBALT	5.60		MG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	M	COPPER	39.40		MG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	M	IRON	32,700.00		MG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	M	LEAD	49.90		MG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	M	MAGNESIUM	5,540.00		MG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	M	MANGANESE	220.00		MG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	M	MERCURY	0.38		MG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	M	NICKEL	18.50		MG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	M	POTASSIUM	3,580.00		MG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	M	SELENIUM	1.00	U	MG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	M	SILVER	0.79	UJ	MG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	M	SODIUM	580.00		MG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	M	THALLIUM	0.39	U	MG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	M	VANADIUM	44.50		MG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	M	ZINC	61.90		MG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OS	1,2,4-TRICHLOROBENZENE	600.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OS	1,2-DICHLOROBENZENE	600.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OS	1,3-DICHLOROBENZENE	600.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OS	1,4-DICHLOROBENZENE	600.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OS	2,4,5-TRICHLOROPHENOL	1,400.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OS	2,4,6-TRICHLOROPHENOL	600.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OS	2,4-DICHLOROPHENOL	600.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OS	2,4-DIMETHYLPHENOL	600.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OS	2,4-DINITROPHENOL	1,400.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OS	2,4-DINITROTOLUENE	600.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OS	2,6-DINITROTOLUENE	600.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OS	2-CHLORONAPHTHALENE	600.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OS	2-CHLOROPHENOL	600.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OS	2-METHYLNAPHTHALENE	31.00	J	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OS	2-METHYLPHENOL	600.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OS	2-NITROANILINE	1,400.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OS	2-NITROPHENOL	600.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OS	3,3'-DICHLOROBENZIDINE	600.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OS	3-NITROANILINE	1,400.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OS	4,6-DINITRO-2-METHYLPHENOL	1,400.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OS	4-BROMOPHENYL PHENYL ETHER	600.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OS	4-CHLORO-3-METHYLPHENOL	600.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OS	4-CHLOROANILINE	600.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OS	4-CHLOROPHENYL PHENYL ETHER	600.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OS	4-METHYLPHENOL	600.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OS	4-NITROANILINE	1,400.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OS	4-NITROPHENOL	1,400.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OS	ACENAPHTHENE	38.00	J	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OS	ACENAPHTHYLENE	90.00	J	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OS	ANTHRACENE	160.00	J	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OS	BENZO(A)ANTHRACENE	2,700.00	J	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OS	BENZO(A)PYRENE	2,400.00	J	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OS	BENZO(B)FLUORANTHENE	2,500.00	J	UG/KG	NORMAL

Area	Location	Top	Bottom	Fraction	Parameter	Value	Qual	Units	SACODE
Drainage Area 3	2WCSD4	0	1	OS	BENZO(G,H,I)PERYLENE	760.00	J	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OS	BENZO(K)FLUORANTHENE	2,100.00	J	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OS	BENZOIC ACID	190.00	J	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OS	BENZYL ALCOHOL	600.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OS	BIS(2-CHLOROETHOXY)METHANE	600.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OS	BIS(2-CHLOROETHYL)ETHER	600.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OS	BIS(2-CHLOROISOPROPYL) ETHER	600.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OS	BIS(2-ETHYLHEXYL)PHTHALATE	710.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OS	BUTYLBENZYL PHTHALATE	600.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OS	CARBAZOLE	50.00	J	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OS	CHRYSENE	3,300.00	J	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OS	DI-N-BUTYL PHTHALATE	600.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OS	DI-N-OCTYL PHTHALATE	72.00	J	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OS	DIBENZO(A,H)ANTHRACENE	160.00	J	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OS	DIBENZOFURAN	600.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OS	DIETHYL PHTHALATE	600.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OS	DIMETHYL PHTHALATE	600.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OS	FLUORANTHENE	2,800.00		UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OS	FLUORENE	80.00	J	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OS	HEXACHLOROBENZENE	600.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OS	HEXACHLOROBUTADIENE	600.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OS	HEXACHLOROCYCLOPENTADIENE	600.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OS	HEXACHLOROETHANE	600.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OS	INDENO(1,2,3-CD)PYRENE	1,200.00	J	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OS	ISOPHORONE	600.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OS	N-NITROSO-DI-N-PROPYLAMINE	600.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OS	N-NITROSODIPHENYLAMINE	600.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OS	NAPHTHALENE	87.00	J	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OS	NITROBENZENE	600.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OS	PENTACHLOROPHENOL	1,400.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OS	PHENANTHRENE	720.00		UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OS	PHENOL	600.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OS	PYRENE	5,200.00		UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OV	1,1,1-TRICHLOROETHANE	18.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OV	1,1,2,2-TETRACHLOROETHANE	18.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OV	1,1,2-TRICHLOROETHANE	18.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OV	1,1-DICHLOROETHANE	18.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OV	1,1-DICHLOROETHENE	18.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OV	1,2-DICHLOROETHANE	18.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OV	1,2-DICHLOROETHENE (TOTAL)	18.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OV	1,2-DICHLOROPROPANE	18.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OV	2-BUTANONE	18.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OV	2-HEXANONE	18.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OV	4-METHYL-2-PENTANONE	18.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OV	ACETONE	18.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OV	BENZENE	18.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OV	BROMODICHLOROMETHANE	18.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OV	BROMOFORM	18.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OV	BROMOMETHANE	18.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OV	CARBON DISULFIDE	18.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OV	CARBON TETRACHLORIDE	18.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OV	CHLOROBENZENE	18.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OV	CHLOROETHANE	18.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OV	CHLOROFORM	18.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OV	CHLOROMETHANE	18.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OV	CIS-1,3-DICHLOROPROPENE	18.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OV	DIBROMOCHLOROMETHANE	18.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OV	ETHYLBENZENE	18.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OV	METHYLENE CHLORIDE	22.00		UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OV	STYRENE	18.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OV	TETRACHLOROETHENE	18.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OV	TOLUENE	18.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OV	TRANS-1,3-DICHLOROPROPENE	18.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OV	TRICHLOROETHENE	18.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OV	VINYL ACETATE	18.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OV	VINYL CHLORIDE	18.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	OV	XYLENES, TOTAL	18.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	PEST/PCB	4,4'-DDD	6.50	J	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	PEST/PCB	4,4'-DDE	60.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	PEST/PCB	4,4'-DDT	60.00	J	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	PEST/PCB	ALDRIN	31.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	PEST/PCB	ALPHA-BHC	31.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	PEST/PCB	ALPHA-CHLORDANE	31.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	PEST/PCB	AROCLOR-1016	600.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	PEST/PCB	AROCLOR-1221	1,200.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	PEST/PCB	AROCLOR-1232	600.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	PEST/PCB	AROCLOR-1242	600.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	PEST/PCB	AROCLOR-1248	600.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	PEST/PCB	AROCLOR-1254	600.00	UJ	UG/KG	NORMAL

Area	Location	Top	Bottom	Fraction	Parameter	Value	Qual	Units	SACODE
Drainage Area 3	2WCSD4	0	1	PEST/PCB	AROCLOR-1260	600.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	PEST/PCB	BETA-BHC	31.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	PEST/PCB	DELTA-BHC	31.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	PEST/PCB	DIELDRIN	60.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	PEST/PCB	ENDOSULFAN I	31.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	PEST/PCB	ENDOSULFAN II	60.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	PEST/PCB	ENDOSULFAN SULFATE	60.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	PEST/PCB	ENDRIN	15.00	J	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	PEST/PCB	ENDRIN ALDEHYDE	59.00	J	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	PEST/PCB	ENDRIN KETONE	60.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	PEST/PCB	GAMMA-BHC (LINDANE)	31.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	PEST/PCB	GAMMA-CHLORDANE	31.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	PEST/PCB	HEPTACHLOR	31.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	PEST/PCB	HEPTACHLOR EPOXIDE	31.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	PEST/PCB	METHOXYCHLOR	310.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCSD4	0	1	PEST/PCB	TOXAPHENE	3,100.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	M	ALUMINUM	10,600.00		MG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	M	ANTIMONY	5.10	U	MG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	M	ARSENIC	5.60		MG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	M	BARIUM	94.10		MG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	M	BERYLLIUM	1.50	U	MG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	M	BORON	27.80	J	MG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	M	CADMIUM	29.50		MG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	M	CALCIUM	3,290.00	J	MG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	M	CHROMIUM	27.80		MG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	M	COBALT	14.40		MG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	M	COPPER	57.20		MG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	M	IRON	23,700.00		MG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	M	LEAD	204.00		MG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	M	MAGNESIUM	4,310.00		MG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	M	MANGANESE	2,640.00		MG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	M	MERCURY	0.18		MG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	M	NICKEL	31.50		MG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	M	POTASSIUM	2,060.00		MG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	M	SELENIUM	0.75	U	MG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	M	SILVER	1.10	U	MG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	M	SODIUM	156.00	U	MG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	M	THALLIUM	0.34	J	MG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	M	VANADIUM	56.70		MG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	M	ZINC	292.00		MG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OS	1,2,4-TRICHLOROBENZENE	630.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OS	1,2-DICHLOROBENZENE	630.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OS	1,3-DICHLOROBENZENE	630.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OS	1,4-DICHLOROBENZENE	630.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OS	2,4,5-TRICHLOROPHENOL	1,500.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OS	2,4,6-TRICHLOROPHENOL	630.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OS	2,4-DICHLOROPHENOL	630.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OS	2,4-DIMETHYLPHENOL	630.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OS	2,4-DINITROPHENOL	1,500.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OS	2,4-DINITROTOLUENE	630.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OS	2,6-DINITROTOLUENE	630.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OS	2-CHLORONAPHTHALENE	630.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OS	2-CHLOROPHENOL	630.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OS	2-METHYLNAPHTHALENE	630.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OS	2-METHYLPHENOL	630.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OS	2-NITROANILINE	1,500.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OS	2-NITROPHENOL	630.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OS	3,3'-DICHLOROBENZIDINE	630.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OS	3-NITROANILINE	1,500.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OS	4,6-DINITRO-2-METHYLPHENOL	1,500.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OS	4-BROMOPHENYL PHENYL ETHER	630.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OS	4-CHLORO-3-METHYLPHENOL	630.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OS	4-CHLOROANILINE	630.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OS	4-CHLOROPHENYL PHENYL ETHER	630.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OS	4-METHYLPHENOL	630.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OS	4-NITROANILINE	1,500.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OS	4-NITROPHENOL	1,500.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OS	ACENAPHTHENE	630.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OS	ACENAPHTHYLENE	630.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OS	ANTHRACENE	630.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OS	BENZO(A)ANTHRACENE	250.00	J	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OS	BENZO(A)PYRENE	210.00	J	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OS	BENZO(B)FLUORANTHENE	220.00	J	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OS	BENZO(G,H,I)PERYLENE	54.00	J	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OS	BENZO(K)FLUORANTHENE	240.00	J	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OS	BENZOIC ACID	110.00	J	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OS	BENZYL ALCOHOL	630.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OS	BIS(2-CHLOROETHOXY)METHANE	630.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OS	BIS(2-CHLOROETHYL)ETHER	630.00	U	UG/KG	NORMAL

Area	Location	Top	Bottom	Fraction	Parameter	Value	Qual	Units	SACODE
Drainage Area 3	2WCSD5	0	1	OS	BIS(2-CHLOROISOPROPYL) ETHER	630.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OS	BIS(2-ETHYLHEXYL)PHTHALATE	630.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OS	BUTYLBENZYL PHTHALATE	630.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OS	CARBAZOLE	630.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OS	CHRYSENE	420.00	J	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OS	DI-N-BUTYL PHTHALATE	630.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OS	DI-N-OCTYL PHTHALATE	630.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OS	DIBENZO(A,H)ANTHRACENE	630.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OS	DIBENZOFURAN	630.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OS	DIETHYL PHTHALATE	630.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OS	DIMETHYL PHTHALATE	630.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OS	FLUORANTHENE	470.00	J	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OS	FLUORENE	630.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OS	HEXACHLOROBENZENE	630.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OS	HEXACHLOROBUTADIENE	630.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OS	HEXACHLOROCYCLOPENTADIENE	630.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OS	HEXACHLOROETHANE	630.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OS	INDENO(1,2,3-CD)PYRENE	98.00	J	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OS	ISOPHORONE	630.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OS	N-NITROSO-DI-N-PROPYLAMINE	630.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OS	N-NITROSODIPHENYLAMINE	630.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OS	NAPHTHALENE	160.00	J	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OS	NITROBENZENE	630.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OS	PENTACHLOROPHENOL	1,500.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OS	PHENANTHRENE	250.00	J	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OS	PHENOL	630.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OS	PYRENE	610.00	J	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OV	1,1,1-TRICHLOROETHANE	13.00	J	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OV	1,1,2,2-TETRACHLOROETHANE	19.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OV	1,1,2-TRICHLOROETHANE	19.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OV	1,1-DICHLOROETHANE	19.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OV	1,1-DICHLOROETHENE	19.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OV	1,2-DICHLOROETHANE	19.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OV	1,2-DICHLOROETHENE (TOTAL)	19.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OV	1,2-DICHLOROPROPANE	19.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OV	2-BUTANONE	19.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OV	2-HEXANONE	19.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OV	4-METHYL-2-PENTANONE	19.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OV	ACETONE	19.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OV	BENZENE	19.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OV	BROMODICHLOROMETHANE	19.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OV	BROMOFORM	19.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OV	BROMOMETHANE	19.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OV	CARBON DISULFIDE	19.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OV	CARBON TETRACHLORIDE	19.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OV	CHLOROBENZENE	19.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OV	CHLOROETHANE	19.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OV	CHLOROFORM	19.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OV	CHLOROMETHANE	19.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OV	CIS-1,3-DICHLOROPROPENE	19.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OV	DIBROMOCHLOROMETHANE	19.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OV	ETHYLBENZENE	19.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OV	METHYLENE CHLORIDE	10.00	J	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OV	STYRENE	19.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OV	TETRACHLOROETHENE	8.00	J	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OV	TOLUENE	4.00	J	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OV	TRANS-1,3-DICHLOROPROPENE	19.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OV	TRICHLOROETHENE	22.00		UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OV	VINYL ACETATE	19.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OV	VINYL CHLORIDE	19.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	OV	XYLENES, TOTAL	19.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	PEST/PCB	4,4'-DDD	63.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	PEST/PCB	4,4'-DDE	63.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	PEST/PCB	4,4'-DDT	10.00	J	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	PEST/PCB	ALDRIN	33.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	PEST/PCB	ALPHA-BHC	33.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	PEST/PCB	ALPHA-CHLORDANE	6.40	J	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	PEST/PCB	AROCLOR-1016	630.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	PEST/PCB	AROCLOR-1221	1,300.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	PEST/PCB	AROCLOR-1232	630.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	PEST/PCB	AROCLOR-1242	630.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	PEST/PCB	AROCLOR-1248	630.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	PEST/PCB	AROCLOR-1254	630.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	PEST/PCB	AROCLOR-1260	630.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	PEST/PCB	BETA-BHC	33.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	PEST/PCB	DELTA-BHC	33.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	PEST/PCB	DIELDRIN	63.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	PEST/PCB	ENDOSULFAN I	33.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	PEST/PCB	ENDOSULFAN II	63.00	UJ	UG/KG	NORMAL

Area	Location	Top	Bottom	Fraction	Parameter	Value	Qual	Units	SACODE
Drainage Area 3	2WCSD5	0	1	PEST/PCB	ENDOSULFAN SULFATE	7.60	J	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	PEST/PCB	ENDRIN	18.00	J	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	PEST/PCB	ENDRIN ALDEHYDE	140.00	J	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	PEST/PCB	ENDRIN KETONE	63.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	PEST/PCB	GAMMA-BHC (LINDANE)	33.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	PEST/PCB	GAMMA-CHLORDANE	7.00	J	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	PEST/PCB	HEPTACHLOR	33.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	PEST/PCB	HEPTACHLOR EPOXIDE	33.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	PEST/PCB	METHOXYCHLOR	37.00	J	UG/KG	NORMAL
Drainage Area 3	2WCSD5	0	1	PEST/PCB	TOXAPHENE	3,300.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCSD6	0	1	M	ALUMINUM	16,900.00		MG/KG	NORMAL
Drainage Area 3	2WCSD6	0	1	M	ANTIMONY	6.40	U	MG/KG	NORMAL
Drainage Area 3	2WCSD6	0	1	M	ARSENIC	13.50		MG/KG	NORMAL
Drainage Area 3	2WCSD6	0	1	M	BARIUM	71.20		MG/KG	NORMAL
Drainage Area 3	2WCSD6	0	1	M	BERYLLIUM	1.00	U	MG/KG	NORMAL
Drainage Area 3	2WCSD6	0	1	M	BORON	34.90	J	MG/KG	NORMAL
Drainage Area 3	2WCSD6	0	1	M	CADMIUM	0.85	U	MG/KG	NORMAL
Drainage Area 3	2WCSD6	0	1	M	CALCIUM	1,920.00	J	MG/KG	NORMAL
Drainage Area 3	2WCSD6	0	1	M	CHROMIUM	97.50		MG/KG	NORMAL
Drainage Area 3	2WCSD6	0	1	M	COBALT	6.20		MG/KG	NORMAL
Drainage Area 3	2WCSD6	0	1	M	COPPER	52.80		MG/KG	NORMAL
Drainage Area 3	2WCSD6	0	1	M	IRON	31,100.00		MG/KG	NORMAL
Drainage Area 3	2WCSD6	0	1	M	LEAD	69.60		MG/KG	NORMAL
Drainage Area 3	2WCSD6	0	1	M	MAGNESIUM	6,140.00		MG/KG	NORMAL
Drainage Area 3	2WCSD6	0	1	M	MANGANESE	196.00		MG/KG	NORMAL
Drainage Area 3	2WCSD6	0	1	M	MERCURY	0.60		MG/KG	NORMAL
Drainage Area 3	2WCSD6	0	1	M	NICKEL	21.50		MG/KG	NORMAL
Drainage Area 3	2WCSD6	0	1	M	POTASSIUM	4,020.00		MG/KG	NORMAL
Drainage Area 3	2WCSD6	0	1	M	SELENIUM	0.98	U	MG/KG	NORMAL
Drainage Area 3	2WCSD6	0	1	M	SILVER	0.85	UJ	MG/KG	NORMAL
Drainage Area 3	2WCSD6	0	1	M	SODIUM	1,120.00		MG/KG	NORMAL
Drainage Area 3	2WCSD6	0	1	M	THALLIUM	0.42	U	MG/KG	NORMAL
Drainage Area 3	2WCSD6	0	1	M	VANADIUM	54.90		MG/KG	NORMAL
Drainage Area 3	2WCSD6	0	1	M	ZINC	54.90		MG/KG	NORMAL
Drainage Area 3	2WCSD6	0	1	OS	1,2,4-TRICHLOROBENZENE	700.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD6	0	1	OS	1,2-DICHLOROBENZENE	700.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD6	0	1	OS	1,3-DICHLOROBENZENE	700.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD6	0	1	OS	1,4-DICHLOROBENZENE	700.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD6	0	1	OS	2,4,5-TRICHLOROPHENOL	1,700.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD6	0	1	OS	2,4,6-TRICHLOROPHENOL	700.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD6	0	1	OS	2,4-DICHLOROPHENOL	700.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD6	0	1	OS	2,4-DIMETHYLPHENOL	700.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD6	0	1	OS	2,4-DINITROPHENOL	1,700.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD6	0	1	OS	2,4-DINITROTOLUENE	700.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD6	0	1	OS	2,6-DINITROTOLUENE	700.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD6	0	1	OS	2-CHLORONAPHTHALENE	700.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD6	0	1	OS	2-CHLOROPHENOL	700.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD6	0	1	OS	2-METHYLNAPHTHALENE	700.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD6	0	1	OS	2-METHYLPHENOL	700.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD6	0	1	OS	2-NITROANILINE	1,700.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD6	0	1	OS	2-NITROPHENOL	700.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD6	0	1	OS	3,3'-DICHLOROBENZIDINE	700.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD6	0	1	OS	3-NITROANILINE	1,700.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD6	0	1	OS	4,6-DINITRO-2-METHYLPHENOL	1,700.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD6	0	1	OS	4-BROMOPHENYL PHENYL ETHER	700.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD6	0	1	OS	4-CHLORO-3-METHYLPHENOL	700.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD6	0	1	OS	4-CHLOROANILINE	700.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD6	0	1	OS	4-CHLOROPHENYL PHENYL ETHER	700.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD6	0	1	OS	4-METHYLPHENOL	700.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD6	0	1	OS	4-NITROANILINE	1,700.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD6	0	1	OS	4-NITROPHENOL	1,700.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD6	0	1	OS	ACENAPHTHENE	700.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD6	0	1	OS	ACENAPHTHYLENE	700.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD6	0	1	OS	ANTHRACENE	65.00	J	UG/KG	NORMAL
Drainage Area 3	2WCSD6	0	1	OS	BENZO(A)ANTHRACENE	250.00	J	UG/KG	NORMAL
Drainage Area 3	2WCSD6	0	1	OS	BENZO(A)PYRENE	700.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD6	0	1	OS	BENZO(B)FLUORANTHENE	320.00	J	UG/KG	NORMAL
Drainage Area 3	2WCSD6	0	1	OS	BENZO(G,H,I)PERYLENE	240.00	J	UG/KG	NORMAL
Drainage Area 3	2WCSD6	0	1	OS	BENZO(K)FLUORANTHENE	290.00	J	UG/KG	NORMAL
Drainage Area 3	2WCSD6	0	1	OS	BENZOIC ACID	700.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD6	0	1	OS	BENZYL ALCOHOL	700.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD6	0	1	OS	BIS(2-CHLOROETHOXY)METHANE	700.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD6	0	1	OS	BIS(2-CHLOROETHYL)ETHER	700.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD6	0	1	OS	BIS(2-CHLOROISOPROPYL) ETHER	700.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD6	0	1	OS	BIS(2-ETHYLHEXYL)PHTHALATE	700.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD6	0	1	OS	BUTYLBENZYL PHTHALATE	700.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD6	0	1	OS	CARBAZOLE	700.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD6	0	1	OS	CHRYSENE	430.00	J	UG/KG	NORMAL
Drainage Area 3	2WCSD6	0	1	OS	DI-N-BUTYL PHTHALATE	700.00	U	UG/KG	NORMAL

Area	Location	Top	Bottom	Fraction	Parameter	Value	Qual	Units	SACODE
Drainage Area 3	2WCSD6	0	1	OS	DI-N-OCTYL PHTHALATE	700.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD6	0	1	OS	DIBENZO(A,H)ANTHRACENE	700.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD6	0	1	OS	DIBENZOFURAN	700.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD6	0	1	OS	DIETHYL PHTHALATE	700.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD6	0	1	OS	DIMETHYL PHTHALATE	700.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD6	0	1	OS	FLUORANTHENE	330.00	J	UG/KG	NORMAL
Drainage Area 3	2WCSD6	0	1	OS	FLUORENE	700.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD6	0	1	OS	HEXACHLOROBENZENE	700.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD6	0	1	OS	HEXACHLOROBUTADIENE	700.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD6	0	1	OS	HEXACHLOROCYCLOPENTADIENE	700.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD6	0	1	OS	HEXACHLOROETHANE	700.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD6	0	1	OS	INDENO(1,2,3-CD)PYRENE	200.00	J	UG/KG	NORMAL
Drainage Area 3	2WCSD6	0	1	OS	ISOPHORONE	700.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD6	0	1	OS	N-NITROSO-DI-N-PROPYLAMINE	700.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD6	0	1	OS	N-NITROSODIPHENYLAMINE	700.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD6	0	1	OS	NAPHTHALENE	700.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD6	0	1	OS	NITROBENZENE	700.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD6	0	1	OS	PENTACHLOROPHENOL	1,700.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD6	0	1	OS	PHENANTHRENE	210.00	J	UG/KG	NORMAL
Drainage Area 3	2WCSD6	0	1	OS	PHENOL	700.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD6	0	1	OS	PYRENE	530.00	J	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	M	ALUMINUM	3,510.00		MG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	M	ANTIMONY	3.20	U	MG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	M	ARSENIC	1.20		MG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	M	BARIUM	17.00		MG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	M	BERYLLIUM	0.55	U	MG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	M	BORON	11.00	J	MG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	M	CADMIUM	0.43	U	MG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	M	CALCIUM	922.00	J	MG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	M	CHROMIUM	5.70	U	MG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	M	COBALT	2.20		MG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	M	COPPER	4.60	U	MG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	M	IRON	6,940.00		MG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	M	LEAD	3.50		MG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	M	MAGNESIUM	1,160.00		MG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	M	MANGANESE	101.00		MG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	M	MERCURY	0.11	U	MG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	M	NICKEL	3.30	J	MG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	M	POTASSIUM	870.00	U	MG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	M	SELENIUM	0.43	UJ	MG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	M	SILVER	0.43	UJ	MG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	M	SODIUM	36.00	U	MG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	M	THALLIUM	0.21	U	MG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	M	VANADIUM	12.80		MG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	M	ZINC	10.30	U	MG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OS	1,2,4-TRICHLOROBENZENE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OS	1,2-DICHLOROBENZENE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OS	1,3-DICHLOROBENZENE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OS	1,4-DICHLOROBENZENE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OS	2,4,5-TRICHLOROPHENOL	850.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OS	2,4,6-TRICHLOROPHENOL	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OS	2,4-DICHLOROPHENOL	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OS	2,4-DIMETHYLPHENOL	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OS	2,4-DINITROPHENOL	850.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OS	2,4-DINITROTOLUENE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OS	2,6-DINITROTOLUENE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OS	2-CHLORONAPHTHALENE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OS	2-CHLOROPHENOL	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OS	2-METHYLNAPHTHALENE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OS	2-METHYLPHENOL	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OS	2-NITROANILINE	850.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OS	2-NITROPHENOL	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OS	3,3'-DICHLOROBENZIDINE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OS	3-NITROANILINE	850.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OS	4,6-DINITRO-2-METHYLPHENOL	850.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OS	4-BROMOPHENYL PHENYL ETHER	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OS	4-CHLORO-3-METHYLPHENOL	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OS	4-CHLOROANILINE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OS	4-CHLOROPHENYL PHENYL ETHER	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OS	4-METHYLPHENOL	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OS	4-NITROANILINE	850.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OS	4-NITROPHENOL	850.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OS	ACENAPHTHENE	43.00	J	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OS	ACENAPHTHYLENE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OS	ANTHRACENE	190.00		UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OS	BENZO(A)ANTHRACENE	900.00		UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OS	BENZO(A)PYRENE	800.00		UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OS	BENZO(B)FLUORANTHENE	990.00		UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OS	BENZO(G,H,I)PERYLENE	260.00		UG/KG	NORMAL

Area	Location	Top	Bottom	Fraction	Parameter	Value	Qual	Units	SACODE
Drainage Area 3	2WCSD7	0	1	OS	BENZO(K)FLUORANTHENE	620.00		UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OS	BENZOIC ACID	150.00	J	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OS	BENZYL ALCOHOL	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OS	BIS(2-CHLOROETHOXY)METHANE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OS	BIS(2-CHLOROETHYL)ETHER	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OS	BIS(2-CHLOROISOPROPYL) ETHER	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OS	BIS(2-ETHYLHEXYL)PHTHALATE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OS	BUTYLBENZYL PHTHALATE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OS	CARBAZOLE	230.00		UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OS	CHRYSENE	1,100.00		UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OS	DI-N-BUTYL PHTHALATE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OS	DI-N-OCTYL PHTHALATE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OS	DIBENZO(A,H)ANTHRACENE	52.00		UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OS	DIBENZOFURAN	45.00		UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OS	DIETHYL PHTHALATE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OS	DIMETHYL PHTHALATE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OS	FLUORANTHENE	1,600.00		UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OS	FLUORENE	76.00		UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OS	HEXACHLOROBENZENE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OS	HEXACHLOROBUTADIENE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OS	HEXACHLOROCYCLOPENTADIENE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OS	HEXACHLOROETHANE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OS	INDENO(1,2,3-CD)PYRENE	480.00		UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OS	ISOPHORONE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OS	N-NITROSO-DI-N-PROPYLAMINE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OS	N-NITROSODIPHENYLAMINE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OS	NAPHTHALENE	36.00	J	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OS	NITROBENZENE	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OS	PENTACHLOROPHENOL	850.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OS	PHENANTHRENE	1,300.00		UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OS	PHENOL	350.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OS	PYRENE	2,500.00		UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OV	1,1,1-TRICHLOROETHANE	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OV	1,1,2,2-TETRACHLOROETHANE	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OV	1,1,2-TRICHLOROETHANE	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OV	1,1-DICHLOROETHANE	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OV	1,1-DICHLOROETHENE	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OV	1,2-DICHLOROETHANE	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OV	1,2-DICHLOROETHENE (TOTAL)	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OV	1,2-DICHLOROPROPANE	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OV	2-BUTANONE	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OV	2-HEXANONE	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OV	4-METHYL-2-PENTANONE	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OV	ACETONE	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OV	BENZENE	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OV	BROMODICHLOROMETHANE	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OV	BROMOFORM	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OV	BROMOMETHANE	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OV	CARBON DISULFIDE	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OV	CARBON TETRACHLORIDE	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OV	CHLOROBENZENE	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OV	CHLOROETHANE	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OV	CHLOROFORM	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OV	CHLOROMETHANE	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OV	CIS-1,3-DICHLOROPROPENE	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OV	DIBROMOCHLOROMETHANE	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OV	ETHYLBENZENE	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OV	METHYLENE CHLORIDE	11.00		UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OV	STYRENE	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OV	TETRACHLOROETHENE	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OV	TOLUENE	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OV	TRANS-1,3-DICHLOROPROPENE	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OV	TRICHLOROETHENE	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OV	VINYL ACETATE	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OV	VINYL CHLORIDE	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	OV	XYLENES, TOTAL	11.00	U	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	PEST/PCB	4,4'-DDD	35.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	PEST/PCB	4,4'-DDE	35.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	PEST/PCB	4,4'-DDT	35.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	PEST/PCB	ALDRIN	18.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	PEST/PCB	ALPHA-BHC	18.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	PEST/PCB	ALPHA-CHLORDANE	18.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	PEST/PCB	AROCLOR-1016	350.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	PEST/PCB	AROCLOR-1221	710.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	PEST/PCB	AROCLOR-1232	350.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	PEST/PCB	AROCLOR-1242	350.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	PEST/PCB	AROCLOR-1248	350.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	PEST/PCB	AROCLOR-1254	350.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	PEST/PCB	AROCLOR-1260	350.00	UJ	UG/KG	NORMAL

APPENDIX C.2 SEDIMENT DATA
SITE 20 - AREA A WEAPONS CENTER, NEW LONDON, CONNECTICUT

Area	Location	Top	Bottom	Fraction	Parameter	Value	Qual	Units	SACODE
Drainage Area 3	2WCSD7	0	1	PEST/PCB	BETA-BHC	18.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	PEST/PCB	DELTA-BHC	18.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	PEST/PCB	DIELDRIN	35.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	PEST/PCB	ENDOSULFAN I	18.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	PEST/PCB	ENDOSULFAN II	35.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	PEST/PCB	ENDOSULFAN SULFATE	35.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	PEST/PCB	ENDRIN	35.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	PEST/PCB	ENDRIN ALDEHYDE	35.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	PEST/PCB	ENDRIN KETONE	35.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	PEST/PCB	GAMMA-BHC (LINDANE)	18.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	PEST/PCB	GAMMA-CHLORDANE	18.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	PEST/PCB	HEPTACHLOR	18.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	PEST/PCB	HEPTACHLOR EPOXIDE	18.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	PEST/PCB	METHOXYCHLOR	180.00	UJ	UG/KG	NORMAL
Drainage Area 3	2WCSD7	0	1	PEST/PCB	TOXAPHENE	1,800.00	UJ	UG/KG	NORMAL

Appendix D

Cost Estimation and Backup Calculations

APPENDIX D-1 ALTERNATIVE 1: NO ACTION, CAPITAL AND OPERATION AND MAINTENANCE COSTS, SITE 20 - AREA A WEAPONS CENTER, NAVAL SUBMARINE BASE, NEW LONDON, CONNECTICUT

Item No.	Cost Categories and Items	Description	Unit Cost	Quantity	Total Cost
A. CAPITAL COSTS					
	Not applicable	Not applicable			$0
	Line Item Total				$0
	Total Capital Cost				**$0**
B. OPERATION AND MAINTENANCE (O&M) COSTS					
2	**CERCLA Mandated Five-Year Review Meeting**				
2.1	Soil and sediment sampling	Sample once every 5 years	$22,550	1	$22,550
2.2	Meetings	Meet once at the end of the 5-year period	$5,000	1	$5,000
2.3	Travel	Travel to the meeting site	$500	1	$500
2.4	Reports	Summary of data and site status	$10,000	1	$10,000
	5-Year Review Costs				**$38,050**
C. COST SUMMARY					
	Capital Costs		$0		
	30-Year Present Worth of O&M at 5% with 2% inflation		$142,544		
	30-Year Present Worth Costs		**$142,544**		

APPENDIX D-2 ALTERNATIVE 2: INSTITUTIONAL CONTROLS AND MONITORING, CAPITAL AND OPERATION AND MAINTENANCE COSTS, SITE 20 - AREA A WEAPONS CENTER, NAVAL SUBMARINE BASE, NEW LONDON, CONNECTICUT

Item No.	Cost Categories and Items	Description	Unit Cost	Quantity	Total Cost
A. CAPITAL COSTS					
1	**Environmental Land Use Restriction**				
1.1	Land use restrictions on Master Base Plan	Governs activities and use at site	$10,000	1	$10,000
	Subtotal				$10,000
1.2	Contingency			20%	$2,000
	Line Item Total				$12,000
	Total Capital Costs				**$12,000**
B. OPERATION AND MAINTENANCE (O&M) COSTS					
2	**Annual Soil and Sediment Monitoring (Years 1 - 5)**				
2.1	Soil and sediment sampling - labor and equipment	Sample 10 locations once per year	$1,200	10	$12,000
2.2	Analytical costs	Analyses of samples for COCs	$255	10	$2,550
2.3	Disposal	Gloves, PPE, etc.	$500	1	$500
2.4	Sampling preparation, mobilization, and demobilization	For each sampling event	$2,500	1	$2,500
2.5	Reports	Summary and interpretation of lab results	$5,000	1	$5,000
	Annual O&M Costs (Years 1-5)				**$22,550**
3	**CERCLA Mandated Five-Year Review Meeting**				
3.1	Soil and sediment sampling (as 2.1 through 2.4 above)	Sample once every 5 years	$22,550	1	$22,550
3.2	Meetings	Meet once at the end of the 5-year period	$5,000	1	$5,000
3.3	Travel	Travel to the meeting site	$500	1	$500
3.4	Reports	Summary of data and site status	$10,000	1	$10,000
	5-Year Review Costs				**$38,050**
C. COST SUMMARY					
	Capital Costs		$12,000		
	30-Year Present Worth of O&M at 5% with 2% inflation		$246,102		
	30-Year Present Worth Costs		**$258,102**		

APPENDIX D-3 ALTERNATIVE 3a: SEDIMENT 10^{-5} RISK-BASED PRG/MORE STRINGENT OF SOIL RSRs AND 10^{-5} RISK-BASED PRG, SELECTIVE EXCAVATION (INDUSTRIAL SCENARIO), ASPHALT BATCHING, INSTITUTIONAL CONTROLS AND MONITORING, CAPITAL AND OPERATION AND MAINTENANCE COSTS, SITE 20 - AREA A WEAPONS CENTER, NAVAL SUBMARINE BASE, NEW LONDON, CONNECTICUT

Item No.	Cost Categories and Items	Description	Unit Cost	Quantity	Total Cost
A. CAPITAL COSTS					
1	**Environmental Land Use Restriction**				
1.1	Land use restriction on Base Master Plan	Govern activities and use at site	$10,000	1	$10,000
	Subtotal				$10,000
1.2	Contingency			20%	$2,000
	Line Item Total				**$12,000**
2	**Selective Excavation**				
2.1	Excavation/Onsite Stockpiling	Includes loading, staging (lump sum)	$1,000	1	$1,000
2.2	Backfilling	Includes purchase, transport, and compacting of clean fill (lump sum)	$500	1	$550
2.3	Site Restoration	Includes re-asphalting (lump sum)	$1,500	1	$1,500
2.4	Asphalt Batching	Disposal costs (per ton) (includes transportation)	$100	3	$300
2.5	Post-Excavation Soil Sampling	Includes laboratory costs for analysis of soil samples	$255	2	$510
2.6	Engineering Design	10% of excavation cost		10%	$386
2.7	Mobilization/Demobilization, Construction Management, Permitting, and Site Services	10% of excavation cost		10%	$386
2.8	Contingency			20%	$772
2.9	Closure report	Outlining results of the program	$15,000	1	$15,000
	Line Item Total				**$20,404**
	Total Capital Costs				**$32,404**
B. OPERATION AND MAINTENANCE (O&M) COSTS					
3	**Annual Soil and Sediment Monitoring (Years 1 - 5)**				
3.1	Sample collection - labor and equipment costs	Sample 5 locations once a year	$1,200	5	$6,000
3.2	Analytical costs	Analyses of soil samples for COCs	$255	5	$1,275
3.3	Disposal	Gloves, PPE, etc.	$500	1	$500
3.4	Sampling preparation, mobilization, and demobilization	For each sampling event	$2,500	1	$2,500
3.5	Reports	Summary and interpretation of lab data	$5,000	1	$5,000
	Annual O&M Costs (Years 1-5)				**$15,275**
4	**CERCLA Mandated Five-Year Review Meeting**				
4.1	Soil and sediment sampling (as 3.1 through 3.4 above)	Sample once every 5 years	$15,275	1	$15,275
4.2	Meetings	Meet once at the end of the 5-year period	$5,000	1	$5,000
4.3	Travel	Travel to the meeting site	$500	1	$500
4.4	Reports	Summary of data and site status	$10,000	1	$10,000
	5-Year Review Costs				**$30,775**
C. COST SUMMARY					
	Capital Costs		$32,404		
	30-Year Present Worth of O&M= at 5% with 2% inflation		$185,438		
	30-Year Present Worth Costs		**$217,842**		

APPENDIX D-3 ALTERNATIVE 3a: SEDIMENT 10^{-5} RISK-BASED PRG/MORE STRINGENT OF SOIL RSRs AND 10^{-5} RISK-BASED PRG, SELECTIVE EXCAVATION (INDUSTRIAL SCENARIO), OFFSITE DISPOSAL, INSTITUTIONAL CONTROLS AND MONITORING, CAPITAL AND OPERATION AND MAINTENANCE COSTS, SITE 20 - AREA A WEAPONS CENTER, NAVAL SUBMARINE BASE, NEW LONDON, CONNECTICUT

Item No.	Cost Categories and Items	Description	Unit Cost	Quantity	Total Cost
A. CAPITAL COSTS					
1	**Environmental Land Use Restriction**				
1.1	Land use restriction on Base Master Plan	Govern activities and use at site	$10,000	1	$10,000
	Subtotal				$10,000
1.2	Contingency			20%	$2,000
	Line Item Total				**$12,000**
2	**Selective Excavation**				
2.1	Excavation/Onsite Stockpiling	Includes loading, staging (lump sum)	$1,000	1	$1,000
2.2	Backfilling	Includes purchase, transport, and compacting of clean fill (lump sum)	$500	1	$550
2.3	Site Restoration	Includes re-asphalting (lump sum)	$1,500	1	$1,500
2.4	Landfill Disposal	Disposal costs (per ton) (includes transportation)	$72	3	$215
2.5	Post-Excavation Soil Sampling	Includes laboratory costs for analysis of soil samples	$255	2	$510
2.6	Engineering Design	10% of excavation cost		10%	$377
2.7	Mobilization/Demobilization, Construction Management, Permitting, and Site Services	10% of excavation cost		10%	$377
2.8	Contingency			20%	$755
2.9	Closure report	Outlining results of the program	$15,000	1	$15,000
	Line Item Total				**$20,284**
	Total Capital Costs				**$32,284**
B. OPERATION and MAINTENANCE (O&M) COSTS					
3	**Annual Soil and Sediment Monitoring (Years 1 - 5)**				
3.1	Sample collection - labor and equipment costs	Sample 5 locations once a year	$1,200	5	$6,000
3.2	Analytical costs	Analyses of soil samples for COCs	$255	5	$1,275
3.3	Disposal	Gloves, PPE, etc.	$500	1	$500
3.4	Sampling preparation, mobilization, and demobilization	For each sampling event	$2,500	1	$2,500
3.5	Reports	Summary and interpretation of lab data	$5,000	1	$5,000
	Annual O&M Costs (Years 1-5)				**$15,275**
4	**CERCLA Mandated Five-Year Review Meeting**				
4.1	Soil and sediment sampling (as 3.1 through 3.4 above)	Sample once every 5 years	$15,275	1	$15,275
4.2	Meetings	Meet once at the end of the 5-year period	$5,000	1	$5,000
4.3	Travel	Travel to the meeting site	$500	1	$500
4.4	Reports	Summary of data and site status	$10,000	1	$10,000
	5-Year Review Costs				**$30,775**
C. COST SUMMARY					
	Capital Costs		$32,284		
	30-Year Present Worth of O&M= at 5% with 2% inflation		$185,438		
	30-Year Present Worth Costs		**$217,722**		

APPENDIX D-3 ALTERNATIVE 3b: SEDIMENT 10^{-5} RISK-BASED PRG/MORE STRINGENT OF SOIL RSRs AND 10^{-5} RISK-BASED PRG, SELECTIVE EXCAVATION (RESIDENTIAL SCENARIO), ASPHALT BATCHING, CAPITAL AND OPERATION AND MAINTENANCE COSTS, SITE 20 - AREA A WEAPONS CENTER, NAVAL SUBMARINE BASE, NEW LONDON, CONNECTICUT

Item No.	Cost Categories and Items	Description	Unit Cost	Quantity	Total Cost
A. CAPITAL COSTS					
1	**Selective Excavation**				
1.1	Excavation/Onsite Stockpiling	Includes loading, staging (CY)	$8	199	$1,592
1.2	Backfilling	Includes purchase, transport, and compacting of clean fill (CY)	$22	219	$4,816
1.3	Site Restoration	Includes re-asphalting (lump sum)	$5,125	1	$5,125
1.4	Asphalt Batching	Disposal costs (per ton) (includes transportation)	$33	328	$10,836
1.5	Post-Excavation Soil Sampling	Includes laboratory costs for analysis of soil samples	$255	28	$7,140
1.6	Surface Water Diversion	Temporary surface water diversion (lump sum)	$5,000	1	$5,000
1.7	Engineering Design	10% of excavation cost		10%	$3,451
1.8	Mobilization/Demobilization, Construction Management, Permitting, and Site Services	10% of excavation cost		10%	$3,451
1.9	Contingency			20%	$6,902
1.10	Closure report	Outlining results of the program	$15,000	1	$15,000
	Line Item Total				$63,312
	Total Capital Costs				**$63,312**
B. OPERATION AND MAINTENANCE (O&M) COSTS					
	Total Annual O&M Costs				**$0**

C. COST SUMMARY

Capital Costs	$63,312
30-Year Present Worth of O&M= (O&M) x (P/A), 5% for 30 years with 2% inflation	$0
30-Year Present Worth Costs	**$63,312**

APPENDIX D-3 ALTERNATIVE 3b: SEDIMENT 10^{-5} RISK-BASED PRG/MORE STRINGENT OF SOIL RSRs AND 10^{-5} RISK-BASED PRG, SELECTIVE EXCAVATION (RESIDENTIAL SCENARIO), OFFSITE DISPOSAL, CAPITAL AND OPERATION AND MAINTENANCE COSTS, SITE 20 - AREA A WEAPONS CENTER, NAVAL SUBMARINE BASE, NEW LONDON, CONNECTICUT

Item No.	Cost Categories and Items	Description	Unit Cost	Quantity	Total Cost
A. CAPITAL COSTS					
1	**Selective Excavation**				
1.1	Excavation/Onsite Stockpiling	Includes loading, staging (CY)	$8	199	$1,592
1.2	Backfilling	Includes purchase, transport, and compacting of clean fill (CY)	$22	219	$4,816
1.3	Site Restoration	Includes re-asphalting (lump sum)	$5,125	1	$5,125
1.4	Landfill Disposal	Disposal costs (per ton) (includes transportation)	$72	328	$23,641
1.5	Post-Excavation Soil Sampling	Includes laboratory costs for analysis of soil samples	$255	28	$7,140
1.6	Surface Water Diversion	Temporary surface water diversion (lump sum)	$5,000	1	$5,000
1.7	Engineering Design	10% of excavation cost		10%	$4,731
1.8	Mobilization/Demobilization, Construction Management, Permitting, and Site Services	10% of excavation cost		10%	$4,731
1.9	Contingency			20%	$9,463
1.10	Closure report	Outlining results of the program	$15,000	1	$15,000
	Line Item Total				$81,240
	Total Capital Costs				**$81,240**
B. OPERATION AND MAINTENANCE (O&M) COSTS					
	Total Annual O&M Costs				**$0**
C. COST SUMMARY					
	Capital Costs		$81,240		
	30-Year Present Worth of O&M= (O&M) x (P/A), 5% for 30 years with 2% inflation		$0		
	30-Year Present Worth Costs		**$81,240**		

Project Site 20 Feasibility Study Project No. 29600.90
Subject Cost Estimate Sheet No. 1 of 1
Drawing No.
Computed by RC Date 1/18/00 Checked by Date

to account for inflation Replace i with IR
where $IR = i + f + (i * f)$
Assume:

$f = -2\%$
$i = 5\%$

$$IR = -0.02 + 0.05 + (0.05 * (-0.02)) = 0.029$$

To Calculate the 30 year present worth the following formula was used:

$$XNPV = \sum_{j=1}^{N} \frac{P_i}{(1 + IR)^{\frac{(d_i - d_1)}{365}}}$$

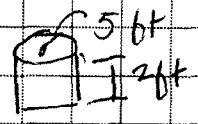
Where: $IR = 0.029$
d_i = last payment date
d_1 = 0th payment date
P_i = last payment date

This calculation is provided in Microsoft Excel spreadsheet and is used to determine 30 year present worth when payments are not necessarily periodic or consistant.

Project Site 20 Feasibility Study Project No. 29600.90
Subject Alternative 3 Excavation Limit Sheet No. 1 of 2
Drawing No.
Computed by RC Date 3/6/00 Checked by SO Date 3/8/00

Alternative 3a: Industrial Scenario

Hot Spot at 2WCTB2: (5 ft diameter × 2 ft deep)



Area = $\pi (2.5)^2 = 19.6\ ft^2$
Volume = $(19.6\ ft^2)(2\ ft) = 39.2\ ft^3$
$= 2\ cy$

Total weight: (assuming $122.2\ lb/ft^3$)
$= (2\ cy)(27\ ft^3/cy)(122.2\ lb/ft^3)(1\ ton/2000\ lbs)$
$= 3.3$ tons

Confirmation Samples: (assuming 5 sample per hot spot
1 sample per 10' swale
1 sample per 5 truck loads (100 cy)

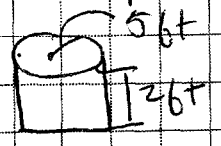
= 2 Samples

Project Site 20 Feasibility Study Project No. 29600090
Subject Alternative 3 Sheet No. 2 of 2
Excavation Limit Drawing No.
Computed by RC Date 3/6/00 Checked by SLO Date 5/8/00

Alternative 3b

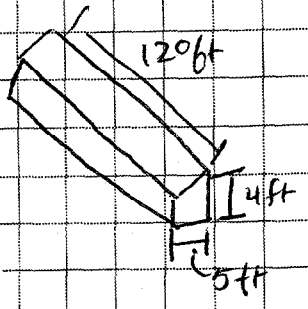
Residential Scenario

Hot Spot at 2WCTB2: (5 ft diameter x 2 ft deep)



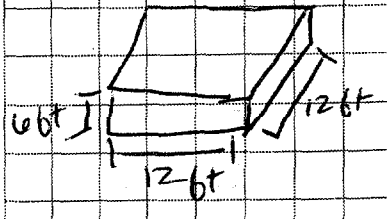
Area = $\pi(2.5\ ft)^2 = 19.6\ ft^2$
Volume = $(19.6\ ft^2)(2\ ft) = 39.2\ ft^3 = 2\ cy$

Excavation at 2WCSD3 (120 ft x 5 ft x 4 ft)



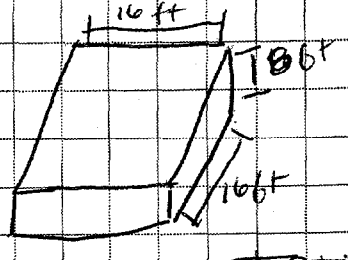
Area = $(120\ ft)(5\ ft) = 600\ ft^2$
Volume = $(600\ ft^2)(4\ ft) = 2{,}400\ ft^3 = 89\ cy$

Excavation at 2WCTB (12 ft x 12 ft x 6 ft)



Area = $(12\ ft)(12\ ft) = 144\ ft^2$
Volume = $(144\ ft^2)(6\ ft^2) = 864\ ft^3 = 32\ cy$

Excavation at 2WCTB5 (16 ft x 16 ft x 8 ft)



Area = $(16\ ft)(16\ ft) = 256\ ft^2$
Volume = $(256\ ft^2)(8\ ft) = 2{,}048\ ft^3 = 76\ cy$

TOTAL Surface Area: $19.6 + 600 + 144 + 256 = 1020\ ft$
TOTAL VOLUME = $2 + 89 + 32 + 76 = 199\ cy$
Total Weight = $(199\ cy)(27\ ft^3/cy)(122\ lb/ft^3)(1\ ton/2000\ lbs) = 32$

Confirmation Samples = 28