

APPENDIX A

- **PROPOSED PLAN**
- **PUBLIC NOTICE**

PROPOSED PLAN



Naval Submarine Base - New London

SITE 3 - NEW SOURCE AREA SOIL PROPOSED PLAN

Introduction

This Proposed Plan summarizes the Navy's preferred option to remediate the soil in the **New Source Area (NSA)** at Site 3 (Area A Downstream Watercourses) at Naval Submarine Base - New London (NSB-NLON) (Figure 1). Only the soil at the Site 3 - NSA, which is a small portion of Site 3, is addressed in this Proposed Plan; groundwater issues at Site 3 will be addressed separately under the **Record of Decision (ROD)** prepared for the groundwater at Sites 3, 7, 14, 15, 18, and 20 which are a portion of the **Basewide Groundwater Operable Unit (OU) 9**. The Site 3 - NSA was identified, but not addressed, during the remedial action that took place for the Site 3 soil and sediment (**OU3**). Site 3 - NSA is located within the limits of Site 3, but it is being addressed independently from **OU3** at Site 3. The Site 3 - NSA was not addressed during the remedial action when it was discovered because the nature and extent of contamination was unknown. Site 3 is one of 25 sites being addressed by the Navy's **Installation Restoration (IR) Program**. The **IR Program** is being conducted to identify and clean up sites created by past operations that do not meet today's environmental standards.

A detailed description of Site 3 is provided in the **Basewide Groundwater Operable Unit Remedial Investigation (BGOURI) Update/Feasibility Study (FS) Report**, which is available in the Information Repositories at the locations identified on Page 7. Petroleum contamination was the only chemical of concern (**COC**) identified for the Site 3 - NSA soil. Because petroleum is excluded from consideration under the **Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)** (the law more commonly known as **Superfund**), the **FS** for Site 3 - NSA soil was prepared to meet the requirements of the Navy's **IR Program** and the **State of Connecticut Remediation Standard Regulations (RSRs)**:

This Proposed Plan recommends remedial action for Site 3 - NSA soil. The **BGOURI Update/FS Report** did not identify unacceptable human health risk and petroleum contamination is excluded from consideration under **CERCLA**; therefore, the Proposed Remedy under **CERCLA** is **No Further Action (NFA)**. However, because petroleum concentrations at the site

The Cleanup Proposal...

After careful study of Site 3 - NSA soil the Navy proposes the following plan:

Under CERCLA

- ◊ **NFA**

Under State Regulations

- ◊ Finalize delineation of petroleum-contaminated soil.
- ◊ Construct a temporary detour road to maintain access to critical Navy facilities.
- ◊ Excavate, characterize, transport and dispose/recycle all petroleum-contaminated soil off site as appropriate.
- ◊ Collect verification samples to ensure removal of all petroleum-contaminated soil.
- ◊ Restore site to pre-excavation conditions.

Technical terms shown in bold print are defined in the glossary on Page 8.

What Do You Think?

The Navy is accepting public comments on this Proposed Plan from July 16, 2004 to August 17, 2004. You do not have to be a technical expert to comment. If you have a comment or concern, the Navy wants to hear it before making a final decision.

There are two ways to formally register a comment:

1. Offer oral comments during the July 28, 2004 public meeting, or
2. Send written comments postmarked no later than August 17, 2004 following the instructions provided at the end of this Proposed Plan.

To the extent possible, the Navy will respond to your oral comments during the July 28, 2004 public meeting and hearing. In addition, regulations require the Navy to respond to all formal comments in writing. The Navy will review the transcript of the comments received at the meeting, and all written comments received during the formal comment period, before making a final decision and providing a written response to the com-

ments in a document called a **Responsiveness Summary**.

Learn More About the Proposed Plan

The Navy will describe the Proposed Plan and hear your questions at an informational public meeting.

A formal public hearing will immediately follow this meeting.

July 28	PUBLIC MEETING
Meeting: 6:30 pm	
Hearing: 7:00 pm	
Date: July 28, 2004	
Location: Best Western Olympic Inn, Route 12, Groton, Connecticut	

For further information on the meeting, call Ms. Melissa Griffin with the NSB-NLON Environmental Department at (860) 694-5191.

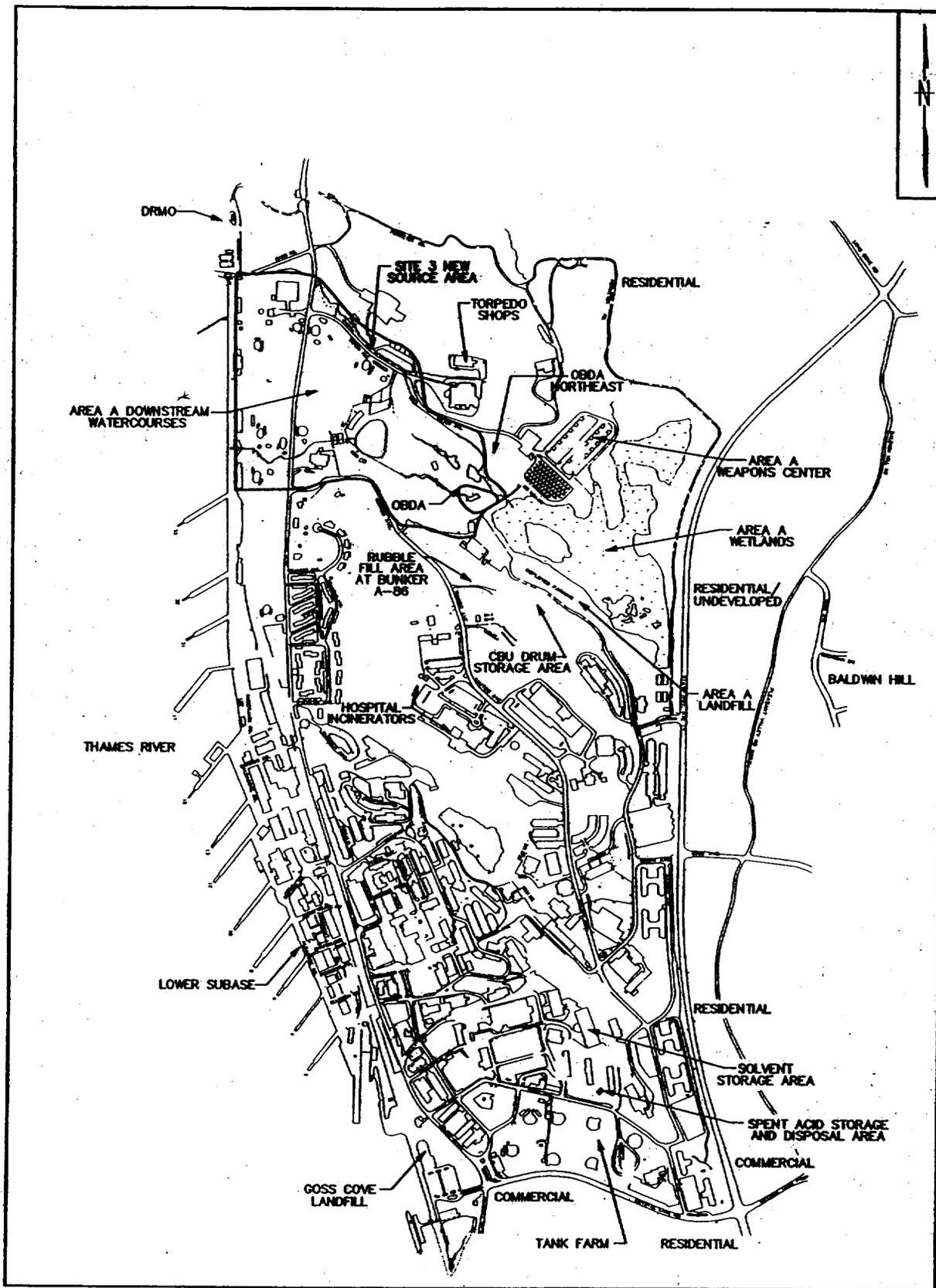


Figure 1. Site Location Map

Introduction (Continued)

exceed the Connecticut RSRs, remediation will occur to address State regulations. Remedial action is recommended to protect people from direct exposure to contaminated soil. Also, there is potential for free petroleum product to migrate from soil to groundwater and from groundwater to surface water. Due to these potential risks, remedial action is proposed.

History

Site 3 is located in the northern portion of NSB-NLON and includes undeveloped wooded areas and recreational areas (golf course and lake for swimming). Site 3 - NSA (0.06 acre) and the Area A Downstream Watercourses/Over Bank Disposal Area (OBDA) (9 acres) are the only portions of Site 3 (approximately 75 acres) where soil issues were identified. Groundwater issues have been identified in most of Site 3 and they are being addressed in a separate ROD. As shown on Figure 2, the Site 3 watercourses include North Lake and several small ponds and interconnected streams. The streams within Site 3 convey surface water to the Thames River. Site 3 was investigated in several phases from 1990 to 2002. In March 1997, accumulated debris in the OBDA (Figure 2), including discarded wooden pallets, telephone poles, and empty tanks, was removed as part of a Time-Critical Removal Action and disposed off site. During 1999 and 2000, a remedial action (RA) was initiated for Site 3 OU3 and the removal of contaminated soil and sediment was completed. Approximately 18,050 tons of soil and sediment contaminated with pesticides and metals were excavated and disposed at off-site disposal facilities. Site restoration activities are still ongoing.

Site 3 - NSA is a small abandoned disposal area (0.06 acre) located along the northern edge of Site 3, just north of Triton Road and Stream 5 (Figure 3). Site 3 - NSA was discovered during the RA for Site 3 OU3. Sediment that exhibited potential petroleum contamination (i.e., odor and sheen on pooled water) was encountered during the RA activities. Upon further investigation, a small disposal area was discovered on the hillside adjacent to Stream 5. Debris such as rusted drums and wire cable was found intermingled with soil and boulders. The NSA was not remediated at the time of the Site 3 OU3 RA because the nature and extent of contamination was unknown, but temporary measures were taken to minimize any further contaminant migration. Groundwater at Site 3 was further investigated during the BGOURI in 2000, but the results of the investigation were inconclusive and data gaps remained. To address the newly found Site 3 - NSA and the data gaps identified during the BGOURI, a Data Gap Investigation (DGI) was completed in the fall of 2002 prior to initiating a FS. During the DGI, temporary wells were installed to measure groundwater levels and sample groundwater, and soil samples were also collected. The samples were analyzed for contaminants including metals, organics, pesticides, and polychlorinated biphenyls (PCBs). The results of the DGI were presented and evaluated in the BGOURI Update/FS, and remedial alternatives were developed to address the contaminated soil associated with Site 3 - NSA.

Findings of the Field Investigations

During the 1999-2000 RA for OU3, a sample of the sediment that exhibited potential petroleum contamination was col-

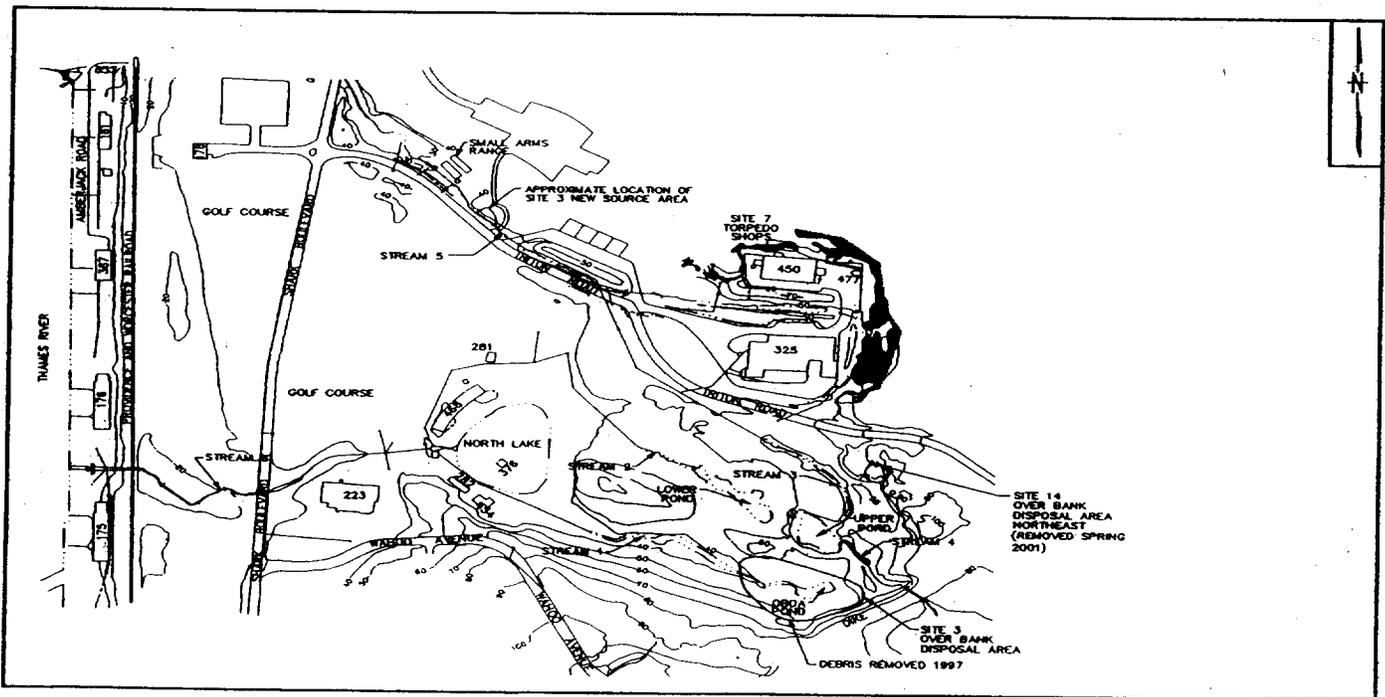


Figure 2. Site 3 Layout Map

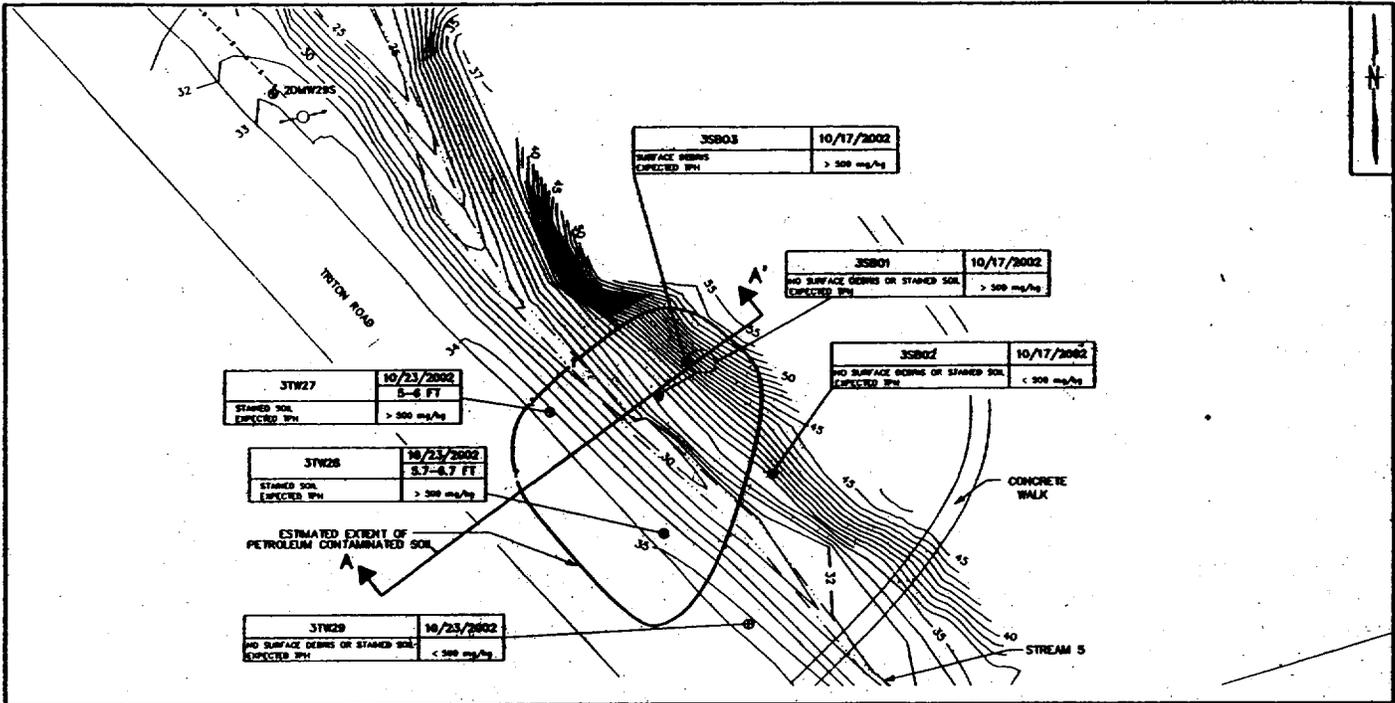


Figure 3. Site 3 - New Source Area Layout and Contaminant Distribution Map

lected and analyzed. Total Petroleum Hydrocarbons (TPH) were detected at a concentration of 1,750 milligrams per kilogram (mg/kg) in the sediment sample. TPH at this concentration exceeds the direct exposure and pollutant mobility criteria for soil pursuant to the State's RSRs. During the DGI, petroleum-stained subsurface soil was found in two soil borings, and field-screening vapor measurements indicated the presence of petroleum. The results of the DGI showed that petroleum and polynuclear aromatic hydrocarbons (PAHs) were the primary contaminants in the soil at the Site 3 - NSA. However, the PAH contamination was localized and found to be related to the Triton Road asphalt pavement. The PAHs were not retained as COCs because they were not site-related. The petroleum contamination detected during the DGI appears to be from a historic release at Site 3 - NSA. The petroleum contamination was present at the interface

where overlying soil meets bedrock and has migrated to the south beneath Stream 5 and potentially beneath Triton Road (Figure 4).

The results of the human health risk assessment (HHRA) conducted during the BGOURI Update for contaminants other than TPH, such as metals and organic compounds, indicated that there were no unacceptable risks to human health or the environment. In addition, a screening level ecological risk assessment (ERA) was conducted for Site 3 - NSA contaminants other than TPH, and it showed that there are no significant risks to ecological receptors from direct exposure to soil or potential exposure from migration of soil contamination to sediment or groundwater to surface water at the Site 3 - NSA. Based on these results, petroleum was the only contaminant retained as a COC for Site 3 - NSA. The

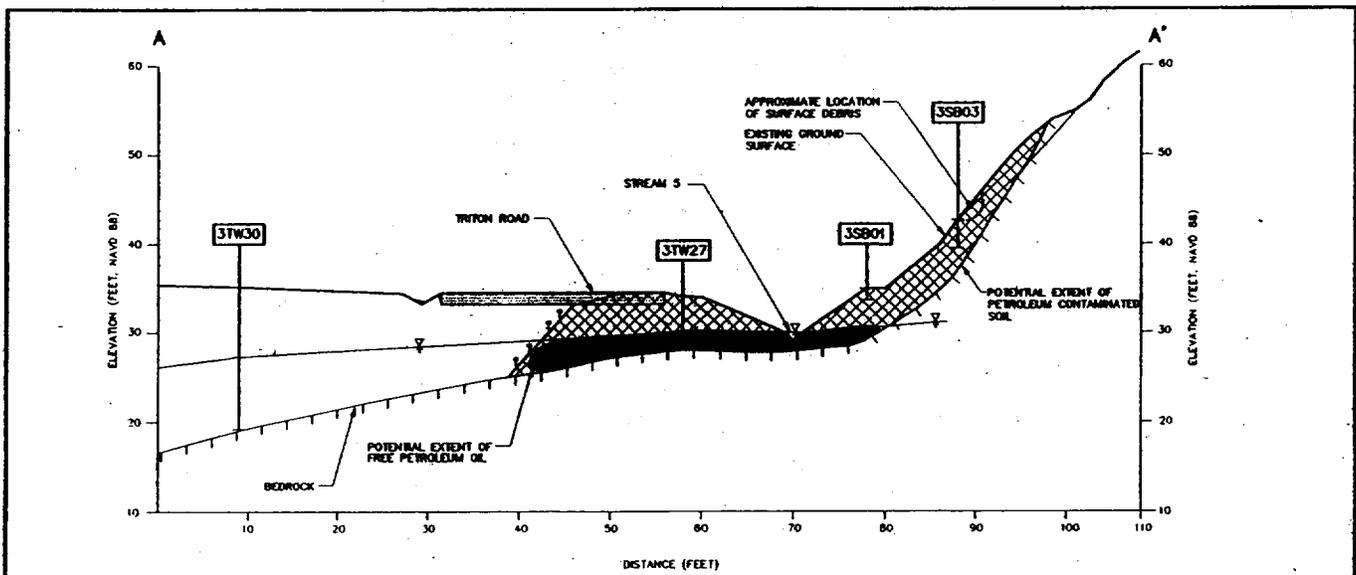


Figure 4. Cross Section A-A' through Site 3 - New Source Area

remedial goals (RGs) selected for petroleum for protection of human health and the environment are provided below. These RGs address the direct exposure and pollutant mobility criteria for soil pursuant to the State's RSRs.

Receptor	Remedial Goal
Human (Future Potential Resident)	500 mg/kg [Extractable TPH (ETPH)]
Ecological	No mobile free product

It is the Navy's current judgement that the Preferred Alternative identified in the Proposed Plan, or one of the other active measures considered in the Proposed Plan, is necessary to protect public health or welfare or the environment from actual or threatened releases of pollutants or contaminants from Site 3 - NSA soil which may present an imminent and substantial endangerment to public health or welfare.

Summary of Alternatives Considered for Site 3 - NSA Soil

The Navy prepared the BGOURI Update/FS to develop and evaluate remedial alternatives for Site 3 - NSA. The three alternatives selected for detailed evaluation include Alternative S1 (No Action), Alternative S2 (Institutional Controls), and Alternative S3 (Excavation and Offsite Disposal). Alternative S1 was evaluated for comparison purposes, and the other two alternatives were evaluated based on their abilities to meet the Remedial Action Objectives (RAOs). The RAOs as defined in the FS are (1) to protect current receptors (construction workers, employees, and trespassers) from incidental exposure to contaminated soil, (2) to protect existing groundwater quality, (3) to protect aquatic ecological receptors, and (4) to protect potential future residential receptors from incidental exposure to contaminated soil. The following table summarizes the remedial alternatives considered in the BGOURI Update/FS. Estimated costs are presented, including capital, operation and maintenance (O&M), and total present worth costs.

What is Risk and How is it Calculated?

A human health risk assessment estimates "baseline risk." This is an estimate of the likelihood of health problems occurring if no cleanup action were taken at a site. To estimate baseline risk at a site, the Navy undertakes a four-step process:

- Step 1: Analyze Contamination
- Step 2: Estimate Exposure
- Step 3: Assess Potential Health Dangers
- Step 4: Characterize Site Risk

In Step 1, the Navy looks at the concentration of contaminants found at a site as well as past scientific studies on the effects these contaminants have had on people (or animals, when human studies are unavailable). Comparisons between site-specific concentrations and concentrations reported in past studies helps the Navy to determine which contaminants are most likely to pose the greatest threat to human health.

In Step 2, the Navy considers the different ways that people might be exposed to the contaminants identified in Step 1, the concentrations that people might be exposed to, and the potential frequency and duration of exposure. Using this information, the Navy calculates a "reasonable maximum exposure" (RME) scenario, which portrays the highest level of human exposure that could reasonably be expected to occur.

In Step 3, the Navy uses the information from Step 2 combined with information on the toxicity of each chemical to assess potential health risks. The likelihood of any kind of cancer resulting from a site is generally expressed as an upper bound probability; for example, a "1 in 10,000 chance." In other words, for every 10,000 people that could be exposed, one extra cancer may occur as a result of exposure to site contaminants. An extra cancer case means that one more person could get cancer than would normally be expected to from all other causes. For non-cancer health effects, the Navy calculated a "hazard index." The key concept here is that a "threshold level" (measured usually as a hazard index of less than 1) exists below which non-cancer health effects are no longer predicted.

In Step 4, the Navy determines whether site risks are great enough to cause health problems for people at or near the site. The results of the three previous steps are combined, evaluated, and summarized. The Navy adds up the potential risks from the individual contaminants to determine the total risk resulting from the site.

Remedial Alternatives	Components	Comment
Alternative S1: No Action	None.	This alternative is not expected to be fully protective of human health and the environment because of risks from non-CERCLA regulated contaminants. Capital Cost = \$0 O&M Cost (Present Worth) = \$0 Total Present Worth Cost = \$0
Alternative S2: Institutional Controls	Place restrictions on excavation and handling of impacted soil as well as future development of the site. Maintain existing permeable cover (soil/gravel/asphalt) over contaminated soil. Monitor for the migration of petroleum.	Under this alternative human health and the environment would be protected through institutional controls that restrict excavation and exposure to impacted soil. Monitoring would be used to track any migration of petroleum from site soil. Capital Cost = \$61,100 O&M Cost (Present Worth) = \$63,100 Total Present Worth Cost = \$124,200
Alternative S3: Excavation and Off-site Disposal	Finalize delineation of petroleum-contaminated soil. Construct temporary road. Excavate, characterize, transport, and dispose/recycle all contaminated soil off site. Conduct verification sampling. Perform site restoration.	Under this alternative human health and the environment would be protected since all of the contaminated soil would be removed from the site and disposed properly. Capital Cost = \$286,100 O&M Cost = \$0 Total Present Worth Cost = \$286,100

Alternatives Evaluation Criteria

The following is a summary of the nine criteria recommended for use under the Navy's IR Program to balance the pros and cons of the remedial alternatives. The Navy and State of Connecticut agreed that the use of these criteria and the FS evaluation approach meets the intent of the Connecticut RSRs. The FS alternatives were evaluated using the first seven criteria and the State of Connecticut has agreed to the proposed remedial action. After comments from the public are received, the alternatives will be further compared using the public's input to verify that the selected alternative is the most appropriate for Site 3 - NSA.

- Overall protection of human health and the environment:** The alternative should protect human health as well as plant and animal life on and near the site.
- Compliance with Statutory and Regulatory Requirements:** The alternative should meet applicable State environmental statutes, regulations, and requirements.
- Long-term effectiveness and permanence:** The alternative should maintain reliable protection of human health and the environment over time.
- Reduction of toxicity, mobility, or volume through treatment:** As a preference, the selected alternative should use treatment to permanently reduce the level of toxicity of contaminants at the site, the spread of contaminants away from the source of contamination, or the amount of contamination at the site.
- Short-term effectiveness:** The alternative should minimize short-term hazards to workers, residents, or the environment during implementation of the remedy.
- Implementability:** The alternative should be technically feasible, and the materials and services needed to implement the remedy should be readily available.
- Cost:** Capital costs, annual operation and maintenance costs, and their associated net present values of all alternatives retained for detailed analysis shall be compared.
- State acceptance:** The State environmental agency should agree with the proposed remedy.
- Community acceptance:** The community should agree with the proposed remedy. Community acceptance is based on the comments received during the public meeting and public comment period.

The Navy's Proposed Remedy

The Navy's Proposed Remedy for Site 3 - NSA soil under CERCLA is NFA.

The Navy's Proposed Remedy is cleanup under State of Connecticut authority of non-CERCLA regulated soil contamination that poses a risk. To meet State requirements the Navy selected Remedial Alternative S3: Excavation and Off-Site Disposal. The alternative meets all of the RAOs by removing the contaminated soil from the site. This remedial alternative consists of five major components: (1) Finalize delineation of petroleum-contaminated soil; (2) Construct a temporary detour road to maintain access to critical Navy facilities; (3) Excavate, characterize, transport, and dispose/recycle all petroleum-contaminated soil; (4) Collect verification samples to ensure removal of all petroleum-contaminated soil; and (5) Restore site. This alternative can be completed within 1.5 years after the start of design activities.

- Finalizing the delineation of petroleum-contaminated soil will involve advancing soil borings and collecting soil samples to determine the horizontal and vertical extent of the contaminated soil.
- A temporary detour road will be installed south of Triton Road to maintain vehicular access to various critical Navy facilities during the excavation of contaminated soil beneath Triton Road.
- Petroleum-contaminated soil will be excavated and stockpiled at the site. Excavation will continue until verification samples indicate that all petroleum-contaminated soil with ETPH concentrations greater than 500 mg/kg (RG) has been removed. The estimated volume of petroleum-contaminated soil is 385 cubic yards (580 tons). Approximately 136 pounds (18 gallons) of petroleum may be present in the contaminated soil. The estimated volume of additional overlying clean soil and uncontaminated rock expected to be mixed with the contaminated soil is 129 cubic yards (190 tons). It is also estimated that an additional 127 cubic yards (190 tons) of material will need to be excavated to ensure a stable excavation.
- The stockpiled contaminated soil will subsequently be sampled and characterized and then disposed or recycled offsite as appropriate.
- Rocks (boulders) that can be easily separated from contaminated soil will be set aside, cleaned if necessary,

and subsequently placed back into the excavation after excavation activities are complete. Also, clean soil may be excavated to gain access to the contaminated soil and to form stable side walls. This clean soil will be segregated, tested, and used during site restoration. Onsite and imported clean soil will be used to restore the site and reinstall Triton Road.

- The temporary detour road will be removed after excavation activities are complete and Triton Road is reinstalled. Material from the temporary detour road will be re-used as fill material as appropriate.

The U.S. Environmental Protection Agency (EPA) and Connecticut Department of Environmental Protection (CTDEP) concur with the Navy's Proposed Remedy of NFA under CERCLA. The CTDEP concurs with the Navy's Proposed Remedy of Excavation and Off-Site Disposal under the Connecticut RSRs.

Based on information currently available, the Navy believes the Proposed Remedy of Excavation and Off-Site Disposal meets the CTDEP RSRs and provides the best balance of tradeoffs among the other alternatives. The Navy expects the Proposed Remedy of Excavation and Off-Site Disposal to satisfy the following minimum requirements: a. be protective of human health and the environment; b. comply with statutory and regulatory requirements; c. be cost-effective; and d. utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable.

The Public's Role in Alternative Selection

Community input is integral to the selection process. The Navy, EPA, and State of Connecticut will consider all comments in selecting the remedial action prior to signing the Record of Decision. The public is encouraged to participate in the decision-making process.

This Proposed Plan for Site 3 - NSA soil is available for review, along with supplemental documentation, at the following Information Repositories:

Groton Public Library
52 Newtown Road
Groton, CT 06340
(860) 441-6750

Hours:
Mon. - Thur.: 9:00am - 9:00pm
Fri.: 9:00am - 5:30pm
Sat.: 9:00am - 5:00pm
Sun.: noon - 6:00pm

Bill Library
718 Colonel Ledyard
Highway
Ledyard, CT 06339
(860) 464-9912

Hours:
Mon. - Thur.: 9:00am - 9:00pm
Fri. & Sat.: 9:00am - 5:00pm
Sun.: 1:00pm - 5:00pm

For further information, please contact:

Mark Evans, Remedial Project Manager
Naval Facilities Engineering Command
Engineering Field Activity Northeast
10 Industrial Highway
Mail Stop 82, Code 1823/ME
Lester, Pennsylvania 19113-2090
Tel. (610)595-0567 ext. 162
Email: mark.evans1@navy.mil

Melissa Griffin
Installation Restoration Manager
Naval Submarine Base-New London
Building 439
Groton, CT 06349-5039
Tel. (860) 694-5191
Email: griffinm@cnme.navy.mil

Kymerlee Keckler, Remedial Project Manager
United States Environmental Protection Agency
1 Congress Street
Suite 1100 (HBT)
Boston, MA 02114-2023
Tel. (617) 918-1385
Email: keckler.kymerlee@epa.gov

Mark Lewis
Environmental Analyst 3
Connecticut Department of Environmental Protection
Eastern District Remediation Program
Planning & Standards Division
Bureau of Waste Management
79 Elm Street
Hartford, CT 06106-5127
Tel. (860) 424-3768
Email: mark.lewis@po.state.ct.us

Glossary of Technical Terms

Basewide Groundwater Operable Unit Remedial Investigation (BGOURI) Update/Feasibility Study (FS): A Remedial Investigation report describes the site, documents the nature and extent of contaminants detected at the site, and presents the results of the risk assessment. An FS report presents the development, analysis, and comparison of remedial alternatives.

Connecticut Remediation Standard Regulations (RSRs): Connecticut regulations (Sections 22a-133k-1 through 3 of the Regulations of Connecticut State Agencies) concerning the remediation of polluted soil and groundwater.

Contaminants: any physical, biological, or radiological substance or matter that, at a certain concentration, could have an adverse effect on human health and the environment.

Data Gap Investigation (DGI): A follow-up investigation performed to address data gaps identified in the results of the previous investigation.

Ecological Risk Assessment (ERA): Scientific method to evaluate the effects on ecological receptors to exposure to contaminants in site-specific medium (e.g., soil, groundwater, etc.)

Excavation: Earth removal with construction equipment such as backhoe, trencher, front-end loader, etc.

Extractable Total Petroleum Hydrocarbons (ETPH): A method of analysis designed to measure certain widely used petroleum products such as kerosene, jet and diesel fuels, No. 2 to No. 6 fuel oils, and motor oil. The ETPH method may be used for testing soil and groundwater samples and is used specifically to demonstrate compliance with Connecticut RSRs.

Human Health Risk Assessment (HHRA): Scientific method to evaluate the effects on human receptors to exposure to contaminants in site-specific medium.

Installation Restoration (IR) Program: The purpose of the program is to identify, investigate, assess, characterize, and clean up or control releases of hazardous substances, and to reduce the risk to human health and the environment from past waste disposal operations and hazardous material spills at Navy activities in a cost-effective manner.

milligram per kilogram (mg/kg): One part of contaminant in a million parts of a solid material.

New Source Area (NSA): The newly identified disposal area within Site 3 where petroleum contamination was discovered.

Operable Unit (OU): Contaminated media, site, or set of sites that are evaluated as a group.

Polynuclear Aromatic Hydrocarbons (PAHs): High molecular weight, relatively immobile, and moderately toxic solid organic chemicals featuring multiple benzenic (aromatic) rings in their chemical formula. Typical examples of PAHs are naphthalene and phenanthrene.

Record of Decision (ROD): An official document that describes the selected CERCLA remedy for a site.

Remedial Action (RA): Activities to control exposure to, treat, or remove contaminated medium, waste, or material.

Remedial Goal (RG): Allowable concentration of contaminant that can be left in medium and not adversely impact human health or the environment. It may also be the end result of a long-term action that stops or substantially reduces a release or threatened release of hazardous substances.

Responsiveness Summary: A summary of written and oral comments received during the public comment period, together with the Navy's and the State of Connecticut's responses to these comments.

Total Petroleum Hydrocarbons (TPH): Measure of the concentration or mass of organic compounds containing carbon and hydrogen in petroleum and derived products.

USE THIS SPACE TO WRITE YOUR COMMENTS

Your input on the Proposed Plan for Site 3 - NSA soil at Naval Submarine Base – New London is important to the Navy. Comments provided by the public are valuable in helping the Navy select the final clean-up remedy for this site.

You may use the space below to write your comments, then fold and mail. Comments must be postmarked by August 17, 2004. Comments can be submitted via mail or e-mail and should be sent to either of the following addresses:

Mr. Mark Evans, Remedial Project Manager
Naval Facilities Engineering Command
Engineering Field Activity Northeast
10 Industrial Highway
Mail Stop 82, Code 1823/ME
Lester, Pennsylvania 19113-2090
Tel: (610) 595-0567 ext. 162
e-mail: mark.evans1@navy.mil

Ms. Melissa Griffin
Installation Restoration Manager
Naval Submarine Base - New London
Building 439
Groton, CT 06349-5039
Tel: (860) 694-5191
e-mail: griffinm@cnrne.navy.mil

If you have any questions about the comment period, please contact Mr. Mark Evans at (610) 595-0567 ext. 162.

Name _____

Address _____

City _____

State _____ Zip _____

Telephone _____

PUBLIC NOTICE

PUBLISHER'S CERTIFICATE

State of Connecticut)
County of New London,) ss. New London

On this 16th day of July, 2004,
Personally appeared before the undersigned, a
Notary Public within and for said County and
State, Kimberlee R. Butler, Legal Advertising Clerk,
of THE DAY, a daily newspaper published
at New London, County of New London, State of
Connecticut, who being duly sworn, states on
oath, that the Order of Notice in the case of
LEGAL 383 PUBLIC NOTICE

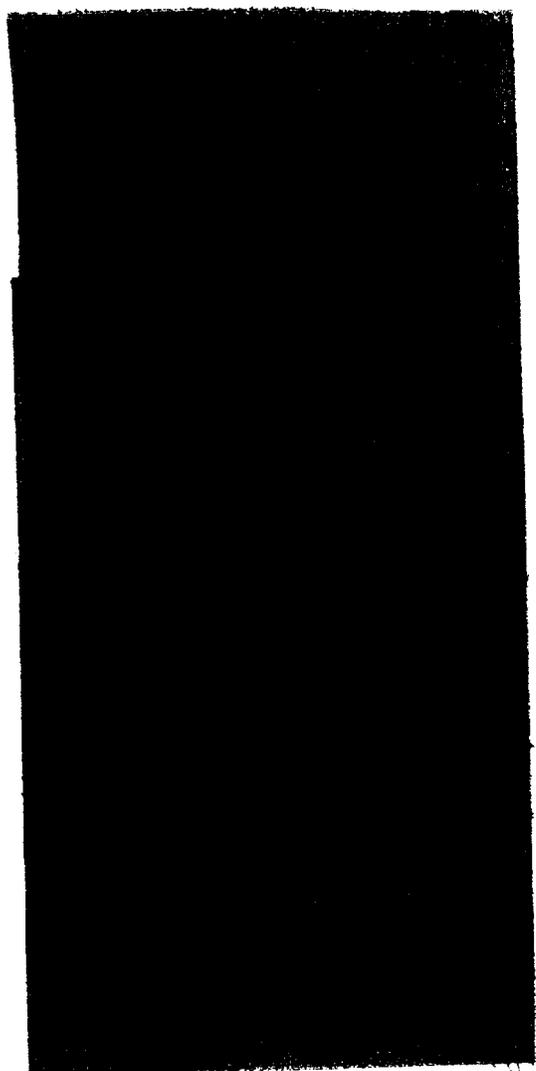
a true copy of which is hereunto annexed, was
published in said newspaper in its issue(s) of
6/2004

Kimberlee R. Butler

Subscribed and sworn to before me
this 16th day of July, 2004

Lorraine Martens
Notary Public

My commission expires 9-30-2008



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APPENDIX B

- B-1 PETROLEUM-CONTAMINATED SOIL
CLEANUP PLAN FOR SITE 3 - NSA SOIL**
- B.2 STATE OF CONNECTICUT
CONCURRENCE LETTER**

**B - 1 PETROLEUM-CONTAMINATED SOIL CLEANUP PLAN
FOR SITE 3 - NEW SOURCE AREA**

1.0 INTRODUCTION

1.1 BACKGROUND

Site 3 - New Source Area (NSA) was discovered during the remediation of contaminated sediment in Stream 5, which is part of Site 3 - Area A Downstream Watercourses [Operable Unit (OU) 3] at Naval Submarine Base - New London (NSB-NLON), Groton, Connecticut. The locations of NSB-NLON and Site 3 - NSA are shown on Figures B-1 and B-2, respectively.

Sediment that exhibited potential petroleum contamination (i.e., odor and sheen on pooled water) was encountered during excavation activities along the northern side of Stream 5. Upon further investigation, rusted drums and steel cable intermingled with boulders and soil were found in a small disposal area upgradient (north) of Stream 5. Site 3 - NSA was not addressed during the remediation of OU3 because the nature and extent of contamination was not well defined.

The Navy investigated Site 3 - NSA in 2002 during a data gap investigation (DGI) for the Basewide Groundwater OU Remedial Investigation (BGOURI) [Tetra Tech NUS, Inc. (TtNUS), 2002]. Because the nature of the contamination at the site was unknown, the investigation was conducted to meet the Navy's requirements under its Installation Restoration (IR) Program and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 United States Code (U.S.C.) §9601, et seq. The results of the investigation are summarized in Section 2.0 of the Site 3 - NSA soil Record of Decision (ROD) and in the BGOURI Update/Feasibility Study (FS) (TtNUS, 2004). A plan view of the estimated extent of contaminated soil at Site 3 - NSA is shown on Figure B-3, and the vertical extent of contaminated soil is shown on Figure B-4.

1.2 OBJECTIVE

The results of the investigation of Site 3 - NSA showed that petroleum was the only contaminant of concern (COC). Because petroleum is excluded from consideration under CERCLA, the Navy recommended No Further Action (NFA) for the contaminated soil at Site 3 - NSA under CERCLA [United States Department of the Navy (Navy), 2004]. However, the Navy recognized that the petroleum contamination represented a threat to human health and the environment and will pursue evaluation of the site under its IR Program and State of Connecticut regulations. The purpose of this plan is to document the Navy's approach to address the petroleum-contaminated soil discovered at Site 3 - NSA.

1.3 APPROACH

The Navy and Connecticut Department of Environmental Protection (CTDEP) discussed ways to address the petroleum-contaminated soil at Site 3 - NSA under the Navy's IR Program and CTDEP's Remediation Standard Regulations (RSRs), Regulations of Connecticut State Agencies (RCSA) 22a-133k-1 through 3. The Navy and CTDEP agreed that the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 Code of Federal Regulations (CFR) 300, FS format was acceptable for developing and evaluating remedial alternatives for the contaminated soil. Therefore, the evaluation of remedial alternatives was conducted following the criteria provided in the NCP and the Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA, Office of Solid Waste and Emergency Response (OSWER) Directive 9355.3-01 [United States Environmental Protection Agency (EPA), 1988] and the Department of the Navy IR Program Manual (Navy, 2001). The CTDEP RSRs were the primary criteria used for the evaluation. The results of the evaluation are documented in the BGOURI Update/FS (TINUS, 2004) and summarized in Section 2.0 below.

After the acceptance of this plan by the State of Connecticut, the Navy will conduct the following activities:

- Prepare a remedial design
- Conduct the remedial action
- Complete a remedial action report

2.0 DEVELOPMENT AND EVALUATION OF REMEDIAL ALTERNATIVES

2.1 REMEDIAL ACTION OBJECTIVES

Remedial action objectives (RAOs) provide a general description of what the response action will accomplish. These goals serve as the design basis for the remedial alternatives discussed in the next section. The RAOs provide the basis for evaluating cleanup options for the site and an understanding of how the risks identified in the BGOURI Update (TINUS, 2004) will be addressed by the response action.

The following RAOs were developed to address current and potential future human health and ecological risks associated with Site 3 - NSA soil:

RAO1 - Protect current receptors (construction workers, employees, and trespassers) from incidental exposure to soil contaminated with petroleum hydrocarbons at concentrations greater than the CTDEP Industrial/Commercial Direct Exposure Criterion for Total Petroleum Hydrocarbons (TPH) (2,500 mg/kg). Site petroleum concentrations potentially exceed the criterion for Industrial/Commercial receptors.

RAO2 - Protect existing GB-classified groundwater quality by preventing the leaching of petroleum hydrocarbons from soil at concentrations greater than the CTDEP Pollutant Mobility Criterion for TPH (2,500 mg/kg).

RAO3 - Protect aquatic ecological receptors by preventing the migration of free petroleum oil from site soil into surface water.

RAO4 - Protect potential future residential receptors from incidental exposure to soil contaminated with petroleum hydrocarbons at concentrations greater than the CTDEP Residential Direct Exposure Criterion for TPH (500 mg/kg).

During the Stream 5 remediation in 1999 and the DGI in 2002, environmentally significant levels of TPH were detected in the soil of the Site 3 - NSA and at the water table just northeast of Triton Road. The extent of the petroleum-contaminated soil likely extends from Site 3 - NSA southwestward to underneath Triton Road (see Figures B-3 and B-4). The presence of TPH in the soil is considered environmentally significant because free petroleum oil was observed to form on surface water and groundwater. Free petroleum oil can migrate to Stream 5 (RAO 3) and/or along the groundwater/soil interface (RAO 2).

The soil samples collected during the DGI for the BGOURI (TINUS, 2004) were not analyzed for TPH. However, based on the 1999 remediation and 2002 field observations and the single sediment sample

result from 1999, TPH concentrations in site soil are expected to be greater than 1,000 mg/kg and may approach 10,000 mg/kg. In accordance with the Connecticut RSRs, this range of TPH concentrations may represent a potential threat to construction workers (RAO 1) and to potential future residents (RAO 4) that come in direct contact with the petroleum-contaminated soil. That is, TPH concentrations may exceed Connecticut direct exposure RSRs for industrial/commercial receptors and potential future residents. Also, in accordance with Connecticut RSRs, concentrations of polynuclear aromatic hydrocarbons (PAHs) in the surface soil represent a potential treat to groundwater through migration (RAO 2).

Based on available information, the potential volume of petroleum-contaminated soil is approximately 385 cubic yards (580 tons). This estimate of petroleum-contaminated soil excludes 129 cubic yards (190 tons) overlying clean soil and uncontaminated rock that are expected to be mixed with the contaminated soil in this area. It was also estimated that an additional 127 cubic yards (190 tons) of material would need to be excavated to ensure a stable excavation. Based on an assumed average TPH concentration of 1,000 mg/kg in this soil, a total of approximately 136 pounds (18 gallons) of petroleum product may be present.

The remediation goals selected to meet the RAOs are summarized in Table B-1. The Navy decided to select the remedial goal of 500 mg/kg for TPH, which will address concerns to both current and future receptors. Cleanup of the petroleum-contaminated soil at the site to this level will allow the Navy to use the site without restriction in the future. Groundwater concerns at Site 3 are CERCLA-related and will be addressed in a ROD.

2.2 DESCRIPTION OF ALTERNATIVES

Several options were considered for soil remediation. The options were evaluated based on effectiveness, implementability, and general cost. Following the FS screening process, three options were retained for consideration.

2.2.1 Description of Remedial Alternatives

A list of the remedial alternatives and their major components as they sequentially occur in the remediation process are discussed below.

Alternative S1 - No Action

Under this alternative, no activities would be conducted for this site. The No Action Alternative for soil is not expected to be fully protective of human health and the environment. In particular, contaminated soil

at the site would not be managed and if incorrectly handled could result in potential risks to human health, and free petroleum oil could impact site surface water. The assumed durations and estimated costs associated with this alternative are summarized as follows:

- Estimated Time for Design and Construction: NA
- Estimated Time for Operation: 30 years
- Estimated Capital Cost: \$0
- Estimated Operation and Maintenance (O&M) Cost (Present Worth): \$0
- Estimated Total Present Worth: \$0

Alternative S2 - Institutional Controls

This alternative was developed to protect human health and the environment by placing restrictions on the excavation and handling of contaminated soil at this site. Under this alternative, existing permeable covers (soil/gravel/asphalt) would be maintained at the site as long as waste remains, but no additional cover would be placed at the site. If disturbance of the subsurface is necessary (e.g., underground utility or building foundation work) and contaminated soil is contacted or excavated, construction workers must wear appropriate personal protective equipment (PPE). If contaminated soil is excavated, the soil must be tested, properly handled, and disposed (e.g., in a landfill and not used as clean fill). When the excavation is complete, a permeable cover consistent with site operations must be re-applied to the site. The institutional controls would also prohibit future residential development of this site, and the NSB-NLON Site Use Restriction document and other environmental records would note the location and types of contamination observed at the site.

Monitoring wells would be installed at the Site 3 - NSA and at downgradient areas to evaluate the presence and migration of petroleum. Monitoring wells would be placed between Site 3 - NSA and Stream 5 and the area west of Triton Road. Natural degradation of site contaminants is assumed to occur. Short-term groundwater testing would be conducted to confirm that petroleum has not impacted area groundwater. Regular long-term monitoring of the wells would be conducted to evaluate degradation and migration of petroleum product. Periodic testing of the petroleum-contaminated soil would be conducted on an as-needed basis associated with construction. Because there is only petroleum-related soil contamination at the site that is being addressed under State of Connecticut requirements and because there are no CERCLA-related hazardous substances, pollutants, or contaminants in the soil that pose an unacceptable risk during future site use, five-year reviews will not be required for the Site 3 - NSA soil. The assumed durations and estimated costs associated with this alternative are summarized as follows:

• Estimated Time to Implement Institutional Controls :	6 months
• Estimated Time to Monitor:	30 years
• Estimated Capital Cost:	\$61,100
• Estimated Annual O&M Cost (Present Worth):	\$63,100
• Estimated Total Present Worth:	\$124,200

Alternative S3 - Excavation and Off-Site Disposal

This remedial alternative consists of five major components: (1) Finalize delineation of petroleum-contaminated soil; (2) Construct a temporary detour road to maintain access to critical Navy facilities; (3) Excavate, characterize, transport, and dispose/recycle all petroleum-contaminated soil off-site as appropriate; (4) Collect verification samples to ensure removal of all petroleum-contaminated soil; and (5) Restore the site to pre-excavation conditions. Additional details of the five major components are provided below.

- Finalizing the delineation of petroleum-contaminated soil would include advancing soil borings and collecting soil samples to determine the horizontal and vertical extent of the contaminated soil.
- A temporary detour road would be installed to the south of Triton Road to maintain vehicular access to various critical Navy facilities during the excavation of contaminated soil beneath Triton Road.
- Petroleum-contaminated soil would be excavated and stockpiled at the site. The estimated volume of petroleum-contaminated soil is approximately 385 cubic yards (580 tons). Approximately 136 pounds (18 gallons) of petroleum may be present in the contaminated soil. The estimated volume of additional overlying clean soil and uncontaminated rock that are expected to be mixed with the contaminated soil is approximately 129 cubic yards (190 tons). It is also estimated that an additional 127 cubic yards (190 tons) of material would need to be excavated to ensure a stable excavation. Excavation would continue until verification samples indicate that all petroleum-contaminated soil with Extractable TPH (ETPH) concentrations greater than 500 mg/kg has been removed.
- The stockpiled contaminated soil would be sampled and characterized and then disposed or recycled off site as appropriate.
- Rocks (boulders) that can be easily separated from contaminated soil would be set aside, cleaned if necessary, and subsequently placed back into the excavation after excavation activities are complete. Also, clean soil may be excavated to gain access to the contaminated soil and to form stable side

walls. This clean soil would be segregated, tested, and used during site restoration. On-site and imported clean soil would be used to restore the site and to reinstall Triton Road.

- The temporary detour road would be removed after excavation activities are complete and Triton Road is reinstalled. Material from the temporary detour road will be reused as fill material as appropriate.

This alternative meets all of the RAOs by removing the petroleum-contaminated soil from the site. Alternative S3 was developed to protect human health and the environment by excavating all contaminated soil and disposing/recycling it off site at an appropriate facility. Rock and clean soil would be reused at the site. If implemented, the alternative would represent a clean closure for soil at the site with no additional requirements. The assumed durations and estimated costs associated with this alternative are summarized as follows:

- Estimated Time from Start of Design to Completion: 1.5 years
- Estimated Time for Excavation and Staging: 6 to 8 weeks
- Estimated Capital Cost: \$286,100
- Estimated Annual O&M Cost (Present Worth): \$0
- Estimated Total Present Worth: \$286,100

2.2.2 Common Elements and Distinguishing Features of Each Alternative

This section describes common elements and distinguishing features unique to each response action.

Alternatives S1, S2, and S3 are similar in that none of these alternatives treat the contaminated soil. Under each of these alternatives, the contaminated soil remains contaminated. For Alternatives S1 and S2, the contaminant remains in the soil at Site 3 - NSA, and for Alternative S3, the contaminant remains in the soil, but the soil is transported off site to be disposed or processed at another facility.

Alternatives S1 and S2 allow the contaminated soils to remain in place. However, Alternative S2 provides for some institutional controls that would restrict construction and development activities, thus removing the potential for contacting the contaminated soil that will remain in place; Alternative S1 does not provide for any type of activity restrictions.

Alternatives S2 and S3 are similar in that they both address the exposure pathways. However, Alternative S2 addresses the exposure pathways associated with Site 3 - NSA by preventing construction and development activities, and Alternative S3 addresses the exposure pathways by removing the

contaminated soil from Site 3 - NSA. Both alternatives address the risk issues with Site 3 - NSA, but Alternative S3 allows future use of the site with no land use restrictions.

Alternative S3 is the only alternative that meets the 500 mg/kg remediation goal for ETPH and results in no free product remaining at the site. Alternatives S1 and S2 allow for passive natural degradation of contamination, but only Alternative S2 includes periodic monitoring to confirm contaminant degradation.

2.2.3 Expected Outcome of Each Alternative

Under Alternative S1 (No Action), the site could not be released for unrestricted use. In the event that the site was released for unrestricted use, Alternative S1 would not be protective of human health. Additionally, Alternative S1 does not address the potential hazards that may result from migration of soil contaminants to groundwater.

Under Alternative S2 (Institutional Controls), the site could not be released for unrestricted use. Institutional controls would dictate protective site restrictions and procedures for construction activities performed at Site 3 - NSA. As with Alternative S1, Alternative S2 does not fully address the potential hazards that may result from migration of soil contaminants to groundwater.

Under Alternative S3 (Excavation and Off-Site Disposal), following the remedial alternative, Site 3 - NSA could be released for unrestricted use. Unacceptable human health risks would be removed and the potential for contaminant migration from soil to groundwater would be eliminated.

2.3 SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

This section summarizes the comparative analysis of alternatives presented in the detailed analysis section of the BGOURI Update/FS Report (TtNUS, 2004). The major objective is to evaluate the relative performance of the alternatives with respect to the nine CERCLA/NCP evaluation criteria so that the advantages and disadvantages of each are clearly understood.

2.3.1 Overall Protection of Human Health and the Environment

Soil Alternatives S1, S2, and S3 are all expected to be moderately protective of human health and the environment under current conditions. Contaminants in site soil are relatively isolated from human contact and therefore do not present significant risks.

Except for potential migration of petroleum hydrocarbons to surface water, contaminated soil does not represent a significant ecological threat. The petroleum hydrocarbons could migrate to surface water and

adversely affect ecological receptors under Alternatives S1 and S2, but not Alternative S3 in which this soil would be excavated. Under Alternative S1, the potential for impacts would be unknown. For Alternative S2, the potential impacts would be monitored, and if a problem was identified, additional action would be conducted.

Also, because contamination would remain at the site without adequate notification, Alternative S1 (No Action) may not be protective of current or future receptors. Construction workers or potential future residents could come in contact with the petroleum-contaminated soil, resulting in unacceptable risks (RAOs 1 and 3). Also, contaminated soil could be excavated and used elsewhere without restriction. If the contaminated soil/waste was used elsewhere without adequate cover, unacceptable risks to human health could result.

Although available data do not indicate that petroleum-contaminated soil would impact groundwater (RAO 2), under Alternative S1, any impact would not be known. Under Alternative S2, potential impacts to groundwater would be monitored, and under Alternative S3, the contaminated soil would be removed and the potential for impact thereby eliminated.

Alternative S3 would achieve all the RAOs and be the most protective alternative by removing all contaminated soil.

Alternative S2 would also achieve all the RAOs but would be less protective of human health and the environment than Alternative S3 because contaminants would remain on site and would require long-term enforcement of site use restrictions. Alternative S2 also includes monitoring to track contaminant concentration changes and migration over time and would identify a potential change in site characteristics that would warrant additional action. Because the COC in Site 3 - NSA soil is organic, it is subject to slow, natural biological and chemical degradation. Under Alternative S2, soil concentrations should decrease to less than the remedial goal, but several years to several decades may be required. At that time, site use restrictions could be eliminated.

2.3.2 Compliance with Statutory and Regulatory Requirements

An assessment of regulatory requirements for Alternatives S1, S2, and S3 is provided in Tables B-2 through B-6. Alternative S3 would comply with all chemical-specific regulatory requirements. Alternative S2 would not completely comply with the chemical-specific regulatory requirements. The alternative would not comply with the CTDEP Direct Exposure Criterion because petroleum-contaminated soil would remain in portions of the site without adequate cover for it to be defined by the State as inaccessible soil. Soil with petroleum concentrations in excess of the CTDEP Pollutant Mobility Criterion would also remain at the site under this alternative. Because unmanaged petroleum-contaminated soil would remain at the

site, Alternative S1 would not comply with the CTDEP RSRs for contaminated soil. Location-specific and action-specific regulatory requirements are not applicable to Alternatives S1 and S2. Alternative S3 would comply with action-specific and location-specific regulatory requirements. Alternative S3 involves the off-site disposal or reuse of contaminated soil and potentially of treatment residues. This action would trigger State hazardous and/or solid waste requirements. Alternative S3 also involves excavation and placement of material in a watercourse, which would trigger the requirements of the Connecticut Inland Wetlands and Watercourses Act.

2.3.3 Long-Term Effectiveness and Permanence

Currently, there is an estimated 385 cubic yards of contaminated soil containing approximately 136 pounds of petroleum at the site. Alternative S3 would be very effective in the long term by removing all contaminated soil from the site.

Alternative S2 could be effective in the long term, although this alternative depends on relatively slow natural degradation processes to address contaminated soil. In addition, the petroleum-contaminated soil at the site without adequate cover could represent a threat to current receptors. Monitoring would be used to track decreases in contaminant concentrations over time. Institutional controls would be used to maintain the effectiveness of this alternative until the contaminant concentration decreases to less than the remedial goal. Based on the results of monitoring, additional action may be required in the future to be protective of human health and the environment.

Alternative S1 may not be effective in the long term. Potentially unacceptable risks would remain for site soil, and these risks would not be known.

2.3.4 Reduction of Toxicity, Mobility, or Volume through Treatment

Alternatives S1 and S2 do not use treatment to reduce toxicity, mobility, or volume. Under Alternative S3, approximately 385 cubic yards of contaminated soil containing approximately 136 pounds of petroleum would be removed from the site and either beneficially reused or placed in a landfill. Treatment of this soil is not anticipated to be required.

2.3.5 Short-Term Effectiveness

The three soil alternatives are expected to be effective in the short term. Under Alternative S3, potential risks to the community and to construction workers could result from excavation and off-site disposal of contaminated soil. However, these risks would be managed through existing federal and State requirements for construction works and transportation.

Alternative S1 would not achieve the RAOs. Alternative S2 would achieve most of the RAOs within approximately 6 months, the time required to implement institutional controls and start monitoring. Final degradation of petroleum hydrocarbons is expected to require years to decades to complete. Alternative S3 would achieve the RAOs in approximately 1.5 years.

2.3.6 Implementability

All three soil alternatives are expected to be implementable. Alternative S1 would be the easiest to implement because it involves no action. Alternative S2 would also be relatively easy to implement because it involves only minimal actions.

Alternative S3 is expected to involve excavation within a stream bed and below the water table. As a result, water would be collected, characterized, and possibly treated prior to discharge. Based on the estimated volume, the water may be discharged to either a local stream or the Groton publicly-owned treatment works (POTW). If treatment is needed, a granular activated carbon (GAC) unit with pre-filtration may be employed. Approval and/or permits would be required, and based on the contaminants and volume, should be obtainable. Vendors and facilities are available to perform the work.

2.3.7 Cost

The estimated present-worth cost of each alternative is presented below. Capital costs were calculated using present dollars and do not account for inflation or the future value of money.

Alternative	Capital Cost	O&M Cost (Present Worth)	Total Cost (Present Worth)
Alternative S1	\$0	\$0	\$0
Alternative S2	\$61,100	\$63,100	\$124,200
Alternative S3	\$286,000	\$0	\$286,000

2.3.8 State Acceptance

The State of Connecticut has expressed their support of Alternative S3, Excavation and Off-Site Disposal, under the CTDEP RSRs.

2.3.9 Community Acceptance

The Navy's plan for Site 3 - NSA soil was presented to the public on July 28, 2004. Based on the fact that no comments were expressed at the public meeting and no written comments were received during

the public comment period, it appears that the community generally agrees with the Selected Remedy. A transcript of the public meeting can be found in Appendix C of the Site 3 - NSA soil ROD.

2.4 PRINCIPAL THREAT WASTE

The IR Program establishes an expectation that treatment will be used to address the principal threats posed by a site wherever practicable. Principal threat wastes are those source materials considered to be highly toxic or highly mobile that generally cannot be contained or that would present a significant risk to human health or environment should exposure occur. Although petroleum is present at the site at levels that exceed Connecticut RSRs, petroleum is not considered to be highly toxic and therefore is not a principal threat waste.

3.0 SELECTED REMEDY

This section identifies the Selected Remedy and expands on the details for this alternative provided in the Description of Alternatives, Section 2.2.

3.1 SUMMARY OF THE RATIONALE FOR THE SELECTED REMEDY

The Navy selected a remedy for the petroleum-contaminated soil at Site 3 - NSA under the Navy's IR Program and CTDEP RSRs. The Selected Remedy for Site 3 - NSA petroleum-contaminated soil is Alternative S3 (Excavation and Off-Site Disposal). The purpose of the remedy is to eliminate or reduce the risk to human health and the environment associated with direct contact with contaminated soil and petroleum product. This alternative meets the RAOs, provides adequate protection of human health and the environment, and attains CTDEP regulatory requirements in a cost-effective manner. This is the only alternative that will allow for the clean closure of Site 3 - NSA soil and unrestricted use of Site 3 - NSA.

3.2 DESCRIPTION OF THE SELECTED REMEDY

The Selected Remedy, Excavation and Off-Site Disposal, calls for the design and implementation of response measures that will protect human health and the environment. The purpose of the response action is to eliminate or reduce the risk to human health and the environment associated with direct contact with petroleum-contaminated soil. The remedy will consist of five major components: (1) Finalize delineation of petroleum-contaminated soil; (2) Construct a temporary detour road to maintain access to critical Navy facilities; (3) Excavate, characterize, transport, and dispose/recycle all petroleum-contaminated soil off site as appropriate; (4) Collect verification samples to ensure removal of all petroleum-contaminated soil; and (5) restore site to pre-excavation conditions. It is estimated that this alternative can be completed within 1.5 years after the start of design activities. Additional details regarding the remedy are as follows:

- Finalizing the delineation of petroleum-contaminated soil will include advancing an estimated 10 direct push technology (DPT) soil borings and collecting approximately three soil samples per boring (30 samples) to determine the horizontal and vertical extent of the contaminated soil. A remedial design will be completed to document the details of the remedial approach after delineation of the contamination is completed.
- A temporary detour road will be installed to the south of Triton Road to maintain vehicular access to various critical Navy facilities during the excavation of contaminated soil beneath Triton Road.

- Petroleum-contaminated soil will be excavated and stockpiled at the site. Excavation will continue until verification samples indicate that all petroleum-contaminated soil with ETPH concentrations greater than 500 mg/kg has been removed. The ETPH method of analysis is designed to measure certain widely used petroleum products and is used specifically to demonstrate compliance with Connecticut RSRs. The estimated volume of petroleum-contaminated soil is approximately 385 cubic yards (580 tons) and approximately 136 pounds (18 gallons) of petroleum may be present in the contaminated soil. The estimated volume of additional overlying clean soil and uncontaminated rock that are expected to be mixed with the contaminated soil is approximately 129 cubic yards (190 tons). It is also estimated that an additional 127 cubic yards (190 tons) of material will need to be excavated to ensure a stable excavation.
- The stockpiled contaminated soil will be sampled and characterized and then disposed or recycled off site as appropriate.
- Rocks (boulders) that can be easily separated from contaminated soil will be set aside, cleaned if necessary, and subsequently placed back into the excavation after excavation activities are complete. Also, clean soil may be excavated to gain access to the contaminated soil and to form stable side walls. This clean soil will be segregated, tested, and used during site restoration. On-site and imported clean soil will be used to restore the site and to reconstruct Triton Road.
- The temporary detour road will be removed after excavation activities are complete and Triton Road is reconstructed. Material from the temporary detour road will be reused as fill material as appropriate.

3.3 STATUTORY DETERMINATIONS

Under the IR Program, the Navy must select remedies that are protective of human health and the environment, comply with regulatory requirements (unless a statutory waiver is justified), are cost effective, and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practical. In addition, the IR Program includes a preference for remedies that employ treatment that permanently and significantly reduces the volume, toxicity, or mobility of contamination as a principal element and a bias against off-site disposal of untreated wastes. The following sections discuss how the selected remedy meets these statutory requirements.

3.3.1 Protection of Human Health and the Environment

The Selected Remedy will protect human health and the environment by removing soil contaminated in excess of the CTDEP RSRs from the site and transporting the soil for off-site disposal. There are no

short-term threats associated with the Selected Remedy that cannot be readily controlled using conventional engineering practices.

3.3.2 Compliance with Regulatory Requirements

The Selected Remedy of excavation and off-site disposal complies with all regulatory requirements. The requirements considered applicable or potentially applicable to the remediation process are presented below, and all of the requirements are presented in Tables B-4 (chemical-specific), B-5 (action-specific), and B-6 (location-specific).

Chemical-specific regulatory requirements include:

- RSRs - These State regulations provide specific numerical cleanup criteria for contaminants in soil. Requirements are based on groundwater in the area being classified by the State as GB. Groundwater with this classification is assumed to be degraded due to a variety of pollution sources and presumed not suitable for human consumption without treatment.

Action-specific regulatory requirements include:

- Clean Water Act, Section 402, National Pollution Discharge Elimination System (NPDES) - NPDES permits are federal permits required for any discharges to navigable waters. If remedial activities include such a discharge, the NPDES standards would be applicable.
- Clean Water Act, Section 403, Pretreatment Regulations - These federal regulations set general pretreatment requirements for discharging to a POTW. If remedial activities include such a discharge, pretreatment standards would be applicable.
- Hazardous Waste Management - These State specifications establish standards for listing, identification, and management of hazardous waste. The standards of 40 CFR 260 to 262 are incorporated by reference.
- Solid Waste Management Regulations - These State specifications establish standards for management of non-hazardous waste.
- Guidelines for Soil Erosion and Sediment Control - These guidelines provide technical and administrative guidance for the development, adoption, and implementation of an erosion and sediment control program.

- Connecticut Water Pollution Control Act - This State regulation governs the treatment and discharge of water into surface water bodies in the State.

Location-specific regulatory requirements include:

- Inland Wetlands and Watercourses Act - These State rules regulate activities in wetlands and watercourses.

3.3.3 Cost Effectiveness

Although the present worth cost of Alternative S3 is the highest of the three alternatives evaluated, Alternative S3 is the only alternative that meets the CTDEP RSRs. The alternative will allow for clean closure of Site 3 - NSA, and no O&M, annual testing, or reporting costs will be incurred in the future.

3.3.4 Utilization of Permanent Solutions and Alternative Treatment

The Navy determined that the Selected Remedy represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a practical manner at the site. The Selected Remedy is the only alternative that is protective of human health and the environment and complies with regulatory requirements. It also provides the best balance of trade-offs in terms of the evaluation criteria. The Navy also considered the preference for treatment as a principal element, the bias against off-site treatment and disposal, and State and community acceptance.

3.3.5 Preference for Treatment as a Principal Element

The Selected Remedy does not include treatment as a principal element. On-site treatment of contaminated soils was not considered because of the small volume of material identified as being contaminated.

REFERENCES

CTDEP (Connecticut Department of Environmental Protection), 1996. Remediation Standard Regulations. Bureau of Water Management, Permitting, Enforcement and Remediation Division, Hartford, Connecticut, January.

EPA (United States Environmental Protection Agency), 1988. Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA – Interim Final. EPA/540/G-89/004. Office of Emergency and Remedial Response, Washington, D. C., October.

Navy (United States Department of the Navy), 1998. Record of Decision for Area A Downstream Watercourses/OBDA Pond Soil and Sediment, Naval Submarine Base - New London, Northern Division, Lester, Pennsylvania, March.

Navy, 2001 Update. Department of the Navy Installation Restoration Manual (Draft).

Navy, 2004. Site 3 - New Source Area Soil Proposed Plan, Engineering Field Activity Northeast, Lester, Pennsylvania, July.

TtNUS (Tetra Tech NUS, Inc.), 2002. Work Plan for Basewide Groundwater Operable Unit Data Gap Investigation, Naval Submarine Base New London, Groton, Connecticut. King of Prussia, Pennsylvania, October.

TtNUS, 2004. Basewide Groundwater Operable Unit Remedial Investigation Update/Feasibility Study Report for Naval Submarine Base New London, Groton, Connecticut. King of Prussia, Pennsylvania, July.

TABLE B-1

**SITE 3 - NSA SOIL REMEDIATION GOALS⁽¹⁾ (mg/kg)
NSB-NLON, GROTON, CONNECTICUT**

Chemical of Concern	Maximum Detected Concentration - Soil	Goal for Protection of Current Receptors⁽²⁾	Goal for Protection of Groundwater (GA/GB)	Goal for Protection of Aquatic Ecological Receptors	PRG for Protection of Future Potential Receptors⁽³⁾
Total Petroleum Hydrocarbons	>1000 ⁽⁴⁾	2,500	500/2,500	No mobile free product	500

- 1 The remediation goals are based on Regulations of Connecticut State Agencies (RCSA) 22a-133k including direct contact and groundwater protection considerations.
- 2 Current receptors consist of employees, construction workers, and trespassers. Employees and trespassers would be exposed to surface soils only. Construction workers may be exposed to both surface and subsurface soils.
- 3 Future receptors consist of residents living at the site that may be exposed to both surface and subsurface soils.
- 4 The maximum concentration of TPH in soil is not known. Based on a TPH concentration of 1,750 µg/kg detected in a sediment sample collected and analyzed during the Stream 5 remedial effort, the detection of stained subsurface soil during the DGI, and the presence of an oil sheen on surface water during the Stream 5 remedial effort and on groundwater in temporary monitoring wells during the DGI, concentrations in excess of 1,000 mg/kg are expected to be present in the subsurface soils at the Site 3 - NSA.

TABLE B-2

ASSESSMENT OF CHEMICAL-SPECIFIC REGULATORY REQUIREMENTS FOR SITE 3 - NSA SOIL
ALTERNATIVE S1 - NO ACTION
NSB-NLON, GROTON, CONNECTICUT

STATE OF CONNECTICUT

Requirement	Citation	Status	Synopsis of Requirement	Evaluation/Action to Be Taken
Remediation Standard Regulations	CGS 22a-133k; RCSA 22a-133k - 1 thru 3	Applicable	These regulations provide specific numerical cleanup criteria for contaminants in soil. Requirements are based on groundwater in the area being classified by the State as GB.	Alternative would not comply with requirement. Petroleum is likely to be present in soils at concentrations greater than applicable criteria. This petroleum could impact groundwater and adjacent surface water.

TABLE B-3

ASSESSMENT OF CHEMICAL-SPECIFIC REGULATORY REQUIREMENTS FOR SITE 3 - NSA SOIL
 ALTERNATIVE S2 - INSTITUTIONAL CONTROLS
 NSB-NLON, GROTON, CONNECTICUT

STATE OF CONNECTICUT

Requirement	Citation	Status	Synopsis of Requirement	Evaluation/Action to Be Taken
Remediation Standard Regulations	CGS 22a-133k; RCSA 22a-133k - 1 thru 3	Applicable	These regulations provide specific numerical cleanup criteria for contaminants in soil. Requirements are based on groundwater in the area being classified by the State as GB.	<p>Alternative would partially comply with requirement. Petroleum is likely to be present in soils at concentrations greater than applicable criteria; however, the contaminated soil would be managed as described below.</p> <p>The depth of soil cover and asphalt of Triton Road would allow some of the contaminated soil to be designated as inaccessible soil. Soil in other areas would not be able to be designated as inaccessible and would not comply with the requirements.</p> <p>Institutional controls would be used to limit worker contact with contaminated soils during normal construction/maintenance activities. They would also be used to prohibit future residential development in contaminated areas.</p> <p>Monitoring would be conducted to confirm that insoluble oils and soluble contaminants do not impact groundwater or adjacent surface water.</p>

TABLE B-4

ASSESSMENT OF CHEMICAL-SPECIFIC REGULATORY REQUIREMENTS FOR SITE 3 – NSA SOIL
 ALTERNATIVE S3 - EXCAVATION AND OFF-SITE DISPOSAL
 NSB-NLON, GROTON, CONNECTICUT

STATE OF CONNECTICUT

Requirement	Citation	Status	Synopsis of Requirement	Evaluation/Action to Be Taken
Remediation Standard Regulations	CGS 22a-133k; RCSA 22a-133k - 1 thru 3	Applicable	These regulations provide specific numerical cleanup criteria for contaminants in soil. Requirements are based on groundwater in the area being classified by the State as GB.	Alternative would comply with requirement. Petroleum-contaminated soil will be excavated and properly managed off site. This action would eliminate site contamination that could adversely impact human health and the environment.

TABLE B-5

**ASSESSMENT OF ACTION-SPECIFIC REGULATORY REQUIREMENTS FOR SITE 3 – NSA SOIL
ALTERNATIVE S3 - EXCAVATION AND OFF-SITE DISPOSAL
NSB-NLON, GROTON, CONNECTICUT
PAGE 1 OF 2**

FEDERAL

Requirement	Citation	Status	Synopsis of Requirement	Evaluation/Action to be Taken
Clean Water Act, Section 402, NPDES	40 CFR 122 through 125, 131	Applicable	NPDES permits are required for any discharges to navigable waters. If remedial activities include such a discharge, the NPDES standards would be applicable. Standards would be enforced through the State program.	If water management is required during soil excavation and the water is to be discharged directly to a surface water body, treatment in accordance with these regulations will likely be required.
Clean Water Act, Section 403, Pretreatment Regulations	Section 403	Applicable	General pretreatment requirements for discharge to a POTW. If remedial activities include such a discharge to the local sanitary sewer, pre-treatment standards would be applicable. Standards would be enforced through the State program.	If water management is required during soil excavation and the water is to be discharged to a sanitary sewer system, treatment in accordance with these regulations may be required.

TABLE B-5

ASSESSMENT OF ACTION-SPECIFIC REGULATORY REQUIREMENTS FOR SITE 3 – NSA SOIL
 ALTERNATIVE S3 - EXCAVATION AND OFF-SITE DISPOSAL
 NSB-NLON, GROTON, CONNECTICUT
 PAGE 2 OF 2

STATE OF CONNECTICUT

Requirement	Citation	Status	Synopsis of Requirement	Evaluation/Action to be Taken
Hazardous Waste Management: Generator and Handler Requirements, Listing, and Identification	RCSA § 22a-449(c) 100-102	Applicable	These sections establish standards for listing, identification, and management of hazardous waste. The standards of 40 CFR 260 to 262 are incorporated by reference.	Excavated soils would be tested for hazardous waste characteristics (i.e. TCLP criteria). If soils were determined to be a hazardous waste, they would be excavated, stored, transported, and disposed off site in accordance with hazardous waste regulations.
Solid Waste Management Regulations	RCSA §22a-209-1 to 15	Applicable	These sections establish standards for management of non-hazardous waste.	If the soils are determined to be a non-hazardous waste, they would be managed and disposed off site in accordance with the non-hazardous regulations.
Guidelines for Soil Erosion and Sediment Control	The Connecticut Council on Soil and Water Conservation	To be considered	The guidelines provide technical and administrative guidance for the development, adoption, and implementation of an erosion and sediment control program.	These guidelines would be incorporated into the design for excavation of contaminated soils near the stream at the site.
Connecticut Water Pollution Control Act	RCSA §22a - 416 to -599	Applicable	The regulations govern the treatment and discharge of water into surface water bodies in the State.	If water management is required during soil excavation and the water is to be discharged directly to a surface water body, treatment in accordance with these regulations will likely be required. If water is to be discharged to a POTW, the applicable pre-treatment sections of the POTW permit would apply.

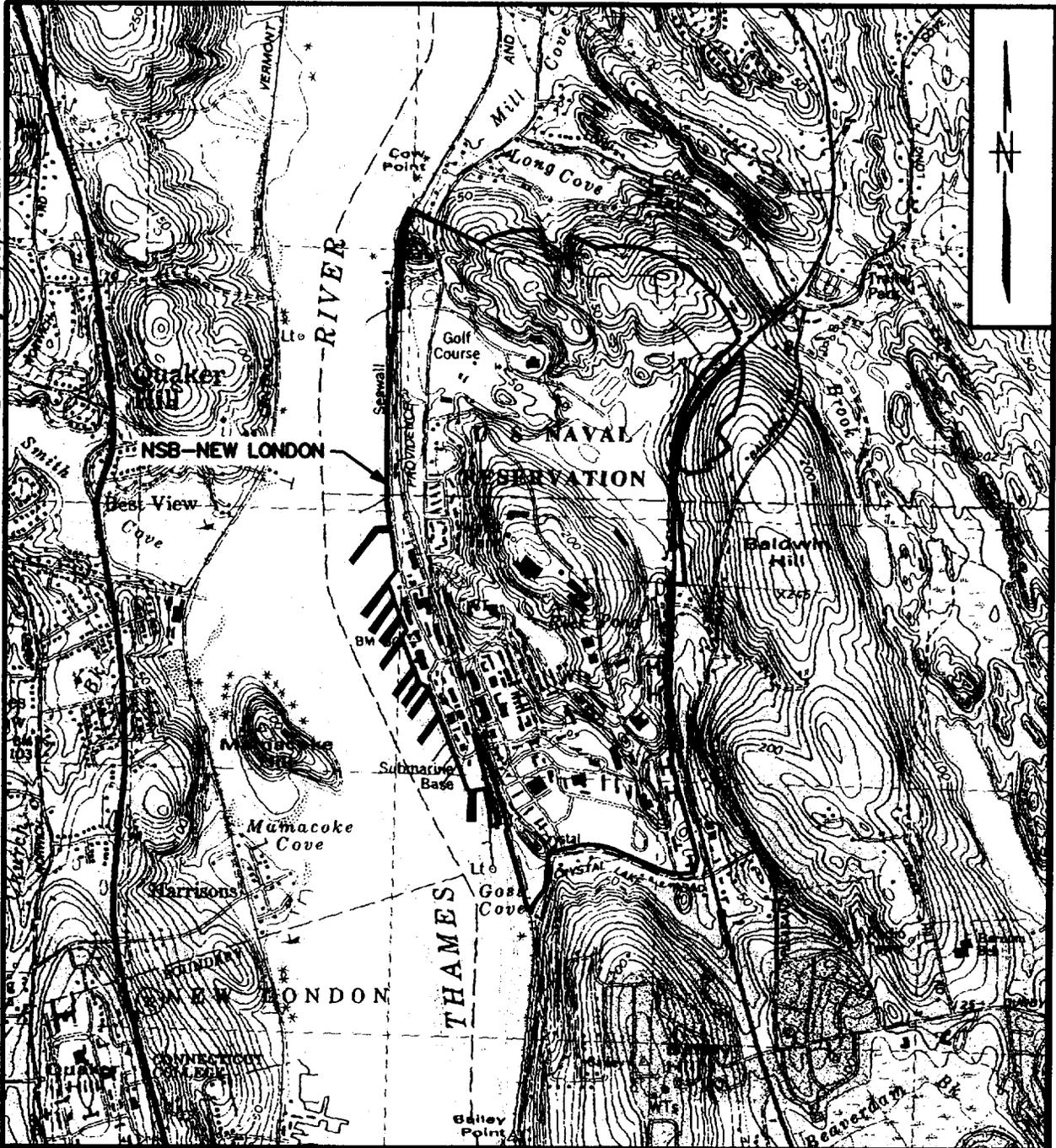
TABLE B-6

ASSESSMENT OF LOCATION-SPECIFIC REGULATORY REQUIREMENTS FOR SITE 3 - NSA SOIL
ALTERNATIVE S3 - EXCAVATION AND OFF-SITE DISPOSAL
NSB-NLON, GROTON, CONNECTICUT

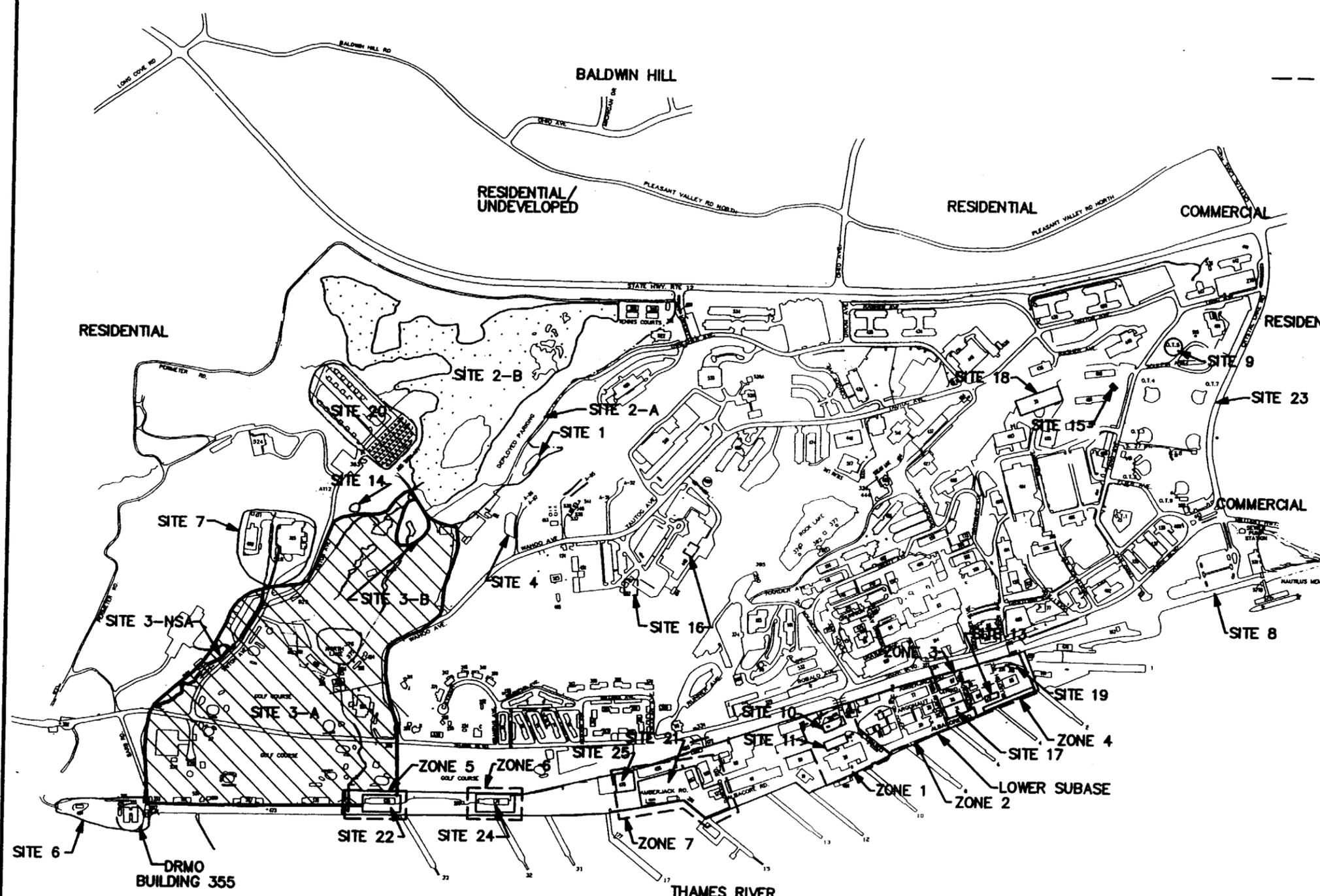
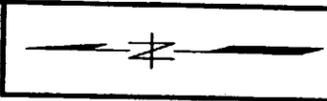
STATE OF CONNECTICUT

Requirement	Citation	Status	Synopsis of Requirement	Evaluation/Action to be Taken
Inland Wetlands and Watercourses Act	CGS § 22a-36 and 45, RCSA § 22a-39-1 through 15	Applicable	These rules regulate activities in wetlands and watercourses.	The alternative proposes to excavate petroleum-contaminated soil from beneath Stream 5 and restore the area using uncontaminated material. The substantive requirements of the standards will be met to address excavation and subsequent restoration of the watercourse.

ACAD: 4286CM10.dwg 12/10/03 DM PIT



 <p>CONNECTICUT QUADRANGLE LOCATION</p>	<p>0 2000 4000 SCALE IN FEET</p> <p>SOURCE: QUADRANGLE MAP UNCASTVILLE, CONNECTICUT 1984.</p>			
<p>DRAWN BY DATE DM 12/10/03</p>	 Tetra Tech NUS, Inc.	<p>CONTRACT NO. 2863</p>	<p>OWNER NO. 0816</p>	
<p>CHECKED BY DATE</p>	<p>LOCATION MAP NSB-NLON GROTON, CONNECTICUT</p>		<p>APPROVED BY <i>CAR</i></p>	<p>DATE 12/12/03</p>
<p>COST/SCHED-AREA</p>			<p>APPROVED BY</p>	<p>DATE</p>
<p>SCALE AS NOTED</p>			<p>DRAWING NO. FIGURE B-1</p>	<p>REV. 0</p>

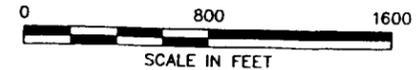


LEGEND:

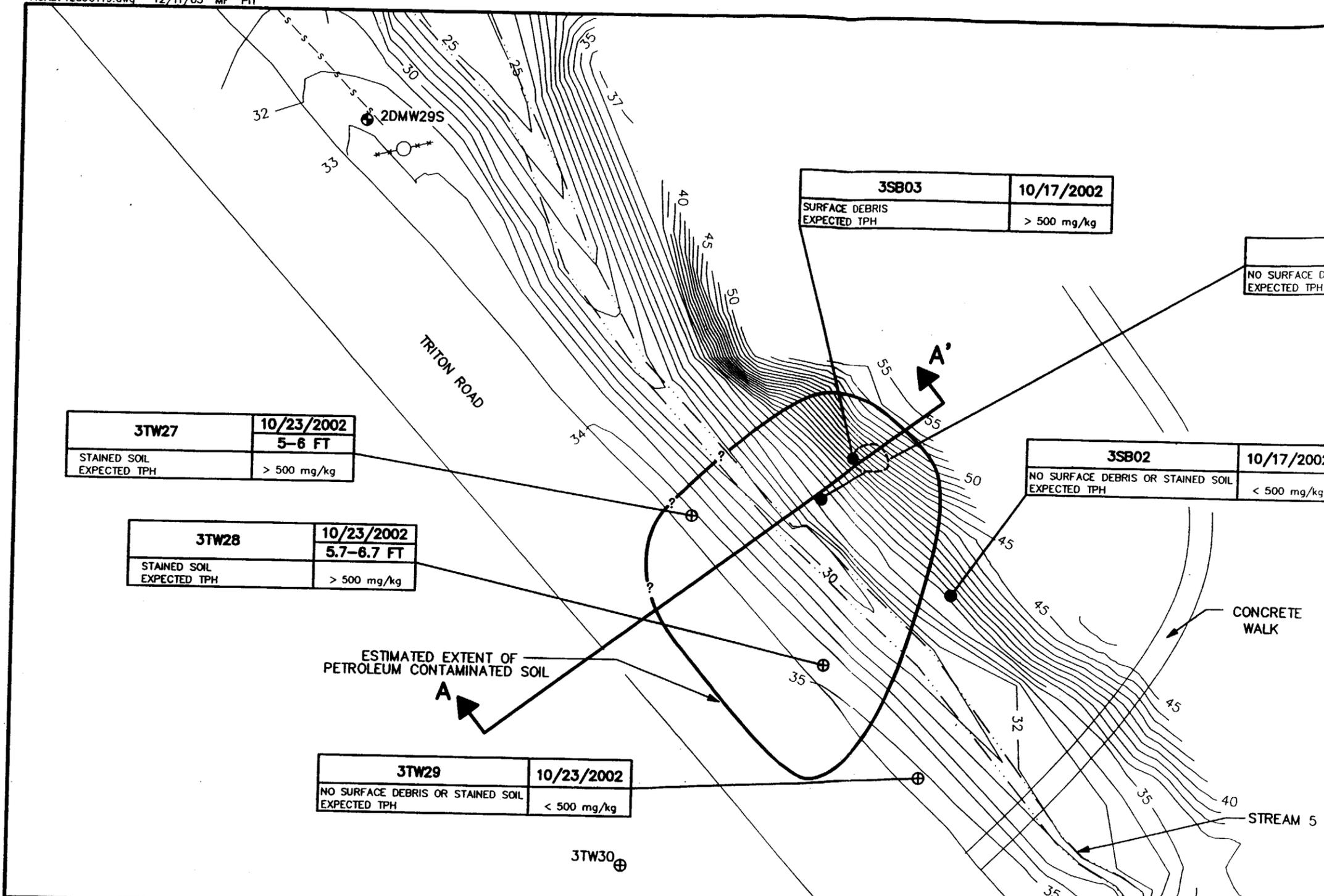
--- LOWER SUBBASE REMEDIAL INVESTIGATION ZONE BOUNDARY

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 BOUNDARIES 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) OVBANK DISPOSAL AREA (OBDA) NEW SOURCE AREA (NSA)
 - SITE 4 - RUBBLE FILL AREA AT BUNKER A-86
 - 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 SUBBASE-FUEL STORAGE TANKS AND TANK 54-H
 - SITE 11 - LOWER SUBBASE-POWER PLANT OIL TANKS
 - SITE 13 - LOWER SUBBASE-BUILDING 79 WASTE OIL PIT
 - SITE 14 - OVBANK 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 SUBBASE-CLASSIFIED MATERIALS INCINERATOR



NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES	DRAWN BY	DATE	Tetra Tech NUS, Inc.		CONTRACT NO.	OWNER NO.		
							DM	12/10/03	SITE LOCATION MAP NSB-NLON GROTON, CONNECTICUT		4286	0841		
							CHECKED BY	DATE			APPROVED BY	DATE		
							COST/SCHED-AREA				APPROVED BY	DATE		
							SCALE	AS NOTED		DRAWING NO.	FIGURE B-2	REV.	0	



3TW27	10/23/2002
STAINED SOIL EXPECTED TPH	5-6 FT > 500 mg/kg

3TW28	10/23/2002
STAINED SOIL EXPECTED TPH	5.7-6.7 FT > 500 mg/kg

3TW29	10/23/2002
NO SURFACE DEBRIS OR STAINED SOIL EXPECTED TPH	< 500 mg/kg

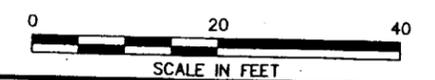
3SB03	10/17/2002
SURFACE DEBRIS EXPECTED TPH	> 500 mg/kg

3SB01	10/17/2002
NO SURFACE DEBRIS OR STAINED SOIL EXPECTED TPH	> 500 mg/kg

3SB02	10/17/2002
NO SURFACE DEBRIS OR STAINED SOIL EXPECTED TPH	< 500 mg/kg

- LEGEND:**
- ⊕ MONITORING WELL LOCATION
 - ⊕ TEMPORARY WELL LOCATION
 - SOIL BORING LOCATION
 - 3SB01 SOIL BORING LOCATION
 - mg/kg MILLIGRAMS PER KILOGRAM
 - 30— TOPOGRAPHIC CONTOUR
 - STREAM
 - s-s- STORM SEWER
 - x-o-x UTILITY POLE
 - A-A' CROSS SECTION LOCATION
 - APPROXIMATE LOCATION OF SURFACE DEBRIS

NOTE:
 1. REPORTED CONCENTRATIONS ARE ASSUMED. 500 mg/kg REPRESENTS THE CONNECTICUT REMEDIATION STANDARD REGULATION FOR RESIDENTIAL EXPOSURE.



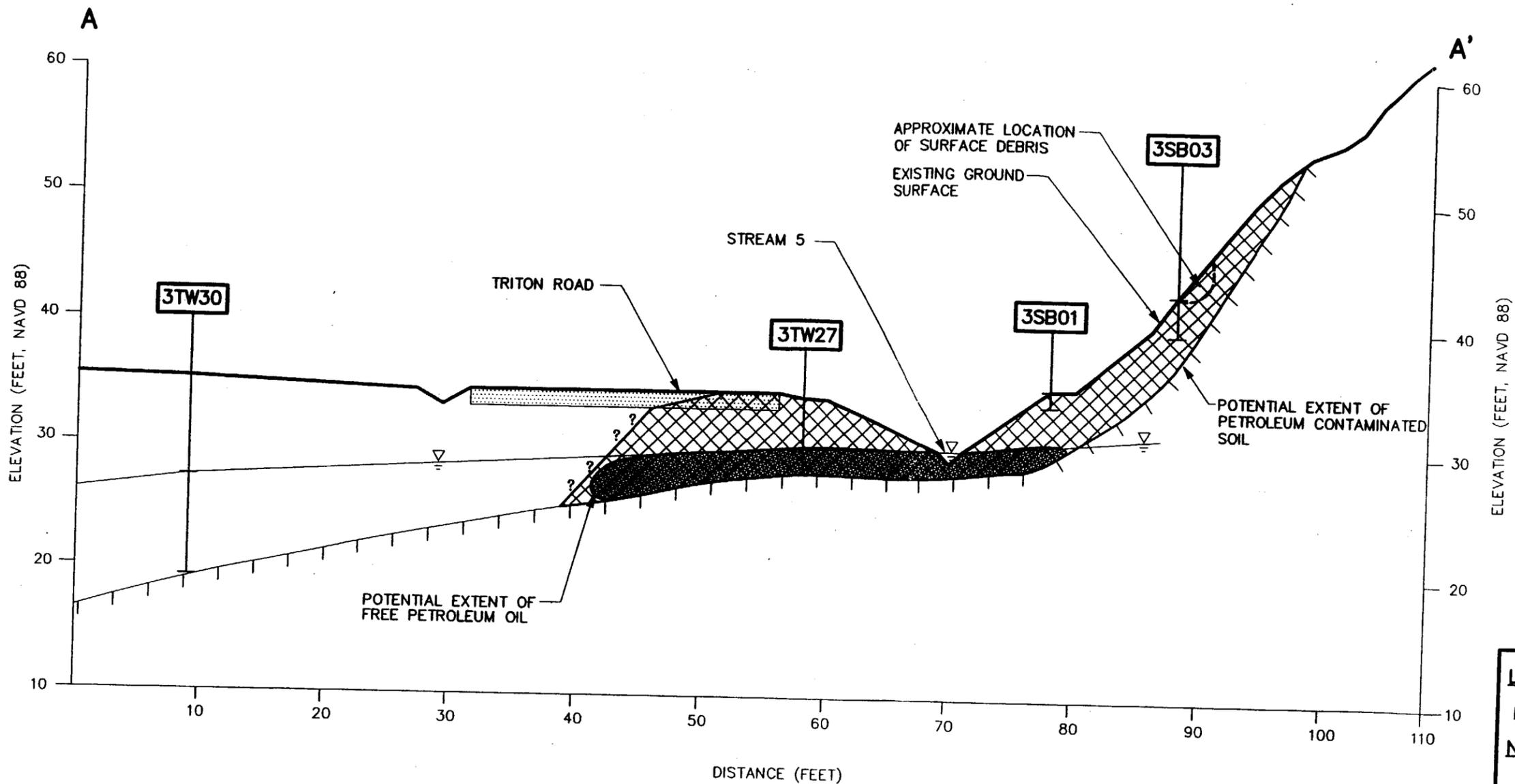
NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

DRAWN BY	DATE
DM	12/11/03
CHECKED BY	DATE
COST/SCHED-AREA	
SCALE	
AS NOTED	

Tetra Tech NUS, Inc.

ESTIMATED EXTENT OF SOIL CONTAMINATION
 SITE 3 - NEW SOURCE AREA
 NSB-NLON
 GROTON, CONNECTICUT

CONTRACT NO. 4286	OWNER NO. 0841
APPROVED BY CAR	DATE 12/12/03
APPROVED BY	DATE
DRAWING NO. FIGURE B-3	REV. 0



LEGEND:
 BEDROCK

NOTE:
 LITHOLOGIC, GROUNDWATER AND SURFACE INFORMATION FOR TEMPORARY WELLS 3TW30 AND 3TW27 ARE PROJECTED ONTO CROSS-SECTION

0 10 20
 SCALE IN FEET

NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

DRAWN BY: DM
 DATE: 12/11/03
 CHECKED BY: _____
 DATE: _____
 COST/SCHED-AREA: _____
 SCALE: AS NOTED

Tetra Tech NUS, Inc.
 ESTIMATED EXTENT OF PETROLEUM CONTAMINATED SOIL
 SITE 3 - NEW SOURCE AREA
 NSB-NLON
 GROTON, CONNECTICUT

CONTRACT NO. 4286	OWNER NO. 0841
APPROVED BY CAR	DATE 12/12/03
APPROVED BY	DATE
DRAWING NO. FIGURE B-4	REV. 0

**B-2 STATE OF CONNECTICUT
CONCURRENCE LETTER**



STATE OF CONNECTICUT
DEPARTMENT OF ENVIRONMENTAL PROTECTION

79 ELM STREET HARTFORD, CONNECTICUT 06106

PHONE: (860) 424-3001



Arthur J. Rocque, Jr.
Commissioner

September 30, 2004

Susan Studlien, Director
U.S. Environmental Protection Agency
Office of Site Remediation and Restoration
1 Congress St.
Suite 1100 (HIO)
Boston, MA 02114-2023

Sean P. Sullivan, Jr.
Captain, USN
Commanding Officer
Naval Submarine Base New London
Box 00
Groton, CT 06349

Re: State Concurrence with Remedy for Soil - Site 3 New Source Area- Naval Submarine
Base New London, Groton, Connecticut

Dear Captain Sullivan and Ms. Studlien:

The Connecticut Department of Environmental Protection (CTDEP) concurs with the remedy selected by the EPA and the Navy for soil at the Site 3 New Source Area at the Naval Submarine Base New London, Groton, Connecticut.

Approximately 385 cubic yards of petroleum- contaminated soil are present at the site. The Navy and EPA determined that this soil does not present an actionable risk under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). However, the petroleum concentrations exceed the direct exposure and pollutant mobility criteria specified in the State's Remediation Standard Regulations (Regulations of Connecticut State Agencies, Sections 22a-133k-1 to k-3). Therefore, the Navy will excavate the contaminated soil and dispose of it off site or recycle it at a licensed facility.

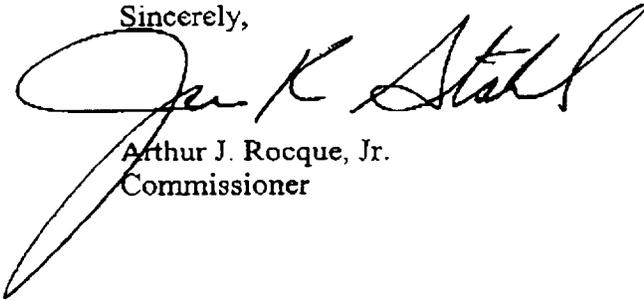
The remedy is described in detail in the proposed plan dated July 2004, and in the draft Record of Decision dated September 2004.

The Navy will address ground water at these sites under a separate remedy. CTDEP expects that the groundwater remedy will comply with all state regulatory requirements.

State Concurrence- Site 3 New Source Area
Page 2 of 2

Thank you for your cooperation on this project. We look forward to working with the Navy and the US Environmental Protection Agency toward continued remediation at the Naval Submarine Base.

Sincerely,



Arthur J. Rocque, Jr.
Commissioner

AJR:MRL

C: Mr. Mark Evans, Remedial Project Manager
Naval Facilities Engineering Command
Engineering Field Activity Northeast
10 Industrial Highway
Mail Stop 82, Code 1823/ME
Lester, PA 19113-2090

Ms. Kymberlee Keckler, Remedial Project Manager
US Environmental Protection Agency- Region 1
1 Congress St.
Suite 1100 (HBT)
Boston, MA 02114-2023