NAVAL SUBMARINE BASE
NEW LONDON

Naval Submarine Base – New London, Groton, CT
"The First and Finest"

INTRODUCTION

The Naval Submarine Base New London (SUBASENLON) mission is to provide the facilities, deliver the services, and create the environment for the Fleet, Fighter, and Family to: homeport and put combat-ready submarines to sea and train professional submariners. It supports submarine training, repair and maintenance, and medical facilities, military offices, and 350+ acres of housing in Groton, CT and recreation at the Admiral Fife Naval Recreation Area in Stonington, CT for Navy personnel and their families.

SUBASENLON was designated as a Navy Yard after the State of CT donated 112 acres to the Navy in 1868. The site started as moorage for inactive ships and a coaling station for the Atlantic fleet. The Navy designated the site the Nation's first Submarine Base in 1916. During World War I, the base expanded extensively adding six piers and 81 buildings. In 1916, a Submarine School (SUBSCOL) was established and in 1918 the Submarine Medical Center was founded. During World War II, SUBASENLON expanded and built in excess of 180 buildings and acquired adjacent land. The Medical Research Laboratory started in 1946 and in 1968 the SUBSCOL changed from an activity to a command and became the largest tenant on the base.

Today, SUBASENLON is home to more than 70 tenant commands and activities including the Submarine Learning Center; SUBSCOL; Naval Submarine Medical Research Laboratory; Naval Undersea Medical Institute; and Naval Branch Health Clinic Groton. SUBASENLON employs 6,500 active duty sailors, 2,000+ civilian employees and contractors, and supports some 12,000 family members who contribute so much to Navy Team NLON, the Navy, and this Nation through daily sacrifice and service.

SUBASENLON, located in the towns of Groton and Ledyard, CT, consists of 687 acres with more than 200 buildings, 15 nuclear submarines, and 11 piers, and is situated on the east bank of the Thames River, approximately 6 miles north of the Long Island Sound. It is bordered on the east and south by roads, on the west by the Thames River, and on the north by a low ridge from the Thames River to Baldwin Hill. The Providence-Worchester Railroad bisects SUBASENLON and infrastructure west of the railroad is referred to as "Lower Base" and infrastructure east of the railroad is referred to as "Upper Base". Land use adjacent to the base is residential and commercial. The Thames River is used for commercial maritime, recreation and fishing.

RESTORATION BACKGROUND

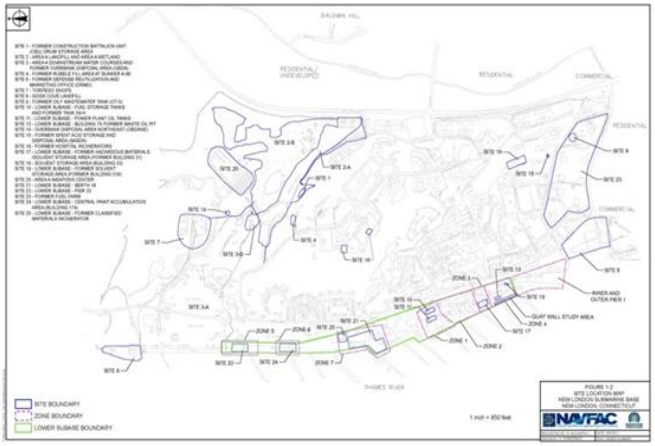
Program Summary

Primary operations that historically affected environmental conditions at SUBASENLON include: ship, submarine, vehicle, and locomotive maintenance activities and associated waste disposal practices, battery maintenance and overhaul activities, petroleum product leaks from Underground Storage Tanks and fuel distribution lines, landfilling, disposal of ash and dredge material, and application of pesticides.

The first environmental investigation of oil contaminated groundwater was conducted in 1979. In 1983, an Initial Assessment Study (IAS) was completed. This basewide investigation identified several potential disposal areas on SUBASENLON. Results of the IAS lead to the placement of SUBASENLON on the National Priorities List (NPL) on August 30, 1990.

In 1995, a Federal Facility Agreement (FFA) was signed with EPA and has served as a roadmap for the complex and active restoration program at

SUBASENLON. The IAS and subsequent investigations identified 24 sites which were evaluated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Eleven Record of Decisions (RODs) were issued between 1995 and 2012. Certain RODs were issued for Operable Units (OUs) because of site location or media (soil, sediment, and groundwater). The final ROD for the lower base OU4 area was issued in August 2012 and Remedial Designs (RD), Remedial Action Work Plans (RAWPs) and remediation actions have begun for remaining soil and sediment sites.



Program Management and the Team

Program management for the Navy Environmental Restoration Program (NERP) at SUBASENLON is conducted through an Integrated Project Team (IPT) within NAVFAC, Mid-Atlantic (MIDLANT). The MIDLANT Remedial Project Manager (RPM) is supported by technical, acquisition, and legal professionals across the NAVFAV MIDLANT organizations. MIDLANT and SUBASENLON personnel work together with several consulting engineering and remediation contractors (Resolution Consultants (RC), AGVIQ, CBI, and H&S Environmental [8A contractor]) and the regulatory community (EPA, CTDEEP, USFWS, NOAA and other agencies).

A central program management office (PMO) was established by RC who provides overall basewide management and engineering support. The basewide support function is cost-effective because of systems in place to facilitate communication and coordination between different contractors and regulatory agencies, and schedule and prioritize site activities.

The goal of the NERP is to implement site-specific and effective remedial actions (RAs) to protect human health and the environment. The IPT has monthly calls or meetings without third-party facilitation where each stakeholder updates the status of work, deadlines for submittals, and provides immediate responses to questions or issues that arise. The calls/meetings are effective at discussing technical and logistical issues, continuing respectful relationships with regulatory agencies, updating project progress, and creating an environment where priorities are maintained.

The Naval Installation Restoration Information Solution repository is faithfully used to foster knowledge transfer and technical reviews between the Navy and contractors. The SUBASENLON Land Use Control (LUC) Tracker internet based database is used by Navy and contractor staff to manage requirements of the numerous LUCs on SUBASENLON. These communication and coordination tools allow for easy transfer of site data, design information, construction progress, reports, regulatory and SUBASENLON requirements and result in:

- attainment of project technical and regulatory objectives;
- fewer mistakes and rework;
- expedited schedules; and
- reduced costs for the Navy.

The IPT effectively employs the CERCLA process to reduce risks to human health and the environment while minimizing impacts to mission readiness and civil works missions. The IPT is on schedule to achieve the goal of attaining remedies in place for all sites in FY 15 with construction complete in FY 16. Over the past two FYs, the IPT has made exceptional progress, including the completion of the following listed in Table 1.

Table 1

Action Document	Number Completed During Achievement Period
Land Use Control Remedial Design	2
Remedial Action Design	2
Remedial Action Work Plan	1
Remedial Action Completion Report	2
Monitoring and Inspection Report	2
Sampling and Analysis Plan	2
Site Management Plan	1
Site Assessment Screening Evaluation	1
Construction Completion Report	1
New Operation and Maintenance Manual Volumes VI, VII, and VIII and Volumes I and II Updates	5

Long Term Management

LUCs (i.e., administrative and engineering controls that limit exposure of human and ecological receptors to contaminants) for soil, groundwater and/or sediment have been implemented at 6 sites. LUC RDs are being finalized for 7 sites within the OU4 area. LUCs are used at sites where contaminants are left in place at levels that do not allow for unlimited use or unrestricted exposure. LUCs reduce the cost and time to complete RAs, while ensuring that remaining contaminants do not pose an unacceptable risk to human health or the environment. LUC Tracker is used by navy personnel to manage the inspection status and follow up items required as part of the LUCs.

As part of the 1995 FFA, a Site Management Plan (SMP) was developed. The SMP is updated annually, and is a management tool for planning, reviewing, and setting priorities for environmental investigative and remedial response activities.

An Operation, Maintenance, and Monitoring (OM&M) plan, initially prepared in 2006, and updated regularly as additional OUs are transitioned from restoration into the OM&M phase, provides long-term guidance and instruction for OM&M activities. The OM&M includes 6 sites (plus Site 23 groundwater) where long-term monitoring and maintenance are required. OM&M activities include inspections of LUCs, monitoring well networks, physical site monitoring, system sampling and monitoring, and routine repair and maintenance actions.

As part of long term management efforts at SUBASENLON, the SUBASENLON NERP Manager conducts quarterly inspections of three CERCLA landfill caps independent of required annual inspections. This effort:

- identifies any deficiencies early;
- facilitates getting certain deficiencies corrected immediately;
- allows monitoring the type and extent of deficiency; and
- facilitates planning, budgeting, and scheduling for contractor based annual inspection and deficiency correction actions.

Site Close-Out Status

Working as a team, the NAVFAC Mid-Atlantic RPM, SUBASENLON PWD Environmental Division, and SUBASENLON PWD Facilities Engineering and Acquisition Division (FEAD) have managed, overseen, and carried out required projects to restore the base property and achieve regulatory closure. Out of the 24 sites investigated under CERCLA, 13 sites have achieved Site Close-Out where No Further Action (NFA) is required and 6 sites have LUCs and OM&M activities. The OU4 area includes 6 sites which have RDs or LUC RDs currently under development. Based upon a review of data for Site 23 (soil – Former Fuel Farm), additional sampling will be completed in 2014. It is anticipated that the results will determine that Site 23 will require NFA.

With the planned completion of remedial actions within the OU4 area in 2014/2015, the NSB-NLON team is expecting to begin the NPL delisting process in 2015.

Community Involvement

The NERP at SUBASENLON has a long history of community involvement, beginning with the establishment of a Technical Review Committee (TRC) in 1988. The TRC was composed of Navy representatives, their respective support

contractors, CTDEEP, EPA, and other local officials and technical experts from the community. The TRC met on a quarterly basis and discussed issues associated with the SUBASENLON NERP.

In the fall of 1993, the TRC converted to a Restoration Advisory Board (RAB) to encourage more public involvement in the Program. A Community Relations Plan was developed in 1994 and was most recently updated as a Community Involvement Plan (CIP) in 2011. RAB meetings were held quarterly, from fall 1993 to November 2001. Beginning in the spring of 2002, RAB meeting frequency was reduced to an average of two meetings per year because of a decline in public attendance.

In the spring of 2009, the SUBASENLON Public Works Department (PWD) Environmental Division began preparing a quarterly newsletter to inform interested community members about the NERP progress and activities.

Public meetings are held annually to present proposed cleanup actions to the community.

SUMMARY OF ACCOMPLISHMENTS

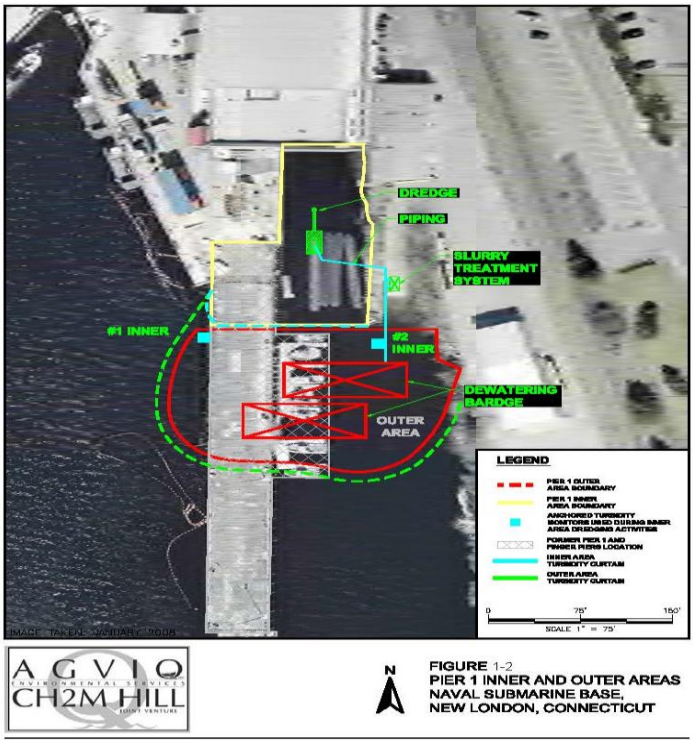
Pier 1 Inner Area Sediment Removal Action

Former Pier 1 is located on the southwest corner of NSB-NLON on the Thames River. A marine railway was located at Pier 1 and was used to pull boats and submarines out of the water for sandblasting, paint scraping, and maintenance from 1940-1960.

The Pier 1 Removal Action Area includes the Inner and Outer Area. Sediments contained elevated concentrations of polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), and metals. A feasibility study determined the nature and extent of contamination and potential risk to receptors.

In 2009/2010 The Navy completed a non-time critical removal action in the Action Area sediments because of potential risk to ecological receptors from exposure to contaminated sediment. The removal action objective (RAO) stated in an Action Memorandum was to minimize the potential migration of, and mitigate the risk to ecological receptors posed by chemicals of concern (COCs) in sediment. To meet the RAO, the remedy removed 11,300 tons of sediment with a clamshell and long-stick hydraulic excavator to bedrock in the Action Area to remove sediment with COC concentrations greater than preliminary remedial goals.

A post-removal visual inspection of the Pier 1 Inner Area floor by Navy divers indicated portions of Inner Area still had sediment depths greater than



4 inches. It was estimated that approximately 346 cubic yards (CY) of sediment remained in the Inner Area. Based on the inspection and sample results, a Phase 2 removal action was completed to meet the objective of removing all residual Pier 1 Inner Area sediment to bedrock to the maximum extent practicable.

Phase 2 was completed between September 2012 and February 2013. The removal action consisted of hydraulic and diver assisted dredging, dewatering, stabilization, offsite transportation and disposal of approximately 376 CY of residual contaminated sediment. Sub-bottom and bathymetry surveys and direct measurements confirmed the objective has been met. A Construction Completion Report was prepared and approved by the EPA in FY 2014.

OU4 - Zone 4 Remedies

Zone 4 includes Site 13 – Building 79 Waste Oil Pit and Site 19 – Former Solvent Storage Area (Building 316). Zone 4 is covered entirely with asphalt pavement, concrete, and buildings and the ground surface slopes gently toward the Thames River. Fuel oil distribution lines formerly ran throughout Zone 4; however, they have since been abandoned. A wooden pier and quay wall constructed in the 1940's underlies the paved marginal wharf in the western part of Zone 4.

Zone 4 Soils

The ROD reported that PAHs were detected in soil at concentrations that exceed CT Residential Direct Exposure Criteria (RES DEC) and lead in soil at concentrations that exceed CT RES DEC and Industrial/Commercial (I/C) Target Action Levels. The cost-effective RAO is excavation to meet I/C Remedial Goals (RGs), LUCs, including CERCLA risk-based engineering controls, institutional controls and inspections, and long-term monitoring. In addition, total petroleum hydrocarbons commingled with CERCLA contaminants in a portion of Site 13 were collaterally addressed in the remedy for the CERCLA contaminants resulting in cost saving by removing state regulated waste as part of the CERCLA clean -up. Construction started in spring 2014. Excavation, soil removal, backfilling, and compaction were completed in FY 14 in three excavation areas. Area 1 (parking) was returned to SUBASENLON in September 2014. Final asphalt cover will be completed in Areas 2 and 3 in December 2014.

Significant volumes of asphalt and concrete were recycled for use off site. Side wall samples indicate the majority of the highest concentrations of COCs were removed. Significant constraints for this work included having to work within the main travel corridor on lower base to access the piers and submarines, and the presence of known and unanticipated utilities that required careful excavation (i.e., hand shovels) in the excavation areas. The success of completing this RA is because of the close coordination between the FEAD, PWD Environmental Division, Port Operations and the contractor to effectively phase the work in a way that returns one excavated area to SUBASENLON before completing the RA in another excavation area to avoid and minimize risks to mission readiness and civil works missions. The draft Final LUC RD was issued in February 2013 and approved by the EPA.

Zone 4 – Thames River Sediment

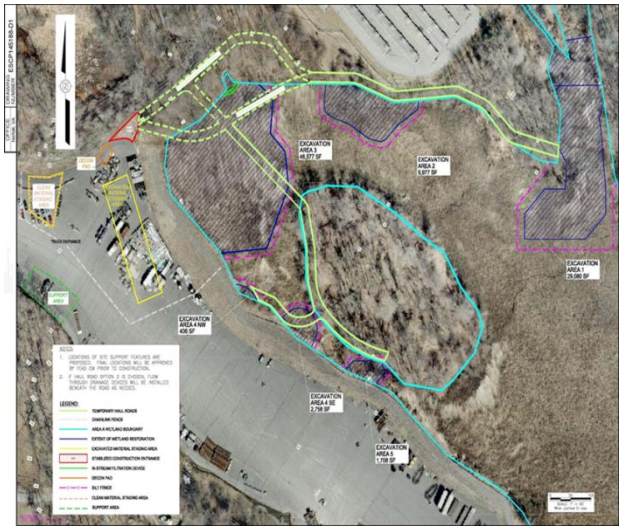
The ROD identified unacceptable ecological risks to benthic invertebrates and piscivorous birds from exposure to metals, PAHs, pesticides, and PCBs in sediment. The remedy identified in the ROD is dredging to meet RGs in the majority of Zone 4, LUCs, including institutional controls and inspections in Zone 4 and Outer Pier 1, long-term monitoring in Zone 4 and Outer Pier 1, and five-year reviews for Zone 4 and Outer Pier 1. The LUC

components include prohibiting disturbance of sediment over the 1,930 square feet (SF) area in Outer Pier 1, uncontrolled disturbance adjacent to the quay wall and existing Pier 2 and yearly inspections. The Draft Final RD for sediment was approved in FY 2014. The RAWP will be submitted to EPA and CTDEEP for approval December 2014 and dredging is expected to begin in spring 2015. To facilitate the approval of the RD regular coordination with EPA and CTDEEP and between the contractors resulted in resolving technical issues during finalization of the RD so that the RAWP will be consistent with the RD minimizing the extent of comments on the RAWP. In addition, the Navy and EPA agreed to consolidate review times (i.e., 30 days versus 60 days) to facilitate approving the RAWP and beginning the work in spring 2015.

The Draft LUC RDs were issued November 2012. Draft Final LUC RDs were issued in February 2013 and approved by EPA in February 2013.

Wetland Restoration Area

The Area A Wetland – Site 2B, consists of 19.3 acres of remediated and enhanced wetland that was created from placement of approximately 1.2 million CY of dredged sediment from the Thames River in the 1950's and was subject to heavy pesticide application and runoff from chemicals and chemical wastes from the adjacent buildings and a landfill. Remediation began in December 2012 to meet RG's and included excavation to remove COCs affecting ecological receptors and enhancement of wetland functions, biodiversity and managing invasive species.



The project excavated 6,800 CY of CERCLA-regulated sediments that were transferred to a contained staging area for dewatering with the use of a drying agent. The dried soil was loaded for transport to an off-site disposal facility and clean fill material was imported for backfilling and grading to pre-existing conditions.

The enhancement phase was implemented according to a Wetland Restoration Plan (WRP), which was completed and expeditiously approved (within three weeks of submission to the regulatory agencies) while remediation was ongoing to keep the project on schedule and within budget. The WRP provided enhancement measures to restore and improve wetland functions including habitat that may be affected from excavation efforts. Enhancement included construction of 8 topographical reliefs to support approximately 36,400 SF of native tree and shrub woody areas and 4 stream channels. 508 trees and shrubs were planted in the 8 relief areas and hydro-seeding of emergent species occurred throughout the enhancement area. The addition of the woody areas and stream channels provides edge habitat and functional attributes for an ecological lift. The improvements have met the WRP objectives for percent cover in planted areas, there is an increase in the number and diversity of wildlife use throughout the wetland, and are maintained

according to the ongoing invasive species control program.

The success of the program was featured in the Navy Currents magazine in summer 2013 and appeared in the SUBASENLON Dolphin, can be accessed via http://www.dolphin-news.com/articles/2013/01/17/news/doc50f6ded271073279786567.txt?viewmode=default. The article outlines the overall favorable review of the project, keeping in line with the ultimate goal of delisting NSB-NLON from the NPL in 2015.

2013

2014

Sites 9 and 23

Site Assessment Screening Evaluations (SASEs) were conducted for Site 9 (Former OT-5 UST) and Site 23 (Former Tank Farm). The SASEs re-evaluated historic soil analytical data against EPA Regional Screening Levels to determine the site's status as a CERCLA-regulated site.

Site 9 and Site 23 was the location of Crystal Lake, which was filled in the early 1940s. The Tank Farm was constructed during World War II to store fuel oil. In the 1970s, the 750,000-gallon capacity UST was converted to a storage tank for bilge water and other waste solutions. OT-5 was in use until 1989 and was drained and found to contain waste oil sludge with PCBs. Following the PCB waste sludge removal, OT-5 was decontaminated, demolished and abandoned in place. Clean borrow material was transported to the site to establish the current grade.

Based on the evaluation, the nature and extent of soil impacts had been reasonably characterized in Site 9, compounds that were detected were found to not exceed EPA risk criteria, a recommendation was made of NFA under CERCLA. EPA has accepted the conclusions for Site 9.

Limited additional investigation is expected to be performed at Site 23 in December 2014. The results will be incorporated into the SASE, with the goal of concluding that Site 23 will require NFA. The area of Site 9 and 23 was redeveloped in 2012 into an athletic field and track.

Site Delisting

Working as a team, the NAVFAC Mid-Atlantic RPM, NSB-NLON PWD Environmental Division, and SUBASENLON PWD FEAD have managed, overseen, and carried out the projects required to restore the base property, achieve regulatory closure and avoid risks to mission readiness.

With the planned completion of remedial actions within the OU4 area in 2014, the NSB-NLON team is expecting to begin the NPL delisting process in 2015.