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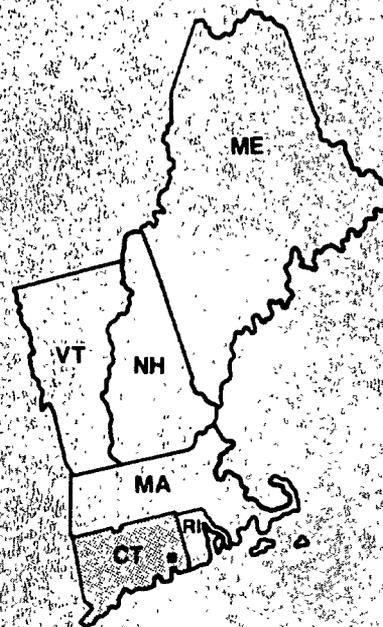
Environmental Monitoring
Systems Laboratory
P.O. Box 93478
Las Vegas NV 89193-3478

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Research and Development

EPA **Site Analysis**
New London Submarine Base
Groton, Connecticut

EPA Region 1
and OERR



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Site Analysis
New London Submarine Base
Groton, Connecticut

by
Dean Anderson, Imagery Analyst
The Bionetics Corporation
Warrenton, Virginia 22186

Contract No. 68-03-3532

Technical Monitor
Thomas R. Osberg
Environmental Photographic Interpretation Center
Environmental Monitoring Systems Laboratory
Warrenton, Virginia 22186, FTS 737-7508

ENVIRONMENTAL MONITORING SYSTEMS LABORATORY
OFFICE OF RESEARCH AND DEVELOPMENT
U.S. ENVIRONMENTAL PROTECTION AGENCY
LAS VEGAS, NEVADA 89193-3478

NOTICE

This document has undergone a technical and quality control/assurance review and approval by personnel of the EPA/ORD Environmental Monitoring Systems Laboratory at Las Vegas (EMSL-LV), and is for internal Agency use and distribution only.

ABSTRACT

This report presents an analysis of aerial photography of the New London Submarine Base, located in Groton, Connecticut. The installation was analyzed to assist the Environmental Protection Agency (EPA)'s Region 1 in its assessment of twelve known sites that have been identified as potential sources of contamination, and to identify any additional potential sources of contamination.

Collateral information supplied by EPA Region 1 states that the Navy Department designated the installation a Submarine Base in 1916. An Installation Restoration (IR) Study dated August 1991 identified eleven hazardous waste disposal sites on the installation. Additionally, collateral information states that significant environmental activity may have occurred at North Lake.

Findings include numerous fill areas, staining, refuse, debris, liquid discharges, extractions, and light- and dark-toned material.

The EPA's Environmental Photographic Interpretation Center in Warrenton, Virginia, a branch of the Advanced Monitoring Systems Division of the Environmental Monitoring Systems Laboratory in Las Vegas, Nevada, performed this analysis at the request of the Superfund Support Section of EPA Region 1 in Boston, Massachusetts, and the Office of Emergency and Remedial Response in Washington, D.C. This analysis covers the period between 1941 and 1991, and the report was completed in March 1992.

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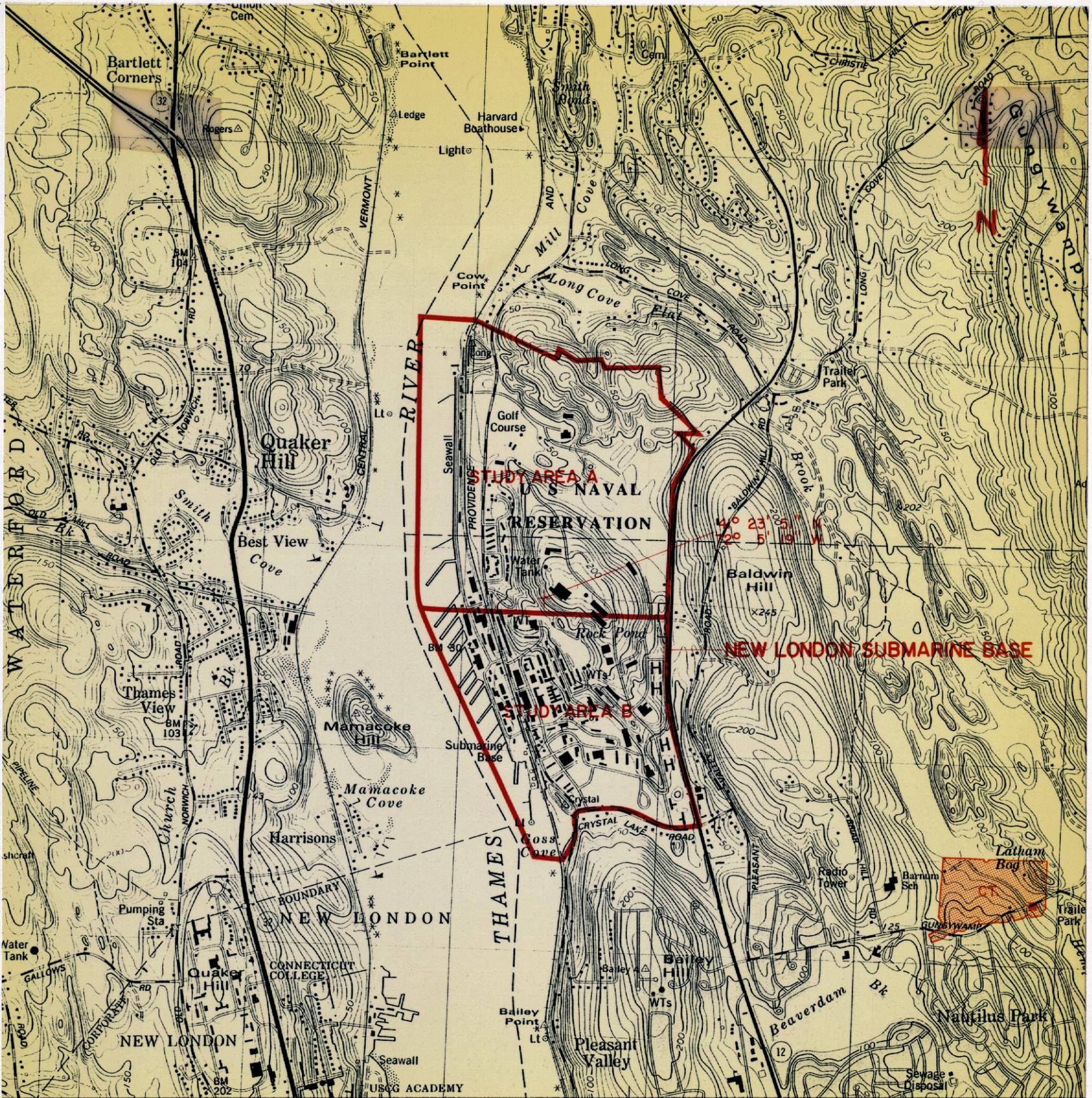


FIGURE I
NEW LONDON SUBMARINE BASE

LOCATION MAP
UNCASVILLE, CT. QUAD

APPROX. SCALE 1:24,000

INTRODUCTION

An analysis of aerial photography was performed on the New London Submarine Base, located in Groton, Connecticut. According to collateral information, the site comprises 221 hectares (547 acres).

The U.S. Environmental Protection Agency (EPA)'s Region 1 requested this analysis to aid in its assessment of eleven known sites and to document past activities and disposal practices at North Lake and throughout the installation.

Figure 1 shows the site location, keyed to a photocopy of a U.S. Geological Survey (USGS) 1:24,000-scale topographic map. Site boundaries or areas used in this analysis were determined from observations made from the aerial photography in conjunction with collateral data supplied by EPA Region 1 and do not necessarily denote legal property lines or ownership.

Aerial photography of New London Submarine Base was obtained to represent the 50-year period from 1941 to 1991.¹ Black-and-white photography from 1941, 1943, 1951, 1952, 1957, 1963, 1969, 1970, 1974, 1981, and 1986; and color photography from 1985 and 1991 were used for this analysis. Photography from 1941, 1951, 1970, 1981 and 1985 was analyzed but not reproduced for this report due to the poor resolution of the photography and/or the lack of significant features, activities, and/or change. Any significant changes noted in those years will be annotated and discussed with the following year of photography reproduced in this report.

Collateral information supplied by EPA Region 1 states that in 1868, 45 hectares (112 acres) of land on the east bank of the Thames River were officially designated a Navy Yard. Little information is known about the site prior to 1916. In 1916, the Navy Department designated the installation a Submarine Base. During World Wars I and II, facilities at the base were expanded extensively. Growth at the base continued after World War II,

¹A complete listing of maps and photography used in this report is provided in the References section.

and currently over 300 buildings occupy 221 hectares (547 acres) of base property. An Installation Restoration (IR) Study dated August 1991 identified eleven past hazardous waste disposal sites on the installation. These sites are listed as the Construction Battalion Unit (CBU) Drum Storage Area, Rubble Fill at Bunker A-86, Torpedo Shops, Goss Cove Landfill, Over Bank Disposal Area Northeast (OBDANE), Spent Acid Storage and Disposal Area, Former Gasoline Station, Area A, Over Bank Disposal Area, Defense Reutilization and Marketing Office (DRMO), and the Lower Subbase. Area A is composed of the Area A Landfill and the Area A Wetland. These twelve sites will be referred to as the IR Sites throughout the remainder of this analysis. Additionally, collateral information states that significant environmental activity may have occurred at North Lake, which is actively used by Navy personnel for recreation.

Significant activity was noted at nine of the IR Sites during this analysis. Most activity occurred at the Defense Reutilization and Marketing Office (DRMO), Area A, and Goss Cove Landfill. Extensive filling and waste disposal activity was evident at all three sites. The most significant onsite activity noted during this analysis occurred during the 1950's, 60's, and early 70's. No significant activity was noted at the Rubble Fill at Bunker A-86, the Former Gasoline Station, and North Lake throughout this analysis.

The EPA's Environmental Photographic Interpretation Center in Warrenton, Virginia, a branch of the Advanced Monitoring Systems Division of the Environmental Monitoring Systems Laboratory in Las Vegas, Nevada, performed this analysis at the request of the Superfund Support Section of EPA Region 1 in Boston, Massachusetts, and the Office of Emergency and Remedial Response in Washington, D.C. This analysis covers the period from 1941 to 1991, and the report was completed in March 1992.

METHODOLOGY

A search of government and commercial sources was undertaken to obtain the best available aerial photography of the site spanning the desired time frame. The photography and other sources of information used in this report are listed in the References section.

The analysis was performed by viewing backlit transparencies of aerial photography through stereoscopes. Stereoscopic viewing creates a perceived three-dimensional effect which, when combined with viewing at various magnifications, enables the analyst to identify signatures associated with different features and environmental conditions. The term "signature" refers to a combination of visible characteristics (such as color, tone, shadow, texture, size, shape, pattern, and association) which permit a specific object or condition to be recognized on aerial photography.

The terms "possible" and "probable" are used to indicate the degree of certainty of signature identification. "Possible" is used when only a few characteristics are discernible or these characteristics are not unique to a signature. "Probable" is used when incrementally more characteristics are discernible. No qualifying terms are used when the characteristics of a signature allow for a definite feature identification.

Photographic prints were made from those years of aerial photographic coverage that reveal significant information about the site. The analyst's findings are annotated on overlays to prints and/or base maps and described in the accompanying text. Site boundaries or areas used in this analysis were determined from observations made from the aerial photography in conjunction with collateral data supplied by EPA Region 1 and do not necessarily denote legal property lines or ownership.

Due to factors inherent in the photographic printing process, prints do not exhibit the level of detail that is visible in the original aerial photography. Therefore, some features identified from the aerial photography may not be clearly discernible, or even visible, on the photographic prints presented in this report.

PREFACE TO THE NEW LONDON SUBMARINE BASE ANALYSIS

For the purpose of this analysis, the installation has been divided into two study areas. Study Area A encompasses the northern portion of the installation and Study Area B the southern portion.

An attempt was made in this analysis to locate and track the 11 IR Sites identified by collateral information, as well as to identify additional environmentally significant features and activities at North Lake and throughout the installation. The boundaries of the 11 IR Sites were determined from collateral information and observations made from the aerial photography.

Throughout this analysis, the IR Sites located within a study area are introduced and summarized prior to the discussion of each year of analysis. After that time they will be annotated and discussed only in those years when they appear active. No significant activity is noted at North Lake throughout this analysis. It is discussed only in the 1943 text but is annotated throughout this analysis.

Open storage areas, visible throughout this analysis, generally contain various types of raw materials which are probably used for submarine repair and operations. However, other types of materials including debris, scrap, and solid waste/refuse may also be present within open storage areas. Open storage areas are annotated and discussed only if associated with potential environmentally significant features such as tanks, drums, stains, debris, refuse, or material.

Vertical tanks, horizontal tanks (HT), and water towers annotated throughout this analysis will not be discussed unless they are associated with stains and/or spills.

Railroad tracks, fences, and smokestacks (SS) are annotated, but not discussed, on the year of photography nearest the year in which the feature is initially sighted. One of the annotated smokestacks may be part of an onsite incinerator which, according to collateral information, ceased operations in 1963. Buildings and access roads are not annotated unless they appear to be environmentally significant.

SUMMARY CHART OF IR SITES

Study Area A

	10/8/41	10/9/41	43	51	52	57	63	69	70	74	81	85	86	91
Defense Reutilization and Marketing Office (DRMO)	A	A	A	O	O	A	A	A	A	A	A	A	A	A
North Lake	I	I	A	A	A	A	A	A	A	A	A	A	A	A
Torpedo Shops	N	N	N	N	N	A	A	A	A	A	A	A	A	A
Over Bank Disposal Area (OBDA)	N	N	N	N	N	N	A	A	A	A	I	I	I	I
Rubble Fill at Bunker A-86	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Area A	N	N	N	N	N	N	A	A	A	A	A	A	A	A
Construction Battalion Unit (CBU) Drum Storage Area	N	N	N	N	N	N	N	A	A	A	A	A	A	A
Over Bank Disposal Area Northeast (OBDANE)	N	N	N	N	N	N	N	A	A	A	I	I	I	I

Study Area B

	10/8/41	10/9/41	43	51	52	57	63	69	70	74	81	85	86	91
Lower Subase	A	A	A	O	O	A	A	A	A	A	A	A	A	A
Former Gasoline Station	A	A	A	A	A	A	N	N	N	N	N	N	N	N
Spent Acid Storage and Disposal Area	I	I	A	O	A	I	I	I	I	I	I	I	I	A
Goss Cove Landfill	N	N	A	A	A	A	A	A	A	A	I	I	I	I

A - Active (indicating some change or is in use)
 I - Inactive
 N - Feature not Present
 O - Feature not Visible on Available Photography

AERIAL PHOTO SITE ANALYSIS

STUDY AREA A

According to collateral information, seven IR Sites and North Lake are found in Study Area A. The seven IR Sites are the Defense Reutilization and Marketing Office (DRMO), Torpedo Shops, Over Bank Disposal Area (OBDA), Rubble Fill at Bunker A-86, Area A, Construction Battalion Unit (CBU) Drum Storage Area, and Over Bank Disposal Area Northeast (OBDANE). The following collateral information was supplied for each IR Site and North Lake by EPA Region 1:

Defense Reutilization and Marketing Office (DRMO) - This site is currently used as a storage and collection facility for items to be sold at auctions and sales. From 1950 to 1969 it was used as a major base landfill and burning ground.

North Lake - Oil, battery acids, and construction materials may have been dumped in or near the lake in the 1950's and 60's.

Torpedo Shops - Fuels, solvents, and petroleum products may have been discharged into the septic systems until 1983.

Over Bank Disposal Area (OBDA) - This disposal area is located on the slope of the dike below and adjacent to the Area A Landfill. Disposal occurred at this site after the earthen dike was constructed in 1957. A 1982 Initial Assessment Study (IAS) reported that the materials were not covered and included 30 partially covered 200-gallon metal fuel tanks and scrap lumber.

Rubble Fill at Bunker A-86 - This area is situated on a wooded hillside that slopes down to the north-northeast. The 1982 IAS report identified discarded construction materials including concrete, asphalt, an electric motor, tar buckets, wood, and gravel. The report concluded that material had not been disposed at this site for more than ten years prior to 1982.

Area A - This area is made up of the Area A Landfill, Area A Wetlands, and the Area A Downstream Watercourses. The Area A Landfill comprises approximately 3 hectares (7 acres) and opened sometime before 1957. The base incinerator ceased operating in 1963, and from 1963 to 1973 all wastes generated by the submarines and base operations were disposed in the landfill,

unburned. Landfilling operations ceased in 1973. In 1991, the deployed personnel parking lot and open storage are visible on the Area A Landfill. The Area A Wetland abuts the north side of the landfill and comprises approximately 12 hectares (30 acres). In 1957, dredge spoils from the Thames River were pumped to this area and contained within an earthen dike that extends from the Area A Landfill to the south side of the Weapons Storage Area.

Construction Battalion Unit (CBU) Drum Storage Area - This unpaved area is adjacent to the Area A Landfill. The 1982 IAS report identified twenty-six 55-gallon drums of waste oil, lube oil, and paint materials at the site. Some of the drums were leaking.

Over Bank Disposal Area Northeast (OBDANE) - This area is located in a heavily wooded area on the edge of a ravine northwest of the Area A Landfill and south of the Torpedo Shops. The 1982 IAS report stated that the vegetation at the site indicated that no dumping had occurred within ten years of 1982. Several empty fiber drums were observed in this area in 1982 and 1988.

JUNE 19, 1943 (FIGURE 2)

DRMO

Since 1941, two areas within the DRMO have been filled (FA) with material. Two piles of multi-toned material (M) are also visible in the DRMO.

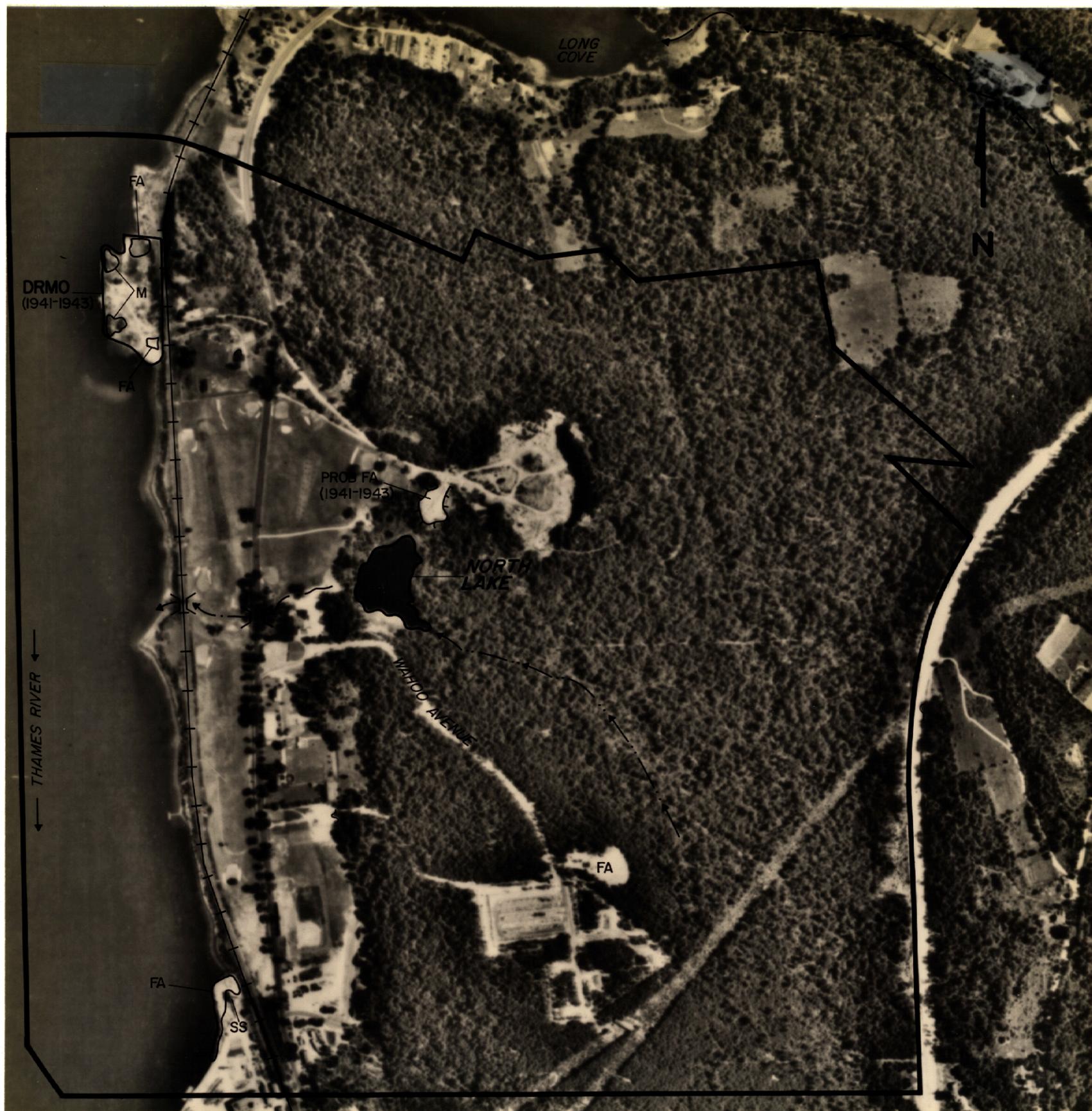
North Lake

In 1941, only a small pool of liquid was visible in the southwest corner of North Lake. Currently, the lake appears to be filled to near capacity. No significant activity is noted at North Lake throughout the remainder of this analysis. It will be annotated but is not discussed further.

Other Findings

A probable fill area, first evident in 1941, is located northeast of North Lake. This area is possibly being used to stockpile material excavated from the area directly to the east. Additional fill areas are found in the southwestern and south central portions of the study area. Filling has occurred along the Thames River in the southwest corner of the study area since 1941, and filling is evident in an area which appears to be a probable weapons storage facility under construction in the south central portion of the study area.

A drainage analysis was performed for this year, with any significant changes noted on subsequent years of photography. Drainage originating within the site flows west towards the Thames River.



LEGEND

- B - Building
- C - Containers
- CO - Cylindrical Object
- D - Drums
- DB - Debris
- DG - Disturbed Ground
- DK - Dark-Toned
- EXT - Extraction
- FA - Fill Area
- HT - Horizontal Tank
- LQ - Liquid
- LT - Light-Toned
- M - Material
- MM - Mounded Material
- NT - Medium-Toned
- OF - Outfall
- OS - Open Storage
- R - Refuse
- SS - Smokestack
- ST - Stain
- - - - - Access Road
- - - - - Berm
- - - - - Channelized Drainage
- - - - - Culvert
- - - - - Dike
- - - - - Direction of Flow
- - - - - Edge of Slope
- - - - - Feature Boundary
- - - - - Fence
- - - - - Historical Boundary
- - Horizontal Tank
- - - - - Natural Drainage
- - - - - Railroad
- - - - - Site Boundary
- - - - - Study Area Boundary
- - - - - Suspected Drainage
- - Vertical Tank
- - Water Tower

**FIGURE 2
NEW LONDON SUBMARINE BASE**

**STUDY AREA A
JUNE 19, 1943**

APPROX. SCALE 1:7,200

AUGUST 24, 1952 (FIGURE 3)

For security reasons, the west side of the study area along the Thames River was darkened on the original 1951 and 1952 photography; therefore, the DRMO and other areas along the river are not visible on Figure 3.

Other Findings

In 1951 and 1952, material is being extracted (EXT) from the probable fill area noted in 1943. Additionally, two pools of liquid (LQ) are evident in the area directly east of the extraction.

The probable weapons storage facility is now fenced. It will no longer be annotated or discussed unless significant environmental activity is associated with it.



LEGEND

- B - Building
- C - Containers
- CO - Cylindrical Object
- D - Drums
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- EXT - Extraction
- FA - Fill Area
- HT - Horizontal Tank
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- MM - Mounded Material
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- - Vertical Tank
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FIGURE 3
NEW LONDON SUBMARINE BASE

STUDY AREA A
AUGUST 24, 1952

APPROX. SCALE 1:6,900

APRIL 10, 1957 (FIGURE 4)

DRMO

Some additional filling (not annotated) has occurred in the DRMO. A pile of probable material and a possible pool of liquid are visible in the northwestern portion of the DRMO. Smoke (not annotated) emanates from the possible pool of liquid, suggesting that it may be on fire. A stained access road which appears to support vehicular traffic leads through the DRMO. A trail which leads to the probable material appears stained. An additional possible stain (ST) is noted in the southwest corner, and open storage is evident in the southwestern and eastern portions.

Torpedo Shops

Building 325 (B325) is located where pools of liquid were seen in 1951 and 1952. Probable liquid is evident near the west edge of B325.

Other Findings

The extraction remains northeast of North Lake, but appears inactive. Directly north of the study area, an access road leads past an area of disturbed ground (DG).



LEGEND

- B - Building
- C - Containers
- CO - Cylindrical Object
- D - Drums
- DB - Debris
- DG - Disturbed Ground
- DK - Dark-Toned
- EXT - Extraction
- FA - Fill Area
- HT - Horizontal Tank
- LQ - Liquid
- LT - Light-Toned
- M - Material
- HM - Mounded Material
- MT - Medium-Toned
- OF - Outfall
- OS - Open Storage
- R - Refuse
- SS - Smokestack
- ST - Stain
- - - - - Access Road
- ==== Berm
- ==== Channelized Drainage
-)(Culvert
- {} Dike
- Direction of Flow
- ==== Edge of Slope
- ==== Feature Boundary
- ==== Fence
- - - - - Historical Boundary
- Horizontal Tank
- ==== Natural Drainage
- ==== Railroad
- ==== Site Boundary
- ==== Study Area Boundary
- ==== Suspected Drainage
- Vertical Tank
- Water Tower

FIGURE 4
NEW LONDON SUBMARINE BASE

STUDY AREA A
APRIL 10, 1957

APPROX. SCALE 1:8,100

SEPTEMBER 2, 1963 (FIGURE 5)

DRMO

Additional filling has occurred along the Thames River within the DRMO since 1957. Piles of multi-toned refuse (R) are visible along the west edge of the DRMO, suggesting that it has been pushed out into the Thames River. Probable staining is apparent near the refuse and within the open storage (OS) area along the east side of the DRMO.

Torpedo Shops

Channelized drainage, originating at the bermed area south of the Torpedo Shops, now extends along the east side of B325 and then turns west and flows toward the Thames River.

OBDA

The OBDA is located on the western slope of the dike (not annotated) directly northwest of the Area A Landfill. The dike was constructed to contain dredge spoils pumped from the Thames River into the Area A Wetland. A small quantity of material and/or refuse (not annotated) appears to be strewn along the OBDA's fill face.

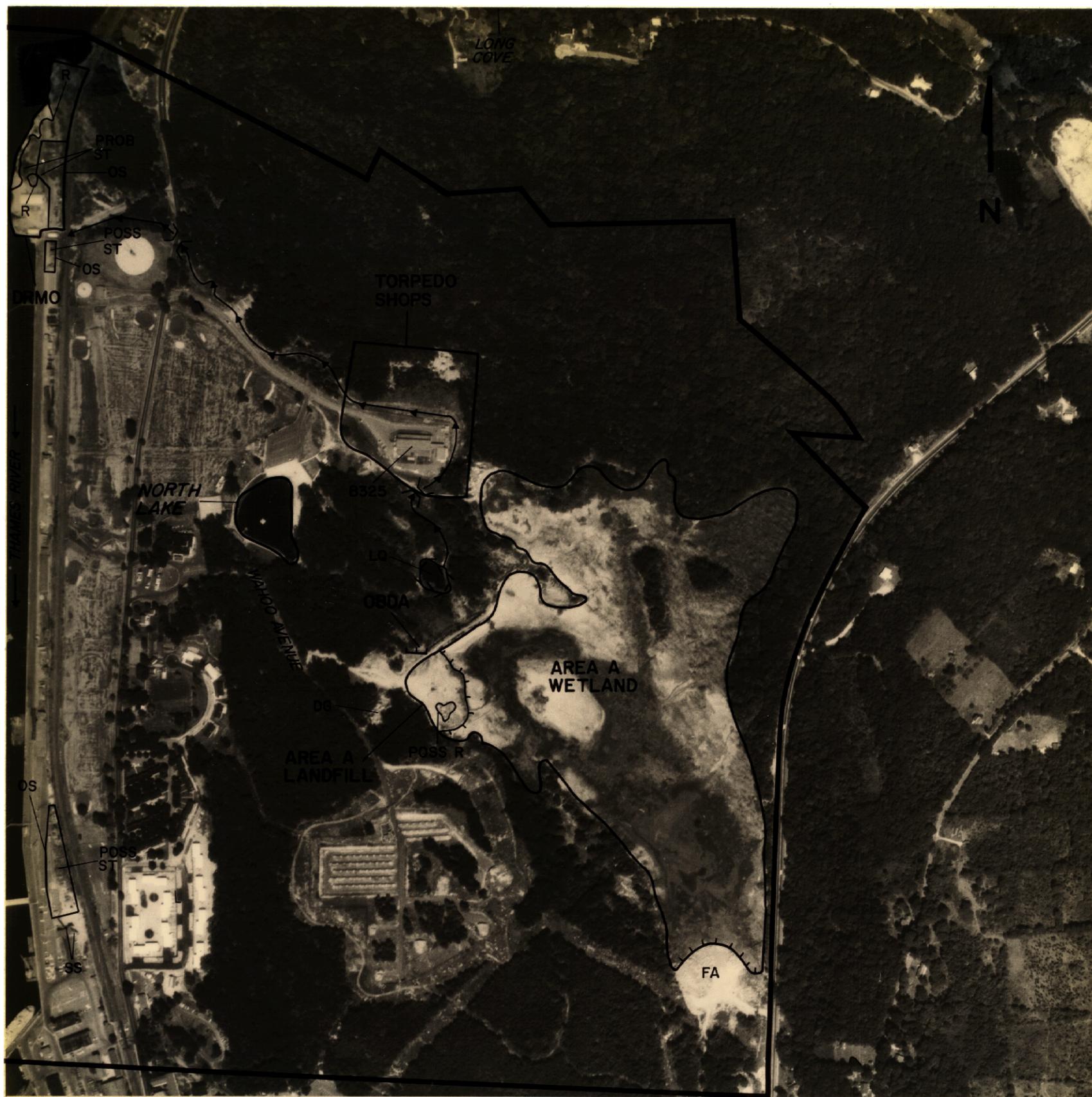
Area A

The surface of the Area A Landfill is light-toned with dark-toned material/refuse (not annotated) scattered along its toe. It appears that the area fill method is being used, whereby new refuse is dumped from the face of previously deposited refuse and is then covered with earth. A pile of medium-toned possible refuse is evident in the southeast corner of the landfill. A road leads to the landfill from Wahoo Avenue.

The Area A Wetland was created when dredge spoils from the Thames River were pumped to the area and contained by an earthen dike.

Other Findings

Two open storage areas are located south of the DRMO along the Thames River. Possible stains are evident in both areas. Numerous containers and/or crates are also visible in the southern open storage area.


LEGEND

- B - Building
- C - Containers
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- >->- Site Boundary
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- >->- Suspected Drainage
- Vertical Tank
- Water Tower

FIGURE 5
NEW LONDON SUBMARINE BASE

STUDY AREA A
SEPTEMBER 2, 1963

APPROX. SCALE 1:7,000

An area of disturbed ground is directly west of the Area A Landfill. The area is void of vegetation, and material and/or refuse has apparently been dumped into the area, which is accessed from Wahoo Avenue. The material and/or refuse appears to be similar to that seen in the Area A Landfill. This disturbed area is evident through 1974, after which time it revegetates. The area will be annotated through 1974 but will not be discussed further.

A fill area is visible in the southeast corner of the study area. This fill area is composed of material excavated from an area to the south, which is undergoing site preparations for building construction (see Figure 13). A road leads from the excavation to the fill area.

JUNE 1, 1969 (FIGURE 6)

The most significant activity has occurred in the eastern portion of the study area. The Area A Landfill and the OBDA have expanded, and activity is visible at the Construction Battalion Unit (CBU) Drum Storage Area.

DRMO

Piles of refuse are still visible along the Thames River within the DRMO. The northern pile of refuse is lighter-toned (LT) than the others. The eastern pile of refuse may be intermixed with stacked boxes and/or crates. A possible stain is visible between the piles of refuse. Another possible stain is seen near numerous probable containers (C), directly north of a building in the southern portion of the DRMO.

Torpedo Shops

A light-toned area is evident along the south edge of the parking area near B325. Open storage areas, consisting of box-shaped objects, are visible southeast and northeast of B325.

OBDA

The OBDA has expanded, and an increased volume of multi-toned refuse is evident along the top of the bank and on the fill face. Two possible stains and a possible stain and/or liquid are also visible on the bank of the disposal area. A weapons storage

6-1-69

LEGEND

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- >--- Natural Drainage
- >--- Railroad
- >--- Site Boundary
- >--- Study Area Boundary
- >--- Suspected Drainage
- Vertical Tank
- Water Tower



FIGURE 6
NEW LONDON SUBMARINE BASE

STUDY AREA A
JUNE 1, 1969

APPROX. SCALE 1:7,400

area (not annotated) has been constructed just north of the dike which contains the Area A Wetland.

Area A

The Area A Landfill has expanded along the southwest edge of the Area A Wetland. An elongated light-toned area and numerous stacked probable containers are visible near the fill face in the northwestern portion of the landfill. A large possible stain and/or material is evident along the southwest edge of the Area A Landfill, between the probable containers and the CBU Drum Storage Area. This area is darker-toned than the surrounding soils, and vehicular activity is evident throughout the area. Piled coarse-textured multi-toned refuse and a possible stain are evident in the southeastern portion of the landfill. Numerous pools of liquid (not annotated) are scattered throughout the landfill. Surface water runoff from directly south and within the landfill drains north as overland flow into the Area A Wetland. Liquid (not annotated) is visible along the south edge and in the southeast corner of the Area A Wetland.

CBU Drum Storage Area

Four rows of probable containers are evident in the eastern portion of the CBU Drum Storage Area. These probable containers are similar to those found in the Area A Landfill. Possible staining (not annotated) is apparent along the northwest edge of the probable containers.

OBDANE

Activity is now evident at the OBDANE. Lumpy refuse and/or material is visible along the fill face.

Other Findings

A possible stain is visible in an open storage area immediately south of the DRMO. Another open storage area farther south contains a pile of probable refuse and numerous neatly arranged probable containers.

Elsewhere, an athletic complex (not annotated) has been constructed on the fill area in the southeast corner of the study area, and a portion of the probable weapons storage area (not annotated) south of the CBU Drum Storage Area has been dismantled and the area leveled.

FEBRUARY 24, 1974 (FIGURE 7)

The scale and resolution of the original imagery hindered the identification of individual features within the disposal areas.

DRMO

The open storage of equipment and materials is evident throughout the DRMO. A pile of debris (DB) and an adjacent large stained area are visible in the central portion of the DRMO. Probable containers and/or crates and vehicles (neither annotated) are seen along the northwest and southwest edges of the DRMO, respectively. A stain is visible near the south edge of a building in the southern portion of the DRMO.

Torpedo Shops

B450 is now seen north of B325. A possible stain is noted northeast of B450. Staining and/or liquid is seen on the road near the northeast corner of B325. Open storage of materials and/or equipment is apparent southeast of B325.

OBDA

Multi-toned refuse remains along the top of the bank and on the fill face of the OBDA. A fence or barrier on the bank of the OBDA appears to restrict the entrance.

Area A

Light-toned rough-textured mounded material (MM) is visible in the southeastern portion of the Area A Landfill, where additional filling has occurred since 1970. A mound of material is also seen on the ball field (not annotated). Additional multi-toned mounded material is seen in the central portion of the landfill. A pool of liquid is apparent along the southwest edge of this material. Another pool of liquid, in an excavated area south of the mounded material, has been evident since 1970.

Liquid and/or the stain remaining from a liquid is visible in and adjacent to the open storage area southeast of the OBDA. This liquid and/or resulting stain originates near two light-toned quonset structures (not annotated) directly south of the OBDA. The liquid and/or stain extends to the Area A Wetland.

CBU Drum Storage Area

This drum storage area has expanded since 1969. Two stacks of numerous possible drums (D) are evident in the south central portion of the storage area. Probable staining is visible north of one stack of possible drums. Additional probable stains and a pool of liquid are visible west of numerous containers.

OBDANE

Additional refuse and/or material has been deposited at the OBDANE. The deposited refuse and/or material appears to have been mixed with earthen material. No additional activity is noted at the OBDANE in future years, and it will not be annotated or discussed further.

Other Findings

Staining is apparent in an open storage area near the Thames River, south of the DRMO. Probable refuse and numerous containers were seen in this open storage area in 1969.

Two piles of light-toned material and two areas of neatly arranged probable containers are visible northwest and south of the CBU Drum Storage Area, respectively. The probable containers are located near a storage bunker (not annotated). A new building has been constructed in the southern portion of the study area, where a portion of the probable weapons storage area was dismantled.



LEGEND

- B - Building
- C - Containers
- CO - Cylindrical Object
- D - Drums
- DB - Debris
- DG - Disturbed Ground
- DK - Dark-Toned
- EXT - Extraction
- FA - Fill Area
- HT - Horizontal Tank
- LQ - Liquid
- LT - Light-Toned
- M - Material
- MM - Mounded Material
- MT - Medium-Toned
- OF - Outfall
- OS - Open Storage
- R - Refuse
- SS - Smokestack
- ST - Stain
- - - - - Access Road
- >--- Berm
- >--- Channelized Drainage
- >--- Culvert
- >--- Dike
- >--- Direction of Flow
- >--- Edge of Slope
- >--- Feature Boundary
- >--- Fence
- >--- Historical Boundary
- >--- Horizontal Tank
- >--- Natural Drainage
- >--- Railroad
- >--- Site Boundary
- >--- Study Area Boundary
- >--- Suspected Drainage
- - Vertical Tank
- - Water Tower

FIGURE 7
NEW LONDON SUBMARINE BASE

STUDY AREA A
FEBRUARY 24, 1974

APPROX. SCALE 1:7,600

MARCH 23, 1986 (FIGURE 8)

DRMO

In 1985, numerous piles of dark-toned material and increased activity were noted in the northern portion of the DRMO. Possible staining was apparent west of the building in the southern portion, and open storage was mainly found along the Thames River in the western portion.

In 1986, increased quantities of material in open storage areas are evident throughout the DRMO. Three piles of dark-toned (DK) material, as well as two areas containing dark-toned objects (not annotated) which are uniform in size and shape, are found in the northern portion. Direct access to the nearby railroad tracks is apparent, indicating that material is probably loaded or unloaded in this area. In the central portion of the DRMO, two stains and/or pools of liquid are directly north of a pile of multi-toned debris. Staining was first noted in this location in 1985. A retaining wall is visible on the west side of containers and/or crates (not annotated) in an open storage area west of the pile of debris. Farther south, probable staining is evident near numerous possible drums seen along the Thames River.

Torpedo Shops

Possible drums are noted in an open storage area west of B450 and also directly east of B450. Most of the possible drums are seen east of B450, just north of a small building (not annotated). Elsewhere, possible drums and a pool of liquid are visible on the southeast side of B325.

OBDA

Although no active disposal appears to be occurring at the OBDA, scattered refuse (not annotated) is evident in the northeastern portion of the fill face. No additional activity is noted at the OBDA throughout the remainder of this analysis, and it will not be annotated or discussed further.

Area A

Although no additional landfilling is evident after 1974, activity is visible on the landfill through 1991. The deployed personnel parking lot (not annotated), located in the central



LEGEND

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- D - Drums
- DB - Debris
- DG - Disturbed Ground
- DK - Dark-Toned
- EXT - Extraction
- FA - Fill Area
- HT - Horizontal Tank
- LQ - Liquid
- LT - Light-Toned
- M - Material
- HM - Mounded Material
- MT - Medium-Toned
- OF - Outfall
- OS - Open Storage
- R - Refuse
- SS - Smokestack
- ST - Stain
- - - - - Access Road
- - - - - Berm
- - - - - Channelized Drainage
- - - - - culvert
- - - - - Dike
- - - - - Direction of Flow
- - - - - Edge of Slope
- - - - - Feature Boundary
- - - - - Fence
- - - - - Historical Boundary
- - Horizontal Tank
- - - - - Natural Drainage
- - - - - Railroad
- - - - - Site Boundary
- - - - - Study Area Boundary
- - - - - Suspected Drainage
- - Vertical Tank
- - Water Tower

**FIGURE 8
NEW LONDON SUBMARINE BASE**

**STUDY AREA A
MARCH 23, 1986**

APPROX. SCALE 1:7,200

portion of the landfill, and a concrete pad were first evident in 1981. According to collateral information, the concrete pad was used for above-ground storage of industrial wastes.

In 1986, three small streams of liquid originate at the concrete pad and adjacent buildings (not annotated) and flow into the Area A Landfill. An additional stain and/or pool of liquid and two probable stains are seen on the concrete pad. Five piles of dark-toned earthen material and two piles of medium-toned (MT) earthen material are noted southeast of the probable stains. The largest pile of previously mentioned dark-toned material and an additional pile of dark-toned material, noted in the southeastern portion of the Area A Landfill, were evident in 1985.

CBU Drum Storage Area

The CBU Drum Storage Area has reduced in size since 1974 and appears to be neat and orderly. The deployed personnel parking lot (not annotated) covers a portion of the area previously occupied by the drum storage area. Eight possible drums are noted in the northern section of the drum storage area.

Other Findings

Four piles of possible refuse are located near an open storage area directly east of the Torpedo Shops.

A fill area and a possible fill area are visible west of the Area A Landfill. The possible fill area contains rough-textured material and a dark-toned area (neither annotated) near its center and was first seen in 1985. The fill area is mainly void of vegetation, and a possible stain is visible on its eastern portion. Four possible drums are visible east of the fill area.

Additional buildings, first evident in 1981, have been constructed in the southern portion of the study area where part of the probable weapons storage area (not annotated) was dismantled. Disturbed ground and a pile of light-toned material are visible in this area. A probable stain and/or pool of liquid was also seen in this area in 1985. Farther south, staining is evident on the paved surface near probable garbage dumpsters near the southeast corner of a large building (not annotated).

MAY 30, 1991 (FIGURES 9A AND 9B)

Figure 9B shows the location of the June 19, 1943 shoreline within the New London Submarine Base, registered to the May 30, 1991 photograph. Extensive filling along the shoreline has occurred in numerous areas since 1943.

DRMO

Dark-toned material or the residue remaining from the piles of dark-toned material seen in 1986 is evident in the northern portion of the DRMO. Three piles of probable refuse, stacked probable debris, and three stains and/or pools of liquid are visible in the central portion of the DRMO. The soil surrounding the southwestern pile of probable refuse is stained.

Torpedo Shops

Numerous vehicles, equipment and materials, probably related to construction and/or maintenance activities, are seen in the parking areas surrounding B325. Liquid and/or the remaining stain from a liquid emanates from the south side of B325. A pile of probable refuse and six cylindrical objects (CO) are also found south of B325. A probable stain is visible near construction and/or maintenance activity east of B325. The possible drums remain east of B450.

Area A

A possible stain is visible amongst material and equipment on the concrete pad in the northwestern portion of the Area A Landfill. Eight possible drums and four cylindrical objects are noted west of the deployed personnel parking lot (not annotated) in the central portion of the landfill. A possible stain is evident near three possible tractor trailers (not annotated) in the southeastern portion of the landfill. No additional filling is noted within the landfill area, and the general appearance of the area is neat and orderly.

CBU Drum Storage Area

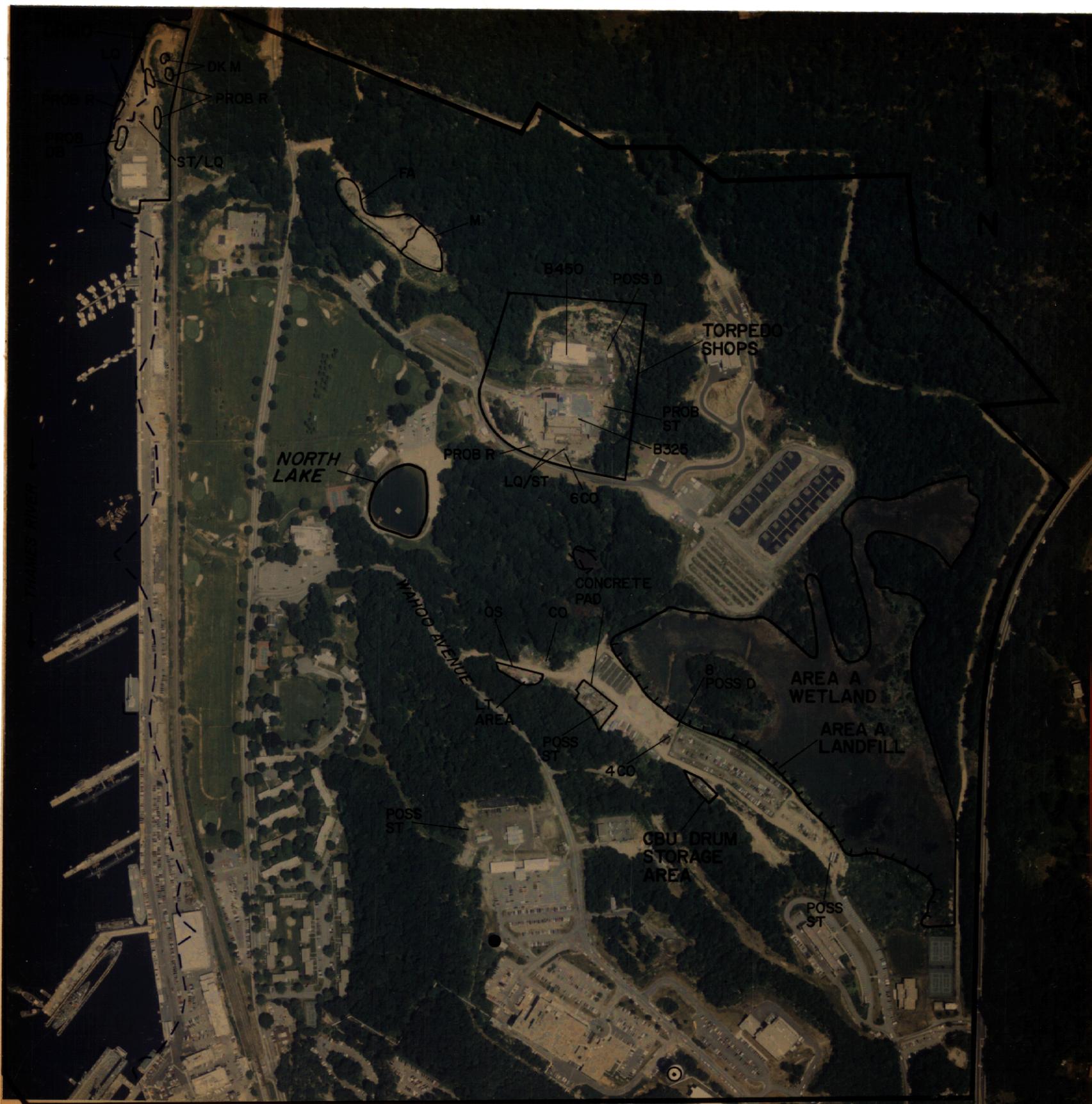
Three possible tractor trailers and a light-toned area (neither annotated) are visible in the CBU Drum Storage Area.

Other Findings

A natural swale northwest of the Torpedo Shops has been filled with material and leveled since 1986. A large pile of material is evident at the east end of this fill area.

The fill area and possible fill area (neither annotated) seen northwest of the Area A Landfill in 1986 have begun to revegetate. A cylindrical object is evident in the east corner of the revegetating fill area. A light-toned area is apparent in an open storage area southwest of the cylindrical object.

A possible stain is visible in an area west of Wahoo Avenue where disturbed ground, light-toned material, and probable staining were noted in 1985 and 1986.



LEGEND

- B - Building
- C - Containers
- CO - Cylindrical Object
- D - Drums
- DB - Debris
- DG - Disturbed Ground
- DK - Dark-Toned
- EXT - Extraction
- FA - Fill Area
- HT - Horizontal Tank
- LQ - Liquid
- LT - Light-Toned
- M - Material
- MM - Mounded Material
- MT - Medium-Toned
- OF - Outfall
- OS - Open Storage
- R - Refuse
- SS - Smokestack
- ST - Stain
- - Access Road
- - Berm
- - Channelized Drainage
- - Culvert
- - Dike
- - Direction of Flow
- - Edge of Slope
- - Feature Boundary
- - Fence
- - Historical Boundary
- - Horizontal Tank
- - Natural Drainage
- - Railroad
- - Site Boundary
- - Study Area Boundary
- - Suspected Drainage
- - Vertical Tank
- - Water Tower

**FIGURE 9A/B
NEW LONDON SUBMARINE BASE**

**1943 SHORELINE
STUDY AREA A
MAY 30, 1991**

APPROX. SCALE 1:6,500

STUDY AREA B

According to collateral information, four IR Sites are found in Study Area B. They are the Lower Subbase, Former Gasoline Station, Spent Acid Storage and Disposal Area, and Goss Cove Landfill. The following collateral information was supplied for each of these sites:

Lower Subbase - The Lower Subbase is the original subbase; therefore, its use dates back to 1867. Most of the construction at the Lower Subbase took place in the early 1900's, with major expansion between 1935 and 1940. Previous reports have identified four potential sources of fuel oil contamination on the Lower Subbase. These potential sources are listed below, along with a summary of the collateral information supplied for each.

1. Building 79 (B79) Waste Oil Pit - Building 79 was used to service diesel train engines. The service area included a pit into which waste oil and solvents were reportedly drained.
2. Power Plant (B29) Oil Tanks - Four underground tanks were seen adjacent to and east of the power house (B29). Two tanks contained No. 6 grade fuel oil, one contained diesel fuel, and the other contained waste oil from the bilge oil recovery system at the power plant. The tanks have been in place since World War II. Past oil leakage was apparent when the tanks were cleaned.
3. Fuel Oil Storage Tanks at Building 107 (B107) - Five concrete underground storage tanks located southwest of B107 have been in use since World War II. Three of the tanks were used to store diesel fuel, and the other two stored lube oil. A sixth tank was used as a reclamation tank for the other five.
4. Fuel Oil Distribution System - Distribution systems are in place on the Lower Subbase for No. 6 fuel oil and diesel fuel. The lines are used to convey fuel to the power house and to the tanks under the ball fields near the main gate; and to fuel ships at the piers.

Buildings 79, 29, and 107 are annotated throughout this analysis but are not discussed unless they are associated with significant environmental activity.

Former Gasoline Station - The gasoline station operated from 1940 to the early 1960's. When originally constructed in 1940, it had one garage bay and one pump island. The locations of the underground storage tanks and the method of sewage disposal are not known. The site was renovated in 1950, and the fate of the original underground tanks is unknown. Between 1962 and 1964 the gasoline station was demolished; it is not known if the gasoline tanks and associated piping or the waste oil tank were removed.

Spent Acid Storage and Disposal Area - The site consists of a relatively flat area completely covered with concrete or bituminous pavement. The site was reportedly used before and after World War II for the temporary storage of waste battery acid in a rubber-coated underground tank. The batteries were placed on a concrete pad next to the tank where some acids occasionally leaked, although no major spills were recorded. When the tank was full, the acid was pumped into a tank truck and disposed in the Area A Landfill.

Goss Cove Landfill - Incinerator ash and inert rubble were disposed at this site from 1946 to 1957. The Nautilus Museum and a paved parking lot have been constructed directly over the former landfill.

JUNE 19, 1943 (FIGURE 10)

The most significant activity has occurred in the southern portion of the study area, where wetlands have been filled since 1941.

Lower Subase

Three buildings (B79, B29, and B107) are seen in the Lower Subase. B79 and B29 were apparent in 1941, while B107 was not yet constructed. These buildings remain throughout this analysis and will be annotated but not discussed unless they are associated with significant environmental activity.

A possible stain is currently seen near a small building (not annotated) near the southern boundary of the Lower Subase.

Gasoline Station

No significant activity is noted at the gasoline station. The station was evident in 1941 and remains onsite through 1957. It will be annotated but not discussed unless associated with significant activity.

Spent Acid Storage and Disposal Area

In 1941, possible crates and/or containers and a pile of probable dark-toned material (neither annotated) were evident in the area. Currently, two piles of earthen material are located in the unpaved Spent Acid Storage and Disposal Area.

Goss Cove Landfill

No activity was noted in this area in 1941. In 1943, light-toned material is visible in the Goss Cove Landfill, suggesting that some waste disposal may be occurring.

Other Findings

Two possible stains are visible near two similar buildings (neither annotated) north of the Lower Subase. Neither stain is evident after 1943.

An area along the Thames River, south of the Lower Subase, has been filled since 1941. Structures are seen on and adjacent to the fill area.

The historical boundary of a wetlands area, visible in 1941, is annotated on Figure 10. In 1941, approximately three-quarters of the area within this boundary was open water. By 1943, the


LEGEND

- B - Building
- C - Containers
- CO - Cylindrical Object
- D - Drums
- DB - Debris
- DG - Disturbed Ground
- DK - Dark-Toned
- EXT - Extraction
- FA - Fill Area
- HT - Horizontal Tank
- LQ - Liquid
- LT - Light-Toned
- M - Material
- NM - Mounded Material
- HT - Medium-Toned
- OF - Outfall
- OS - Open Storage
- R - Refuse
- SS - Smokestack
- ST - Stain
- - - - - Access Road
- >--- Berm
- >--- Channelized Drainage
-)(Culvert
- |--- Dike
- >--- Direction of Flow
- |--- Edge of Slope
- |--- Feature Boundary
- |--- Fence
- - - - - Historical Boundary
- >--- Horizontal Tank
- >--- Natural Drainage
- |--- Railroad
- |--- Site Boundary
- |--- Study Area Boundary
- >--- Suspected Drainage
- Vertical Tank
- ⊙ Water Tower

FIGURE 10
NEW LONDON SUBMARINE BASE

STUDY AREA B
JUNE 19, 1943

APPROX. SCALE 1:6,600

area has been filled, most likely with material from the extraction south of the study area. The extraction was not evident in 1941.

A vegetated mound of material, a circular area and two probable pools of liquid are noted within and near the former wetland's boundary. The mound of material may be excess extracted material, and the two pools of liquid probably remain from the wetland. The circular area, north of the vegetated mound, may be a partially covered tank. Collateral information states that tanks are located in this area. Additionally, a small structure is noted near the middle of this circular area. Additional small structures are noted in two east-west linear paths extending through the area.

AUGUST 24, 1952 (FIGURE 11)

For security reasons, the west side of the study area along the Thames River was darkened on the 1951 and 1952 original photography; therefore, the Lower Subase and other areas along the river are not visible on Figure 11.

Spent Acid Storage and Disposal Area

The 1951 photography did not provide coverage of the Spent Acid Storage and Disposal Area. In 1952, a possible stain is seen directly west of three rows of containers and/or crates (not annotated). No significant activity is noted in this area until 1991; the area will continue to be annotated but will not be discussed further until that time.

Goss Cove Landfill

In 1951, the northern portion of Goss Cove was filled and leveled, and active filling was occurring along the south edge.

In 1952, the landfill has continued to expand to the south, and piles of probable refuse (not annotated) are visible along its south edge.

Other Findings

No additional activity was noted at the extraction south of the study area after 1943. Two structures and numerous vehicles (neither annotated) are visible in the northwestern portion of the extraction. No additional site-related activity is noted in this extraction; it will not be annotated on subsequent figures.

Three possible stains, two of which were evident in 1951, are visible in the central portion of the study area. Additionally, an elongated pool of probable liquid is seen north of the Spent Acid Storage and Disposal Area. A pool of liquid was also apparent west of the Spent Acid Storage and Disposal Area in 1951.

An area directly southeast of Rock Pond, first apparent in 1951, has been cleared (not annotated) and appears to be a construction materials storage area. Two small structures (neither annotated) are noted in the east and west ends of the aforementioned area.



LEGEND

- B - Building
- C - Containers
- CO - Cylindrical Object
- D - Drums
- DB - Debris
- DG - Disturbed Ground
- DK - Dark-Toned
- EXT - Extraction
- FA - Fill Area
- HT - Horizontal Tank
- IQ - Liquid
- LT - Light-Toned
- N - Material
- NM - Mounded Material
- MT - Medium-Toned
- OF - Outfall
- OS - Open Storage
- R - Refuse
- SS - Smokestack
- ST - Stain
- - Access Road
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-)(- Culvert
- - Dike
- - Direction of Flow
- - Edge of Slope
- - Feature Boundary
- - Fence
- - Historical Boundary
- - Horizontal Tank
- - Natural Drainage
- - Railroad
- - Site Boundary
- - Study Area Boundary
- - Suspected Drainage
- - Vertical Tank
- - Water Tower

FIGURE II
NEW LONDON SUBMARINE BASE

STUDY AREA B
AUGUST 24, 1952

APPROX. SCALE 1:6,200

APRIL 10, 1957 (FIGURE 12)

Lower Subase

A pool of possible liquid and/or the stain remaining from a liquid flow is visible on the dock in the central portion of the Lower Subase. Farther north, an outfall (OF) into the Thames River is evident west of the power house (B29). This outfall is visible throughout the remainder of this analysis and will be annotated but not discussed further.

Spent Acid Storage and Disposal Area

The area appears to be paved in 1957.

Goss Cove Landfill

The area fill method, which was used in the Area A Landfill, also appears to be the method of use in the Goss Cove Landfill. Evidence suggests that refuse is dumped from the face of previously deposited refuse and covered with earthen material. The landfill has expanded to the south, with active filling noted along its southern slope.

Other Findings

A large pile of dark-toned material and a pool of liquid and/or the stain remaining from a liquid are visible west of the Spent Acid Storage and Disposal Area. Two possible stains are evident northwest of the dark-toned material. One of these possible stains is located in an open storage area, while the other is noted where possible stains were seen in 1951 and 1952. Three possible stains are apparent near earthen bunkers (not annotated) north of the open storage area, and two possible stains are seen north of the Spent Acid Storage and Disposal Area.

Rock Pond appears to be almost dry.



LEGEND

B	- Building
C	- Containers
CO	- Cylindrical Object
D	- Drums
DB	- Debris
DG	- Disturbed Ground
DK	- Dark-Toned
EXT	- Extraction
FA	- Fill Area
HT	- Horizontal Tank
LQ	- Liquid
LT	- Light-Toned
M	- Material
MM	- Mounded Material
MT	- Medium-Toned
OF	- Outfall
OS	- Open Storage
R	- Refuse
SS	- Smokestack
ST	- Stain
---	- Access Road
--->	- Berm
--->---	- Channelized Drainage
)(- Culvert
---	- Dike
--->	- Direction of Flow
--- ---	- Edge of Slope
---	- Feature Boundary
--- ---	- Fence
---	- Historical Boundary
■	- Horizontal Tank
--->	- Natural Drainage
--- ---	- Railroad
---	- Site Boundary
---	- Study Area Boundary
---	- Suspected Drainage
●	- Vertical Tank
○	- Water Tower

FIGURE 12
NEW LONDON SUBMARINE BASE

STUDY AREA B
APRIL 10, 1957

APPROX. SCALE 1:6,500

SEPTEMBER 2, 1963 (FIGURE 13)

Much of the area west of and surrounding the Spent Acid Storage and Disposal Area has been paved and appears to be more organized than in previous years.

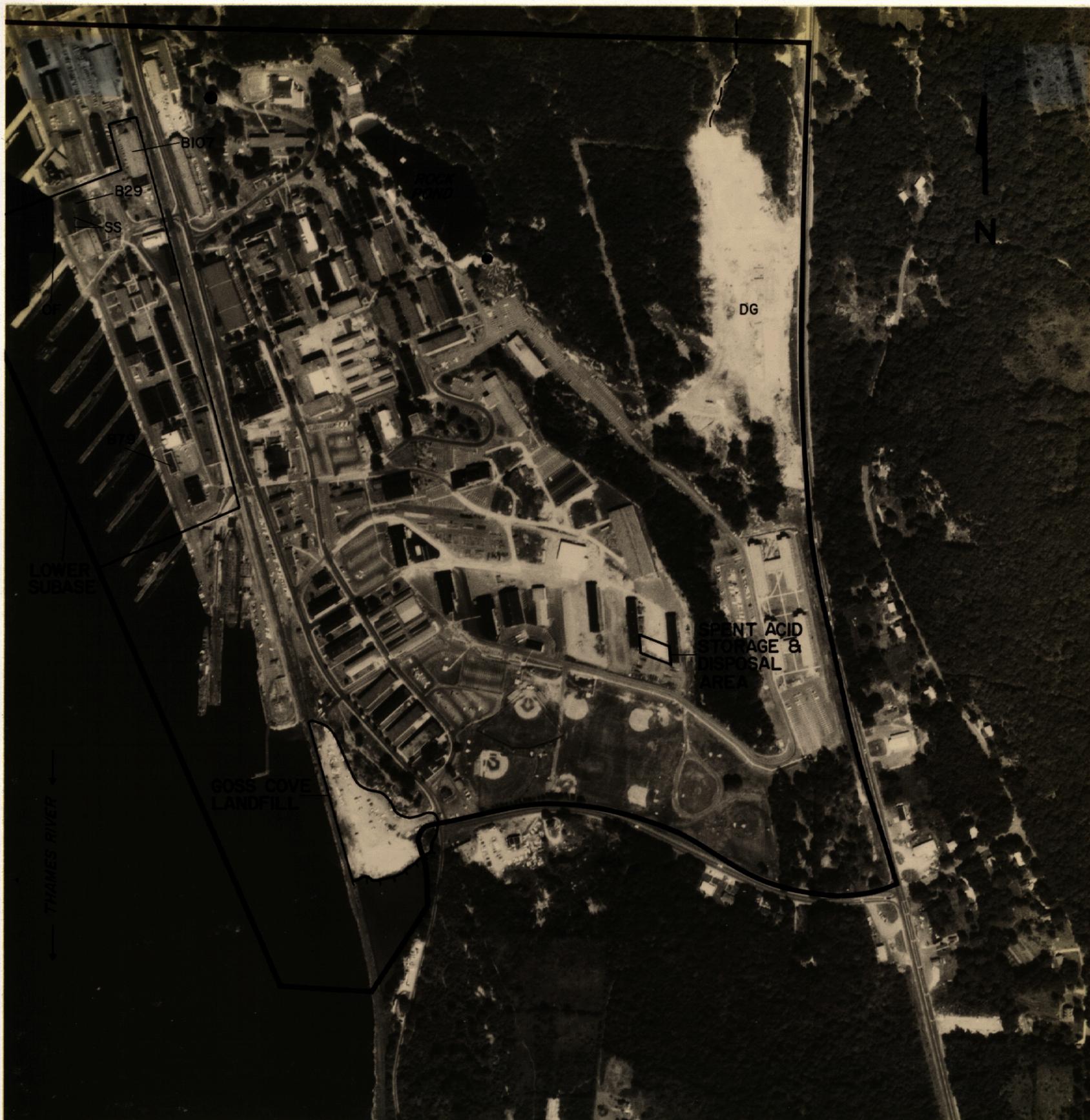
Goss Cove Landfill

The landfill has expanded farther south since 1957. Numerous vehicles (not annotated) are visible in the northern and eastern sections of the landfill.

Other Findings

The construction materials storage area (not annotated) southeast of Rock Pond has been paved for parking. The small pond visible in previous years northwest of Rock Pond has been filled and also paved for parking.

The disturbed ground in the northeastern portion of the study area is where building construction site preparations are underway. A road extends from this location to the fill area shown in Study Area A on Figure 5.



LEGEND

- B - Building
- C - Containers
- CO - Cylindrical Object
- D - Drums
- DB - Debris
- DG - Disturbed Ground
- DK - Dark-Toned
- EXT - Extraction
- FA - Fill Area
- HT - Horizontal Tank
- LQ - Liquid
- LT - Light-Toned
- M - Material
- MM - Mounded Material
- MT - Medium-Toned
- OF - Outfall
- OS - Open Storage
- R - Refuse
- SS - Smokestack
- ST - Stain
- - - - - Access Road
- - - - - Berm
- - - - - Channelized Drainage
- - - - - Culvert
- - - - - Dike
- - - - - Direction of Flow
- - - - - Edge of Slope
- - - - - Feature Boundary
- - - - - Fence
- - - - - Historical Boundary
- - Horizontal Tank
- - - - - Natural Drainage
- - - - - Railroad
- - - - - Site Boundary
- - - - - Study Area Boundary
- - - - - Suspected Drainage
- - Vertical Tank
- - Water Tower

FIGURE 13
NEW LONDON SUBMARINE BASE

STUDY AREA B
SEPTEMBER 2, 1963

APPROX. SCALE 1:6,200

JUNE 1, 1969 (FIGURE 14)

Lower Subase

Flowing liquid and/or the stain remaining from a liquid is visible near the southwest corner of B79. The origin of the liquid and/or stain is not readily apparent, but it does extend to the Thames River.

Goss Cove Landfill

Piled multi-toned refuse, probably indicating active filling, is evident along the south edge of the landfill, and the northern three-quarters of the landfill appears to be used for vehicle parking.

Other Findings

Flowing liquid and/or the stain remaining from a liquid is visible southwest of the Spent Acid Storage and Disposal Area. The liquid and/or stain appears to originate at the southwest corner of the long building directly to the west.

An excavated area in the southeast corner of the study area contains two pools of probable liquid. This excavation may be for the installation or removal of an underground tank and is visible through 1970.

Another liquid flow and/or the stain remaining from a liquid is apparent southeast of the Lower Subase. Liquid and/or staining originates near the southeast corner of a building (not annotated).

Three new buildings (not annotated) have been constructed in the northeastern portion of the study area where the site preparations were noted in 1963.



LEGEND

B	- Building
C	- Containers
CO	- Cylindrical Object
D	- Drums
DB	- Debris
DG	- Disturbed Ground
DK	- Dark-Toned
EXT	- Extraction
FA	- Fill Area
HT	- Horizontal Tank
LQ	- Liquid
LT	- Light-Toned
M	- Material
NM	- Mounded Material
MT	- Medium-Toned
OF	- Outfall
OS	- Open Storage
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ST	- Stain
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---	- Berm
---	- Channelized Drainage
---	- Culvert
---	- Dike
---	- Direction of Flow
---	- Edge of Slope
---	- Feature Boundary
---	- Fence
---	- Historical Boundary
■	- Horizontal Tank
---	- Natural Drainage
---	- Railroad
---	- Site Boundary
---	- Study Area Boundary
---	- Suspected Drainage
●	- Vertical Tank
○	- Water Tower

FIGURE 14
NEW LONDON SUBMARINE BASE

STUDY AREA B
JUNE 1, 1969

APPROX. SCALE 1:6,200

FEBRUARY 24, 1974 (FIGURE 15)

Lower Subase

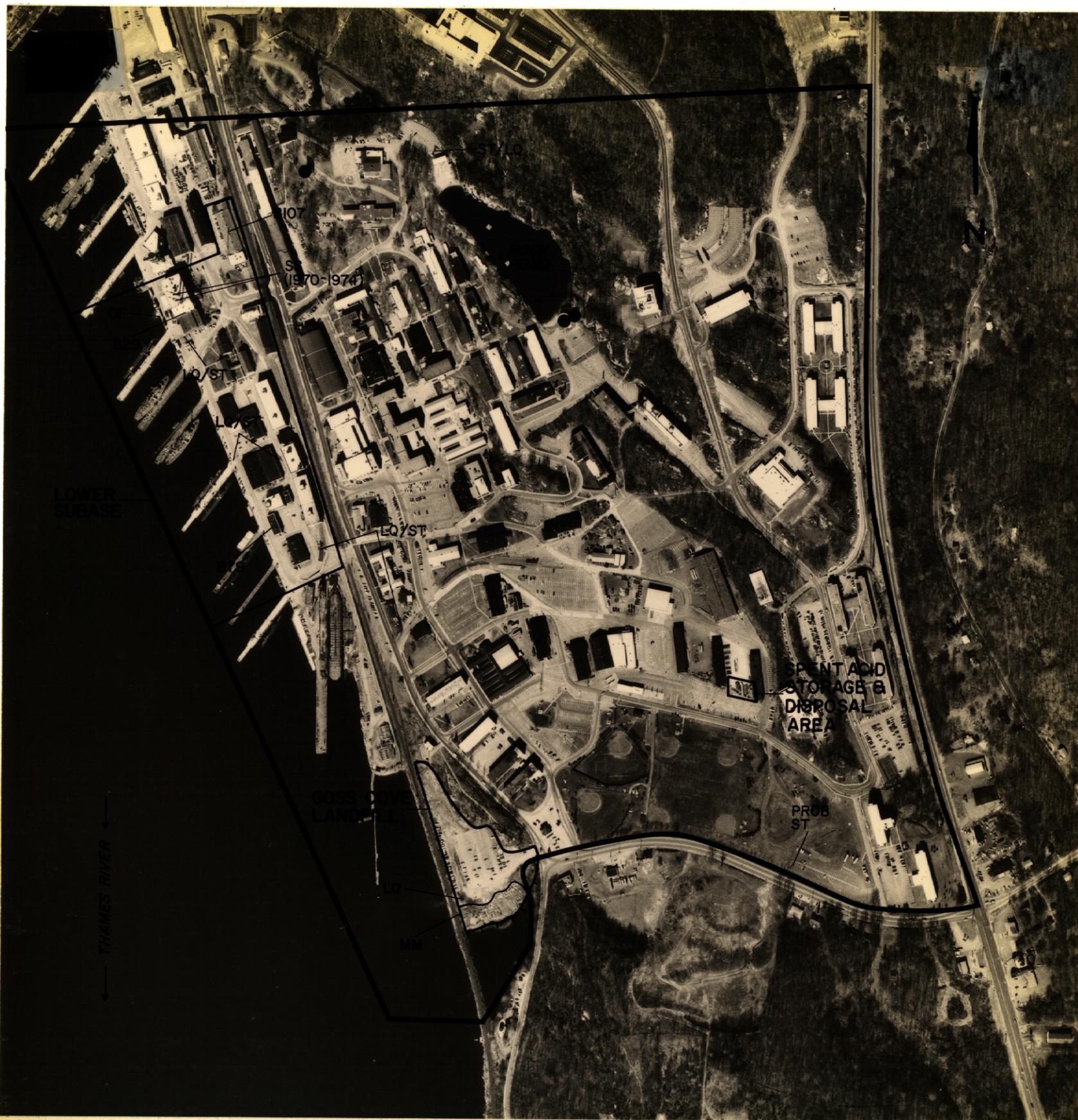
Four streams of flowing liquid and/or the stain remaining from a liquid are noted in the Lower Subase. The two streams and/or stains farthest west appear to flow into the Thames River.

Goss Cove Landfill

A large quantity of multi-toned mounded material is visible in the southern portion of the landfill. This material consists of many mounds in a uniform arrangement, such as that created by emptying numerous consecutive dump truck loads. Pooled liquid to the north may be water trapped from entering the Thames River by the mounded material.

Other Findings

The liquid flow and/or stain remaining from a liquid is still apparent southeast of the Lower Subase. Another liquid flow and/or stain is visible on the paved parking area northwest of Rock Pond. Elsewhere, a probable stain is evident near a row of probable containers (not annotated) on a parking lot (not annotated) in the southeastern portion of the study area.



LEGEND

- B - Building
- C - Containers
- CO - Cylindrical Object
- D - Drums
- DB - Debris
- DG - Disturbed Ground
- DK - Dark-Toned
- EXT - Extraction
- FA - Fill Area
- HT - Horizontal Tank
- LQ - Liquid
- LT - Light-Toned
- M - Material
- MM - Mounded Material
- MT - Medium-Toned
- OF - Outfall
- OS - Open Storage
- R - Refuse
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- - - - - Fence
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- - Horizontal Tank
- - - - - Natural Drainage
- - - - - Railroad
- - - - - Site Boundary
- - - - - Study Area Boundary
- - - - - Suspected Drainage
- - Vertical Tank
- ⊙ - Water Tower

FIGURE 15
NEW LONDON SUBMARINE BASE

STUDY AREA B
FEBRUARY 24, 1974

APPROX. SCALE 1:6,500

MARCH 23, 1986 (FIGURE 16)

Lower Subase

No additional activity was noted in this area in 1981, 1985, and 1986.

Goss Cove Landfill

No additional filling was apparent in the landfill after 1974. Vegetation was evident in the southern portion of the landfill in 1981. The Nautilus Museum was constructed between 1981 and 1985 on the southern portion of the landfill. The Goss Cove Landfill will continue to be annotated but will not be discussed further.

Other Findings

In 1981, a possible stain was visible in an open storage area on the west side of the large building north of the Spent Acid Storage and Disposal Area.

In 1985, two possible stains and flowing liquid were evident in the central and eastern portions of the study area, respectively. The eastern possible stain is also visible in 1986 and appears to be near the loading dock of a building. The flowing liquid extended north from the corner of a building. Also in 1985, flowing liquid and/or the stain remaining from a liquid which originated at a building (not annotated) and extended to the dock along the Thames River, was visible in the northwest corner of the study area.

In 1986, staining is visible on the road surface east of the Lower Subase, and possible stains are noted in the northwestern and central portions of the study area. Liquid and/or the stain remaining from a liquid is seen on the paved parking lot north of Rock Pond, and liquid flows north from the same building in the eastern portion of the study area where liquid was seen in 1985.

Mounded material, consisting of many mounds, such as that created by emptying numerous dump truck loads, is visible in the excavated area south of the study area which was annotated on Figure 11. Staining (not annotated) is also seen in the areas directly northwest of this mounded material.



LEGEND

- B - Building
- C - Containers
- CO - Cylindrical Object
- D - Drums
- DB - Debris
- DG - Disturbed Ground
- DK - Dark-Toned
- EXT - Extraction
- FA - Fill Area
- HT - Horizontal Tank
- LQ - Liquid
- LT - Light-Toned
- M - Material
- HM - Mounded Material
- MT - Medium-Toned
- OF - Outfall
- OS - Open Storage
- R - Refuse
- SS - Smokestack
- ST - Stain
- - - - - Access Road
- - - - - Berm
- - - - - Channelized Drainage
- - - - - Culvert
- - - - - Dike
- - - - - Direction of Flow
- - - - - Edge of Slope
- - - - - Feature Boundary
- - - - - Fence
- - - - - Historical Boundary
- - - - - Horizontal Tank
- - - - - Natural Drainage
- - - - - Railroad
- - - - - Site Boundary
- - - - - Study Area Boundary
- - - - - Suspected Drainage
- - - - - Vertical Tank
- ⊙ - Water Tower

FIGURE 16
NEW LONDON SUBMARINE BASE

STUDY AREA B
MARCH 23, 1986

APPROX. SCALE 1:5,900

MAY 30, 1991 (FIGURES 17A AND 17B)

Figure 17B shows the location of the June 19, 1943 shoreline within the New London Submarine Base, registered to the May 30, 1991 photograph. Extensive filling has occurred along the shoreline in the southern portion of the study area.

Lower Subbase

Staining is noted on the roof of B29 and directly north of B107.

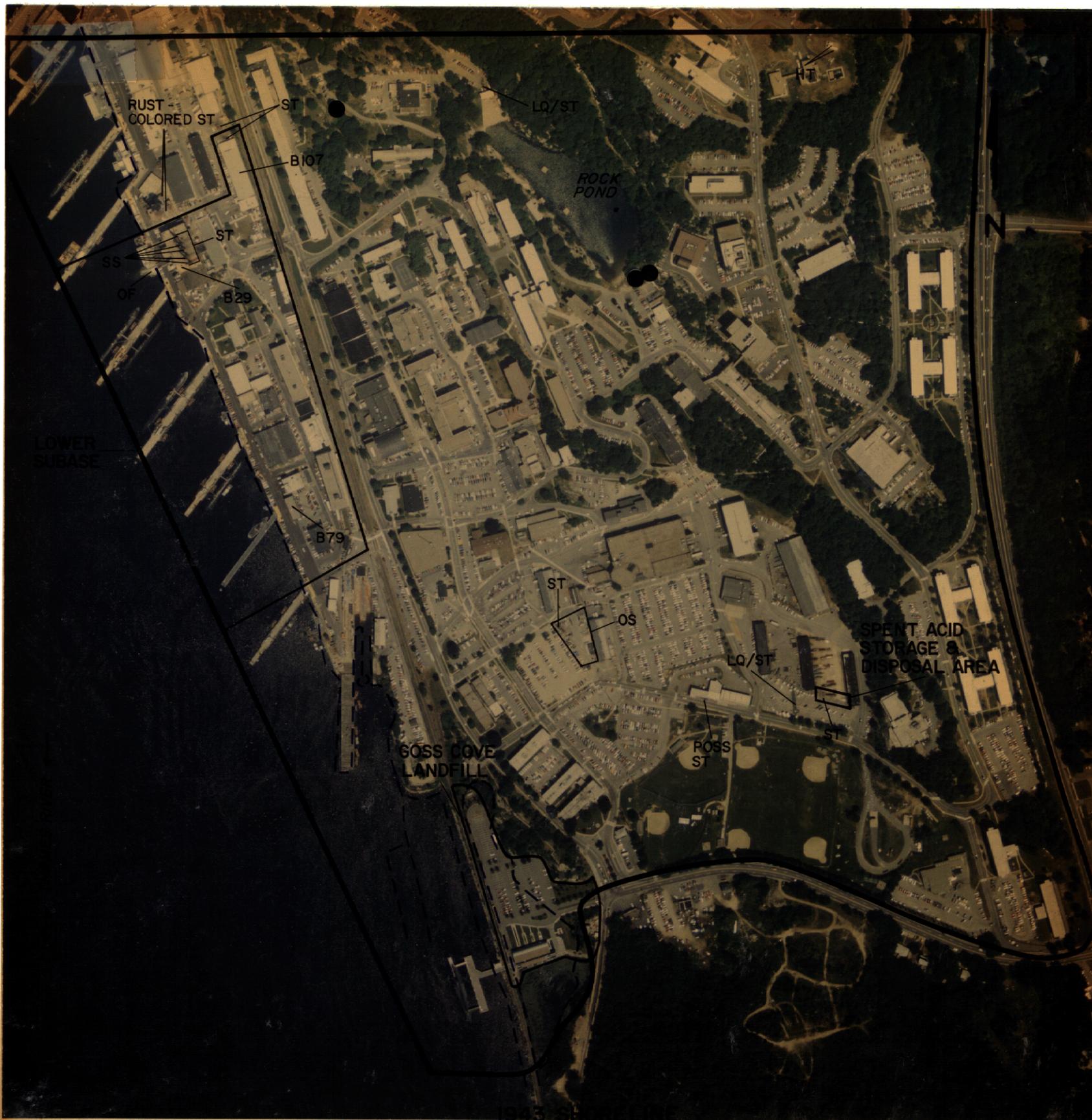
Spent Acid Storage and Disposal Area

Staining and two dark-toned linear objects (not annotated) are found in this area. No evidence of an underground tank was noted throughout this analysis.

Other Findings

Flowing liquid and/or the stain remaining from a liquid and a possible stain are visible west of the Spent Acid Storage and Disposal Area. Farther west, additional staining is evident in an open storage area. Liquid and/or the stain remaining from a liquid is still seen on the paved parking lot north of Rock Pond.

Rust-colored stains are evident north of B29.



LEGEND

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- MM - Mounded Material
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- OS - Open Storage
- R - Refuse
- SS - Smokestack
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- - - - - Culvert
- - - - - Dike
- - - - - Direction of Flow
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- - - - - Feature Boundary
- - - - - Fence
- - - - - Historical Boundary
- - - - - Horizontal Tank
- - - - - Natural Drainage
- - - - - Railroad
- - - - - Site Boundary
- - - - - Study Area Boundary
- - - - - Suspected Drainage
- - Vertical Tank
- ⊙ - Water Tower

FIGURE 17A/B
NEW LONDON SUBMARINE BASE

STUDY AREA B
MAY 30, 1991

APPROX. SCALE 1:5,700

REFERENCES

AERIAL PHOTOGRAPHY

<u>Date</u>	<u>Agency</u>	<u>Mission Code</u>	<u>Agency Frame #</u>	<u>Orig. Scale</u>	<u>EPIC Frame #</u>
October 8, 1941	NARS ¹	W	2:133-135	1:28,800	6402:6-8
October 9, 1941	NARS	W	3:66,67	1:28,800	32681,32682
June 19, 1943	DIA ²	CN	3:88-90	1:24,000	36057-36059
November 21, 1951	ASCS ³	DPE	13H:27-29	1:20,000	3121:48-50
August 24, 1952	ASCS	DPE	16H:16-18	1:20,000	33299-33301
April 10, 1957	USGS ⁴	VPB	1:50-52,67-69	1:24,000	2971:144-149
September 2, 1963	ASCS	DPE	1DD:199-201, 211-214	1:20,000	3121:41-47
June 1, 1969	ASCS	DPE	4KK:105-108, 154-156	1:20,000	3121:34-40
March 1, 1970	USGS	VCIP	2:74-76,94-97	1:24,000	2971:308-314
February 24, 1974	USGS	VDME	1:107-110	1:19,000	36018-36021
October 17, 1981	ASCS	09011	478:21-23, 44-46	1:40,000	35991-35996
May 24, 1985	EPA ⁵	85/183	396-399	1:24,000	85/183:396-399
March 23, 1986	AERO ⁶	CT-DEP	32-72:5350- 5353	1:12,000	35987-35990
May 30, 1991	EPA	91/030	4-15	1:16,000	91/030:4-15

¹National Archives and Records Administration

²Defense Intelligence Agency, U.S. Department of Defense

³Agricultural Stabilization and Conservation Service, U.S. Department of Agriculture

⁴U.S. Geological Survey, U.S. Department of the Interior

⁵U.S. Environmental Protection Agency

⁶Aerographics, Inc., Bohemia, NY

REFERENCES (cont.)

MAP

<u>Source</u>	<u>Name</u>	<u>Scale</u>	<u>Date</u>
USGS	Uncasville, Conn.	1:24,000	1970

PUBLICATION

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