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U.S. DEPARTMENT OF THE NAVY
INSTALLATION RESTORATION PROGRAM

NAVAL AIR STATION, BRUNSWICK
BRUNSWICK, MAINE

PROPOSED PLAN

SITES 5 AND 6

ORION STREET
ASBESTOS DISPOSAL SITE

SANDY ROAD
RUBBLE AND
ASBESTOS DISPOSAL SITE

MARCH 1993

U.S. DEPARTMENT OF THE NAVY
INSTALLATION RESTORATION PROGRAM

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GLOSSARY

REFERENCES

GLOSSARY OF ACRONYMS AND ABBREVIATIONS

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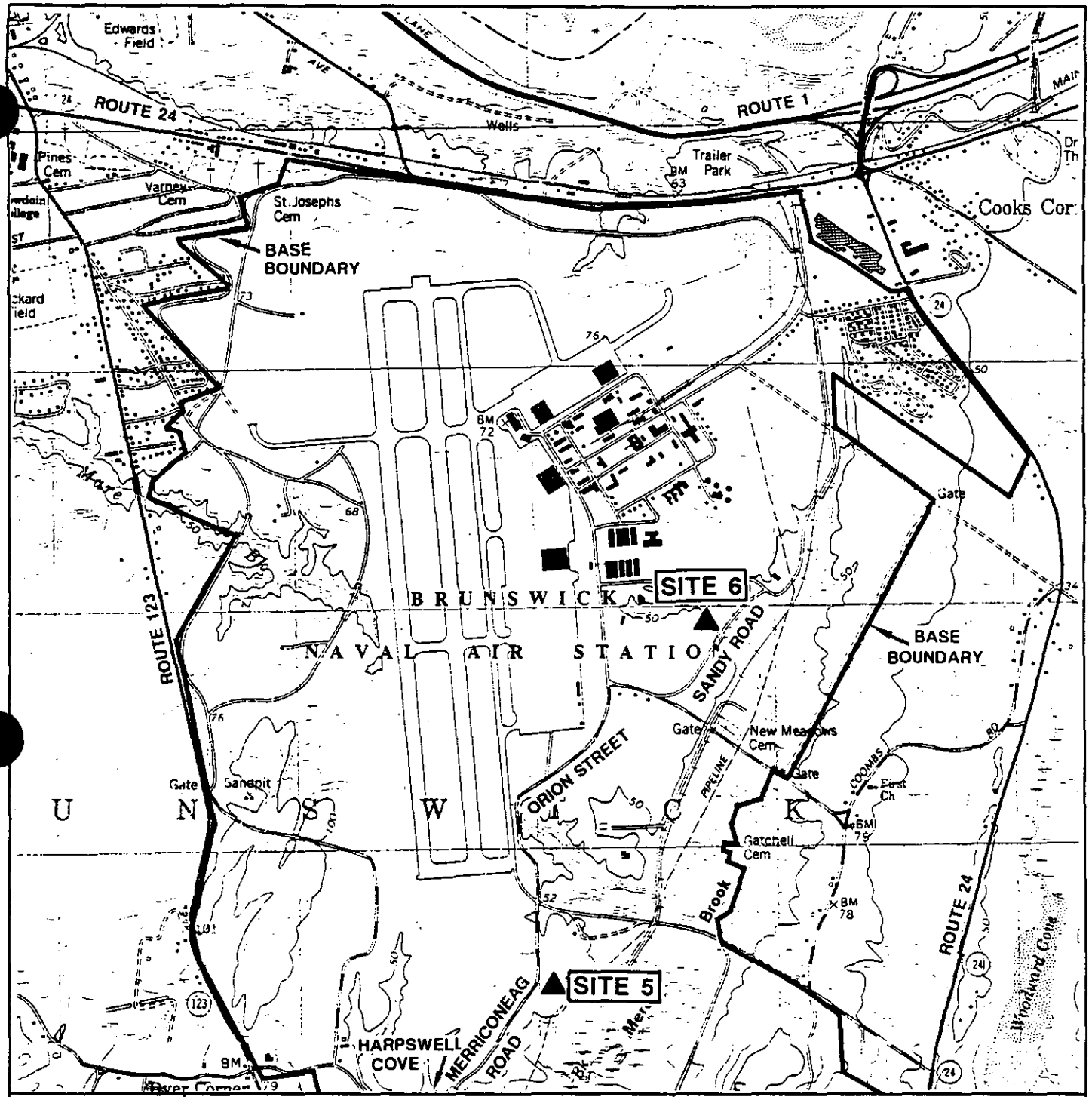
1.0 INTRODUCTION

The U.S. Navy is proposing a cleanup plan, or preferred alternative, to address both the Orion Street Asbestos Disposal Site (Site 5) and the Sandy Road Rubble and Asbestos Disposal Site (Site 6) at the Naval Air Station (NAS) Brunswick in Brunswick, Maine. Sites 5 and 6 are two of 13 sites being addressed by the Navy as part of the cleanup of hazardous materials at NAS Brunswick pursuant to **Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)**. This Proposed Plan summarizes **remedial alternatives** developed in the **Supplemental Feasibility Study (SFS)** completed in July 1991 and evaluated in the **Feasibility Study (FS)** completed in March 1992. The Draft Final Technical Memorandum submitted under a separate cover provides the detailed evaluation of the preferred alternative (ABB-ES, 1993). The Proposed Plan is a milestone in the **Remedial Investigation**/Feasibility Study (RI/FS) process as it represents the transition from studying and evaluating contamination at these sites to taking remedial action.

In accordance with Section 117(a) of CERCLA, the Navy is publishing this Proposed Plan to give the public an opportunity to review and comment on the remedial alternatives under consideration for Sites 5 and 6 before selecting a final remedy. The Navy, in consultation with the United States Environmental Protection Agency (USEPA) and the Maine Department of Environmental Protection (MEDEP), will select the final remedy for the sites after public comments have been reviewed and considered. This Proposed Plan summarizes the results and conclusions of the RI and FS, so that they can be more easily understood. For this reason, technical terms are highlighted in bold print and defined in the glossary at the end of this document.

This Proposed Plan addresses contamination at Sites 5 and 6, located as shown in Figure 1-1. Both sites reportedly were used to dispose of **asbestos**-covered pipes. Site 6 was also a general disposal site for rubble. These sites have not been used as disposal facilities for several years.

Site 5, located off Merriconeag Road, south of the main runway, apparently was used briefly in 1979 to dispose of asbestos-lined pipes from a demolished building (Figure 1-2). A facility engineer who inspected the site in 1980 described it as consisting of two trenches; the first measuring 3 by 20 by 7 feet deep and the second, next to the first, measuring 15 by 30 by 10 feet deep (Roy F. Weston, Inc., 1983).



SOURCE: USGS QUADRANGLE, BRUNSWICK, AND ORRS ISLAND, ME, DATED 1980, 1978. 7.5 MINUTE SERIES.

QUADRANGLE LOCATION

N

SCALE IN FEET

0 2,000 4,000

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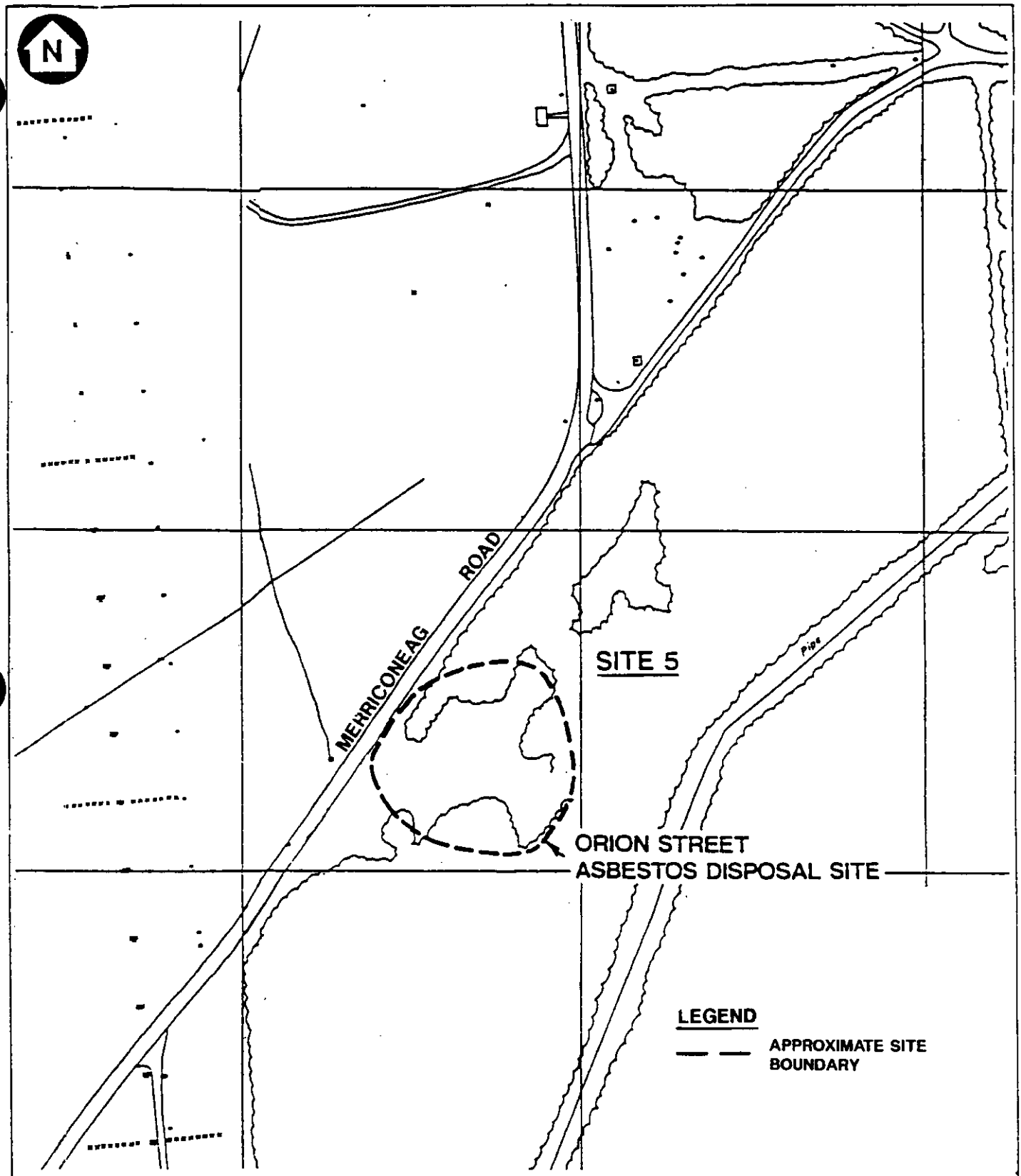
BRUNSWICK, MAINE

SITE LOCATION MAP
SITES 5 AND 6

PROPOSED PLAN SITES 5 AND 6

7124-01

FIGURE 1-1



SCALE IN FEET

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ABB Environmental Services Inc.	SITE LOCATION MAP SITE 5	
INSTALLATION RESTORATION PROGRAM NAVAL AIR STATION BRUNSWICK, MAINE	PROPOSED PLAN SITES 5 AND 6	
	7124-01	FIGURE 1-2

The site is currently covered with soil, seeded, and marked with signs as an asbestos disposal area. The soil and signs are believed to have been added in 1980. Site 5 is approximately one-quarter acre and is covered mostly with grass. The surrounding area is tree-covered. The site is level except for a bank that drops off several feet just southeast of the site.

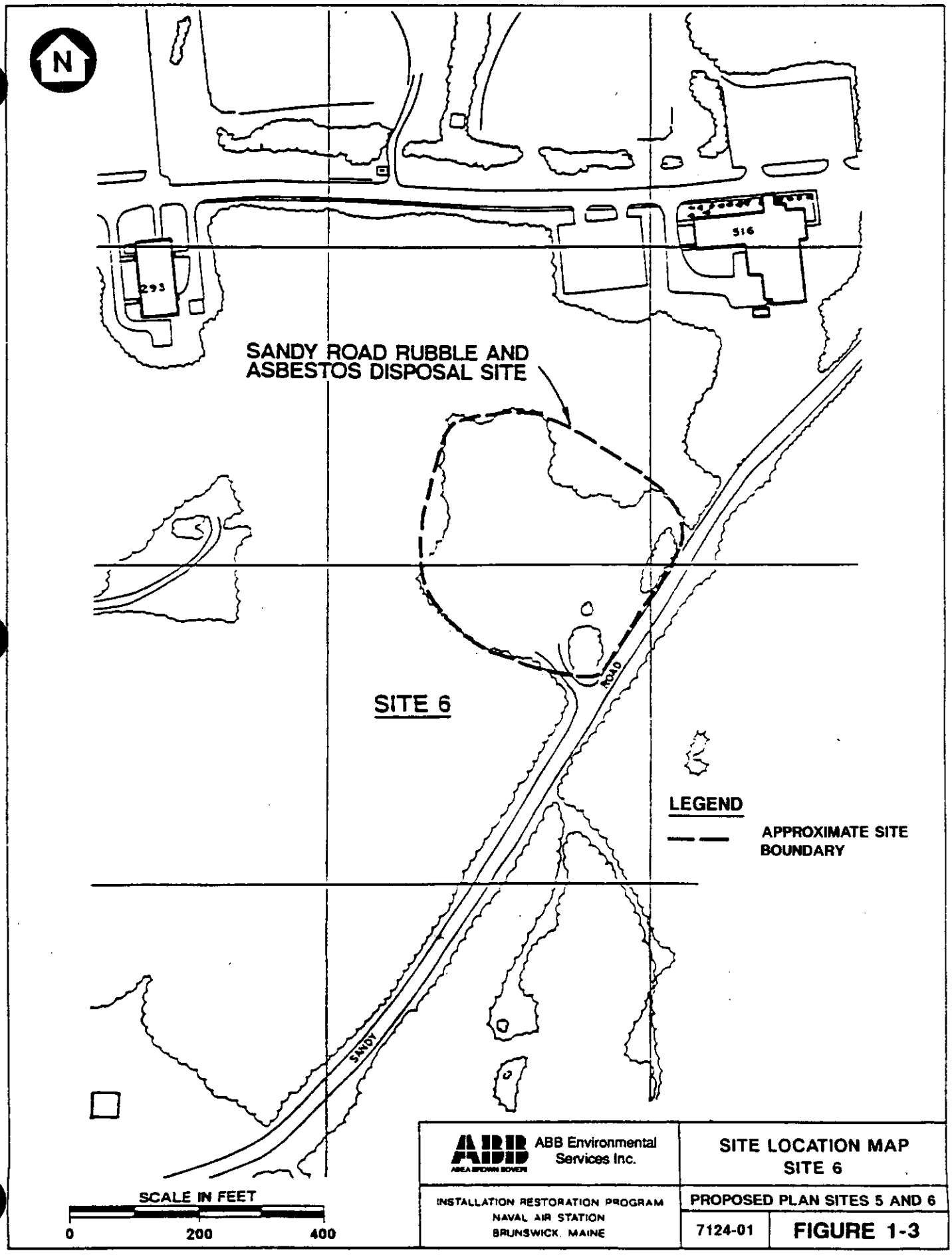
Site 6, the Sandy Road Rubble and Asbestos Disposal Site, is bordered by Sandy Road to the southeast and by a stream behind Building 516 to the north (Figure 1-3). It reportedly was used for general dumping of construction debris until the late 1970s (Roy F. Weston, Inc., 1983). It appears the site was originally a small depression that was later filled with construction debris and other **nonputrescible** wastes. Aircraft parts reportedly were disposed of at this site and asbestos-lined pipes were seen protruding from the surface (Roy F. Weston, Inc., 1983). Currently, vehicle access to Sandy Road is restricted by locked gates; however, portions of this site could be used by NAS Brunswick personnel. The site is nearly level except for a large soil stockpile approximately 15 feet at its highest elevation on the eastern side. Empty pipes, concrete, asphalt, and other debris are visible at the site surface. In addition, steel dumpsters are stored on the southwest corner of the site. Site 6 is approximately 1 acre.

Sites 5 and 6 are being combined in this Proposed Plan based on their common geologic and hydrogeologic conditions and historical use as disposal sites for asbestos, and because the preferred alternatives for remedial action at these sites are interdependent. These sites were evaluated together in the SFS.

The Navy's preferred alternative involves excavating and transporting the materials from Sites 5 and 6 and placing them as **subgrade fill** beneath the landfill cap at Sites 1 and 3, two hazardous waste landfill sites at NAS Brunswick. The Proposed Plan and **Record of Decision (ROD)** for Sites 1 and 3 have been completed and remedial design activities for these sites are ongoing. The preferred alternative is described in greater detail in Section 6.0 of this document.

This Proposed Plan:

1. explains the opportunities for the public to comment on the remedial alternatives (see Section 2.0);


N
293
516
SANDY ROAD RUBBLE AND
ASBESTOS DISPOSAL SITE
SITE 6
SANDY
ROAD
LEGEND
APPROXIMATE SITE
BOUNDARY
SCALE IN FEET
0
200
400
ABB Environmental
Services Inc.
SITE LOCATION MAP
SITE 6
INSTALLATION RESTORATION PROGRAM
NAVAL AIR STATION
BRUNSWICK, MAINE
PROPOSED PLAN SITES 5 AND 6
7124-01
FIGURE 1-3

2. includes a brief history of the site and the principal findings of the RI (see Section 3.0);

3. provides a brief description of the preferred alternative and other alternatives evaluated in the FS (see Sections 6.0 and 7.0);

4. outlines the criteria used by the Navy to propose an alternative for use at the site, and briefly analyzes whether the alternatives would meet each criterion (see Section 8.0); and

5. presents the Navy's rationale for its proposal of the preferred alternative for Sites 5 and 6 (see Section 9.0).

To help the public review the cleanup options for the site, Subsection 2.5 of this document explains where interested citizens can find more detailed descriptions of the remedy selection process and the alternatives under consideration for Sites 5 and 6 at NAS Brunswick.

2.0 THE PUBLIC'S ROLE IN EVALUATING REMEDIAL ALTERNATIVES

The Navy is offering the public the opportunity to review this Proposed Plan and comment on the remedial alternatives. The following paragraphs explain how the public can get involved in the review process.

2.1 PUBLIC INFORMATIONAL MEETING AND PUBLIC HEARING

The Navy will hold a public informational meeting at 7 p.m. on Thursday, April 8, 1993, at the Jordan Acres School on Merrymeeting Road in Brunswick, Maine, to describe the preferred alternative and other alternatives evaluated in the FS. The public is encouraged to attend the meeting to hear the presentations and ask questions. The Navy also will hold a formal public hearing immediately following the public informational meeting to accept verbal comments on the cleanup alternatives under consideration for Sites 5 and 6. This hearing provides an opportunity for people to formally comment on the Proposed Plan after hearing the presentations at the public informational meeting. Comments made at the hearing will be recorded and transcribed, and a copy of the transcript will be added to the **Administrative Record** at the Public Works Office at NAS Brunswick and will also be made available at the following location:

Curtis Memorial Library
23 Pleasant Street
Brunswick, Maine 04011
(207) 725-5242
Hours:
Monday-Wednesday: 9:30 a.m. - 8:00 p.m.
Thursday-Friday: 9:30 a.m. - 6:00 p.m.
Saturday: 9:30 a.m. - 5:00 p.m.

2.2 PUBLIC COMMENT PERIOD

The Navy is conducting a 30-day public comment period from March 29 to April 27, 1993, to provide an opportunity for citizen input in the cleanup decision. During the comment period, the public is invited to review this Proposed Plan, the Supplemental

RI, SFS, and FS reports and the Technical Memorandum and to make comments to the Navy (E.C. Jordan Co., 1991b, 1991a, 1992, and ABB-ES, 1993). These documents, part of the Administrative Record, are available for review at the Curtis Memorial Library, at the address listed in Subsection 2.1.

2.3 WRITTEN COMMENTS

If, after reviewing the information on the site, you would like to comment in writing on the Navy's preferred alternative, any of the other cleanup alternatives under consideration for Sites 5 and 6, or other issues relevant to the cleanup of Sites 5 and 6, please deliver your comments to the Navy at the Public Hearing or mail your written comments (postmarked no later than April 27, 1993) to:

James Shafer, Code 1821
Northern Division
Naval Facilities Engineering Command
10 Industrial Highway, Mail Stop 82
Lester, Pennsylvania 19113-2090

2.4 THE NAVY'S REVIEW OF PUBLIC COMMENTS

The Navy will consider comments received from the public as part of the process of reaching a final decision on the most appropriate remedial alternative for cleanup of Sites 5 and 6. The Navy's final choice of a remedy will be documented in a ROD for the site and submitted to the MEDEP and the USEPA for review, approval, and signature. Public comment is an important part of the ROD process and will be considered in the final remedy selection. A document called a Responsiveness Summary, which summarizes the Navy's responses to comments received during the public comment period, will be issued with the ROD. Public comment is being solicited on all the remedial alternatives described in this Proposed Plan. Once the ROD is signed by the USEPA Regional Administrator, it will become part of the Administrative Record.

2.5 ADDITIONAL PUBLIC INFORMATION

Because this Proposed Plan only summarizes the field investigations and the cleanup alternatives considered for Sites 5 and 6, the public is encouraged to consult the Supplemental RI, SFS, and FS reports, and the Technical Memorandum for more detailed information on the sites and all the remedial alternatives under consideration (E.C. Jordan Co., 1991b, 1991a, 1992, and ABB-ES, 1993). These documents, part of the Administrative Record, are available for review at the Curtis Memorial Library, at the address listed in Subsection 2.1.

If you have any questions about the sites or would like more information, you may call or write:

Public Affairs Office
Attn: Mike L'Abbé
Naval Air Station Brunswick
Brunswick, Maine 04011
(207) 921-2340

or

Meghan Cassidy, Remedial Project Manager
U.S. Environmental Protection Agency
HAN-CAN1
JFK Federal Building
Boston, Massachusetts 02203
(617) 573-5785

or

Mark Hyland, Director
Division of Federal Facilities Remediation
Office of the Commissioner
Maine Department of Environmental Protection
State House Station 17
Augusta, Maine 04333
(207) 287-2651

3.0 BASE HISTORY

NAS Brunswick, located south of the Androscoggin River between Brunswick and Bath, Maine, is an active facility supporting the U.S. Department of the Navy's antisubmarine warfare operations in the Atlantic Ocean and Mediterranean Sea. The primary mission of the base is to operate and maintain P-3 Orion aircraft. NAS Brunswick first became active in the 1940s during World War II, and underwent major expansion in the 1950s.

The base's mission required the use, storage, and disposal of hazardous materials. With growing awareness of the long-term effects of hazardous materials on the environment, the Department of Defense, in 1975, developed a program to address the conditions created by past events and practices. The Installation Restoration Program (IRP) was designed to identify, evaluate, and remediate (clean up) former disposal and spill sites at defense facilities. Originally, the Navy's part of this program was called the Navy Assessment and Control of Installation Pollutants (NACIP) Program. Early reports produced for NAS Brunswick reflect the NACIP process and terminology. The Navy eventually adopted the program structure and terminology of the standard IRP to be consistent with regulatory programs established by new legislation.

The IRP meets the requirements of CERCLA and the Superfund Amendments and Reauthorization Act (SARA) and is conducted in several stages:

1. Research is conducted in the Preliminary Assessment stage to identify potential hazardous waste sites. [This was called the **Initial Assessment Study (IAS)** under the old NACIP program.]

2. Site Inspections then confirm which areas contain contamination, constituting actual "sites." [This was called the **Pollution Abatement Confirmation (PAC)** Study or Step 1A Verification under the old NACIP program.]

3. Next, the RI and FS together characterize the type and distribution of contamination, establish criteria for cleanup, and identify and evaluate any necessary remedial action alternatives and their costs. As part of the RI/FS, a **Risk Assessment** identifies potential effects on human

health and/or the environment to help evaluate the need for and effectiveness of remedial alternatives.

4. A cleanup remedy is proposed and described in the Proposed Plan. Public input is solicited.

5. A remedy is selected and documented in the ROD.

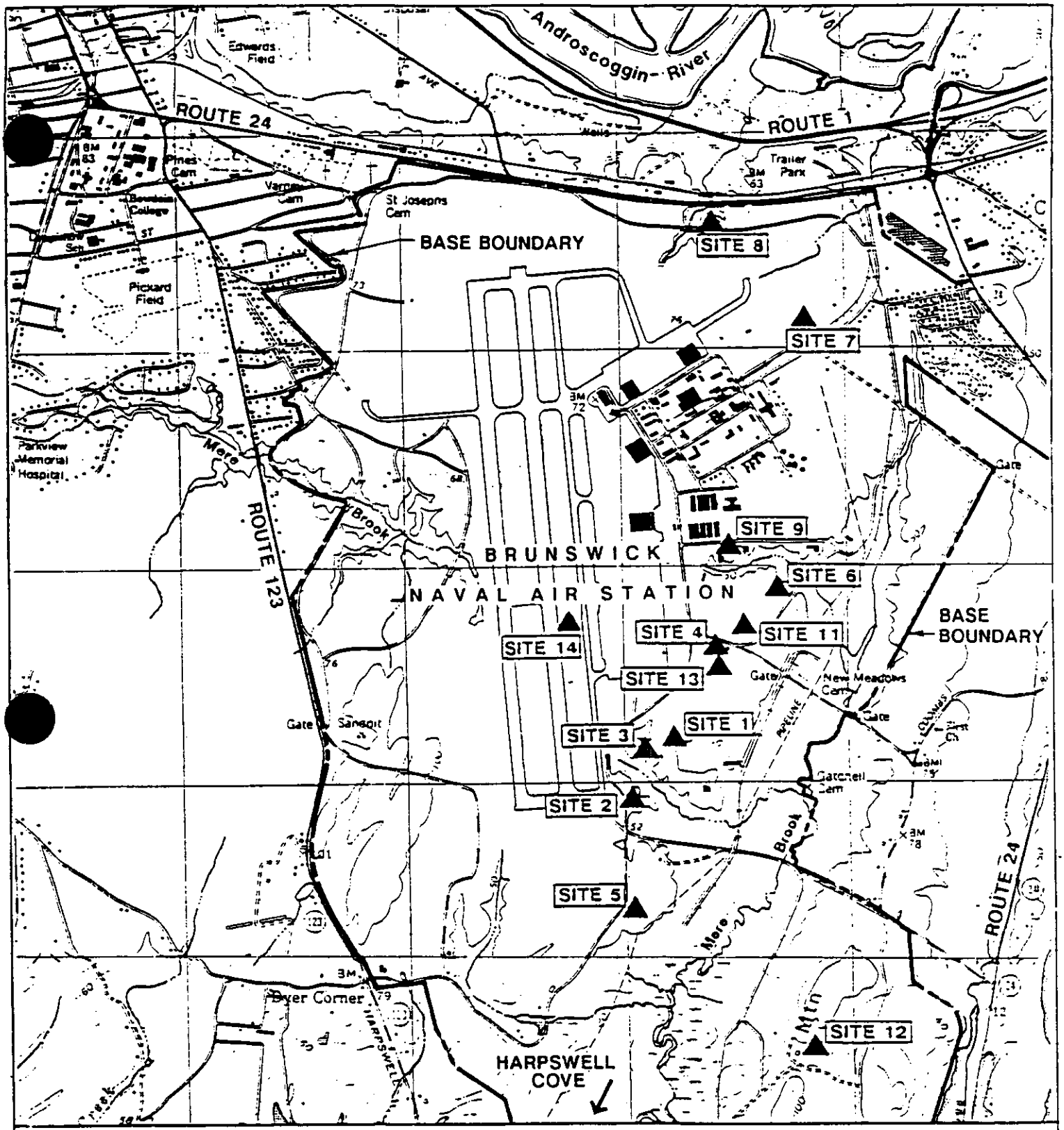
6. The selected alternative is designed and implemented in the Remedial Design and Remedial Action stages. Remedial Design and Remedial Action are implemented following ROD signature.

In 1983, an IAS detailing historical hazardous material usage and waste disposal practices identified 10 potential hazardous waste sites. In 1984, a PAC Study was conducted which recommended further investigation of seven of the 10 original hazardous waste sites (R.F. Weston, Inc., 1983, and E.C. Jordan Co., 1985). The RI/FS process for those seven sites began in 1987. Based on further information, two more sites were added to the RI/FS program in 1989, as were two sites originally identified in the IAS. Two additional sites were included in the program in 1990 for a total of 13 sites that the Navy is currently studying under the IRP (Figure 3-1). The remaining site identified in the IAS, the Harpswell Fuel Depot (Site 10), is no longer under the jurisdiction of NAS Brunswick and is not addressed by the IRP.

In 1987, NAS Brunswick was placed on the USEPA's **National Priorities List (NPL)**. Private-sector NPL sites are eligible for funding from the national environmental trust fund called **Superfund** and are often called Superfund sites. However, Department of Defense sites such as NAS Brunswick are funded through the Defense Environmental Restoration Account.

In 1990, the Navy entered into a Federal Facility Agreement (FFA) with the USEPA and the MEDEP regarding the cleanup of environmental contamination at NAS Brunswick. The FFA sets forth the roles and responsibilities of each agency, sets deadlines for the investigation and cleanup of hazardous waste sites, and establishes a mechanism to resolve disputes among the agencies.

In August 1990, the Navy completed the Draft Final RI and Phase I FS reports. The RI report described field sampling investigations, geology, and hydrogeology, and presented contamination and risk assessments. The Draft Final Phase I FS identified



SOURCE: U.S.G.S. QUADRANGLES, BRUNSWICK, AND ORRS ISLAND, ME.. DATED 1984 AND 1978. 7.5 MINUTE SERIES.

QUADRANGLE LOCATION

N

SCALE IN FEET

0 2,000 4,000

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INSTALLATION RESTORATION PROGRAM
NAVAL AIR STATION
BRUNSWICK, MAINE

SITE LOCATION MAP

PROPOSED PLAN SITES 5 AND 6

7124-01

FIGURE 3-1

remedial action objectives, and developed and screened remedial alternatives for the nine original sites studied in the Draft Final RI. In April 1991, the Navy submitted for regulatory review the Draft Final Supplemental RI and SFS reports for the additional four sites. The Draft Final Supplemental RI report includes the results of the remedial investigations of Sites 5 and 6, the Draft Final SFS presents the development and screening of remedial alternatives, and the FS includes the detailed evaluation of remedial alternatives for these sites (E.C. Jordan Co., 1991b, 1991a, and 1992). The preferred alternative is evaluated in the Technical Memorandum (ABB-ES, 1993).

Because the Navy is committed to providing a timely response to environmental contamination at NAS Brunswick, a strategy was developed to expedite the RI/FS process. This strategy identifies the sites for which enough information exists to proceed to the Proposed Plan phase. Proposed Plans for remediating Sites 1 and 3, the Eastern Plume, and Site 8 have been submitted. RODs for Sites 1 and 3 and the Eastern Plume have been signed and remedial design of the selected alternatives is now underway.

This Proposed Plan is a milestone in the remedial process for Sites 5 and 6. It marks the transition from the investigation phase to the remedial action phase of the IRP. A summary of the Supplemental RI (including the risk assessment), SFS, and FS reports for Sites 5 and 6 are presented in the following subsections.

3.1 Results of the Remedial Investigation

An RI is conducted to define the nature and distribution of contamination at a site. As part of the RI for Sites 5 and 6, the Navy conducted field activities to determine the distribution of contamination at these sites. RI results are presented in Sections 4.0 and 5.0 of the Draft Final Supplemental RI Report (E.C. Jordan Co., 1991b). This document is part of the Administrative Record and is available for review at the Curtis Memorial Library in Brunswick, Maine.

The RI fieldwork was designed to assess the areal distribution of wastes deposited at the sites. **Groundwater** at Site 6 was monitored to determine if the site was contributing to organic contamination detected in groundwater along the eastern boundary of NAS Brunswick (i.e., the Eastern Plume). Groundwater contamination resulting from asbestos (the contaminants of concern at Sites 5 and 6) was not of

concern, because asbestos minerals are very stable in the subsurface environment and are not likely to migrate (Gilbert, et al., 1981).

RI field activities included a **geophysical survey** consisting of a ground-penetrating radar (GPR) survey and a magnetometer survey, sampling of surface soils, and a detailed surface inspection at both sites; as well as **monitoring well** installations, groundwater sampling and analysis, and aquifer permeability testing at Site 6. Results of these investigations are summarized below. An interpretation of the possible health and environmental effects resulting from the contamination identified during the RI is presented in Section 4.0.

3.1.1 Groundwater Flow and Subsurface Geology

An interpretation of groundwater flow at Site 5 is based on the observed regional hydrogeologic conditions in this portion of the base. Specifically, groundwater information generated for Sites 1 and 3 and the southern portions of the Eastern Plume area provide hydrogeologic data that should be generally consistent within the Site 5 area. Groundwater at this site is expected to flow within the **stratified** sand/silty sand/clay soils that overlie the Presumpscot clay unit throughout the base. Groundwater at this site is expected to flow southeast and ultimately discharge to Mere Brook. Mere Brook is located approximately 1,000 feet southeast of Site 5. Estimates of the depth to groundwater based on regional hydrogeology suggest that groundwater is approximately 25 to 30 feet below ground surface (bgs). Based on the 1980 inspection report, this would indicate that asbestos-containing materials are buried above the groundwater table at Site 5.

Site 6 hydrogeology was assessed with three monitoring wells installed within the stratified transitional soils (MW-320 through MW-322) and one monitoring well (MW-302) installed within the coarse sand transitional soils. The **transition** zone in general is typically stratified with silt and clay. Within the transition zone, a unit of coarse-grained sands was observed and appears to be laterally continuous across the eastern and southern portions of the base. The entire transition zone, approximately 50 to 60 feet thick at Site 6, overlies a Presumpscot marine clay that defines the bottom of the overburden aquifer. Shallow groundwater beneath Site 6 generally flows southeast, and is located approximately 15 to 20 feet bgs.

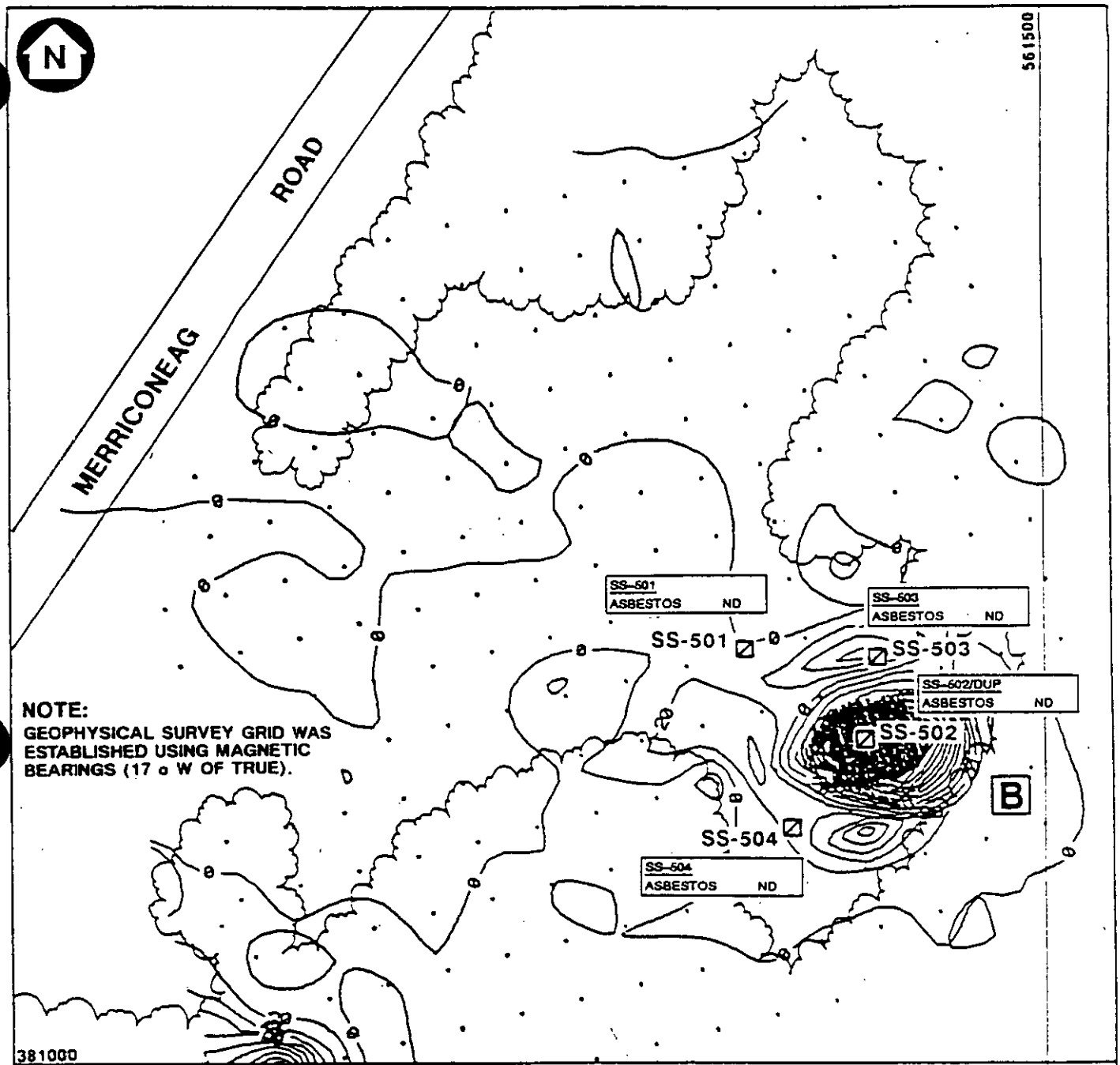
3.1.2 Geophysical Surveys

The magnetometer survey identified the presence of buried ferrous (i.e., iron-containing) material at both sites. Magnetometry is an effective tool for this application because of its sensitivity to even small quantities of ferrous debris intermixed with other debris. The magnetometer survey was conducted because of the possibility of metallic material being buried at any disposal area. Also, "asbestos piping" usually is iron piping insulated with asbestos material. Ferrous material is identified by an anomaly, or density of contour lines in the data.

GPR profiling was conducted in the vicinity of magnetic anomalies to correlate with and supplement the magnetic data. The GPR technique uses high frequency radio waves to determine the presence of subsurface objects and structures. Energy radiated downward into the subsurface is reflected back as a result of natural conditions (e.g., soil layers or changes in moisture content), or manmade features (e.g., buried utilities, tanks, or drums). While magnetometry and GPR techniques can indicate the presence of material below the ground surface, they do not provide positive identification of asbestos.

The GPR and magnetometer surveys at Site 5 were conducted to locate the two trenches where the asbestos-covered pipes were buried. The magnetometer located a single primary magnetic anomaly and a second minor anomaly. The primary anomaly (Anomaly B on Figure 3-2) indicates a definite presence of subsurface metallic materials, but the second minor anomaly (Anomaly A on Figure 3-2) is believed to be caused by the presence of surface debris (e.g., old tin cans). It is possible that the single primary anomaly indicates both trenches and, because they are directly adjacent, the survey could not distinguish between them. The GPR survey did not reveal additional findings but did support the results of the magnetometer survey.

GPR and magnetometer surveys were used to assess the areal extent of Site 6. Unlike Site 5, no single primary magnetic anomaly was found. However, readings forming a semicircular shape were found across the site (Anomaly B on Figure 3-3). This suggests that the semicircular region is probably where asbestos and rubble were disposed of at Site 6. The GPR survey supported these findings. Anomaly A on Figure 3-3 was attributed to dumpsters stored along the southwest edge of the site and is not considered part of the disposal site.



NOTES:

1. SAMPLES COLLECTED DURING SEPTEMBER AND OCTOBER 1990.

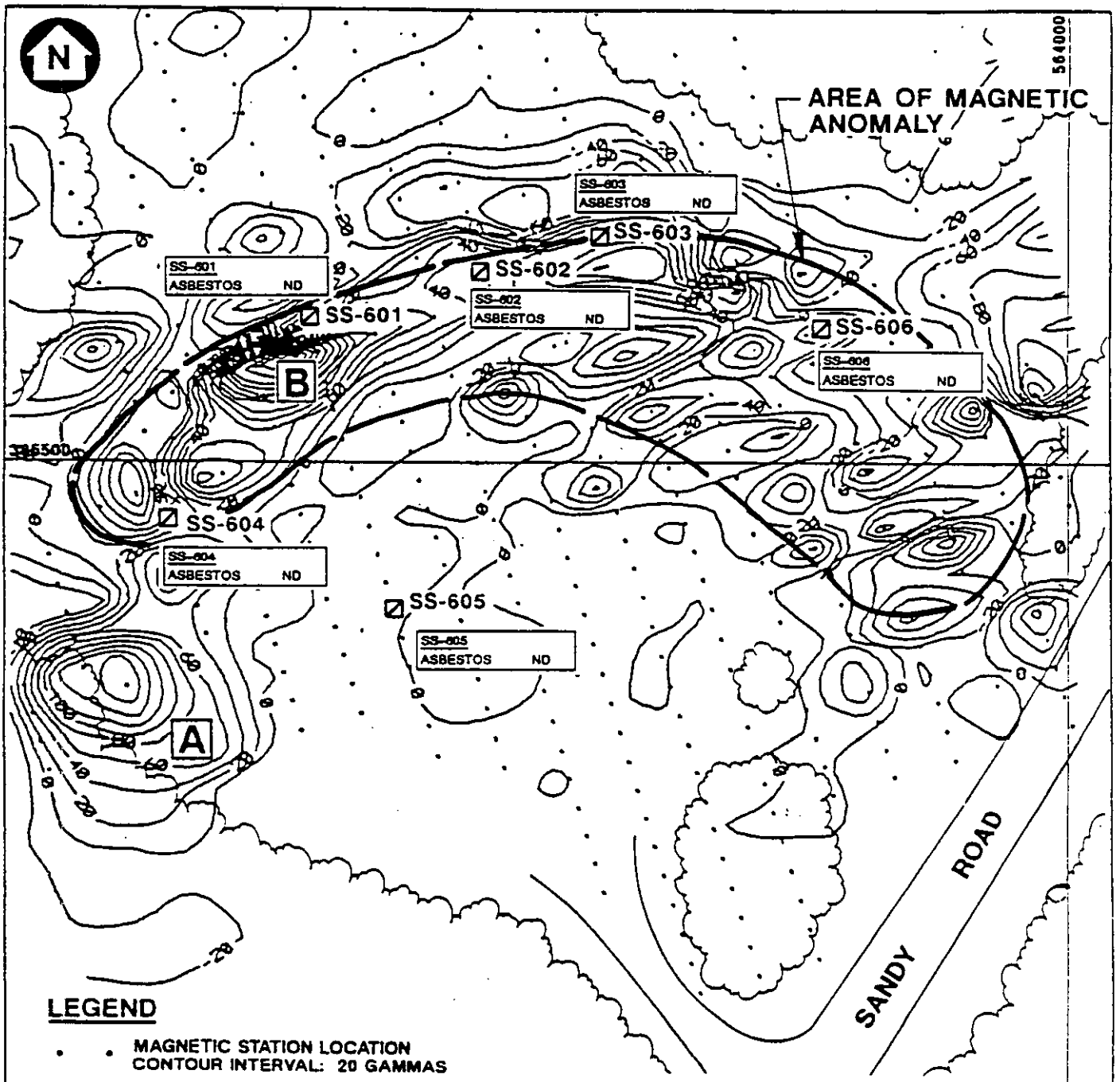
LEGEND

- MAGNETIC STATION LOCATION
  CONTOUR INTERVAL: 20 GAMMAS
- SS-501 SURFACE SOIL SAMPLE LOCATION
- A SURVEY ANOMALY

SCALE IN FEET

0 50 100

ABB Environmental Services Inc.	VERTICAL MAGNETIC GRADIENT CONTOURS AND SURFACE SOIL ANALYTICAL DATA SITE 5
INSTALLATION RESTORATION PROGRAM NAVAL AIR STATION BRUNSWICK MAINE	PROPOSED PLAN SITES 5 AND 6
7124-01	FIGURE 3-2



LEGEND

- MAGNETIC STATION LOCATION
  CONTOUR INTERVAL: 20 GAMMAS
- SS-601 SURFACE SOIL SAMPLE LOCATION
- A SURVEY ANOMALY

NOTES:

1. SAMPLES COLLECTED DURING SEPTEMBER AND OCTOBER 1990.

NOTE:
GEOPHYSICAL SURVEY GRID WAS ESTABLISHED USING MAGNETIC BEARINGS (17°W OF TRUE).

SCALE IN FEET
0 50 100

ABB Environmental Services Inc.	VERTICAL MAGNETIC GRADIENT CONTOURS AND SURFACE SOIL ANALYTICAL DATA SITE 6
INSTALLATION RESTORATION PROGRAM NAVAL AIR STATION BRUNSWICK MAINE	PROPOSED PLAN SITES 5 AND 6
7124-01	FIGURE 3-3

3.1.3 Surface Soils

A detailed visual surface inspection was made to identify any exposed asbestos materials. No evidence of exposed asbestos materials was found in the vicinity of either Site 5 or Site 6. Site 5 is marked as an asbestos disposal site with two warning signs; surface debris (e.g., metal buckets, tin cans, and bottles) is scattered about the site. Four surface soil samples were collected from Site 5 and analyzed for asbestos using **polarized light microscopy**. The locations of the surface soil samples were based on the geophysical survey and surface inspection. Asbestos was not detected in any samples (see Figure 3-2).

Six surface soil samples were collected at Site 6. The sampling locations were established within the semicircular region identified by the magnetometer survey (see Figure 3-3). One of the six samples, collected just south of the magnetic anomaly, was of material resembling pipe covering. The samples were analyzed for the presence of asbestos material; asbestos was not detected in any of the samples.

3.1.4 Groundwater

Groundwater at Site 5 was not monitored because asbestos fibers do not migrate in the subsurface environment (Gilbert, et al., 1981). Four monitoring wells were installed at Site 6 as part of the Eastern Plume investigation. Groundwater was sampled and analyzed for **volatile organic compounds, semivolatile organic compounds,** and **inorganics**. No organic contamination was detected. Groundwater at Site 6 was found to contain calcium, sodium, manganese, bicarbonate, chloride, and sulfate, which are inorganics normally found in groundwater. These inorganics were detected at concentrations consistent with **background concentrations** for NAS Brunswick and are not considered to pose a health hazard (E.C. Jordan Co., 1991b). Background samples were collected from uncontaminated wells upgradient of several sites at NAS Brunswick (E.C. Jordan Co., 1990).

4.0 SUMMARY OF SITE RISKS

A human health and ecological risk assessment was conducted to identify current and future potential risks to human health and the environment from contamination at Sites 5 and 6. Risks could not be quantitatively evaluated because asbestos was not detected in soils at either site. However, an exposure assessment and toxicity assessment were conducted to qualitatively assess potential risks. A summary of these assessments is presented below. For a detailed presentation of the risk assessment, refer to Section 13.0 of the Draft Final Supplemental RI Report (E.C. Jordan Co., 1991b).

4.1 EXPOSURE ASSESSMENT

Site 5 is not near any recreational areas and is remote from base housing. No asbestos was detected in surface soils; therefore, no current exposure is believed to exist. However, if asbestos were uncovered during future development at Site 5, exposure to airborne asbestos could occur. Asbestos minerals are very stable in the subsurface environment and are unlikely to migrate. In addition, at Site 5, the depth to groundwater is believed to be 25 to 30 feet bgs, eliminating the possibility of the asbestos moving through groundwater flow.

Although Site 6 is located in a nonrestricted area of the base, it is not located near any residential or recreational areas, suggesting that potential exposure would be infrequent (e.g., less than 10 times per year). No asbestos was detected in surface soil samples collected in this area and potential exposure to asbestos is considered minimal. However, if asbestos were uncovered during future development at Site 6, exposure to airborne asbestos could occur. Asbestos minerals are stable in the subsurface environment and are unlikely to migrate. In addition, at Site 6, the depth to groundwater is 15 to 20 feet bgs, minimizing the possibility of asbestos moving through groundwater flow. The maximum depth of asbestos at Site 6 is unknown; however, it is unlikely that the disposal site extends as deep as the groundwater.

In addition to on-site exposures (i.e., direct contact with soils or the source itself), the potential for future exposures to off-site receptors through ingestion of contaminated groundwater was evaluated. Because of the site's history as a dump, groundwater samples were collected at Site 6 and analyzed for organic and inorganic compounds.

Contaminants were not detected in the groundwater samples collected at Site 6. The concentration of inorganics detected in the groundwater samples at Site 6 were consistent with background values established during the RI and Supplemental RI (E.C. Jordan Co., 1990 and 1991b). Because asbestos is stable and groundwater is an unlikely transport mechanism, groundwater at Site 5 was not sampled, and Site 6 groundwater samples were not analyzed for asbestos.

4.2 TOXICITY ASSESSMENT

Asbestos is the only contaminant of concern at Sites 5 and 6. "Asbestos" is a general term applied to a family of silicate minerals. These minerals, when crushed or milled, separate into flexible fibers. The toxic and carcinogenic effects of asbestos are related to the length and diameter of these fibers. Inhalation exposure to asbestos fiber or dust has been shown to cause respiratory diseases including lung cancer. Synergistic (magnified) effects of asbestos toxicity have been linked to cigarette smoking. The health effects of asbestos in water are not well known. It is not clear whether the ingestion of asbestos-contaminated water will lead to the same health effects observed after inhalation exposure (Doull et al., 1980).

Air concentrations of asbestos are regulated under the National Emissions Standards for Hazardous Air Pollutants (NESHAPS) and water concentrations are regulated under the Safe Drinking Water Act.

4.3 HUMAN HEALTH RISK CHARACTERIZATION

Because asbestos was not detected in surface soil samples, no current route of exposure is believed to exist. Therefore, the current risks to human health are considered minimal to nonexistent. Any asbestos present at depth is considered to be stable and not likely to migrate. While there is a human health risk associated with future potential exposure to asbestos during construction or excavation-related activities, quantitative risks cannot be estimated because no subsurface samples were collected.

No contaminants were detected in Site 6 groundwater above background concentrations. No current or future potential risk is associated with the use of groundwater.

4.4 SUMMARY OF ENVIRONMENTAL RISK ASSESSMENT

The potential for harmful impacts associated with exposure to site-related contamination by environmental receptors was evaluated in the Ecological Risk Assessment (E.C. Jordan Co., 1990). The various types of ecological habitats at NAS Brunswick and the environmental receptors associated with these habitats are described in detail in the Ecological Risk Assessment. Additional data gathered during the October 1990 sampling round is consistent with the conclusions of this assessment. The concentration of contaminants in surface soils at Sites 5 and 6 were within background concentrations previously described (E.C. Jordan Co., 1990) and are not expected to adversely affect environmental receptors.

5.0 PROPOSED CLEANUP OBJECTIVE

The **baseline** human health and environmental risk assessments for Sites 5 and 6 do not indicate a significant risk from current exposure to asbestos. Because no asbestos is exposed, the major future exposure route of concern for asbestos is inhalation. The potential for increased future risk remains if any asbestos is uncovered during future development at the sites. Therefore, the remedial action objective at Sites 5 and 6 will be to prevent future potential risk of exposure to airborne asbestos.

6.0 THE NAVY'S PREFERRED ALTERNATIVE

The Navy's selection of the preferred alternative for Sites 5 and 6, as described in this Proposed Plan, is the result of a comprehensive evaluation, screening, and regulatory agency review process. The Draft Final SFS for the sites was conducted to identify remedial technologies and develop alternatives that could address contamination at Sites 5 and 6 (E.C. Jordan Co., 1991a). The Draft Final Technical Memorandum and the FS report describe the preferred alternative and all the other alternatives developed, and the process and criteria the Navy used to evaluate each alternative (ABB-ES, 1993; E.C. Jordan Co., 1992).

The FS for Sites 5 and 6 evaluated various alternatives for cleanup of the sites, ranging from no action to alternatives that would eliminate the need for long-term management at the sites. The No Action Alternative was included to comply with the **National Oil and Hazardous Substances Pollution Contingency Plan (NCP)** and to use as a baseline to measure the effectiveness of the other alternatives. Treatment alternatives were screened out early in the FS process because few treatment technologies can effectively treat asbestos, and those are not widely available for full-scale use.

The Navy's preferred alternative for cleanup at Sites 5 and 6 involves excavating, transporting, and placing the material as subgrade fill beneath the proposed landfill cap at Sites 1 and 3. This is a new alternative that was developed during the remedial design phase of Sites 1 and 3, when it was determined that fill requirements for subgrade material beneath the cap could incorporate the material from Sites 5 and 6. In addition, this alternative addresses the concerns raised during the public hearing for Site 8 (October 15, 1992). Excavating material from Sites 5 and 6 will eliminate the need for long-term land-use restrictions at these sites. Hauling material to Sites 1 and 3 will also minimize the hazards associated with transporting asbestos over long distances (e.g., to an off-base location) and eliminate the need for a low-permeability cap at Site 6 and the resultant long-term monitoring and land-use restrictions. Completely removing waste from Sites 5 and 6 allows these areas to be developed for future use and eliminates the need for long-term management.

The following paragraphs describe the preferred alternative in more detail and Section 7.0 presents the other alternatives developed and considered by the Navy for Sites 5 and 6.

Preferred Alternative: Excavation and Use as Subgrade Material at Sites 1 and 3

This alternative involves excavating nonhazardous construction rubble and debris from Site 6, excavating and containerizing asbestos-contaminated material from Sites 5 and 6, and transporting these materials, as well as the stockpiled soil at Site 6, for use as subgrade fill beneath the proposed landfill cap at Sites 1 and 3. This proposed cap exceeds MEDEP regulations for the closure of asbestos waste disposal sites. Although human health risks are not a current concern, this alternative would prevent future contact with asbestos.

This alternative includes the following components:

- development of a health and safety plan
- site preparation
- excavation and confirmation sampling
- containerization of the asbestos-contaminated material
- transportation of materials
- disposal
- site restoration

Components of this remedial alternative are described in the following paragraphs:

Development of a Health and Safety Plan. Because of potential health hazards associated with asbestos exposure, a detailed health and safety plan would be developed prior to any remedial actions at Sites 5 and 6. This plan would comply with the Occupational Safety and Health Act (OSHA) and other state and federal regulations, as appropriate. At a minimum, all workers would be required to wear protective clothing and respirators to prevent exposure to and inhalation of asbestos.

Site Preparation. Site preparation involves all of the activities associated with the alternative that must be conducted before the actual site remediation can begin. Important components include clearing and grubbing of vegetation, constructing an access road, mobilization of equipment, and erosion control at each site.

Site preparation at Sites 5 and 6 would include clearing trees, brush, and other vegetation from the sites and nearby work areas. The sites are relatively flat and free of heavy vegetation, but some of the surrounding area contains small trees and brush that would require some clearing to provide site access.

An access road and small staging area would be constructed at Sites 5 and 6 outside the limits of waste for storage of equipment during excavation, decontamination areas, and access for trucks to remove soil and debris. Staging areas for Sites 5 and 6 are shown on Figures 6-1 and 6-2, respectively. These areas would be used to store excavation equipment, supplies for containerizing asbestos-containing materials, equipment to break up construction rubble (Site 6), and any temporary facilities. Because the sites are small and only a relatively short time would be needed to implement the alternative, only minimal improvements would be made to prepare the access roads and staging areas. The existing access road at Site 6 would be improved to support heavy equipment. Equipment would then be mobilized to the sites.

To minimize erosion and sedimentation to downgradient areas during the excavations, erosion controls (e.g., a silt fence or hay bales) would be placed around the perimeter of the work area along the downgradient edges.

Excavation. Site 5 would be excavated to remove all materials containing asbestos. The overburden soils in the area of the primary anomaly from the magnetometer survey would be excavated and the asbestos-lined pipes removed. The pipes are estimated to be between 7 and 10 feet deep (R.F. Weston, Inc., 1983). For cost estimating purposes, it was assumed that a 1-foot-thick circumference of soil surrounding the pipes would be handled as asbestos waste (Figure 6-3). The soil surrounding the pipes would be cleared using a vacuum device that contains soils automatically, and then the pipes would be removed from the trench. The total quantity of asbestos-contaminated soil and pipes at Site 5 was estimated to be 12 cubic yards. Volume calculations are presented in the FS (E.C. Jordan Co., 1992). Actual volume to be excavated would be determined in the field by experienced asbestos abatement professionals and analytical sampling. Soil samples would also be collected and analyzed after the excavation to confirm the removal of asbestos material. The sampling program would be developed during the design phase, and would be subject to regulatory review and approval.

Site 6 would be excavated to remove all construction rubble and debris, including an assumed volume of 250 cubic yards of asbestos-contaminated materials. For cost estimating purposes, it was assumed that an area of 18,700 square feet would be excavated to a depth of 10 feet, plus the 1,900-cubic-yard on-site soil pile for a total of 8,800 cubic yards of material (Figure 6-4). Volume calculations are presented in the FS (E.C. Jordan Co., 1992). The amount of material to be excavated was

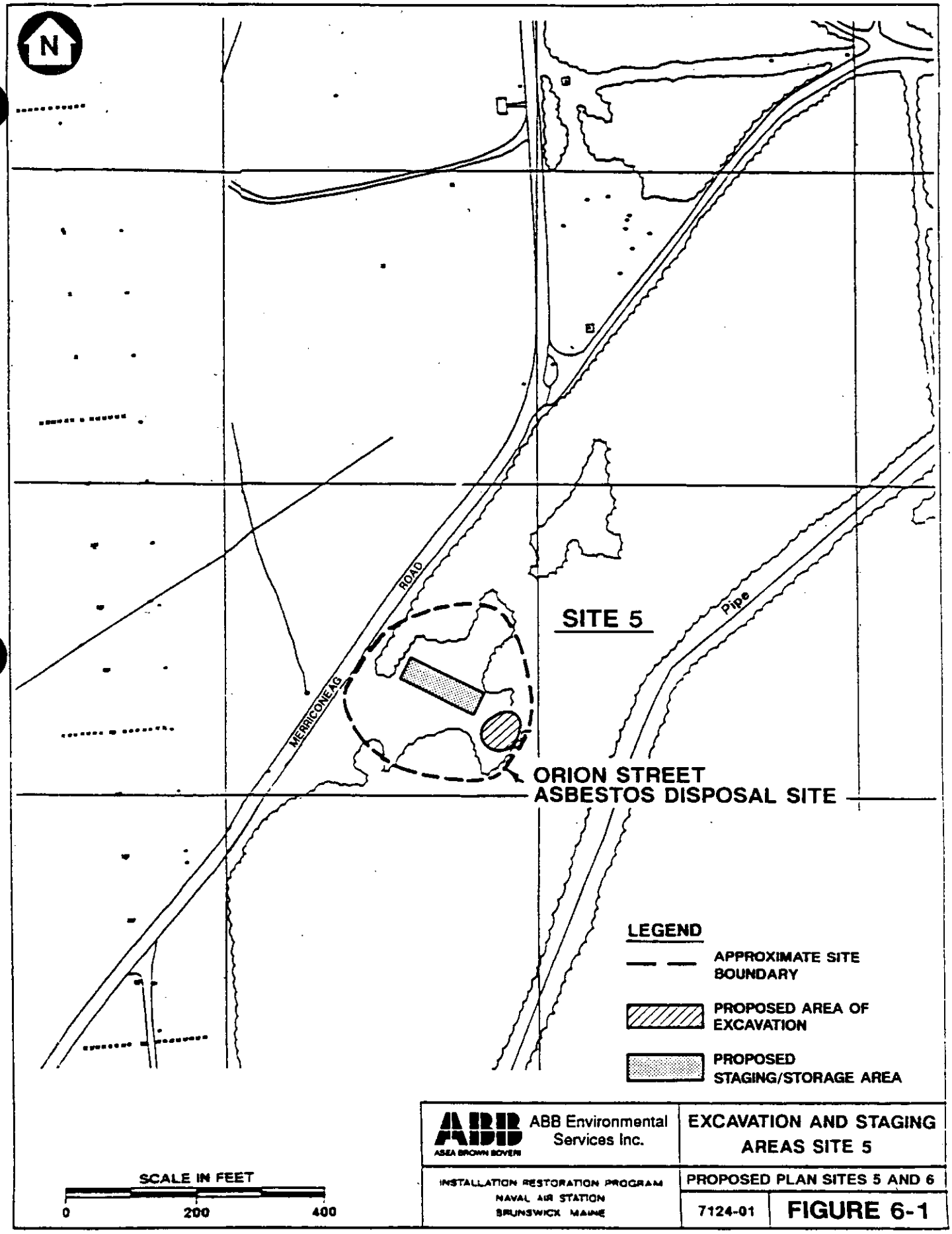
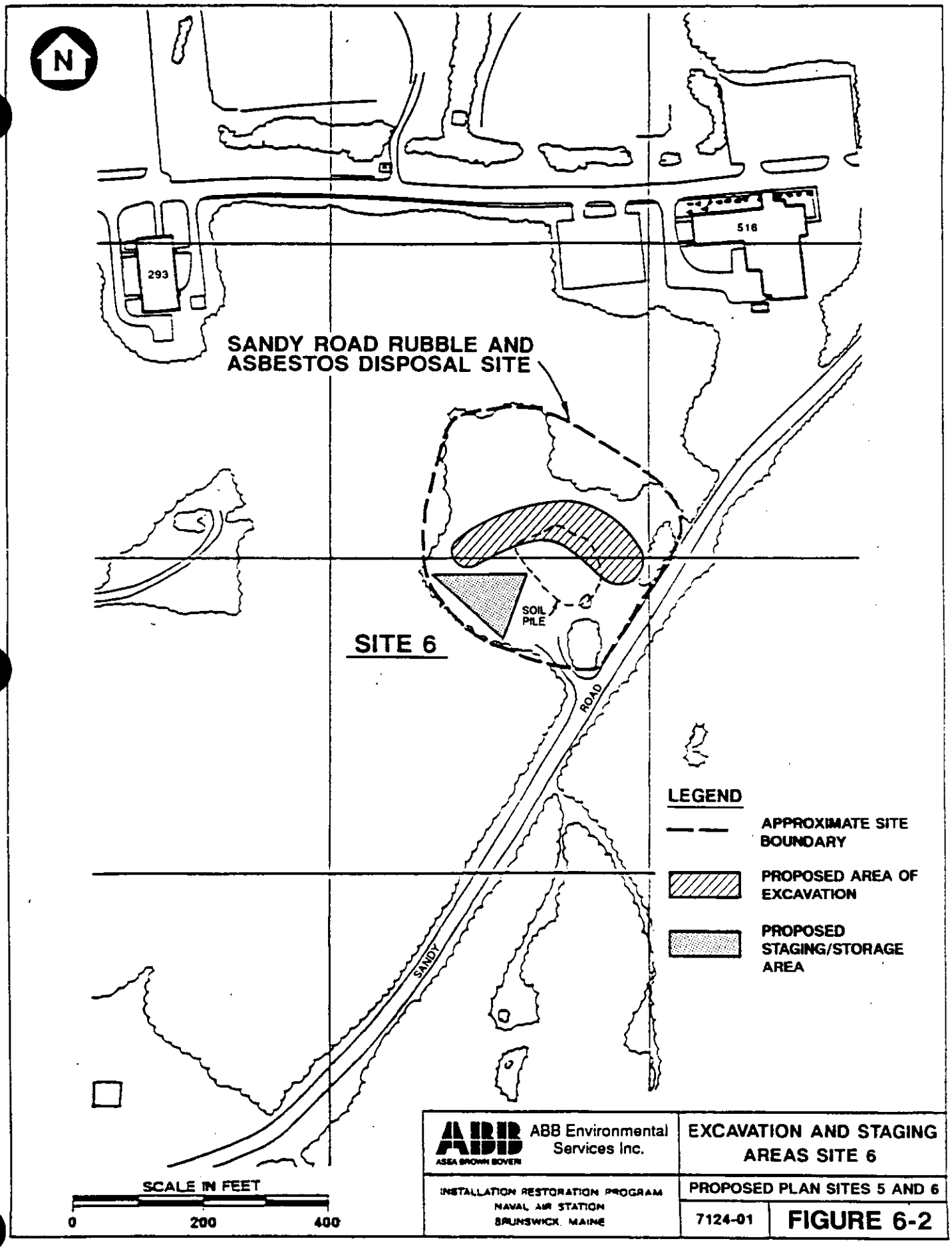
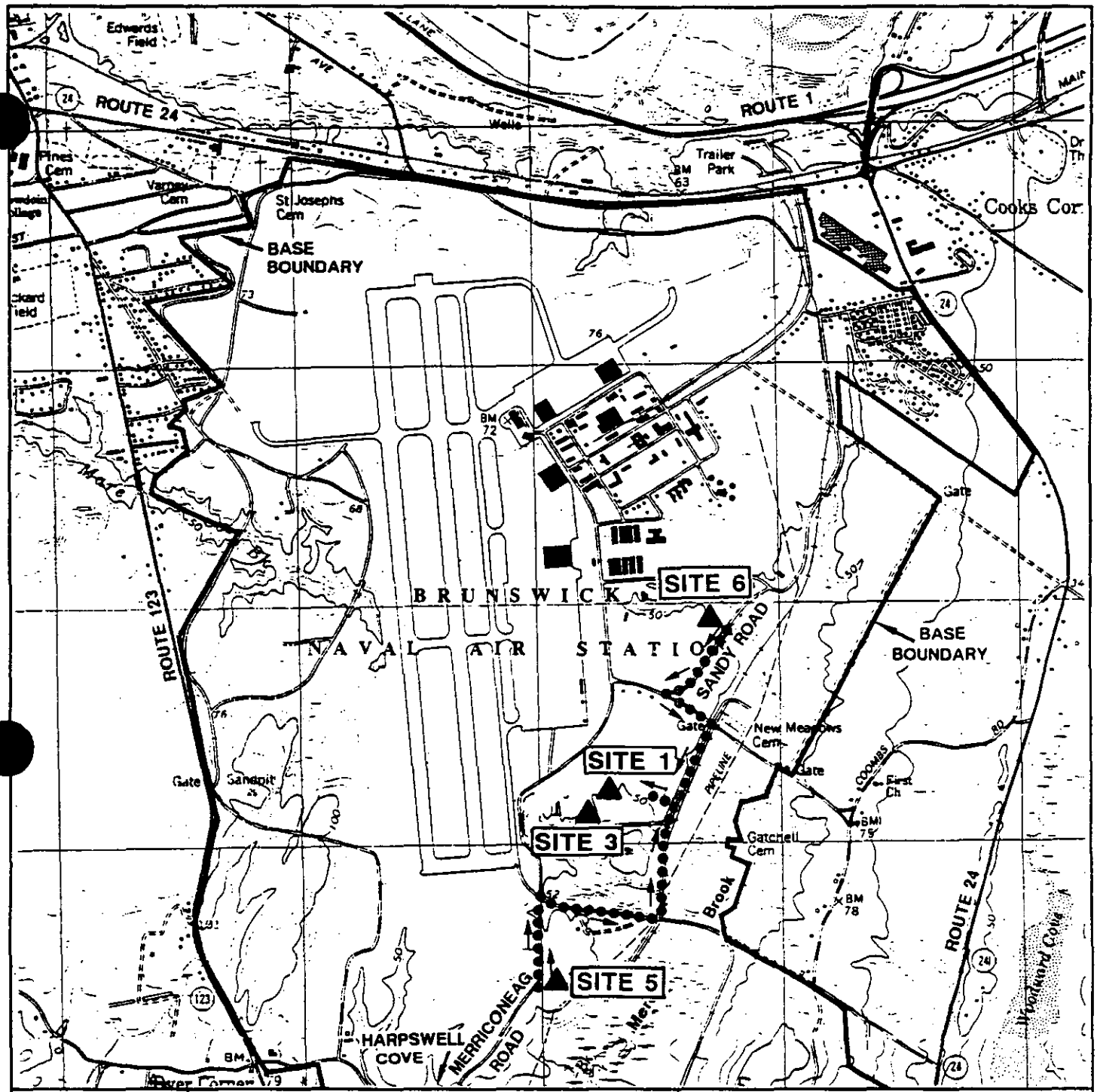


ABB ASEA BROWN BOVERI — ABB Environmental Services Inc.	EXCAVATION AND STAGING AREAS SITE 5	
INSTALLATION RESTORATION PROGRAM NAVAL AIR STATION BRUNSWICK MAINE	PROPOSED PLAN SITES 5 AND 6	
	7124-01	FIGURE 6-1


N
293
516
SANDY ROAD RUBBLE AND
ASBESTOS DISPOSAL SITE
SOIL
PILE
SITE 6
SANDY
ROAD
LEGEND
APPROXIMATE SITE BOUNDARY
PROPOSED AREA OF EXCAVATION
PROPOSED STAGING/STORAGE AREA
SCALE IN FEET
0
200
400
ABB
ASEA BROWN BOVERI
ABB Environmental Services Inc.
INSTALLATION RESTORATION PROGRAM
NAVAL AIR STATION
BRUNSWICK, MAINE
EXCAVATION AND STAGING AREAS SITE 6
PROPOSED PLAN SITES 5 AND 6
7124-01
FIGURE 6-2



SOURCE: USGS QUADRANGLE, BRUNSWICK, AND ORRS ISLAND, ME, DATED 1980, 1978. 7.5 MINUTE SERIES.

QUADRANGLE LOCATION

N

LEGEND

▲ SITE LOCATION

●●●●● PROPOSED TRUCK ROUTE

→ DIRECTION OF TRUCK TRAVEL

SCALE IN FEET

0 2,000 4,000

ABB Environmental Services Inc.

ABB ABBA BROWN BOVERI

INSTALLATION RESTORATION PROGRAM
NAVAL AIR STATION
BRUNSWICK, MAINE

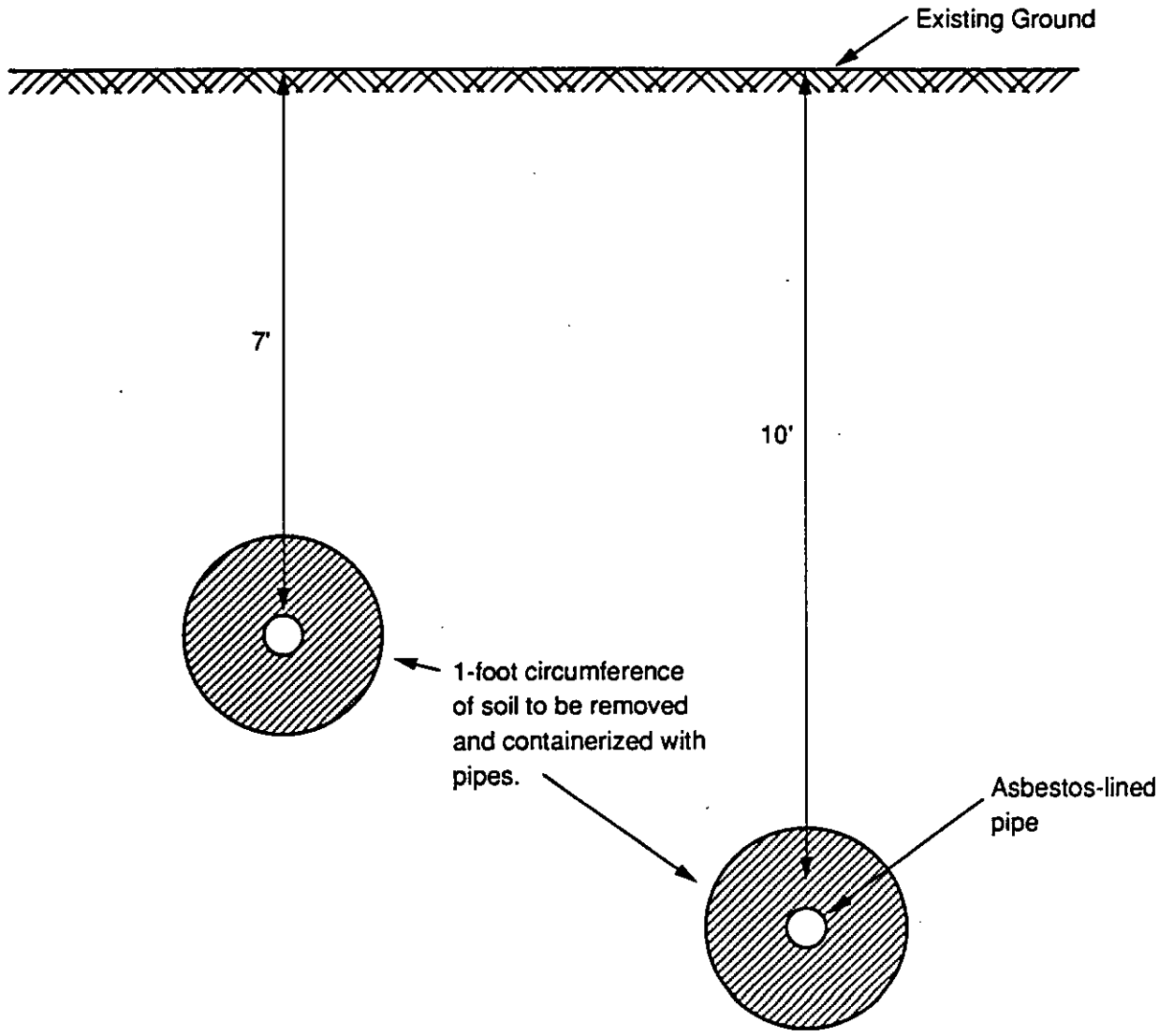
TRANSPORTATION ROUTE SITES 5 AND 6

PROPOSED PLAN SITES 5 AND 6

7124-01

FIGURE 6-5

Site 5: 12 cubic yards asbestos-lined pipe and contaminated soil. Site shall be backfilled with existing overburden and clean borrow material.



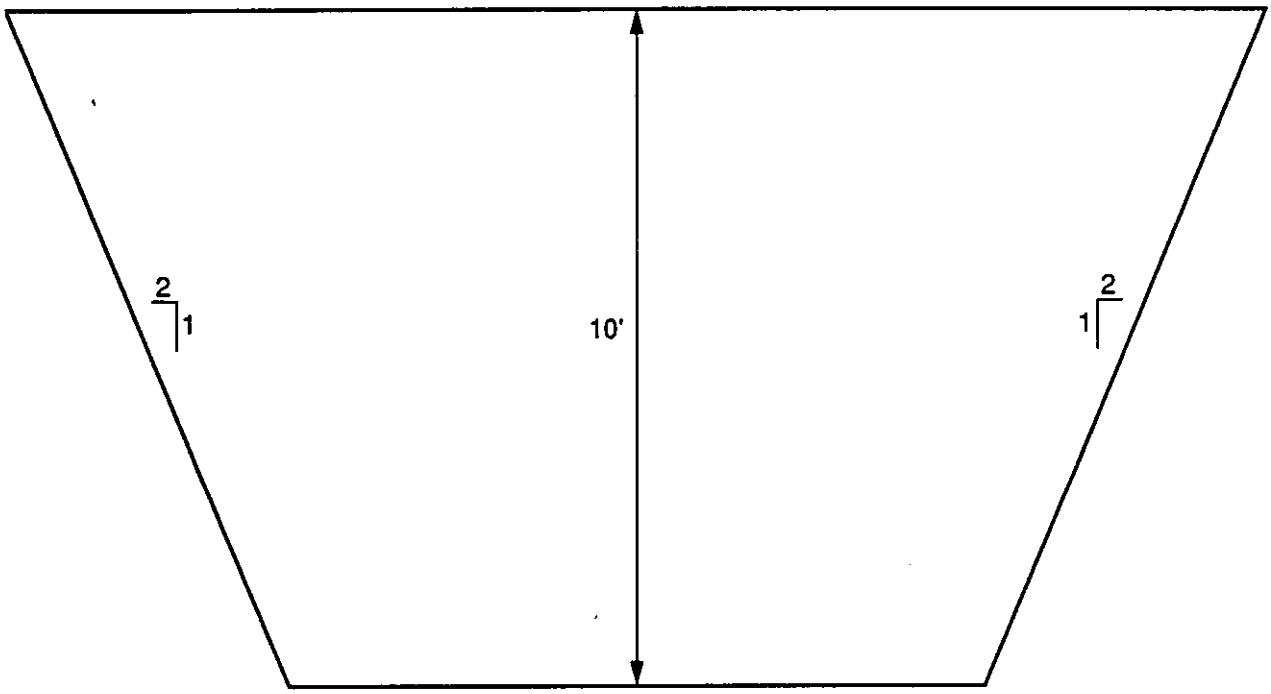
Not to Scale

ABB ASEA BROWN BOVERI — ABB Environmental Services Inc.	CONCEPTUAL CROSS-SECTION SITE 5	
INSTALLATION RESTORATION PROGRAM NAVAL AIR STATION BRUNSWICK, MAINE	PROPOSED PLAN SITES 5 AND 6	
	7124-01	FIGURE 6-3

9301042D

Site 6 Excavation

- 18,700-square-foot area, 10 feet deep (assumed)
- On-site soil pile assumed to be 5 feet high (average) and contain 1,900 cubic yards



Not to Scale

ABB ASEA BROWN BOVERI — ABB Environmental Services Inc.	CONCEPTUAL CROSS-SECTION SITE 6	
INSTALLATION RESTORATION PROGRAM NAVAL AIR STATION BRUNSWICK, MAINE	PROPOSED PLAN SITES 5 AND 6	
	7124-01	FIGURE 6-4

9301041D

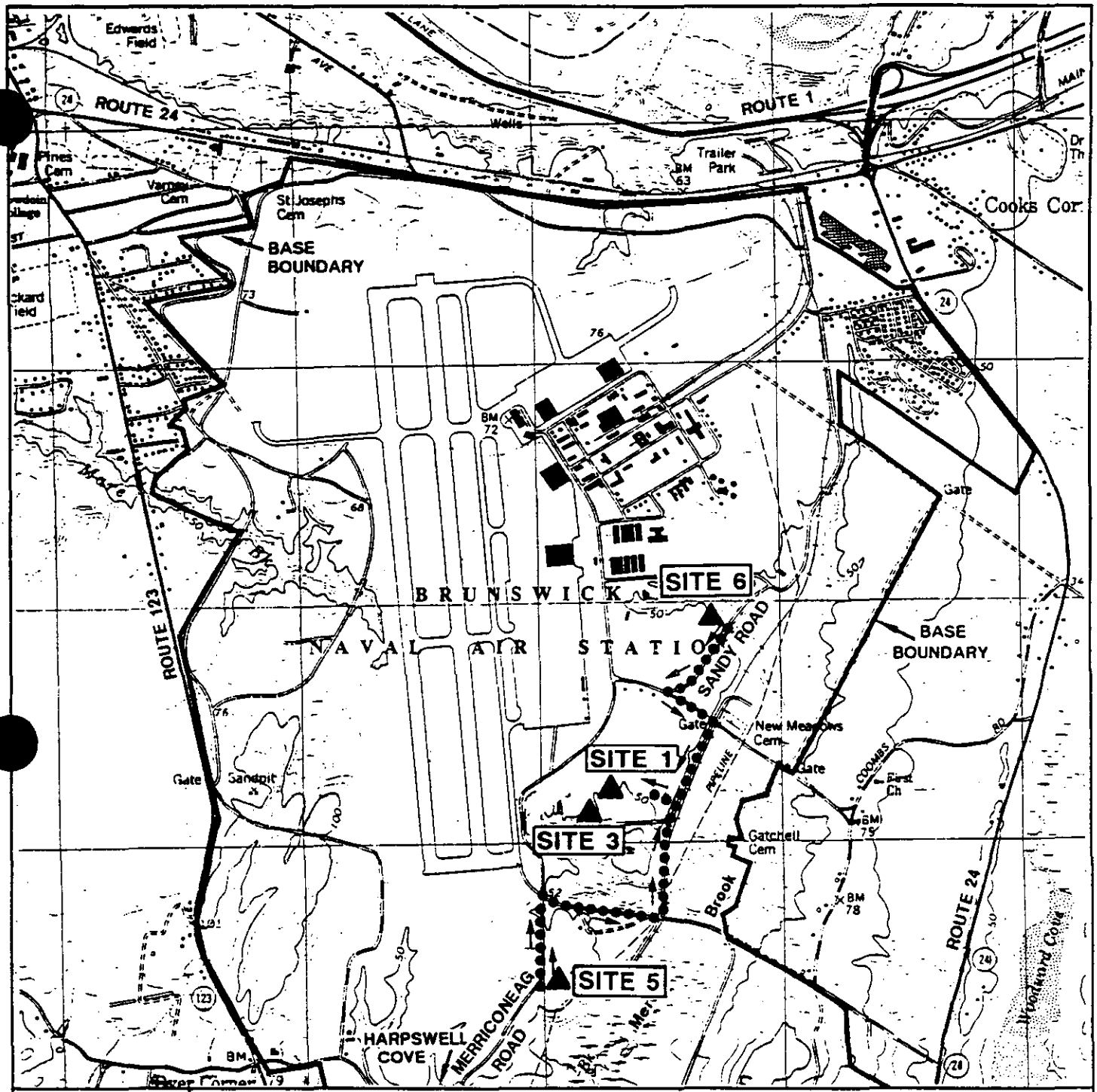
estimated from historical information, geophysical surveys, soil sampling, and monitoring well installation logs presented in the Draft Final Supplemental RI Report (E.C. Jordan Co., 1991b).

During excavation, engineering controls and personal protective equipment would be employed to protect worker safety. A temporary sprinkler system would be installed to keep all soils damp, preventing the generation of dust that could contain asbestos. As previously stated, a detailed health and safety plan would be developed and followed during all remedial actions. Soil samples would also be collected and analyzed after the excavation to confirm the removal of asbestos material. The sampling program would be developed during the design phase and would be submitted for regulatory review and approval. If, during excavation, materials other than asbestos or debris are uncovered, these materials would not be brought to Sites 1 and 3. The regulatory agencies would be notified, and the wastes would be characterized and disposed of at an approved special waste or hazardous waste landfill off base.

Containerization of Asbestos-contaminated Material. The asbestos-contaminated material excavated from Sites 5 and 6 would be containerized in two layers of polyethylene with a minimum thickness of 6 **mils**, sealed with duct tape, and labeled in accordance with NESHAPS regulations (40 CFR 61.150).

Transportation of Materials. Transportation of the material from Sites 5 and 6 to Sites 1 and 3 would be accomplished using 12-cubic-yard dump trucks. The material would be placed at Sites 1 and 3 for use as subgrade fill beneath the proposed landfill cap in accordance with Maine Solid Waste Management Regulations (Chapters 401.7 and 405.4). Chapter 401.7 covers closure of solid waste landfills and 405.4 regulates disposal of asbestos. The transport distance from Site 5 to Sites 1 and 3 is approximately 0.8 mile and from Site 6 to Sites 1 and 3 is approximately 0.65 mile. For cost-estimating purposes, the round-trip transport distance from these sites to Sites 1 and 3 is assumed to be 2 miles. The transportation route would not pass through residential or developed areas of the base. Figure 6-5 depicts the proposed transportation routes.

At Site 5, it is anticipated that excavation, containerization, and transport activities would take two to three days, and that one dump truck would be required for one day only. At Site 6, it is estimated that approximately 250 cubic yards of material would be excavated and loaded for transport each day, and that three to four trucks would be required to keep pace with the rates of excavation, containerization, and breaking of construction debris. Site 6 activities are estimated to last a total of eight weeks (for excavation of 8,800 cubic yards), including site preparation and restoration.



SOURCE: USGS QUADRANGLE, BRUNSWICK, AND ORRS ISLAND, ME, DATED 1980, 1978. 7.5 MINUTE SERIES.

QUADRANGLE LOCATION

N

LEGEND

▲ SITE LOCATION

●●●●● PROPOSED TRUCK ROUTE

→ DIRECTION OF TRUCK TRAVEL

SCALE IN FEET

0 2,000 4,000

ABB Environmental Services Inc.	TRANSPORTATION ROUTE SITES 5 AND 6	
INSTALLATION RESTORATION PROGRAM NAVAL AIR STATION BRUNSWICK, MAINE	PROPOSED PLAN SITES 5 AND 6	
	7124-01	FIGURE 6-5

Disposal. Sites 1 and 3 at NAS Brunswick are existing hazardous waste disposal sites that have been inactive since the 1970s. The cap for these sites is currently being designed in accordance with the Maine Solid Waste Management Regulations and the **Resource Conservation and Recovery Act (RCRA)** Subtitle C guidelines for closure of hazardous waste landfills, which are more stringent than NESHAPS or the Maine regulations for closure of asbestos disposal sites. Using the material from Sites 5 and 6 as subgrade fill at Sites 1 and 3 will help provide the cap with the requisite slopes to promote long-term positive drainage of stormwater off the cap.

Site Restoration. After excavation is complete at Sites 5 and 6, the areas would be backfilled with clean soil and regraded to promote positive drainage, and all denuded areas would then be seeded and mulched to re-establish vegetation. There would be no need for warning signs, institutional controls, or five-year site reviews because no waste would remain at either site.

The cost estimate for the preferred alternative is based on excavating 12 cubic yards of material from Site 5 and 8,800 cubic yards of material from Site 6 and transporting this material to Sites 1 and 3. The cost estimates and time estimates for this alternative are:

Estimated Time for Design and Construction: 4 months
Estimated Time of Operation: not applicable
Estimated Capital Cost: $681,000
*Estimated Operations and Maintenance Costs (**net present worth**): not applicable*
Estimated Total Cost (net present worth): $681,000

7.0 OTHER ALTERNATIVES EVALUATED IN THE FEASIBILITY STUDY

The public is also invited to comment on the other alternatives the Navy developed and evaluated. Because the same five alternatives were evaluated for Sites 5 and 6, the descriptions are combined herein. Each alternative is briefly described below and discussed in more detail in the FS Report (E.C. Jordan Co., 1992). The Excavation/Off-site Disposal Alternative for Site 6 is slightly different from the alternative presented in the FS, because it considers complete removal of all debris and asbestos-containing material rather than excavating only asbestos-containing material. In addition, another alternative that was not evaluated in the FS, Consolidation/Low-permeability Cover System, is presented in Subsection 7.5.

7.1 NO ACTION

The No Action Alternative does not include any remedial actions and provides a baseline for comparing alternatives. In the No Action Alternative, the sites would remain undisturbed. Because no remedial actions would be implemented, no costs would be incurred and long-term human health risks for the site would essentially be the same as those identified in the risk assessment (E.C. Jordan Co., 1991b). No current risks are present because asbestos materials are covered with soil. Site 5 is currently marked by warning signs.

7.2 MINIMAL ACTION

The Minimal Action Alternative for both Site 5 and Site 6 would use institutional controls to limit future activity at the sites. Annual inspections and five-year site reviews would be conducted.

Land-use restrictions can be used to restrict future site use, thereby limiting the potential for human exposure to asbestos. The legal implications of instituting land-use restrictions would be coordinated with appropriate Navy officials and state and local governments. If NAS Brunswick closes, land-use restrictions would be completed in accordance with requirements stated in NESHAPS (40 CFR 61.151[e]). Fencing and warning signs would be placed around each site to reduce public access and potential exposure to soil contaminants. The fence was assumed to be a 6-foot-high chain-link fence for cost estimating purposes. Warning signs would be posted along the fence at 50-foot intervals and there would be one access gate at each site.

Site 5:

Estimated Time for Design and Construction: 2 months
Estimated Time of Operation: 30 years
Estimated Capital Cost: $14,000
Estimated Operations and Maintenance Costs (net present worth): $9,000
Estimated Total Cost (net present worth): $83,000

Site 6:

Estimated Time for Design and Construction: 2 months
Estimated Time of Operation: 30 years
Estimated Capital Cost: $28,000
Estimated Operations and Maintenance Costs (net present worth): $38,000
Estimated Total Cost (net present worth): $134,000

7.3 LOW-PERMEABILITY COVER

The Low-permeability Cover Alternative was evaluated separately for each site. The cover system would be designed to meet current Maine regulations for closure of asbestos waste disposal sites because these requirements are more stringent than the cover system requirements outlined in NESHAPS. A cover would contain asbestos, eliminate the possibility of future contact and inhalation, and prevent generation of asbestos dust. Closure of the sites would also require land use restrictions, fencing, and warning signs as described for the Minimal Action alternatives. Annual inspections would be conducted to check the condition of the fence and cover and repair them when necessary. Five-year reviews would be required under CERCLA.

Site 5:

Estimated Time for Design and Construction: 6 months
Estimated Time of Operation: 30 years
Estimated Capital Cost: $58,000
Estimated Operations and Maintenance Costs (net present worth): $38,000
Estimated Total Cost (net present worth): $170,000

Site 6:

Estimated Time for Design and Construction: 7 months
Estimated Time of Operation: 30 years
Estimated Capital Cost: $133,000

Estimated Operations and Maintenance Costs (net present worth): $38,000
Estimated Total Cost (net present worth): $260,000

7.4 EXCAVATION/OFF-SITE DISPOSAL

The Excavation/Off-site Disposal Alternative for Site 5 involves removing all materials containing asbestos from the site and disposing of them in an off-base landfill permitted to receive asbestos wastes. The Excavation/Off-site Disposal Alternative for Site 6 involves excavating all debris from Site 6 and disposing of it off-site. Proper health and safety procedures would need to be followed during removal and transportation of asbestos. The sites would not need to be closed as asbestos disposal sites, as the Low-permeability Cover alternatives would. Closure of Sites 5 and 6 under the Excavation/Off-site Disposal alternatives would only require filling of the excavations, and restoring the sites to their original condition.

Site 5:

Estimated Time for Design and Construction: 6 months
Estimated Time of Operation: not applicable
Estimated Capital Cost: $90,000
Estimated Operations and Maintenance Costs (net present worth): not applicable
Estimated Total Cost (net present worth): $108,000

Site 6:

Estimated Time for Design and Construction: 9 months
Estimated Time of Operation: not applicable
Estimated Capital Cost: $3,065,000
Estimated Operations and Maintenance Costs (net present worth): not applicable
Estimated Total Cost (net present worth): $3,678,000

Costs for confirmatory sampling during excavation are not included.

7.5 CONSOLIDATION/LOW-PERMEABILITY COVER

This alternative includes excavating asbestos-lined pipes from Site 5, transporting them to Site 6, and constructing a low-permeability soil cover that would be designed and constructed to meet the performance requirements of the MEDEP regulations for the closure of asbestos waste disposal sites, because they are more stringent than those requirements outlined in NESHAPS. Proper health and safety procedures

would need to be followed during the removal of asbestos at Site 5 and transport to Site 6. Although human health risks are not a current concern, this alternative would prevent future contact with asbestos.

The cost estimate assumes the use of 18 inches of clay and 6 inches of vegetative cover to comply with the closure of construction debris landfills under the Maine Solid Waste Management Regulations, because the site would still contain solid waste, and requirements of this regulation are more stringent than the cover requirements for asbestos disposal sites under the Maine regulations, or as specified in NESHAPS.

Sites 5 and 6:

Estimated Time for Design and Construction: 7 months
Estimated Time of Operation: Minimum of 30 years of cover maintenance
Estimated Capital Cost: $249,000
Estimated Operations and Maintenance Costs (net present worth): $38,000
Estimated Total Cost (net present worth): $400,000

8.0 SUMMARY OF THE COMPARATIVE ANALYSIS OF ALTERNATIVES

In FS reports for remediating hazardous waste sites under CERCLA, the USEPA requires that remedial alternatives be evaluated using nine criteria. These nine criteria are used to select a remedy that meets national Superfund program goals of protecting human health and the environment, maintaining long-term protection, and minimizing untreated waste. Definitions of the nine criteria and a summary of the Navy's evaluation of the proposed remedial action and the other alternatives using the nine criteria are provided in the following subsections.

8.1 OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT

Overall Protection of Human Health and the Environment addresses how an alternative as a whole will protect human health and the environment. This includes an assessment of how human health and environmental risks are properly eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.

Currently, all the alternatives provide adequate protection of human health and the environment. There is no current risk at Sites 5 and 6 because there is no exposure to asbestos. The Excavation/Off-site Disposal and Consolidation/Low-permeability Cover alternatives for Sites 5 and 6 and the Preferred Alternative, Excavation and Use as Subgrade Material at Sites 1 and 3, would prevent future exposure, but engineering controls would be required to minimize exposure to airborne asbestos during excavation. The Minimal Action and Low-permeability Cover alternatives for both Sites 5 and 6 additionally reduce potential risk by limiting future exposure to contaminated soils. The No Action alternatives for Sites 5 and 6 might not be protective of human health if the sites were developed for residential use.

8.2 COMPLIANCE WITH APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARS)

Compliance with **Applicable or Relevant and Appropriate Requirements (ARARs)** addresses whether or not a remedy complies with all state and federal environmental and public health laws and requirements that apply or are relevant and appropriate

to the conditions and cleanup options at a specific site. If an ARAR cannot be met, the reasons must be clearly stated and a waiver may be required.

The Low-permeability Cover and the Consolidation/Low-permeability Cover alternatives for Sites 5 and 6, and the cover system component at Sites 1 and 3 of the Preferred Alternative, would meet the performance requirements of the Maine Landfill Disposal Regulations for the Management, Testing, and Disposal of Special Wastes (38 MRSA Section 1304, Chapter 405.4) governing disposal of asbestos, and the State of Maine Solid Waste Management Regulations (Chapter 401.7) and the Resource Conservation and Recovery Act (RCRA) Subtitle D governing the closure of solid waste landfills, which are relevant and appropriate. The cover performance requirements in the state regulations for asbestos disposal are more stringent than those outlined in the federal NESHAPS. The Cover System Preferred Alternative exceeds RCRA Subtitle D and meets RCRA Subtitle C governing the closure of hazardous waste landfills. The Excavation/Off-site Disposal and Consolidation/Low-permeability Cover alternatives for Sites 5 and 6 and the Excavation and Use as Subgrade Material at Sites 1 and 3 (the Preferred Alternative) would be conducted in accordance with NESHAPS and OSHA requirements. Fugitive dusts from clearing, grading, and excavation activities would be controlled (e.g., by using water sprays) to meet the requirements of NESHAPS. It should be noted that although the cover system at Sites 1 and 3 of the Preferred Alternative exceeds state and federal requirements for asbestos and construction debris, the landfill at Sites 1 and 3 is an unlicensed facility which is non-compliant with the asbestos disposal requirements of these regulations. However, the Maine Division of Solid Waste Facility Licensing has waived this requirement because disposal of the material at Sites 1 and 3 would be part of a remedial action (MEDEP, 1993). Location-specific ARARs require that erosion control measures such as revegetation and erosion control fencing be used during excavation and grading to prevent sediment transport off-site. The No Action and Minimal Action alternatives for both Sites 5 and 6 would not meet the Maine requirements for closure of asbestos waste disposal sites (38 MRSA Section 1304, Chapter 405.4).

The Preferred Alternative, Excavation and Use as Subgrade Material at Sites 1 and 3, exceeds the requirements of the most stringent ARAR, which is the State of Maine Solid Waste Management Regulations, Chapter 401.7.

8.3 LONG-TERM EFFECTIVENESS AND PERMANENCE

Long-term Effectiveness and Permanence refers to the ability of an alternative to maintain reliable protection of human health and the environment over time once cleanup goals have been met.

No unacceptable risk currently exists at either site. Excavation of asbestos-containing materials under the Consolidation/Low-permeability Cover and Excavation/Off-site Disposal alternatives and the Preferred Alternative, Excavation and Use as Subgrade Material at Sites 1 and 3, would be effective in eliminating long-term risks at Site 5 and would allow for unlimited use of the area following remedial action. The Excavation/Off-site Disposal Alternative and Excavation and Use as Subgrade Material at Site 1 and 3 (the Preferred Alternative) would also allow for unlimited use and eliminate potential risks at Site 6. The Low-permeability Cover alternatives for Sites 5 and 6 would effectively cover the sites and limit site access, but would require long-term inspection and maintenance. The Minimal Action alternatives for Sites 5 and 6 would limit access and future land use as long as the restrictions were enforced. There is a risk associated with uncontrolled exposure to asbestos in the future, so the No Action alternatives for both Sites 5 and 6 might not protect human health over the long-term.

8.4 REDUCTION OF TOXICITY, MOBILITY, OR VOLUME THROUGH TREATMENT

Reduction of Toxicity, Mobility, or Volume through Treatment are three principal measures of the overall performance of an alternative. The 1986 Superfund amendments emphasize that, whenever possible, the lead agency should select a remedy that uses a treatment process to permanently reduce the level of toxicity of contaminants at the site, minimize the spread of contaminants away from the source of contamination (i.e., mobility), and reduce the volume or amount of contamination at the site.

None of the alternatives for Sites 5 and 6 use treatment technologies that reduce toxicity, mobility, or volume. Asbestos is immobile in the subsurface environment, and would only present a health risk if asbestos fibers were inhaled. Treatment alternatives were screened out early in the FS process because few treatment technologies can effectively treat asbestos, and those are not widely available for full-scale use.

8.5 SHORT-TERM EFFECTIVENESS

Short-term Effectiveness refers to the likelihood of adverse effects on human health or the environment that could result during the construction and implementation of an alternative until cleanup goals have been achieved.

There would be no adverse effects on the community during implementation of the No Action, Minimal Action, or Low-permeability Cover alternatives for Sites 5 and 6. Dust suppression techniques would be used during cover construction for both Low-permeability Cover alternatives.

During excavation under the Excavation/Off-site Disposal alternatives for Sites 5 and 6, the Consolidation/Low-permeability Cover Alternative or the Preferred Alternative, engineering controls and personal protective equipment would be employed to protect site workers. A sprinkler system would be installed to keep all soils damp, preventing the generation of dust that could contain asbestos. Workers would also wear protective clothing and respirators to prevent inhalation of asbestos and follow a site health and safety plan. The Consolidation/Low-permeability Cover Alternative, which includes consolidation of waste from Site 5 with Site 6, and Excavation and Use as Subgrade at Sites 1 and 3, the Preferred Alternative, minimize potential hazards associated with transporting excavated materials over long hauling distances.

Environmental impacts for the remedial alternatives are associated with removal of trees and brush and surface water runoff. The No Action and Minimal Action alternatives for Sites 5 and 6 would have no adverse effects. All other alternatives that include a cover or an excavation component would require minor clearing of brush and some engineering controls to handle surface water runoff and erosion control.

8.6 IMPLEMENTABILITY

Implementability refers to the technical and administrative feasibility of an alternative, including the availability of materials and services needed to implement the alternative.

The No Action alternatives for both Sites 5 and 6 would be simple to implement. The Minimal Action alternatives for both sites would require land-use restrictions. The Low-permeability Cover alternatives for Sites 5 and 6 would also be easily implemented; however, they would require identification of a suitable borrow source and land-use restrictions. The Excavation/Off-site Disposal and Consolidation/Low-permeability Cover alternatives and the Preferred Alternative, Excavation and Use as Subgrade Material at Site 1 and 3, would be most difficult to implement, because they require special asbestos-handling procedures for removal and transportation of the material; the Consolidation/Low-permeability Cover Alternative for Site 6 would also require identification of a suitable borrow source and land-use restrictions. Locating the asbestos-contaminated material at Site 6 may be difficult and require significant exploration; however, the estimate of 8,800 cubic yards of material at this site was conservative and the actual volume to be removed may be significantly less.

8.7 COST

Cost includes the capital (up-front) cost of implementing an alternative as well as the cost of operating and maintaining the alternative over the long-term, and net present worth of both capital and operation and maintenance costs.

The capital, operation and maintenance, and total cost for each alternative is provided as part of the site description in the preceding sections on "The Navy's Preferred Alternative" and "Other Alternatives Evaluated in the FS." The No Action alternatives for Sites 5 and 6 would cost nothing. The major cost component in the Minimal Action alternatives for Sites 5 and 6 is long-term site inspection and five-year review costs. The cost estimates assume that these inspections and reviews would continue for 30 years. The Low-permeability Cover alternatives for Sites 5 and 6 are more expensive, because in addition to site inspections, five-year reviews, and institutional controls, the cost estimates include material and construction costs for the cover systems, engineering design costs, and long-term maintenance costs.

The Site 5 Excavation/Off-site Disposal Alternative cost was of the same order of magnitude as the Low-permeability Cover Alternative for Site 5 because of high excavation costs; however, the Excavation/Off-site Disposal Alternative for Site 5 does not include long-term maintenance and review costs. The Excavation/Off-site Disposal Alternative for Site 6 assumed that all material disposed of at Site 6 would

be excavated and transported to an off-base landfill for final disposal. More than half of the total cost of this alternative is estimated to be for transporting and disposing of the soil and debris, making this alternative prohibitively expensive. The cost of Consolidation/Low-permeability Cover Alternative was estimated by combining the Excavation/Off-Site Disposal Alternative costs for Site 5 and the Low-permeability Cover Alternative costs for Site 6. Transportation and disposal costs for Site 5 were eliminated, but construction costs for Site 6 were increased to account for burial of Site 5 pipes using soil from the Site 6 soil pile. Over half of the estimated cost of the Preferred Alternative, Excavation and Use as Subgrade Material at Sites 1 and 3, is attributed to the excavation and backfilling cost at Site 6, which is based upon 8,800 cubic yards. This volume is a conservative estimate, and the cost may be significantly reduced depending upon the actual volume encountered. Other benefits of this alternative are that with the material placed beneath the proposed cap at Sites 1 and 3, there would be no off-base hauling of material as there would be for the Excavation/Off-site Disposal Alternative and there would be no long-term monitoring cost as there would be for the Consolidation/Low-permeability Cover Alternative.

8.8 STATE ACCEPTANCE

State Acceptance addresses whether, based on its review of the RI/FS and Proposed Plan, the state concurs with, opposes, or has no comment on the alternative the Navy is proposing as the remedy for the site.

The State of Maine has reviewed the Proposed Plan and has no further comments. The state may comment after it has had an opportunity to review comments received during the public comment period.

8.9 COMMUNITY ACCEPTANCE

Community Acceptance addresses whether the public concurs with the Navy's Proposed Plan. Community Acceptance of this Proposed Plan will be evaluated based on comments received at the Public Hearing and during the public comment period. It should be noted that the Excavation and Use as Subgrade Material at Sites 1 and 3 Alternative was developed as a direct result of public comment received on the Site 8 Preferred Alternative. Public comments specifically requested the

evaluation of alternatives that do not result in land-use restrictions. The Navy's Preferred Alternative for Sites 5 and 6 was developed to meet this objective.

8.10 SUMMARY

Of the nine criteria, protection of human health and compliance with all ARARs are requirements that must be met by all remedies. The Navy balances its consideration of alternatives with respect to long-term effectiveness and permanence; reductions of toxicity, mobility, or volume through treatment; short-term effectiveness; implementability; and cost. State and community concerns are considered as modifying criteria factored into a final selection of a remedy. Consideration of USEPA, state, and community comments may prompt the Navy to modify aspects of the preferred alternative or decide that another alternative provides a more appropriate balance.

9.0 THE NAVY'S RATIONALE FOR PROPOSING THE PREFERRED ALTERNATIVE

Based on current information and analysis of the RI and FS reports, the Navy believes that the preferred alternative for Sites 5 and 6 is consistent with the requirements of the Superfund law and its amendments, specifically Section 121 of CERCLA, and to the extent practicable, the NCP. All the alternatives presented in this Proposed Plan would provide overall protection of human health and the environment under current conditions; however, the Excavation and Use as Subgrade Material at Sites 1 and 3 Alternative may provide additional protection if the base is used for residential development in the future because Sites 5 and 6 would not require land-use restrictions.

In the Navy's analysis, the preferred alternative identified in this Proposed Plan is more effective than the other alternatives considered. Over half of the cost associated with the preferred alternative are directly related to excavation and backfill; if the actual volume excavated is less than the estimate, the cost of this remediation would be significantly reduced and be comparable in cost to the other alternatives considered. Although this alternative is estimated to be more costly than the other alternatives under consideration, except for the Excavation/Off-site Disposal Alternative for Site 6, the Navy believes that the benefit in providing the opportunity for future development of Sites 5 and 6 offsets the increased cost.

In addition, in the Navy's estimation, the preferred alternative would achieve the best balance among the criteria used by USEPA to evaluate the alternatives. The preferred alternative would provide short- and long-term protection of human health and the environment, and would attain all federal and state applicable or relevant and appropriate human health and environmental requirements.

Administrative Record: A file established and maintained in compliance with Section 113(k) of CERCLA consisting of information upon which the lead agency bases its final decisions on the selection of cleanup method(s) for a Superfund site. The Administrative Record should be established at or near the site and made available to the public.

Applicable or Relevant and Appropriate Requirements (ARARs): ARARs include any state or federal statute or regulation that pertains to protection of public health and the environment in addressing certain site conditions or using a particular cleanup technology at a Superfund site. The Navy must consider whether a remedial alternative meets ARARs as part of the process for selecting a cleanup alternative for a Superfund site.

Asbestos: A mineral that separates into thread-like fibers. Asbestos does not conduct heat or electricity and does not burn, which is why it was used as an insulating or fireproofing material. Inhalation exposure to asbestos fiber or dust has been shown to cause respiratory diseases including lung cancer.

Background Concentration: The amount of a substance that occurs naturally in the environment.

Baseline: A statement of existing conditions and their relative consequences should no further action be taken.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA): A federal law passed in 1980 and modified in 1986 by the Superfund Amendments and Reauthorization Act (SARA). The act created a special tax that goes into a trust fund, commonly known as Superfund, to investigate and clean up abandoned or uncontrolled hazardous waste sites.

Feasibility Study (FS): A report that summarizes the development and analysis of remedial alternatives.

Geophysical Survey: Site investigation techniques (e.g., magnetometer, ground-penetrating radar) that do not require invasive activity. These techniques are used to characterize subsurface conditions (e.g., buried drums or utilities, surface of bedrock).

Groundwater: Water found beneath the earth's surface that fills pores in soil and bedrock to the point of saturation. Groundwater may transport substances that have percolated downward from the ground surface as it flows toward its point of discharge.

Initial Assessment Study (IAS): Field investigations that confirm the presence of hazardous materials at a site.

Inorganics: Class of naturally occurring compounds that includes metals, cyanide, nitrates, sulfates, chlorides, carbonate, bicarbonate, and other oxide complexes.

Mil: Unit of measure equal to one thousandth of an inch.

Monitoring Wells: Wells drilled to collect groundwater samples for physical, chemical, or biological analysis to determine the amounts, types, and distribution of contaminants in the groundwater beneath the site.

National Oil and Hazardous Substances Pollution Contingency Plan (NCP): The federal regulation that guides determination of the sites to be corrected under the Superfund program and the program to prevent or control spills into surface waters or other portions of the environment.

National Priorities List (NPL): USEPA's list used to prioritize uncontrolled or abandoned hazardous waste sites identified for possible long-term remedial action under Superfund.

Net Present Worth: The amount of money necessary to secure the promise of future payment, or series of payments, at an assumed interest rate.

Nonputrescible: Non-degradable; material that does not decay or rot.

Overburden Aquifer: Water-bearing soil overlying the bedrock layer.

Polarized Light Microscopy: Identification of the presence, content, and type of asbestos by viewing a sample through a polarized light microscope.

Pollution Abatement Confirmation (PAC) Study: A study conducted to confirm the presence of hazardous constituents or hazardous waste.

Record of Decision (ROD): A public document that explains the cleanup alternative to be used at a National Priorities List (NPL) site. The ROD is based on information and technical analysis generated during the RI/FS and on consideration of the public comments and community concerns.

Remedial Alternatives: Cleanup options evaluated for a site to address contamination and contaminated media at the site.

Remedial Investigation (RI): The Remedial Investigation determines the nature and extent and composition of contamination at a hazardous waste site, and directs the types of cleanup options that are developed in the FS.

Resource Conservation and Recovery Act (RCRA): A federal law passed in 1976 and modified in 1984 by the Hazardous and Solid Waste Amendments. The Act required USEPA to establish a system for controlling hazardous wastes from the point of generation, through transport, treatment, storage, and final disposal.

Risk Assessment: Evaluation and estimation of the current and future potential for adverse human health or environmental effects from exposure to contaminants.

Semivolatile Organic Compounds: A group of chemical compounds having a molecular weight greater than 100. These compounds are heavier than and less volatile than volatile organic compounds.

Stratified: Layered.

Subgrade Fill: Material placed to provide the proper grades for final cover at a site (e.g., landfill, roadway). Soil is the most commonly used fill material; however recycled materials, construction debris, etc., may be incorporated on a site-specific basis.

Superfund: The program operated under CERCLA and SARA that funds and carries out the USEPA solid waste emergency and long-term removal activities.

Supplemental Feasibility Study (SFS): Presents the identification and screening of remedial technologies and the development and screening of remedial alternatives steps of the FS process for sites investigated during the Supplemental RI (E.C. Jordan Co., 1991b).

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ARARs	Applicable or Relevant and Appropriate Requirements
bgs	below ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
FFA	Federal Facility Agreement
FS	Feasibility Study
IAS	Initial Assessment Study
IRP	Installation Restoration Program
MEDEP	Maine Department of Environmental Protection
NACIP	Navy Assessment and Control of Installation Pollutants
NAS	Naval Air Station
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NESHAPS	National Emissions Standards for Hazardous Air Pollutants
NPL	National Priorities List
OSHA	Occupational Safety and Health Act
PAC	Pollution Abatement Confirmation
RI	Remedial Investigation
RCRA	Resource Conservation and Recovery Act
ROD	Record of Decision
SARA	Superfund Amendments and Reauthorization Act
SFS	Supplemental Feasibility Study
USEPA	U.S. Environmental Protection Agency