TECHNICAL MEMORANDUM

DETAILED EVALUATION OF ALTERNATIVE 5, 6E: EXCAVATION AND USE AS SUBGRADE MATERIAL AT SITES 1 AND 3

Prepared for:

U.S. Department of the Navy
Northern Division
Naval Facilities Engineering Command
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Prepared by:

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Portland, Maine
Project No. 7124-01

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INTRODUCTION

The Excavation and Use as Subgrade Material at Sites 1 and 3 Alternative was developed in response to the results of borrow estimates calculated during the Design Development Submission work for Sites 1 and 3 at the Naval Air Station (NAS) in Brunswick, Maine. These borrow estimates indicate that the material from Sites 5 and 6 could be incorporated as subgrade fill beneath the proposed landfill cap at Sites 1 and 3.

This technical memorandum describes the Excavation and Use as Subgrade Material at Sites 1 and 3 Alternative and presents the detailed evaluation of this alternative against the nine evaluation criteria specified in the National Oil and Hazardous Substances Pollution Contingency Plan. It is similar in content and format to the detailed evaluation of the other alternatives developed for these sites and presented in the Feasibility Study (FS) (E.C. Jordan Co., 1992).

1.0 DETAILED EVALUATION OF EXCAVATION AND USE AS SUBGRADE MATERIAL AT SITES 1 AND 3

The following subsections present the detailed analysis of the Excavation and Use as Subgrade Material at Sites 1 and 3 Alternative. This alternative was identified in response to the results of borrow estimates calculated during the Design Development Submission work for Sites 1 and 3, which indicated that the material from Sites 5 and 6 could be incorporated as subgrade material beneath the proposed landfill cap. These estimates are based on a new landfill height dictated by a geotechnical evaluation of the slurry wall consolidation around the perimeter of the landfill at Sites 1 and 3. In addition, this alternative addresses public concerns over restricted future land use at NAS Brunswick. Because waste would be removed from both Sites 5 and 6, institutional controls and long-term maintenance would not be required at either site.

2.0 ALTERNATIVE 5, 6 E: EXCAVATION AND USE AS SUBGRADE MATERIAL AT SITES 1 AND 3

Alternative 5, 6 E 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 Maine Department of Environmental Protection (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.

2.1 Description

This alternative includes the following components:

- development of a health and safety plan
- site preparation
- excavation and confirmation sampling
- containerization of 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 the 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, mobilizing equipment, and controlling erosion at each site.

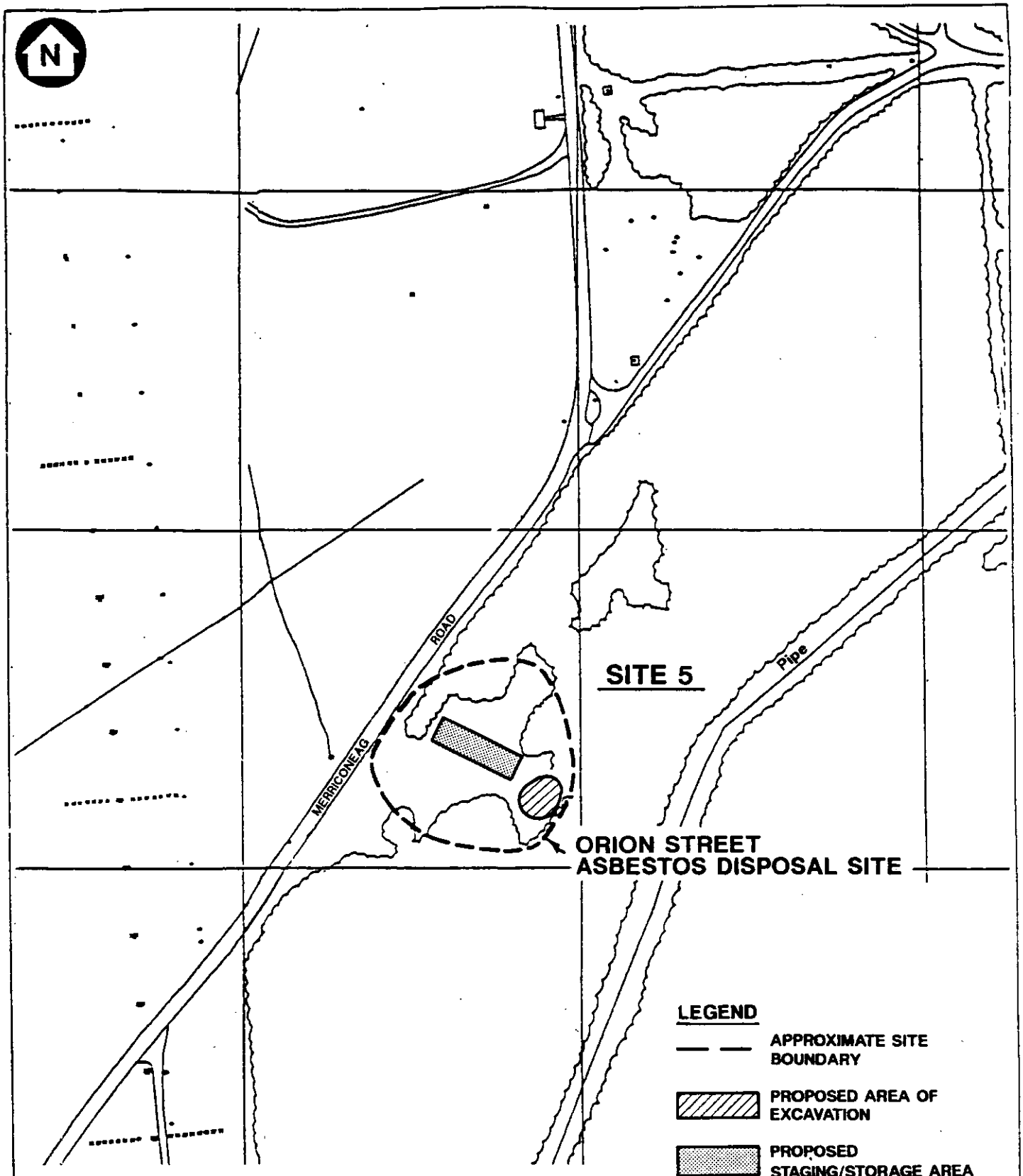
Site preparation at Sites 5 and 6 would include clearing trees, brush, and other vegetation from the sites and nearby work areas. The sites are relatively flat and free of heavy vegetation, but some of the surrounding area contains small trees and brush that would require some clearing to provide site 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 2-1 and 2-2, respectively. These areas would be used to store excavation equipment, supplies for containerizing asbestos-contaminated 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 2-3). 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.

Site 6 would be excavated to remove all construction rubble and debris, including an assumed volume of 250 cubic yards of asbestos-contaminated materials. Construction rubble and debris would be broken into manageable-sized pieces, as necessary. For



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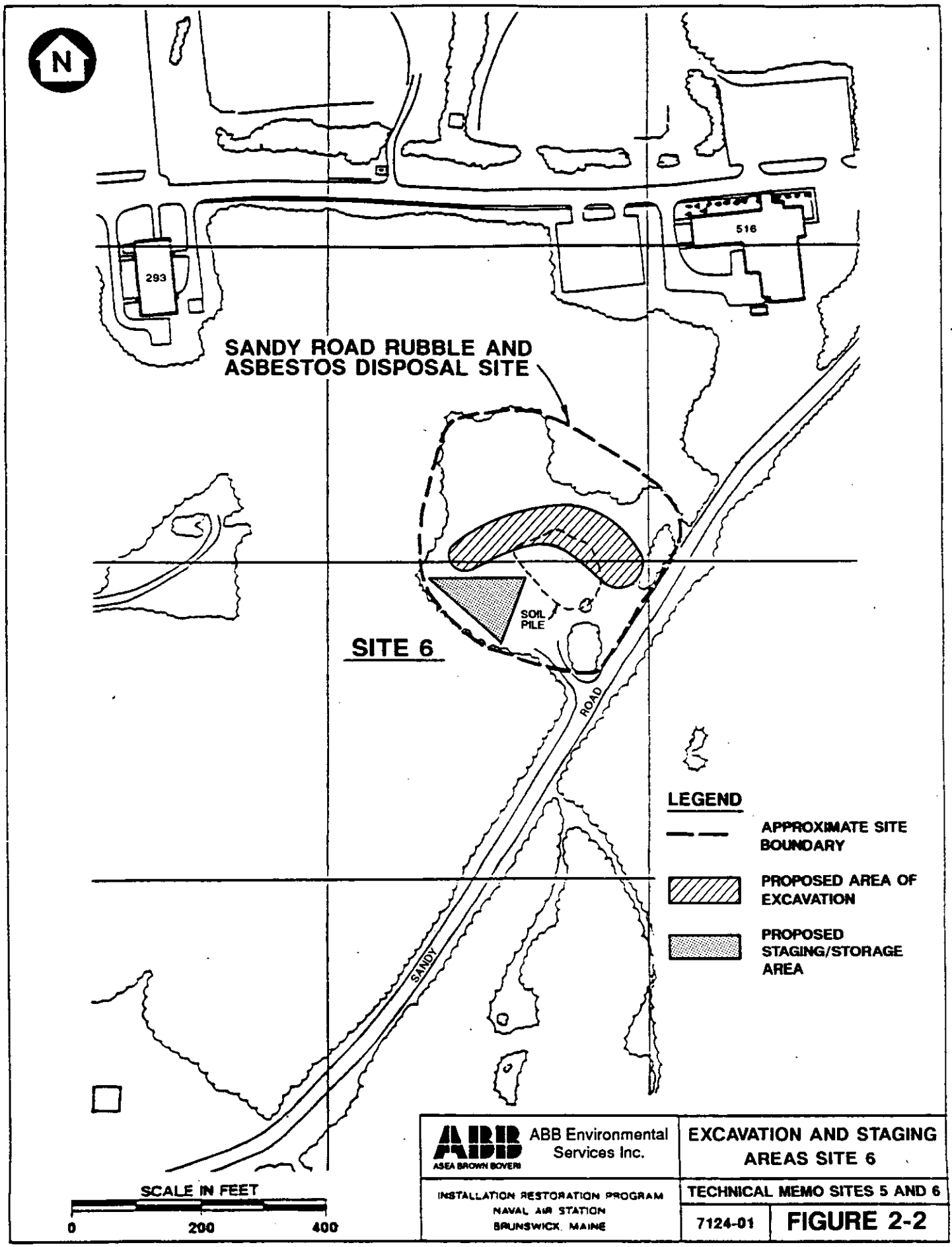
EXCAVATION AND STAGING AREAS SITE 5

INSTALLATION RESTORATION PROGRAM
NAVAL AIR STATION
BRUNSWICK, MAINE

TECHNICAL MEMO SITES 5 AND 6

7124-01

FIGURE 2-1


N
516
293
SANDY ROAD RUBBLE AND ASBESTOS DISPOSAL SITE
SOIL PILE
SITE 6
ROAD
SANDY
LEGEND
APPROXIMATE SITE BOUNDARY
PROPOSED AREA OF EXCAVATION
PROPOSED STAGING/STORAGE AREA
SCALE IN FEET
0
200
400
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EXCAVATION AND STAGING AREAS SITE 6
INSTALLATION RESTORATION PROGRAM
NAVAL AIR STATION
BRUNSWICK, MAINE
TECHNICAL MEMO SITES 5 AND 6
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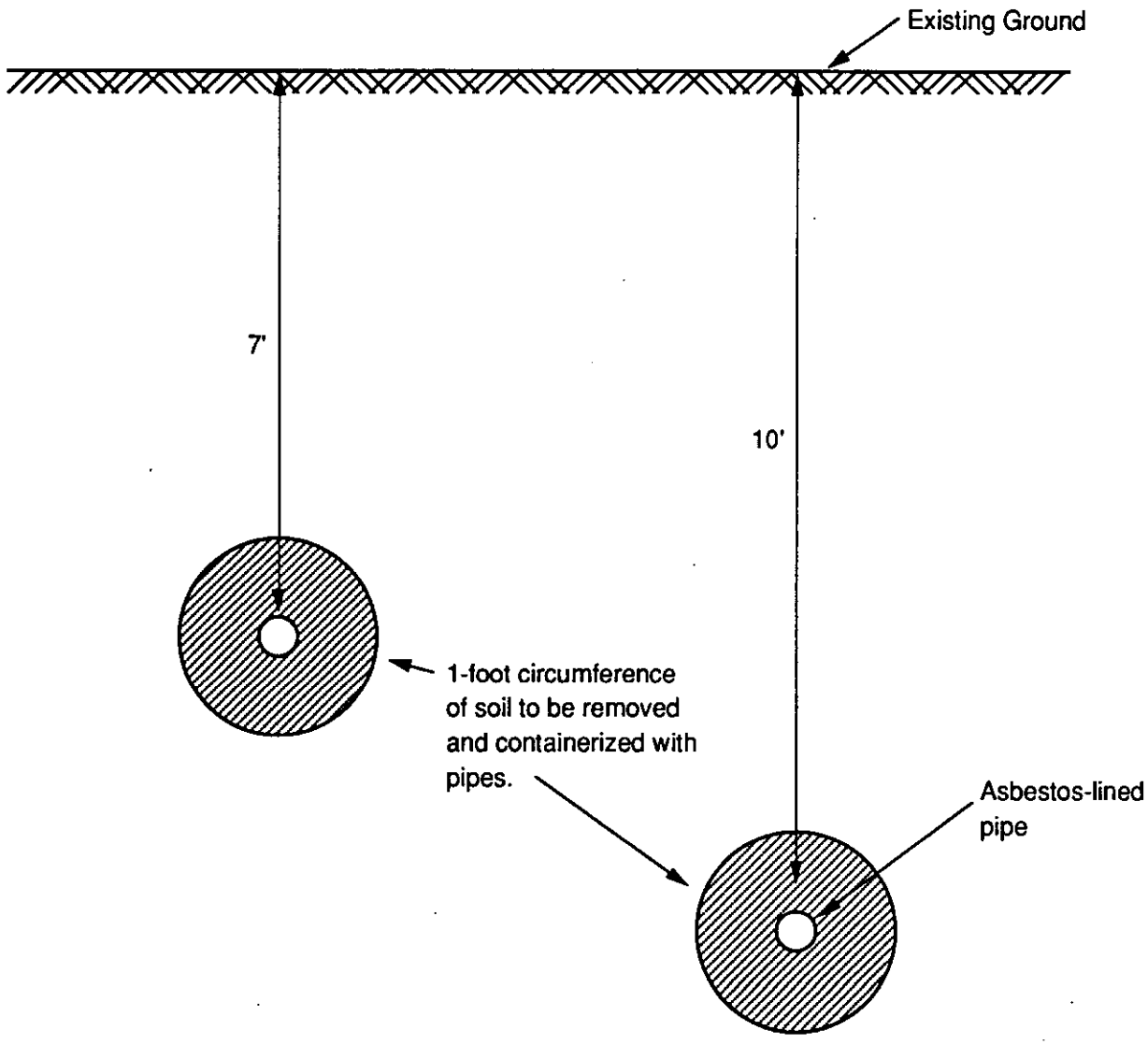
FIGURE 2-2

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

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CONCEPTUAL CROSS-SECTION
SITE 5

INSTALLATION RESTORATION PROGRAM
NAVAL AIR STATION
BRUNSWICK, MAINE

TECHNICAL MEMO SITES 5 AND 6

7124-01

FIGURE 2-3

9301042D

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 2-4). Volume calculations are presented in the FS (E.C. Jordan Co., 1992). The amount of material to be excavated was estimated from historical information, geophysical surveys, soil sampling, and monitoring well installation logs presented in the Draft Final Supplemental Remedial Investigation Report (E.C. Jordan Co., 1991). The 8,800 cubic yards at Site 6 is a conservative volume; cost estimates were also prepared for 4,400 cubic yards to provide a probable range of costs at this site.

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.

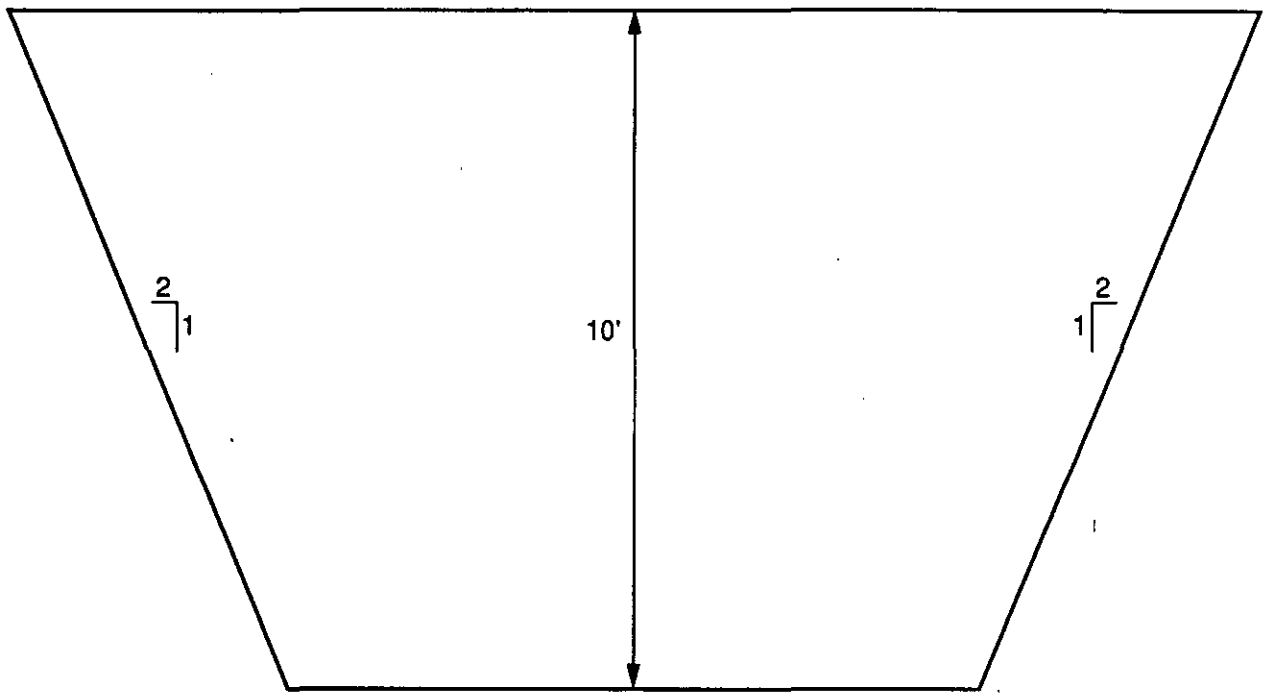
If, during excavation, materials other than asbestos or debris are uncovered, these materials would not be brought to Sites 1 and 3. The regulatory agencies would be notified, and the wastes would be characterized and disposed of at an approved special waste or hazardous waste landfill off base.

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 National Emission Standards for Hazardous Air Pollutants (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 by 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 State of 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

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



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CONCEPTUAL CROSS-SECTION
SITE 6

INSTALLATION RESTORATION PROGRAM
NAVAL AIR STATION
BRUNSWICK, MAINE

TECHNICAL MEMO SITES 5 AND 6

7124-01

FIGURE 2-4

9301041D

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 2-5 depicts the proposed transportation routes.

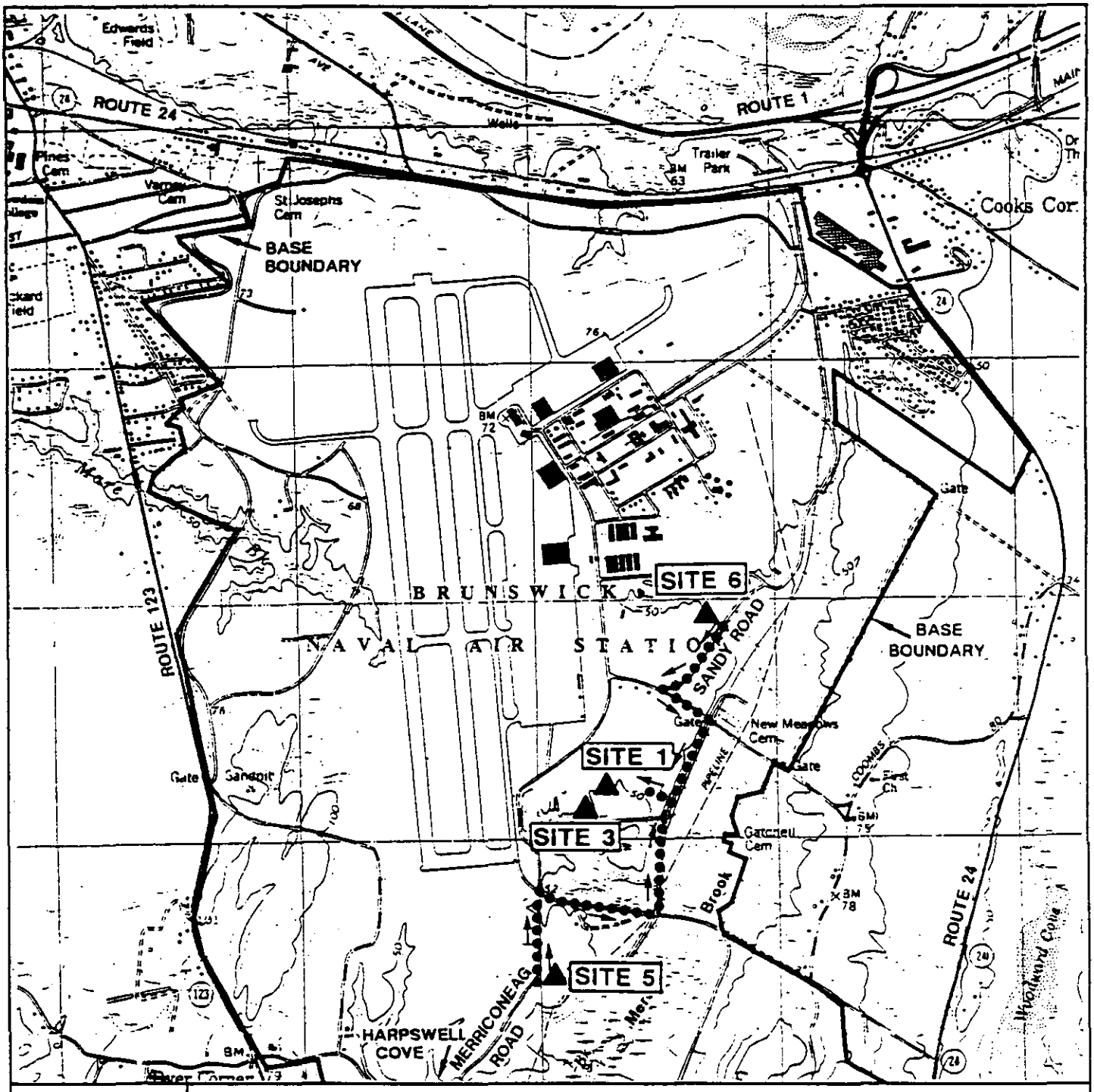
At Site 5, it is anticipated that excavation, containerization, and transport activities would take two to three days, and that one dump truck would be required for one day only. At Site 6, it is estimated that approximately 250 cubic yards of material would be excavated and loaded for transport each 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.

Disposal. Sites 1 and 3 at NAS Brunswick are existing hazardous waste disposal sites that have been inactive since the 1970s. The cap for Sites 1 and 3 is currently being designed in accordance with the Maine Solid Waste Management Regulations and the federal Resource Conservation and Recovery Act 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 on site.

2.2 Overall Protection of Human Health and the Environment

Human health risks from exposure to asbestos are currently not a concern at Sites 5 and 6; however, this alternative would prevent any future contact with asbestos if these sites are ever developed in the future. Asbestos minerals are very stable in the subsurface environment and are unlikely to migrate. Groundwater is considered an unlikely transport mechanism; the depth to groundwater at Site 5 is 25 to 30 feet and



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

MAINE

QUADRANGLE LOCATION

N

LEGEND

▲ SITE LOCATION

●●●●● PROPOSED TRUCK ROUTE

→ DIRECTION OF TRUCK TRAVEL

SCALE IN FEET

0 2,000 4,000

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INSTALLATION RESTORATION PROGRAM
NAVAL AIR STATION
BRUNSWICK, MAINE

TRANSPORTATION ROUTE
SITES 5 AND 6

TECHNICAL MEMO
SITES 5 AND 6

7124-01

FIGURE 2-5

at Site 6 is 15 to 20 feet, minimizing the possibility of asbestos migrating through groundwater flow.

During removal of the asbestos-contaminated materials at Sites 5 and 6, exposure to airborne asbestos could occur. This exposure would be reduced by wetting the material prior to excavation to minimize any airborne migration of asbestos and thereby minimizing any risk to human health and the environment. In addition, the asbestos-contaminated material would be containerized to reduce the risk of any further exposure.

Removal of the rubble and debris from Site 6 would eliminate the physical hazards (i.e., chance of injury) associated with exposed reinforced concrete, pipes, and other debris at the site. Placement of this material at Sites 1 and 3 for use as subgrade fill beneath the proposed landfill cap would reduce accessibility to the debris during construction and eliminate the physical hazards associated with the material once cap construction is complete.

Removal of the material from Sites 5 and 6 would be beneficial to environmental receptors because once the material is removed, the sites would be regraded and revegetated to restore the natural physical condition of each site. This site restoration may potentially provide a more suitable environment for establishment of the natural ecosystem at Sites 5 and 6. Removal of waste from these sites would allow for unrestricted development of these sites in the future.

Placement of the material at Sites 1 and 3 could increase risks to environmental receptors at the landfills; however, these risks will be minimized by the remedial design at Sites 1 and 3: extraction and treatment of the contaminated groundwater beneath the existing landfill; construction of a slurry wall to divert the flow of groundwater around the waste; and construction of a low-permeability cap to divert surface water off the cap and away from the landfill.

2.3 Compliance With Applicable or Relevant and Appropriate Requirements

The material to be excavated at Site 5, and a portion of the material at Site 6, contain asbestos. The NESHAPS Rules for Asbestos act as both chemical- and action-specific Applicable or Relevant and Appropriate Requirements (ARARs) for Sites 5 and 6. The excavation and transport of materials from Sites 5 and 6 to Sites

1 and 3 would comply with both action- and location-specific ARARs. The following location-specific ARARs would need to be considered when performing work at Site 6 to protect the stream northeast of the site, and when landfilling the material at Sites 1 and 3 to protect Mere Brook:

- Maine Natural Resources Protection Act (38 MRSA, Section 480-A through S)
- Natural Resources Protection Act, Permit By Rule Standards (Maine Department of Environmental Protection Regulations, Chapter 305)
- Town Shoreland Zoning Ordinances and State Minimum Guidelines

Action-specific ARARs other than the NESHAPS rules that would be applicable to this alternative include the following:

- OSHA Safety and Health Standards (29 CFR Part 1926)
- Clean Air Act National Ambient Air Quality Standards (40 CFR Part 50)
- Maine Solid Waste Management Regulations (38 MRSA Section 1304, Chapters 401.7 and 405.4)

This alternative is partially compliant with the Maine Solid Waste Regulations; these regulations require that asbestos be disposed of at a licensed facility. The landfill at Sites 1 and 3 is unlicensed. 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).

During site activities, appropriate health and safety practices would be followed. During excavation of material, release of airborne asbestos fibers would be controlled so that ambient air quality standards for particulate emissions are not exceeded. Dust and airborne particle control measures such as wetting the material prior to excavation may be required to suppress generation.

2.4 Long-term Effectiveness and Permanence

Placement of the asbestos-contaminated materials at Sites 1 and 3 as subgrade material beneath the landfill cap would completely remove asbestos from Sites 5 and 6; therefore, no risk of exposure at these sites would remain. Because the asbestos would not be destroyed, some risk of future exposure to the asbestos at Sites 1 and 3 would remain; however, this risk is considered negligible, because the material would be placed beneath the composite landfill cap.

Excavation and placement of the rubble and debris from Site 6 at Sites 1 and 3 as subgrade material beneath the landfill cap would eliminate any physical hazards associated with the material.

2.5 Reduction in Mobility, Toxicity, and Volume Through Treatment

Airborne asbestos is hazardous to human health, but measures such as wetting and containerization of the asbestos-contaminated material at Sites 5 and 6 would reduce its mobility during excavation, transport, and placement at Sites 1 and 3. There is no treatment employed in this alternative; the source is removed and disposed of at Sites 1 and 3.

The construction debris at Site 6 is nonhazardous. The volume of nonhazardous material, estimated at 8,550 cubic yards, may increase slightly from bulking during excavation and handling. Physical hazards associated with the material would be eliminated once the cap is constructed at Sites 1 and 3.

2.6 Short-term Effectiveness

The excavation of the material from the site may pose some potential short-term risks. Release of airborne asbestos fibers during excavation of the material could be controlled by wetting the material prior to excavation. Installation of a silt fence and/or hay bales around the perimeter along downgradient slopes will minimize erosion and sedimentation to downgradient areas. Increased truck traffic at NAS Brunswick would be anticipated during transport of the excavated material to Sites 1 and 3.

2.7 Implementability

Excavation and transport of material is a common practice and the equipment to perform these functions is readily available. Containerization of asbestos has become a common practice in recent years; the materials, equipment, and so forth, required for this work are also readily available.

2.8 Cost

Tables 2-1 and 2-2 present the estimated cost of this alternative. This estimate assumes a project duration of one week at Site 5 and five to eight weeks at Site 6, depending on the amount of material encountered during excavation. The total cost of this alternative ranges from $386,000 to $681,000, based upon the assumed volumes of material at Site 6 of 4,400 to 8,800 cubic yards.

2.9 State Acceptance

The State of Maine has reviewed the Draft Proposed Plan and had no further comments. The state has provided input on disposal of asbestos-contaminated material at Sites 1 and 3 and the action that would be required if hazardous waste is found. The state will have the opportunity to review and comment on this Technical Memorandum and the Proposed Plan for Sites 5 and 6.

2.10 Community Acceptance

The Excavation and Use as Subgrade Material at Sites 1 and 3 Alternative was developed based on public comments received for Site 8. The public will have the opportunity to review and comment on the Proposed Plan for Sites 5 and 6 during the public hearing and public comment period.

TABLE 2-1
ALTERNATIVE 5, 6E:
EXCAVATE AND USE AS SUBGRADE MATERIAL AT SITES 1 AND 3 (4,400 CY)

TECHNICAL MEMORANDUM
NAS BRUNSWICK

EXCAVATE 4,400 cy AT SITE 6	COST	PRESENT WORTH
Capital Costs		
Site Preparation	20,500	
Temp. Road, Decon Pad	8,600	
Mobilization	1,600	
Survey		
Excavation/Backfilling		
Equipment and Labor	113,800	
Fill Material - Place and Compact	45,700	
Protective Clothing	4,200	
Packaging/Transport		
Containerize Asbestos	1,600	
Transport to Landfill	13,900	
Place and Compact at Landfill	22,100	
Site Restoration		
Remove Temporary Pavement	5,900	
Dispose of Temporary Pavement and Road Base	5,500	
Grade	700	
Seed, Fertilize and Mulch	2,200	
Subtotal	246,300	
Contingency (@ 20%)	49,200	
Total Capital Costs:	$295,500	$295,500

continued

TABLE 2-1
ALTERNATIVE 5, 6E:
EXCAVATE AND USE AS SUBGRADE MATERIAL AT SITES 1 AND 3 (4,400 CY)

TECHNICAL MEMORANDUM
NAS BRUNSWICK

EXCAVATE 4,400 cy AT SITE 6	COST	PRESENT WORTH
Indirect Costs		
Health and Safety (@ 5% of Capital Cost)	15,000	
Legal, Administrative, and Permitting (@ 5% of Capital Cost)	15,000	
Engineering (@ 10% of Capital Cost)	30,000	
Services During Construction (@ 10% of Capital Cost)	30,000	
Total Indirect Costs:	$90,000	$90,000
Annual Operating Costs	N/A	N/A
Total Capital Costs:	N/A	N/A
Five-Year Review	N/A	N/A
SUBTOTAL:	N/A	N/A
Total Cost:		$385,500

Notes:

cy = cubic yard

TABLE 2-2
ALTERNATIVE 5, 6E:
EXCAVATE AND USE AS SUBGRADE MATERIAL AT SITES 1 AND 3 (8,800 CY)

TECHNICAL MEMORANDUM
NAS BRUNSWICK

EXCAVATE 8,800 cy AT SITE 6	COST	PRESENT WORTH
Capital Costs		
Site Preparation	20,500	
Temp. Road, Decon Pad	12,300	
Mobilization	1,600	
Survey		
Excavation/Backfilling		
Equipment and Labor	214,400	
Fill Material - Place and Compact	91,200	
Protective Clothing	7,800	
Packaging/Transport		
Containerize Asbestos	3,100	
Transport to Landfill	27,100	
Place and Compact at Landfill	44,100	
Site Restoration		
Remove Temporary Pavement	5,900	
Dispose of Temporary Pavement and Road Base	5,500	
Grade	700	
Seed, Fertilize and Mulch	2,200	
Subtotal	436,400	
Contingency (@ 20%)	87,300	
Total Capital Costs:	$523,700	$523,700

continued

TABLE 2-2
ALTERNATIVE 5, 6E:
EXCAVATE AND USE AS SUBGRADE MATERIAL AT SITES 1 AND 3 (8,800 CY)

TECHNICAL MEMORANDUM
NAS BRUNSWICK

EXCAVATE 8,800 cy AT SITE 6	COST	PRESENT WORTH
Indirect Costs		
Health and Safety (@ 5% of Capital Cost)	26,200	
Legal, Administrative, and Permitting (@ 5% of Capital Cost)	26,200	
Engineering (@ 10% of Capital Cost)	52,300	
Services During Construction (@ 10% of Capital Cost)	52,300	
Total Indirect Costs:	$157,000	$157,000
Annual Operating Costs	N/A	N/A
Total Capital Costs:	N/A	N/A
Five-Year Review	N/A	N/A
SUBTOTAL:	N/A	N/A
Total Cost:		$680,700

Notes:

cy = cubic yard

GLOSSARY OF ACRONYMS AND ABBREVIATIONS

ARARs	Applicable or Relevant and Appropriate Requirements
FS	Feasibility Study
MEDEP	Maine Department of Environmental Protection
NAS	Naval Air Station
NESHAPS	National Emission Standards for Hazardous Air Pollutants
OSHA	Occupational Safety and Health Act

E.C. Jordan Co., 1991. *Draft Final Supplemental Remedial Investigation Report NAS Brunswick*; Portland, Maine; August.

E.C. Jordan Co., 1992. *Feasibility Study NAS Brunswick*; Portland, Maine. March.

Maine Department of Environmental Protection (MEDEP), 1993. Letter from Mark R. Hyland, Director, Federal Facilities Remediation to James Shafer, Project Manager, Department of the Navy, Northern Division; January 25.

R.F. Weston, 1983. *Initial Assessment Study of Naval Air Station, Brunswick, Maine*; West Chester, Pennsylvania; June.