Headquarters, Air Combat Command
Langley Air Force Base,
Virginia

DRAFT FINAL WORK PLAN ADDENDUM FOR PHASE II REMEDIATION OF POL-CONTAMINATED SITES AND OIL/WATER SEPARATOR AND WASTE OIL TANK REMOVALS

HOLLOMAN AFB
ALAMOGORDO, NM

DECEMBER 1995

49 CES/CEV
Holloman Air Force Base
New Mexico

12-1-1995

DRAFT WORK PLAN ADDENDUM FOR PHASE II REMEDIATION OF POL-CONTAMINATED SITES AND OIL/WATER SEPARATOR AND WASTE OIL TANK REMOVALS HOLLOMAN AIR FORCE BASE, NEW MEXICO

Prepared for:
49 CES/CEVR
Holloman Air Force Base, NM
and
HQ ACC/CEVC
Langley Air Force Base, VA

Prepared by:
Ebasco Services, Incorporated
143 Union Boulevard, Suite 1010
Lakewood, Colorado 80228-1824

Under Contract No. DACW45-94-D-0003

Delivery Order 11, Work Authorization Directive 1

U.S. Army Corps of Engineers
Omaha District
Omaha, Nebraska

December 1995

TABLE OF CONTENTS

LIST OF TABLES

APPENDICES

LIST OF FIGURES

LIST OF ACRONYMS

ACGIH	American Conference of Governmental Industrial Hygienists
AFB	Air Force Base
AHA	Activity Hazard Analysis
ANSI	American National Standards Institute
AOC	Area of Concern
bgl	below ground level
BTEX	Benzene, Toluene, Ethylbenzene, and Total Xylenes
CE	Civil Engineering
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CES	Civil Engineering Squadron
CEVR	Civil Engineering Environmental Flight
CFR	Code of Federal Regulations
CGI	Combustible Gas Indicator
CQC	Contractor Quality Control
cy	cubic yards
DOM	Delivery Order Manager
DOT	U.S. Department of Transportation
DRMO	Defense Reutilization Marketing Office
DQCR	Daily Quality Control Report
EIB	Environmental Improvement Board
EPA	U.S. Environmental Protection Agency
FSAP	Field Sampling and Analysis Plan
FSP	Field Sampling Plan
HSWA	Hazardous and Solid Waste Amendments
HWMR	Hazardous Waste Management Regulations
IDW	Investigation-Derived Waste
IRP	Installation Restoration Program
LDR	Land Disposal Restrictions
LNAPL	Light Nonaqueous Phase Liquid
MAP	Management Action Plan
mg/kg	Milligrams Per Kilogram
NMED	New Mexico Environmental Department
MRD	Missouri River Division
NAPL	Nonaqueous Phase Liquid
NFA	No Further Action
NMED	New Mexico Environment Department
NMEIB/	New Mexico Environmental Improvement Board/Underground
USTR	Storage Tank Regulations
OCP	Organochlorine Pesticide
OSHA	Occupational Safety and Health Administration
OWS	Oil/Water Separator

PARCC	Precision, Accuracy, Representativeness, Comparability, and Completeness
PCB	Polychlorinated Biphenyl
PCS	Petroleum-Contaminated Soils
PHSM	Project Health and Safety Manager
PID	Photoionization Detector
POL	Petroleum, Oils, and Lubricants
POTW	Publicly Owned Treatment Works
PPE	Personal Protective Equipment
QAPP	Quality Assurance Project Plan
QA/QC	Quality Assurance/Quality Control
RAA	Regulatory Affairs Advisor
RAL	Remediation Action Levels
RCP	Regulatory Compliance Plan
RCRA	Resource Conservation and Recovery Act
RFA	RCRA Facilities Assessment
RFI	RCRA Facility Investigation
RI	Remedial Investigation
SARA	Superfund Amendments and Reauthorization Act
SSHP	Site Safety and Health Plan
SWMR	Solid Waste Management Regulations
SWMU	Solid Waste Management Unit
TCLP	Toxicity Characteristic Leaching Procedure
TDS	Total Dissolved Solids
TRPH	Total Recoverable Petroleum Hydrocarbons
TPH	Total Petroleum Hydrocarbons
TSDF	Treatment, Storage, or Disposal Facility
USACE	U.S. Army Corps of Engineers
UST	Underground Storage Tank
USTB	Underground Storage Tank Bureau
VOC	Volatile Organic Compound
Tg/kg	Micrograms Per Kilogram
WOT	Waste Oil Tank

1.0 INTRODUCTION

This Draft Final Work Plan Addendum has been prepared to detail oil/water separator (OWS) and waste oil tank (WOT) removals and remediation of POL-contaminated soils (petroleum, oils, and lubricants) at multiple sites at Holloman Air Force Base (AFB), New Mexico. The Work Plan presents the site-specific project objectives and technical approach. All work will be performed in accordance with this Work Plan, the basewide Site Safety and Health Plan (SSHP), Field Sampling and Analysis Plan (FSAP), and Contractor Quality Control (CQC) Plan. The FSAP and CQC Plan are included in the Draft Final Project Plans for Remediation of POL-Contaminated Sites and Oil/Water Separator Removals (EBASCO 1995a).

The purpose of this Work Plan is (1) to provide site-specific details and project objectives and (2) to provide performance-based construction specifications for the removal, installation, and excavation activities.

Holloman AFB is subject to the requirements of several environmental regulatory programs. All of these programs require investigation of sites suspected of contamination. On the basis of previous investigations, some of the sites may require remedial action. Brief descriptions of the main regulatory programs are presented below.

Petroleum-contaminated soil in excess of applicable Base remediation standards has been identified during previous Resource Conservation and Recovery Act (RCRA) Facility Investigations (RFIs) and/or Remedial Investigations (RIs) conducted at Holloman AFB at 14 Table 2 and 3 sites (Radian 1994 and 1995; EBASCO 1995a). In addition, in order to fulfill the requirements of Holloman AFB's Hazardous and Solid Waste Amendments (HSWA) portion of the RCRA Part B permit, 22 OWSs and WOTs, one drainage pit, and six former transformer pads identified as Table 2 and 3 Solid Waste Management Units (SWMUs) must be investigated. If concentrations of contaminants are present in excess of required action levels at these sites, additional remediation may be necessary. The Base has elected to remove the separators and

tanks and to investigate the potential for past releases. This investigation will be conducted during OWS and WOT removal activities. If contaminant concentrations are present in excess of applicable closure standards, affected soil will be removed by additional excavation or treated in situ.

Excavation, OWS and WOT removals, and investigations will be conducted at the following sites:

- Table 2 SWMUs: Removal of OWSs, WOTs, and POL-contaminated soils
  - —SWMU 2: Building 121 OWS
  - —SWMUs 17 and 121: Building 316 OWS and Waste Oil Tank, respectively
  - —SWMUs 21 and 22: Abandoned OWSs for Buildings 702 and 704, respectively
  - —SWMU 39: Building 1092 OWS
  - —SWMUs 40 and 128: Building 1166 OWS and Waste Oil Tank, respectively
  - —SWMUs 132 and AOC-A: Former Drainage Pit, and Transformer and Generator Pads at the Former Building 21 Entomology Shop, respectively
- Table 3 SWMUs: Removal of OWSs, WOTs and POL-contaminated soils:
  - —SWMU 1: Building 55 OWS
  - —SWMU 7: Building 198 OWS
  - —SWMU 11: Building 300 OWS
  - —SWMUs 12 and 13: Buildings 304 and 304A OWS, respectively
  - —SWMU 14: Building 306 OWS (installation)
  - —SWMU 19: Building 638 OWS
  - —SWMU 23: Building 800 OWS

—Near SWMU 25: Building 805 WOT

—SWMU 27: Building 810 OWS

—SWMU 28: Building 822 OWS

—SWMU 29: Building 827 OWS

—SWMU 31: Building 855 OWS

—Near SWMU 35: Building 903 WOT

—SWMU 41: Building 1266 OWS

During removal of SWMU 36 (Building 1001 OWS), it was determined that the WOT had already been removed. All POL-contaminated soil requires in situ remediation. Remedial alternatives are being evaluated for POL-contaminated soils present at SWMU 126 (Building 1001 Waste Oil Tank). Site locations are illustrated in Figure 1, Appendix A.

1.1 PROJECT OBJECTIVES

The objective of this project is to achieve site closure objectives, either through removal of petroleum-contaminated soil at the Table 2 and 3 SWMUs or by supporting the no further action conclusion through site closure sampling. The volume of overexcavated soil will be minimized using on-site analytical testing and field-screening techniques. By combining multiple sites into a single project, efficiencies will be realized for plan preparation, construction mobilization, sampling and analysis, project reporting, disposal, and/or treatment costs of soil, sludge, liquids, and debris.

1.2 WORK PLAN OVERVIEW

This Work Plan has been structured to provide details on the major aspects of the remediation of POL-contaminated sites, the OWS and WOT removals, and OWS installation. The site descriptions are presented in Section 2.0. The Scope of Work, including on-site and off-site activities, is discussed in Section 3.0. The On-Site Work Implementation Plan, which describes

all site activities from mobilization through demobilization, is presented in Section 4.0, while the Regulatory Compliance Plan, describing in particular the transportation and disposal of wastes, is presented in Section 5.0. The site-specific Health and Safety Plan is presented in Section 6.0. Section 7.0, Field Sampling Plan (FSP), references the FSAP and the appropriate sections of this Work Plan to provide guidance for sampling. The Quality Assurance Project Plan (QAPP), Section 8.0 of this document, discusses the quality assurance requirements. The Project Management Plan, which details items such as staffing, schedule, reporting, data management, document control, and meetings, is presented in Section 9.0. References are provided in Section 10.0.

Four appendices accompany this Work Plan. Appendix A contains the site and facility location maps. Appendix B is the Compliance Procedures for Reporting Spills and Releases. Appendix C includes the Field Sampling Standard Operating Procedures (SOPs), which were excluded from the FSAP, and delineates the standard procedures for operations such as drum sampling (EBASCO 1995a). Appendix D includes all related specifications pertaining to POL construction activities.

As established by the RFIs/RIs conducted at the identified Table 2 and 3 SWMUs, no constituents are present in soil in excess of site screening levels or established background levels with the exception of total petroleum hydrocarbons (TPH) and polychlorinated biphenyls (PCBs) (Radian, 1992 and 1994). PCB levels of 10.3 milligrams per kilogram (mg/kg) were detected at SWMU 132. This level exceeds the Base's cleanup criteria of 91 micrograms per kilogram (Tg/kg). The approximate extent of soil contamination in excess of the Base TPH standard (>1,000 mg/kg) has been defined for each site in Section 4.0.

The No Further Action (NFA) option will be selected by Region VI of the U.S. Environmental Protection Agency (EPA) following soil removal activities. In addition, Class 3 Permit modifications will be submitted to the EPA for these sites in order to remove them from the Base's Part B Permit. Table 2 and 3 OWSs and WOTs will be removed with the exception of

these in SWMUs 1 and 28. Following removal, soil samples will be collected in surrounding soils to determine if all contaminated soils have been removed. Any POL-contaminated soil will be removed to a maximum of 5 feet (ft) beyond the original separator excavation or to the extent necessary to obtain clean closure. If POL-contamination has migrated more than 5 ft from the original separator excavation, the continuation of soil excavation will be reevaluated. POL-contaminated soil under and adjacent to structures may require remediation by in situ methods to prevent damage to buildings and concrete slabs.

2.0 SITE DESCRIPTIONS

This section presents brief site descriptions for each of the Table 2 and 3 SWMUs. The site story and detailed descriptions of previous site activities are presented in the Table 2 and 3 RFI Reports (Radian 1994 and 1995). Facility location, site maps and known areas of POL-contaminated soil in excess of the Base's TPH standard are illustrated for each of the sites in Figures 1 through 21 in Appendix A.

2.1 SITE LOCATIONS AND EXISTING CONDITIONS

Locations and existing conditions for each of the Table 2 and 3 sites are discussed in the following sections. Figure 1 presents a map of the Base detailing the locations of all Table 2 and 3 sites. Figures 2 through 21 include the site maps of the individual Table 2 and 3 SWMUs. The figures are included in Appendix A.

The lithology consists primarily of sand and clay. Silt and sandy silt lenses, ranging in thickness from 1 to 2 ft, are interbedded with sand and clay. This stratigraphy is typical of the alluvial, eolian, and playa deposits in the Tularosa Basin (Radian 1994).

Soils will be stockpiled in designated areas, which will be located upgradient from the prominent direction of site drainage, to prevent the migration of contaminants and interference with Base activities. The stockpiles will be placed on and covered with plastic. Berms will also be constructed around the perimeter of the stockpiles for containment. Soil Stockpiling is discussed in Section 4.2.7 and Section 02200 of the specifications in Appendix D.

2.1.1 Table 2 Sites

2.1.1.1 SWMU 2 — Building 121 OWS

SWMU 2 is located approximately 100 ft north of Building 121, which houses the 49th Communications Squadron. The top of the OWS is at ground level and is surrounded by landscaping rock. The OWS has a capacity of 300 gallons (gal) and is constructed of steel. The unit was in operation from 1984 through 1993 (Radian 1994).

The site is easily accessible, level, and covered with landscaping rock, which will be cleared prior to excavation. The SWMU is located approximately 50 ft east of a fuel pump, but no obstructions exist in the immediate vicinity of the area to be excavated. Depth to groundwater is approximately 9.5 ft below ground level (bgl).

Previous RFI work has detected no contaminants above Base cleanup criteria, so sampling is not expected to occur during OWS removal. Per Warren Neff's (Base Project Manager) direction, the removal of 100 cubic yards (cy) of soil will be assumed for this site.

2.1.1.2 SWMUs 17 and 121 — Building 316 OWS and WOT

SWMUs 17 and 121 are located approximately 5 ft north of Building 316. The top of the OWS is at ground level and covered with landscaping rock. The top of the WOT is below grade and also covered with landscaping rock. The depth to the base of these units is approximately 5.5 ft bgl. The OWS is approximately 5 ft long, 3 ft wide, and 4 ft deep, with a total capacity of 400 gal. The size and capacity of the WOT are unknown (Radian 1994).

There are no restrictions with regard to staging or security; however, access is limited by the presence of bollards and an air conditioning unit to the north, by above ground piping and a buried gas line to the east, by asphalt to the west, and by Building 316 to the south. One or more of the bollards may be removed to facilitate excavation, and landscaping rock will need to be removed prior to excavation. Depth to groundwater is approximately 4 ft bgl.

The RFI detected no contaminants above Base cleanup criteria, so sampling is not expected to occur during OWS and WOT removal. Per the Base Project Manager's direction, the removal of 200 cy of soil will be assumed for these sites.

2.1.1.3 SWMUs 21 and 22 — Buildings 702 and 704 OWSs

SWMUs 21 and 22 are located adjacent to the POL washrack and approximately 50 ft south of Building 703. The tops of the OWSs are slightly below ground surface and covered with landscaping rock. This landscaping rock will be cleared and stockpiled prior to excavation. The OWSs are each 1 ft wide, 1 ft long, and 2 ft deep and are constructed of steel. The depth to the base of the OWSs is approximately 6.5 ft bgl. The depth to groundwater is approximately 10 ft bgl (Radian 1994).

No contaminants were detected above Base cleanup criteria at these SWMUs during the RFI; however, soil measurements exceeded 1,000 mg/kg Total Recoverable Petroleum Hydrocarbons (TRPH) at SWMU 123 located to the east of SWMUs 21 and 22. The contamination from SWMU 123 migrated under the POL washrack and the asphalt. As a result SWMU 123 will be treated by in situ methods. Because of the migration of contaminants from SWMU 123, potential sampling and disposal of soil may be required during excavation of the OWSs for SWMUs 21 and 22. Per the Base Project Manager's direction, the removal of 200 cy of soil will be assumed for these sites.

There are no security, access, or staging restrictions related to this site; however, care shall be taken not to overexcavate this area as to prevent damage to the POL washrack pad.

2.1.1.4 SWMU 39 — Building 1092 OWS

SWMU 39 is located on the northern edge of the abandoned fire department training area and contained within a drainage pit, which is enclosed by a fence and occupies approximately 5000 square feet (sq ft). The drainage pit has a diameter of 70 ft and a depth of approximately 6 ft. The OWS, located aboveground in an open concrete box that is approximately 4 sq ft in size, has a capacity of 200 gal. The depth to the base of the OWS is approximately 6 ft bgl. The depth to groundwater is approximately 20 ft bgl (Radian 1994).

There may also be a WOT adjacent to the OWS that requires removal. The WOT has a capacity of 500 gal. The depth to the base of the WOT is 7.5 ft bgl.

There are no security or staging restrictions related to this site; however, access to the OWS may pose a problem because of its location within the drainage pit. Soil will be returned to the excavation after the OWS has been removed and will be remediated in situ by using existing wells for a bioventing system. Because of the replacement and in situ treatment of excavated soil, sampling will not be required at this site. Per the Base Project Manager's direction, the removal of 100 cy of soil will be assumed for this site.

2.1.1.5 SWMUs 40 and 128 — Building 1166 OWS and WOT

SWMUs 40 and 128 are located approximately 200 ft south and slightly east of Building 1604 adjacent to the vehicle washrack. The OWS and WOT are surrounded at ground surface by landscaping rock which will be removed prior to excavation. The OWS has a capacity of 10 gal and is constructed of steel. The WOT (regulated) has a capacity of 250 gal and is also constructed of steel. There is also underground piping, which connects the WOT to the OWS, and a drainage pit. The depth to the base of the OWS is approximately 2.5 ft. The depth to the base of the WOT is unknown, and the depth to groundwater is approximately 26 ft (Radian 1994).

There are no staging, access, or security restrictions associated with this site. Sampling is not expected to be required at this site because no contaminants detected were above Base cleanup criteria. Per the Base Project Manager's direction, the removal of 200 cy of soil will be assumed for these sites.

2.1.1.6 SWMUs 132 and AOC-A — Former Drainage Pit and Transformer and Generator Pads

SWMU 132 is located adjacent to the northwest corner of Building 21. SWMU AOC-A includes six former generator pads and one transformer pad located on the remaining flooring and immediately southeast of the former Building 21, respectively. Building 21 was used as the

Entomology Shop and as a generator station. Depth to groundwater is approximately 4 ft bgl (Radian 1994).

There are no staging, access, or security issues related to this site. These sites are located next to a soccer field, but excavation should pose no threat to individuals using the field. Approximately 156 cy of contaminated soil should be excavated at this site. The concrete flooring may need to be cut and removed to excavate TRPH contaminated soil for SWMU AOC-A.

PCBs, TRPH, and pesticides were detected at SWMU 132, and PCBs and TRPH were detected at SWMU AOC-A; however, pesticides detected at SWMU 132 and PCBs at SWMU AOC-A were not above Base cleanup criteria. Therefore, soil will be sampled for OCPs/PCBs and TRPH at SWMU 132 and TRPH at SWMU AOC-A to fulfill site closure and disposal requirements.

2.1.2 Table 3 Sites

2.1.2.1 SWMU 1 — Building 55 OWS

SWMU 1 is located approximately 40 ft northeast of Building 55. The OWS is an active unit, and excavation of contaminated soil will be attempted without removal of the OWS. If excavation of contaminated soils is not feasible without the removal of the OWS, the removal of the OWS will be evaluated at the time of excavation. The OWS has three chambers constructed of fiberglass with a total capacity of 850 gal. There is also a WOT associated with this OWS that has a capacity of 850 gal. The top of the OWS is at ground surface and surrounded by landscaping rock, which will need to be removed and stockpiled prior to excavation. Depth to groundwater is 3 ft bgl (Radian 1995).

Approximately 330 cy of contaminated soil should be excavated at this site. The contamination migrates under the asphalt and concrete sidewalk and may migrate under the concrete washrack. The extent of soil excavation will need to be evaluated on site. If the full volume of contaminated soil is removed, concrete and asphalt repairs will be necessary.

There are no access or security restrictions at this site; however, staging will be coordinated with Base personnel to maintain smooth operation of Base activities. Soil will be sampled for TRPH for site closure and disposal purposes.

2.1.2.2 SWMU 7 — Building 198 OWS

SWMU 7 is located on the north side of Building 198 between the fence and the building. The top of the OWS is located at ground level and is surrounded by landscaping rock, which will be removed and stockpiled prior to excavation. The OWS has two chambers constructed of concrete with a total capacity of 350 gal. The OWS was converted into a sediment trap in 1991. Depth to groundwater is approximately 7 ft bgl (Radian 1995).

There are no security restrictions at this site; however, staging may be difficult because of the restricted access to the OWS, resulting from the location of a bent bollard and the positioning of the fence.

Approximately 9 cy contaminated soil requires excavation at this site. Care shall be taken to ensure the footing of Building 198 is not compromised during excavation. The influent and effluent lines will be spliced so the operation of the new OWS can continue. Soil will be sampled for TRPH for site closure and disposal purposes.

2.1.2.3 SWMU 11 — Building 300 OWS

SWMU 11 is located to the north of Building 292 and east of Building 300. The OWS is confined by a sidewalk to the south and east, a brick wall to the north, and an electric equipment pad to the west. The OWS is concrete, has an unknown capacity and was converted to a sediment trap. The top of the OWS is at ground level and is surrounded by landscaping rock, which will be removed and stockpiled prior to excavation. Depth to groundwater is approximately 3.5 ft bgl (Radian 1995).

There are no security restrictions at this site; however, staging and access may be restricted because of the proximity of the OWS to the brick wall, electric equipment pad, and Buildings 292 and 300. Excavation will be conducted carefully to avoid any underground utilities that may exist. Concrete patch work will be required for sidewalk repairs.

Approximately 144 cy of soil will require excavation at this site, while leaving the OWS in place. Soil will be sampled for TRPH for site closure and disposal purposes.

2.1.2.4 SWMUs 12 and 13 — Buildings 304 and 304A OWS

SWMUs 12 and 13 were located behind the Base Fire Department (Building 304) prior to removal in 1993. Soil contamination remains under the asphalted area indicated on Figure 11, Appendix A. The depth to groundwater is approximately 3 ft bgl because of mounding. This results from the accumulation of surface water on the northwest corner of Building 304A. Excavation will proceed in a manner that will prevent this surface water from entering the excavation.

Security, staging, and access will be coordinated with the Fire Department so Base operations will not be affected by excavation activities. Asphalt will be cut and removed prior to excavation. Excavation will be monitored closely to insure the footing of Building 304A is not jeopardized.

Approximately 11 cy of contaminated soil will be excavated from this site. TRPH sampling will be performed for site closure and disposal purposes.

2.1.2.5 SWMU 14 — Building 306 OWS

SWMU 14 is located adjacent to the F-4/T-38 washrack. The current OWS is active and constructed of concrete with three chambers. This current OWS is not adequate for treating the volume of waste created by the use of the washrack and will be replaced with a new OWS. The top of the OWS is at ground level and surrounded by landscaping rock,

which will be removed and stockpiled prior to excavation. The depth to the base of the 5,300-gal OWS is approximately 4.5 ft bgl. The depth to groundwater is approximately 5 ft bgl (Radian 1995).

Access and staging is not restricted at this site; however, security will need to be coordinated with Base personnel because of the sites proximal to F-4 and T-38 aircraft. Liquids present in the OWS will be pumped by Base personnel prior to removal of the OWS. There is a possibility that the existing OWS may be used as a secondary containment for the new OWS. Also, underground utilities may be a concern in this area.

No TRPH exceedances were detected in vadose zone soils at this site; however, TRPH exceedances were detected in soils below the water table. Per the Base Project Manager's direction, the removal of 100 cy of soil will be assumed for this site.

2.1.2.6 SWMU 19 — Building 638 OWS

SWMU 19 is located approximately 100 ft east of the T-38 dual-phase extraction system compound. Due to the location of this SWMU, the soil will be returned to the excavation after the OWS has been removed. The OWS was converted into a sediment trap and remains active. The OWS is a single-chamber unit constructed of concrete with a capacity of 400 gal. The piping to this unit may be corroded and require replacement. It is unknown if the new OWS separator is in use or if the cap plugging the influent line has been removed. The depth to the base of the unit is approximately 5.5 ft bgl. The depth to groundwater is approximately 6 ft bgl (Radian 1995).

There are no restrictions related to access or staging at this site; however, flight passes will be acquired for all equipment and personnel. The effluent and influent lines will be spliced together in order to continue operation of the new OWS.

No sampling is anticipated for this site because soil will be remediated in situ by the T-38 dual-phase extraction system.

2.1.2.7 SWMU 23 — Building 800 OWS

This SWMU is located on the southeast corner of Building 800. The OWS (sediment trap) is a two-chamber unit constructed of concrete with a capacity of 900 gal. The top of the OWS is at ground level and surrounded by landscaping rock, which will be removed and stockpiled prior to excavation. The depth to the base of the unit is 6 ft bgl. The depth to groundwater is 5.5 ft bgl (Radian 1995).

There are no access restrictions to the unit; however, security and staging will be coordinated with Base personnel in order to maintain Base activities. The OWS is located next to Building 800, so excavation will be monitored closely to insure the footing is not jeopardized. The influent and effluent lines will be spliced together to maintain the operation of the new OWS.

Approximately 6 cy of contaminated soil require removal from this site. TRPH sampling will be performed for site closure and disposal purposes.

2.1.2.8 SWMU 25 — Building 805 WOT

The WOT associated with SWMU 25 is located north of Building 805. The capacity of the WOT is approximately 750 gal. The material of construction and depth of the WOT are unknown. The approximate location of the WOT is indicated on Figure 15, Appendix A. Depth to groundwater is approximately 4.5 ft bgl (Radian 1995).

There are no access, security, or staging restrictions associated with this site. Underground utilities may be a concern based on the proximity of the unit to Building 805. Landscaping rock covers the unit and will be removed and stockpiled prior to excavation. After the WOT is removed, piping associated with the unit will be capped.

No contaminants above Base cleanup criteria were detected at this site; therefore, sampling is not expected to be required. Per the Base Project Manager's direction, the removal of 100 cy of soil will be assumed for this site.

2.1.2.9 SWMU 27 — Building 810 OWS

SWMU 27 is located approximately 1/4 mile northwest of the Hush Houses. To reach SWMU 27, take the first right turn after the Hush Houses, drive over the curb on the north side of the road before the brick wall, and follow the power lines approximately 200 ft to the abandoned OWS. The OWS is a three-chamber unit constructed of concrete with a capacity of 400 gal. The unit was filled with sand and abandoned in place. Obstacles at the site include manholes, ditches, and an open concrete pit on the northwest side of the mound. Depth to groundwater is between 3 and 4.5 ft bgl (Radian 1995).

There are no staging, access, or security restrictions related to this site; however, there is an overhead power line present. Activities for this site include soil excavation, OWS removal, and light nonaqueous phase liquid (LNAPL) recovery.

Approximately 1620 cy of contaminated soil and an unknown quantity of LNAPL will require removal from this site. TRPH, VOC, SVOC, and lead sampling will be performed for site closure and disposal purposes.

2.1.2.10 SWMU 28 — Building 822 OWS

SWMU 28 OWS was located on the north side of the Building 822 wash rack at the location of the new OWS. Some of the soils were excavated during the installation of the new OWS; however, some contaminated soils requiring excavation still remain. Excavation of this soil will take place without disturbing the new OWS. Depth to groundwater is approximately 6 ft bgl (Radian 1995).

A vacant lot to the west of this site can be used for staging. There are no restrictions related to access; however, this site is in a restricted area and requires coordination with Base personnel for security reasons. Asphalt will be cut and removed prior to excavation. Contaminated soil may migrate under the concrete slab of the washrack, and removal of this soil will be evaluated at the time of excavation.

Approximately 285 cy of contaminated soil requires removal at this site. TRPH sampling will be performed for site closure and disposal purposes.

2.1.2.11 SWMU 29 — Building 827 OWS

SWMU 29 is located adjacent to the washrack for Building 827 and east of the new OWS near the cleanout in the Building 828 compound. The OWS is a single-chamber unit constructed of concrete with a capacity of 900 gal and has been abandoned in place. The unit is covered with asphalt, which will be cut and removed prior to excavation. The depth to groundwater is approximately 4.5 ft bgl (Radian 1995).

There is contaminated soil greater than 1000 mg/kg of unknown quantity associated with this site. It is assumed the soil will be treated in situ by the Building 828 treatment system; therefore, sampling is not expected to be required. Per the Base Project Manager's direction, the removal of 100 cy of soil will be assumed for this site.

2.1.2.12 SWMU 31 — Building 855 OWS

SWMU 31 is located adjacent to the washrack near Building 865. The OWS is a two-chamber unit constructed of steel with a capacity of 400 gal. One of the chambers has a buildup of sediment, which will require removal. This OWS is surrounded by asphalt, which will be cut and removed prior to excavation. The depth to groundwater is approximately 4 ft bgl (Radian 1995).

There are no staging or security restrictions related to this site; however, access to the unit will be limited due to a low powerline approximately 12 ft above ground surface. Contamination may have migrated under the concrete pad of the washrack; therefore, removal of all contaminated soil will be evaluated at the time of excavation. If contamination has migrated beneath the washrack, the Base Project Manager will be contacted for direction.

Less than 3 cy of contaminated soil requires removal at this site. TRPH sampling will be performed for site closure and disposal purposes.

2.1.2.13 SWMU 35 — Building 903 WOT

The WOT related to SWMU 35 is believed to be located north of the new sediment trap in the vicinity of the cleanout, vent, and manhole, approximately 10 ft west of Building 903. The tank is of unknown type and size. The WOT is covered with asphalt, which will be cut and removed prior to excavation. Depth to groundwater is approximately 5 ft bgl (Radian 1995).

There are no security or staging restrictions related to this site; however, certain obstacles may pose access problems. The obstacles include a ditch and culvert located 15 ft north containing 3- to 4-inch landscaping rock, a nearby fire hydrant, overhead power lines, an air conditioner pad, and concrete stoop to the east, and numerous underground utilities may exist because of Building 903's function as a utility shop.

No contaminants above Base cleanup criteria were detected at this site, so sampling is not expected to be required. Per the Base Project Manager's direction, the removal of 100 cy of soil will be assumed for this site.

2.1.2.14 SWMU 41 — Building 1266 OWS

SWMU 41 is located adjacent to the washrack at Building 1266. The OWS is a two-chamber unit constructed of steel with a capacity of 200 gal. The unit is surrounded by asphalt, which will be cut and removed prior to excavation. Excavation of contaminated soil should take place without disturbing the OWS (sediment trap). Depth to groundwater is approximately 25 to 30 ft bgl (Radian 1995).

There are no staging or security restrictions for this site; however, access may be a concern because of the location of a guy wire and support and an electrical box.

Approximately 12 cy of contaminated soil requires removal at this site. TRPH sampling will be performed for site closure and disposal purposes.

3.0 SCOPE OF WORK

This section provides an overview of project activities. A summary of on-site and off-site project-related activities is also provided.

3.1 ON-SITE ACTIVITIES

On-site activities include the following:

- Preconstruction conference
- Mobilization and demobilization
- Construction, including waste characterization and disposal
- Field engineering and quality control
- Sampling
- Security
- Transportation operations
- Field communications
- Community relations

3.1.1 Preconstruction Conference

A preconstruction conference will be conducted at the Base prior to mobilization. Attendees at the conference will include the following:

Name	Affiliation	Project Role
Herman Kalvo	EBASCO	Construction Project Manager/CQC Manager
Dan Holmquist	EBASCO	Site Manager/H & S Manager
Warren Neff	Holloman AFB	Base Project Manager
Jim Hendricks	USACE	Base Resident Engineer

To Be Determined	Subcontractors	Labor and Equipment Operation

Other individuals from the Base, USACE, or the construction subcontractor may attend the meeting, as necessary.

The following preliminary agenda for the meeting has been developed:

- Introductions, roles, and responsibilities
- Review of Scope of Work
- Security issues
- Construction schedule
- Mobilization logistics
- Site access
- Staging areas
- Soil stockpiling areas
- Site drainage
- Site restrictions
- Review of quality assurance/site-specific health and safety plans

The agenda will be formalized prior to the preconstruction conference.

3.1.2 Mobilization/Demobilization

Mobilization activities will include the following:

- Deliver equipment and supplies to the site
- Confirm approval of the base digging permit and inspect utility markouts at the site
- Coordinate with facility points of contact to ensure minimal disturbance to ongoing operations
- Train workers in site-specific health and safety procedures
- Establish decontamination facility(s) as necessary

- Identify potential equipment storage and soil stockpile areas
- Prepare for inspection

The following demobilization activities will commence after completion of construction activities:

- Perform final inspections
- Remove equipment and materials from the site
- Restore sites and operations to preconstruction conditions
- Remove drums and contaminated soil, as necessary

3.1.3 Construction Activities

The following major construction activities will be performed at the site:

- Store contaminated soil and decontamination water, as necessary
- Decontaminate equipment and personnel, as necessary
- Excavate materials with backhoe
- Conduct sampling and analysis
- Remove pumpable liquids and sludges
- Remove OWSs, WOTs, and lines
- Remove pavement
- Segregate excavated soils
- Remove landscape rock
- Provide backfill and compaction
- Replace pavement
- Dispose of soil, liquid, and debris
- Restore site
- Conduct utility relocation and restoration
- Conduct testing and inspections
- Repair or plug existing buried piping

3.1.4 Field Engineering and Quality Control

Field engineering and quality control (QC) are covered under construction supervision and quality control inspection procedures. Field engineering will be performed under the jurisdiction of the EBASCO Construction Project Manager.

Field engineering is one of the primary responsibilities of the EBASCO Construction Project Manager. Field change requests and nonconformance notices will be documented when discrepancies occur between constructed elements and associated drawings and specifications. A QC log will be maintained at the site and will include daily activities and as-built drawings of each site.

QC inspection will be performed by the EBASCO Construction Project Manager/Construction Quality Control (CQC) System Manager in accordance with the CQC Plan (EBASCO 1995a). The Construction Project Manager will document daily construction activities on appropriate log forms, which are included in the CQC Plan. Field change requests and nonconformance reports, also included within the CQC Plan, will be issued and maintained by the Construction Project Manager.

Testing will be performed in accordance with the Field Sampling Plan, Section 7.0, the FSAP and CQC Plan (EBASCO 1995a). Testing encompasses on-site and off-site testing and analysis. On-site testing includes headspace screening of soil cuttings, with a photoionization detector (PID) and immunoassay test kit, and soil compaction. Off-site testing includes analysis of soil by an approved laboratory for verification of contamination and soil proctors. If the headspace and immunoassay screening detects contamination a composite soil sample will be collected for analysis by an off-site laboratory for conformation of contamination.

3.1.5 Site Security

All on-site activities will occur within a cordoned-off area with the use of flashing barricades spaced 8 ft apart and strung together with barricade tape. These will be placed a minimum of 10 ft back from the excavation opening. No unauthorized personnel will be allowed within the barricaded area.

In addition, certain SWMUs are located in sensitive areas, and obtaining access requires coordination with Base personnel. The specific SWMUs with restricted access are discussed in Section 2.0, Site Description.

Site-specific security issues related to the Base and specific sites will be coordinated with the Base Project Manger. The requirements for Base access include a valid drivers license, proof of insurance, vehicle registration, and a sponsor. The Base Project Manager can be contacted at the number listed in Section 3.1.7 and will provide site sponsorship.

3.1.6 Transportation Operations

The following summarizes on-base transportation operations:

- Contractor and subcontractor vehicles will access sites at the Base via the main gate located on State Highway 70. Equipment deliveries and trucks used for disposal of contaminated soil and debris may access the site through the security gate located near the base golf course. (This will be determined at a later date.)

- All vehicles will travel along improved roads and will not enter secure areas without receiving prior clearance. A list of secured areas will be discussed during the preconstruction conference.

- The EBASCO Construction Project Manager and subcontractor personnel will receive vehicle passes that will be valid for the duration of the project. A valid driver's license, proof of vehicular insurance, and valid vehicle registration will be required to obtain a pass.

- The security guard issuing passes will require a sponsor. The individuals listed in Section 3.1.7 can be contacted for sponsorship.

3.1.7 Field Communications

The following are the points of contact and the telephone numbers for the POL Remediation Project:

Point of Contact	Telephone Number
Dan Holmquist (Ebasco Site Manager)	505-479-2668
Warren Neff (Base Project Manager)	505-475-5395

A complete listing of project-related telephone numbers is contained in Section 10.0 of the SSHP.

3.1.8 Community Relations

Community relations are the responsibility of Holloman AFB. All inquiries regarding the project will be referred to the Base Project Manager or a delegated representative.

3.2 OFF-SITE ACTIVITIES

Engineering support will be provided by the EBASCO home office staff. The Project Engineer in the EBASCO Denver office will serve as the point of contact for all field inquiries regarding engineering and will coordinate engineering efforts in compliance with corporate procedures and applicable professional standards.

Procurement of subcontractors and major work items will be accomplished by home office staff. The Procurement Agent will be the point of contact for all subcontractor and vendor inquiries.

The following administrative support functions will be furnished by the home office:

- Contract Administration—The Contract Administrator will assist project management with all issues pertaining to contract compliance.
- Regulatory Compliance—Compliance with permits and regulatory requirements will be overseen by designated home office personnel as described in Section 5.0, Regulatory Compliance Plan (RCP).

- Safety Compliance—The Construction Project Manager will ensure that work is conducted in accordance with the Site-Specific Health and Safety and Basewide Site Safety and Health Plans.

4.0 ON-SITE WORK IMPLEMENTATION PLAN

This section will provide the details of the On-Site Work Implementation Plan, which includes all construction related activities.

4.1 MOBILIZATION

Mobilization activities will include equipment and materials delivery to sites, utility clearance and site review, indication of staging and storage areas, construction of equipment and personnel decontamination facilities, and inspection of materials. Materials will be reviewed to ensure they meet the requirements of the specifications.

4.1.1 Staging and Storage Areas

Staging and storage areas will be designated by the EBASCO Construction Project Manager and coordinated with the appropriate Holloman AFB personnel. These areas will be used for storage of soil, drums, equipment and supplies, maintenance operations, and decontamination and sanitary facilities. Any construction subcontractor may propose the use of additional or alternate areas for this purpose, but this approval must come from the appropriate Holloman AFB personnel and the EBASCO Site Manager.

4.1.2 Equipment and Personnel Decontamination Zones

Materials may exist in some of the OWSs and WOTs that will require removal. After the materials are removed, the OWS and WOT debris may require decontamination so they can be disposed at a nonhazardous landfill. Contaminated soil may be encountered and, as a result of this, soil equipment and personnel will require decontamination. Equipment and personnel decontamination will need to be performed in accordance with the procedures defined in Section 6.0, Health and Safety Plan and the basewide SSHP.

As needed, decontamination facilities shall be constructed at each excavation where contaminated soil is encountered so that equipment and personnel can be decontaminated prior to

moving to the next site location. The following minimum requirements shall be adhered to when constructing and maintaining decontamination areas:

EQUIPMENT DECONTAMINATION AREA

- The equipment decontamination area shall be constructed to ensure the capture of decontamination water. A polyethylene liner will be used to capture the decontamination water for containerization in an approved drum.

- If the liner is damaged or breached during the project, it shall be repaired prior to conducting any equipment and/or debris decontamination.

- Manual gross removal of contaminated materials shall be performed before steam cleaning operations can be employed. Accumulated solids shall be removed from the liner and placed into an approved container.

PERSONNEL DECONTAMINATION AREA

- The personnel decontamination area shall be located outside of the exclusion area and shall serve as the contamination reduction zone.

- Separate containers shall be maintained in each decontamination area for disposal of uncontaminated and contaminated waste. The containers shall be labeled according to their intended use. Filled containers shall be sealed securely to prevent inadvertent releases of waste into the environment.

- Wastewater from decontamination procedures shall be containerized on a daily basis.

- The personnel decontamination area shall be kept clean; good housekeeping practices shall be maintained to containerize wastes immediately and store personnel equipment when not in use.

- Personnel decontamination areas shall consist of a gross contamination basin and a final rinse basin. A liner will be placed beneath each basin to prevent decontamination water from coming in contact with the ground. The decontamination water used in the gross decontamination basin shall contain a phosphate-free detergent and each basin should have a brush for decontamination.

4.2 CONSTRUCTION

In general, construction will consist of OWS installation, OWS and WOT removal, pipeline repair excavation of soil, removal of subsurface structures, backfill and compaction with uncontaminated native soils or imported backfill, and resurfacing, where necessary, to match the existing surface. All work will be performed in accordance with Part 2, Excavation Work, American National Standards Institute (ANSI) A10-2, American Standard Safety Code for Building Construction, current edition, and Occupational Safety and Health Administration (OSHA) specifications regarding confined space entry, excavation, and trenching operations. Construction will be performed in accordance with the CQC Plan (EBASCO 1995a).

4.2.1 Utility Clearance

Prior to conducting site work, a base digging permit will be obtained. Sites will be marked and cleared for subsurface utilities. A preconstruction site walk will be conducted with the USACE Resident Engineer, and the EBASCO Construction Project Manager to inspect and note site and equipment access, staging areas, site drainage, soil stockpile areas, potential site hazards, and emergency evacuation routes.

4.2.2 Site Preparation

Site preparation activities will include the following:

- Establish staging and storage areas
- Perform construction of decontamination facilities, as necessary
- Mark structures that may interfere with construction activities with caution tape
- Remove and stockpile landscaping rock

4.2.3 Relocation and Restoration of Utilities

If any marked or unmarked utility lines are encountered during construction activities, the appropriate Base personnel shall be notified and the utility lines shall be repaired, as necessary.

4.2.4 Sampling

The specified scope of work and anticipated scope of closure verification sampling and analysis for each site are summarized in Table 4-1. Detailed sampling protocol, the type and frequency of quality assurance/quality control (QA/QC) samples to be collected and analyzed, and laboratory QA/QC protocol are summarized in Section 7.0 (FSP), Section 8.0 (QAPP), the FSAP, and CQC Plan (EBASCO 1995a). In general, it is anticipated that during project implementation, field duplicate samples will be analyzed at the contractor's laboratory for each method specified. QA splits will be analyzed at the USACE Missouri River Division (MRD) for each method specified. When volatile organic compound (VOC) analyses are required, one trip blank will be submitted to the laboratory for VOC analysis.

In addition to closure verification samples, waste characterization samples will be collected for excavated soils to be disposed at an approved off-site facility. Samples will also be collected if screening or visual observation indicates contamination may be present. Sample requirements and waste disposal options are summarized in Section 5.0.

4.2.5 Removal of Pumpable Liquids and Sludges and Line Removal

All efforts will be made to have the existing Base contractor or Mr. Darvin St. John, CES/CEVC OWS Manager, remove pumpable liquids and sludges from the inactive and abandoned OWSs/WOTs.. If such coordination is not possible, the contents of product piping and lines will be flushed into the tanks or OWSs. Piping entering the excavation, which have no further use, shall be capped. Any vent lines will be removed during unit extraction.

Pumpable liquids and sludges at each site will be pumped into separate, 55-gallon, U.S. Department of Transportation (DOT)-approved steel drums and labeled. Drums will be transported to the investigation-derived waste (IDW) compound pending analytical results for waste classification prior to disposal. All drums stored on Base property must be placed on pallets.

TABLE 4-1 SCOPE OF WORK SUMMARY FOR POL-CONTAMINATED SITES AND OWS/WOT REMOVALS

	LOCATION	SCOPE OF WORK	MAXIMUM DEPTH OF EXCAVATION(S) (FT BGS)	ESTIMATED VOLUME OF SOIL TO BE REMOVED (CYDS)	REMEDIATION CRITERIA	SAMPLING REQUIREMENTS FOR CLOSURE
Table 2 Sites						
SWMU 2	Building 121 OWS	Stockpile landscaping rock. Remove, transport, and dispose of OWS. Plume influent line to SWMU 119. Backfill excavation with approved fill. Spread landscaping rock.	8	100	TPH < 1,000 mg/kg	4 sides and bottom of each excavation; total of 5 samples for TRPH (If contamination is detected above Base cleanup criteria.)
SWMUs 17 and 121	Building 316 OWS and WOT	Stockpile landscaping rock. Remove, transport, and dispose of OWS and WOT. Cap all lines connected at excavation and at point of origin. Backfill excavation with approved fill. Spread landscaping rock.	Depth to base of unit is 5 ft bgl. Depth to groundwater is 4 ft bgl.	200	TPH < 1,000 mg/kg	4 sides and bottom of each excavation; total of 5 samples TRPH (If contamination is detected above Base cleanup criteria.)
SWMUs 21 and 22	Buildings 702 and 704 OWSs	Stockpile landscaping rock. Remove, transport, and dispose of OWSs. Cap all lines connected at excavation and at point of origin. Backfill excavation with approved fill. Spread landscaping rock.	Depth to base of unit is 6 ft bgl.	200	TPH < 1,000 mg/kg	4 sides and bottom of each excavation; total of 5 samples TRPH (If contamination is detected above Base cleanup criteria.)

TABLE 4-1 SCOPE OF WORK SUMMARY FOR POL-CONTAMINATED SITES AND OWS/WOT REMOVALS

	LOCATION	SCOPE OF WORK	MAXIMUM DEPTH OF EXCAVATION(S) (FT BGS)	ESTIMATED VOLUME OF SOIL TO BE REMOVED (CYDS)	REMEDIATION CRITERIA	SAMPLING REQUIREMENTS FOR CLOSURE
SWMU 39	Building 1092 OWS	Remove, transport, and dispose of OWS. Cap all lines connected at excavation and at point of origin. Backfill excavation with approved fill. Remove, transport, and dispose of SWMU 127 WOT, if present.	Depth to base of WOT is 7.5 ft bgl.	A biovent system, which uses existing wells, will be installed unde a separate task to remediate contaminated soil.	TPH < 1,000 mg/kg	NA
SWMUs 40 and 128	Building 1166 OWS and WOT	Stockpile landscaping rock. Remove, transport, and dispose of OWS and WOT. Excavate, characterize, transport, and dispose of contaminated soil. Cap all lines connected at excavation and at point of origin. Backfill excavation with approved fill. Spread landscaping rock.	0 to 4	200	TPH < 1,000 mg/kg	4 sides and bottom of each excavation; total of 5 samples for TRPH
SWMU 126	Building 1001 WOT	WOT has already been removed and a biovent system will be installed under a separate task for remediation of contaminated soil.	NA	NA	NA	NA

TABLE 4-1 SCOPE OF WORK SUMMARY FOR POL-CONTAMINATED SITES AND OWS/WOT REMOVALS

	LOCATION	SCOPE OF WORK	MAXIMUM DEPTH OF EXCAVATION(S) (FT BGS)	ESTIMATED VOLUME OF SOIL TO BE REMOVED (CYDS)	REMEDIATION CRITERIA	SAMPLING REQUIREMENTS FOR CLOSURE
SWMU 132 and AOC-A	Former Building 21 former drainage pit, and transformer and generator pads	Excavate, characterize, transport, and dispose of soil from six former generator pads and one transformer pad to concrete base. Excavate, characterize, transport and dispose of soil from former drainage pit. PCB-contaminated soils will be disposed off-site at an approved treatment facility. Backfill excavations with approved fill.	0 to 2 for AOC-A and 0 to 4 for SWMU 132. Depth to groundwater is 4 ft bgl.	156	TPH < 1,000 mg/kg Site screening levels for PCBs and OCPs. (*)	4 sides and bottom of each excavation; total of 5 samples for TRPH; total of 5 samples for OCPs/PCBs at SWMU 132; total of 5 samples for TRPH at AOC-A.
Table 3 Sites						
SWMU 1	Building 55 OWS	Stockpile landscaping rock. Excavate, characterize, transport and dispose of contaminated soil. Spread landscaping rock.	0 to 3 Depth to groundwater is 3 ft bgl.	330	TPH < 1,000 mg/kg	4 sides and bottom of each excavation; total of 5 samples for TRPH

TABLE 4-1 SCOPE OF WORK SUMMARY FOR POL-CONTAMINATED SITES AND OWS/WOT REMOVALS

	LOCATION	SCOPE OF WORK	MAXIMUM DEPTH OF EXCAVATION(S) (FT BGS)	ESTIMATED VOLUME OF SOIL TO BE REMOVED (CYDS)	REMEDIATION CRITERIA	SAMPLING REQUIREMENTS FOR CLOSURE
SWMU 7	Building 198 OWS	Cut, remove, transport and dispose of asphalt. Remove, characterize, transport, and dispose of sand from OWS. Remove, transport, and disposal of OWS. Excavate, characterize, transport, and dispose of contaminated soil. Cap all lines connected at excavation and point of origin. Repave area.	6 to 7 Depth to groundwater is 7 ft bgl.	9	TPH < 1,000 mg/kg	4 sides and bottom of each excavation; total of 5 samples for TRPH
SWMU 11	Building 300 OWS	Stockpile landscaping rock. Excavate, characterize, transport, and dispose of contaminated soil. Leave OWS (sediment trap) intact. Backfill excavation with approved fill. Spread landscaping rock.	0 to 3.5 Depth to groundwater is 3.5 ft bgl.	144	TPH < 1,000 mg/kg	4 sides and bottom of each excavation; total of 5 samples for TRPH

TABLE 4-1 SCOPE OF WORK SUMMARY FOR POL-CONTAMINATED SITES AND OWS/WOT REMOVALS

	LOCATION	SCOPE OF WORK	MAXIMUM DEPTH OF EXCAVATION(S) (FT BGS)	ESTIMATED VOLUME OF SOIL TO BE REMOVED (CYDS)	REMEDIATION CRITERIA	SAMPLING REQUIREMENTS FOR CLOSURE
SWMUs 12 and 13	Buildings 304 and 304A former OWSs	Cut, remove, transport, and dispose of asphalt. Excavate, characterize, transport, and dispose of contaminated soil from beneath asphalt driveway. Backfill excavation with approved fill. Repave area.	0 to 2 Depth to groundwater is 3 ft bgl.	3.3	TPH < 1,000 mg/kg	4 sides and bottom of each excavation; total of 5 samples for TRPH
SWMU 14	Building 306 OWS	Stockpile landscaping rock. Extract, characterize, and dispose of pumpable sludges and liquid in OWS. Excavate, characterize, transport, and dispose of contaminated soil. Remove, transport, and dispose of OWS. Install a prefab wastewater recirculation unit. Backfill excavation with approved fill. Spread landscaping rock.	Contamination occurs at a depth of 6 to 8 ft bgl. Depth to base of unit is 5 ft bgl.	100	TPH < 1,000 mg/kg	4 sides and bottom of each excavation; total of 5 samples for TRPH

TABLE 4-1 SCOPE OF WORK SUMMARY FOR POL-CONTAMINATED SITES AND OWS/WOT REMOVALS

	LOCATION	SCOPE OF WORK	MAXIMUM DEPTH OF EXCAVATION(S) (FT BGS)	ESTIMATED VOLUME OF SOIL TO BE REMOVED (CYDS)	REMEDIATION CRITERIA	SAMPLING REQUIREMENTS FOR CLOSURE
SWMU 19	Building 638 OWS	Remove, characterize, transport, and dispose of sand from OWS. Remove, transport, and dispose of OWS. Plume influent line to new OWS. Backfill excavation with approved fill.	Depth to base of unit is 5 ft bgl. Depth to groundwater is 6 ft bgl.	Area will be remediated as part of the T-38 dual phase system.	TPH < 1,000 mg/kg	NA
SWMU 23	Building 800 OWS	Stockpile landscaping rock. Excavate, characterize, transport, and dispose of contaminated soil. Do not undermine building footing. Remove, characterize, transport, and dispose of sand from OWS. Remove, transport, and dispose of OWS. Backfill excavation with approved fill. Spread landscaping rock.	2 to 5.5 Depth to groundwater is 5.5 ft bgl. Depth to base of unit is 6 ft bgl.	6	TPH < 1,000 mg/kg	4 sides and bottom of each excavation; total of 5 samples for TRPH

TABLE 4-1 SCOPE OF WORK SUMMARY FOR POL-CONTAMINATED SITES AND OWS/WOT REMOVALS

	LOCATION	SCOPE OF WORK	MAXIMUM DEPTH OF EXCAVATION(S) (FT BGS)	ESTIMATED VOLUME OF SOIL TO BE REMOVED (CYDS)	REMEDIATION CRITERIA	SAMPLING REQUIREMENTS FOR CLOSURE
Near SWMU 25	Building 805 WOT	Stockpile landscaping rock. Remove, transport, and dispose of WOT. Cap all lines connected at excavation and at point of origin. Backfill excavation with approved fill. Spread landscaping rock.	Depth to groundwater is 4.5 ft bgl.	100	TPH < 1,000 mg/kg	4 sides and bottom of each excavation; total of 5 samples for TRPH (If contamination is detected above Base cleanup criteria.)
SWMU 27	Building 810 OWS	Excavate, characterize, transport, and dispose of contaminated soil. Remove, transport, and dispose of OWS. Recover, characterize, transport, and dispose of LNAPL.	Depth to groundwater is 3 to 4.5 ft bgl. Depth to unit is 5.5 ft bgl.	1620	TPH < 1,000 mg/kg Benzene < 25 mg/kg Site screening levels for VOCs, SVOCs, and lead (*)	4 sides and bottom of each excavation; total of 5 samples for TRPH; total of 5 samples for VOCs; total of 5 samples for SVOCs; and total of 5 samples for lead.
SWMU 28	Building 822 OWS	Cut, remove, and dispose of asphalt. Excavate, characterize, transport, and dispose of contaminated soil. The OWS is to remain intact during excavation. Backfill excavation with approved fill and repave.	Depth to groundwater is 6 ft bgl. Depth to base of unit is 8 ft bgl.	285	TPH < 1,000 mg/kg	4 sides and bottom of each excavation; total of 5 samples for TRPH

TABLE 4-1 SCOPE OF WORK SUMMARY FOR POL-CONTAMINATED SITES AND OWS/WOT REMOVALS

	LOCATION	SCOPE OF WORK	MAXIMUM DEPTH OF EXCAVATION(S) (FT BGS)	ESTIMATED VOLUME OF SOIL TO BE REMOVED (CYDS)	REMEDIATION CRITERIA	SAMPLING REQUIREMENTS FOR CLOSURE
SWMU 29	Building 827 OWS	Cut, remove, and dispose of asphalt. Remove, transport, and dispose of OWS near cleanout. Backfill excavation with approved fill. Repave area.	Depth to base of unit is 6 ft bgl. Depth to groundwater is 4.5 ft bgl.	Soils will be remediated as part of the Building 828 SVE system.	TPH < 1,000 mg/kg	NA
SWMU 31	Building 855 OWS	Cut, remove, and dispose of asphalt. Excavate, characterize, transport, and dispose of contaminated soil. Remove, transport, and dispose of OWS. Cap all lines connected at excavation and point of origin. Backfill excavation with approved fill. Repave area.	Depth of contamination is 3 to 6 ft bgl. Depth to groundwater is 4 ft bgl. Depth to base of unit is 6 ft bgl.	3	TPH < 1,000 mg/kg	4 sides and bottom of each excavation; total of 5 samples for TRPH
Near SWMU 35	Building 903 WOT	Stockpile landscaping rock. Remove, transport, and dispose of WOT located in th vicinity of cleanout and vent. Backfill excavation with approved fill.	Depth to groundwater is 5 ft bgl.	100	TPH < 1,000 mg/kg	4 sides and bottom of each excavation; total of 5 samples for TRPH (If contamination is detected above Base cleanup criteria.)

TABLE 4-1 SCOPE OF WORK SUMMARY FOR POL-CONTAMINATED SITES AND OWS/WOT REMOVALS

	LOCATION	SCOPE OF WORK	MAXIMUM DEPTH OF EXCAVATION(S) (FT BGS)	ESTIMATED VOLUME OF SOIL TO BE REMOVED (CYDS)	REMEDIATION CRITERIA	SAMPLING REQUIREMENTS FOR CLOSURE
SWMU 41	Building 1266 OWS	Cut, remove, and dispose of asphalt. Excavate, characterize, transport, and dispose of contaminated soil. Leave OWS (sediment trap) intact and avoid contact with guy wire. Backfill with approved fill. Repave area.	0 to 2	12	TPH < 1,000 mg/kg	4 sides and bottom of each excavation; total of 5 samples for TRPH

Notes: Waste characterization requirements dependent on type and volume of waste generated. See Section 5.0 for waste analysis criteria.
BGS: below ground surface
CYDS: estimated cubic yards
OWS: oil/water separator
BTEX: benzene, toluene, ethylbenzene, total xylenes
TAL: target analyte list
TPH: total petroleum hydrocarbons
VOC: volatile organic compounds
(*) Site screening levels established based on EPA Region III risk-based concentration levels and/or established basewide background levels for VOCs, semi-VOCs, and metals. See Table 5-1.

4.2.6 Pavement Removal

Concrete or asphalt surfaces over each subsurface structure to be removed will be saw cut and removed approximately 3 ft around the perimeter of the tank or OWS. Asphalt, concrete, and associated construction rubble will be transported to an off-site landfill for disposal. The tanks and OWSs removed will be broken into manageable pieces for transport and also transported to an off-site landfill for disposal.

4.2.7 Segregation of Excavated Soils

Excavated soil will be segregated on the basis of field screening and visual observation. Contaminated soil will be stored temporarily on two layers of 40-mil plastic sheeting within a constructed temporary berm and with protection from distribution by wind. Protection from wind and precipitation will be accomplished by covering the stockpiles with 40-mil plastic sheeting and adequately anchoring the sheeting with sand bags. Excavation will be performed in accordance with Section 02200 of the specifications in Appendix D.

Soils will be returned to the excavations at SWMUs 19, 29, and 39 in the order in which they were removed to avoid exposing contamination at the ground surface.

4.2.8 Soil Removal

After removal of any subsurface structure, soil in the subsurface will be visually inspected and screened with a PID. In general, visually impacted soil will be removed up to 5 feet from the perimeter of the original excavation. If impact extends in excess of 5 feet from the perimeter of the original excavation, the USACE Resident Engineer will make the determination if additional excavation will be conducted, in consultation with the Base Project Manager. Efforts will be made to minimize the amount of soil removed. Excavations will not extend below the water table except where it is necessary for the removal of an OWS or a WOT. Excavation will be performed in accordance with Section 02200 of the specifications in Appendix D.

Closure samples for the OWSs and the TPH-impacted soil excavations will be collected from the bottom of the excavation and from each sidewall. Following removal of visually impacted soil, and/or using organic headspace vapor screening results, one soil sample will be collected with the backhoe bucket or soil auger from each sidewall and from the bottom of each excavation. The soil samples will be screened with an immunoassay screening technique to determine if additional soil removal is warranted or if clean closure can be obtained. Draft EPA Method 4030, using Ensys™ kits, will be the protocol for the on-site immunoassay screening. The applicable SOP for immunoassay screening is presented in the FSAP (EBASCO 1995a). Once excavation is deemed complete, closure verification samples will be collected for laboratory analysis.

4.2.9 Excavation, Backfilling, and Compaction

Following confirmation of clean closure or the determination by the USACE Resident Engineer that no additional excavation will be conducted, the excavation will be backfilled. Backfilling and compaction will be performed to Sections 01430, 02205, 01300, and 02200 of the specifications in Appendix D.

The type of soil material proposed for backfill is specified in Section 02205 of the specifications of Appendix D. Material excavated at the site is generally considered usable for grading and backfill purposes (subject to the designation that the stockpiled soil is not petroleum impacted) as discussed in Section 4.2.8. If possible, the final lift of fill material, when completion occurs in native soil, should be similar in consistency to the native soil. This is not a concern for areas that will be repaved or covered with landscaping rock. Additional fill certified as clean will be imported from an off site location.

The fill will be compacted to the following specifications:

- Compaction to prevent subsidence (no testing) for those areas where no resurfacing is required

- 95 percent of ASTM D698 standard proctor compaction at optimum moisture content for those areas where resurfacing is required. One test per lift to verify compaction in these areas is required.

No fill will be placed on areas where free water is standing or on frozen subsoil areas. If standing water is present, it will be pumped and handled as a pumpable liquid.

4.2.10 Resurfacing Activities

4.2.10.1 Asphalt

If the adjacent surface is asphalt, a 6-inch minimum thickness of gravel base will be installed with 4 inches of bituminous material as specified in Section 02520 of the specifications in Appendix D. In field testing is not required for replacement of asphalt. Asphalt paving is discussed in Section 02520 of the specifications in Appendix D.

4.2.10.2 Concrete

If the adjacent surface is concrete, an 8-inch minimum thickness of gravel base shall be installed overlain by 6 inches of 3,000-psi concrete with a wire mesh as detailed in the drawings. The existing concrete will be doweled to the new concrete with No. 4 dowels at 18-inch centers all around as detailed in the drawings. All edges will be tooled and the slab(s) will have saw-cut control joints not to exceed 400 square feet. The length of the concrete panel should not exceed the width of the panel by a factor of more than 2. The curing agent and control joint fill material to be used are specified in Section 03300 of the specifications in Appendix D. Sidewalks and curbs will be replaced in accordance with Section 2510 of the specifications in Appendix D. In field testing is not required for sidewalk repairs.

4.2.10.3 Soil

If the adjacent surface is soil with landscaping, the top 8 to 12 inches of the excavation will be filled with topsoil and seeded with grass that is similar to that found in the adjacent areas.

4.2.11 Site Restoration

Following backfill and compaction, the site surface will be returned to the original condition or better. All construction debris and equipment will be removed, and grading and paving of the site and sweeping of work area will be performed.

4.2.12 Soil Disposal

With the exception of SWMUs 19, 29, and 39, contaminated soil (i.e., soil containing >1,000 mg/kg TPH) must not be used as backfill. Petroleum-impacted soil will be transported to an approved off-site disposal facility. Guidelines for the disposal of soil and other wastes are presented in Section 5.0, Regulatory Compliance Plan.

4.2.13 Demolition

OWSs, WOTs and debris will be demolished into manageable sizes for disposal at an off-site landfill. Demolition will be performed in accordance with Section 02060 of the specifications in Appendix D.

4.2.14 Pipe Installation

In cases where OWSs are removed from active operation, piping will be installed to maintain operation of the new OWS. Pipe installation will be performed in accordance with Section 15020 of the specifications in Appendix D.

4.2.15 LNAPL Recovery

LNAPL is present at three locations at SWMU 27. The excavation at these locations will be to a depth adequate for recovery of LNAPL. The LNAPL will be removed from the excavation with a pump and containerized for transport to the T-38 dual-phase extraction system, where it will be used for fuel.

5.0 REGULATORY COMPLIANCE PLAN

The Regulatory Compliance Plan (RCP) consists of the following sections. Section 5.1 provides an introduction to the project and regulatory requirements and lists the regulated activities. Section 5.2 provides a description of the wastes expected to be generated during project activities. Section 5.3 addresses waste management activities. Sections 5.4 and 5.5 provide spill-release reporting and training-certification requirements, respectively. Section 5.6 provides policies and procedures for inspection of the project by regulatory agencies and third parties. Section 5.7 details documentation and records retention for project activities. Section 5.8 discusses the procedures for updating the RCP in the event of changes in project activities or applicable regulations.

5.1 INTRODUCTION

This RCP has been specifically developed to identify necessary regulatory requirements applicable to OWS and WOT removals and remediation of POL-contaminated soils at multiple sites at Holloman AFB, New Mexico. The RCP details environmental compliance procedures and regulatory, procedural, and training requirements necessary to conduct the remedial activities with the primary focus on management of waste generated during the implementation of the project.

5.1.1 Regulatory Framework

Holloman AFB is subject to the requirements of several environmental regulatory programs. All of these programs require investigation of sites suspected of contamination. On the basis of previous investigations, the sites addressed in this Work Plan require remedial action. Brief descriptions of the main regulatory programs are presented below.

Holloman AFB has actively conducted an environmental restoration program. Initially, the program was managed under the Air Force's Installation Restoration Program (IRP) but was later integrated with the U.S. Environmental Protection Agency's (EPA) Resource Conservation and Recovery Act's (RCRA) corrective action program. The IRP was established to investigate past

hazardous waste disposal sites at Department of Defense installations. The IRP generally follows the provisions of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the Superfund Amendments and Reauthorization Act (SARA). There are 2 IRP sites identified with this particular Holloman AFB remedial project. Under the RCRA permit, Holloman AFB operates an on-site hazardous waste storage facility. Because of the facility's operating permit, the Base is subject to the RCRA corrective action program. The Hazardous and Solid Waste Amendment (HSWA) portions of the RCRA permit require that Holloman AFB investigate SWMUs identified in the 1988 RCRA Facilities Assessment (RFA). The HWSA permit divided the Base's 113 SWMUs into three separate tables on the basis of their perceived risk to human health and the environment. The SWMUs believed to have the highest potential risk were included on Table 1 of the HSWA permit, while SWMUs believed to have reduced for risk were placed on Tables 2 and 3. The 113 units listed in Tables 1, 2, and 3 of the permit must comply with the approved schedules for implementing the Base's corrective action program.

As appropriate, the Base must comply with the IRP and RCRA corrective action programs. Both are similarly phased and ultimately intended to ensure that contaminated sites posing a threat to human health or the environment are remediated. The preamble of EPA's proposed RCRA Subpart S regulations encourage coordination between the two independent programs. Because its HSWA permit was issued by the EPA, Holloman AFB has integrated the two programs to reduce duplicative efforts. This approach has been endorsed by both EPA Region VI and the New Mexico Environment Department.

5.1.2 Regulated Site Activities

The following actions are addressed in this Work Plan and are applicable to all of the OWSs, WOTs, and remediation of POL-contaminated soil activities. The anticipated regulated activities are as follows:

- OWSs Removal and Replacements—Remove/dispose waste from OWSs (if present); demolish/remove OWSs, install new OWSs (as required).

- Waste Oil Tank Removals—Remove/dispose waste from WOTs (if present) and then demolish/remove WOTs.

- Contaminated Soil Remediation—Remove POL-contaminated soil as necessary for disposal at an approved off-site special waste landfill.

- General—Sample and perform chemical analysis on wastes contained in OWSs, WOTs, and contaminated soil for characterization, storage, and management purposes.

- Transportation and Disposal of Wastes—Dispose and transport of any hazardous or special wastes resulting from remedial activities.

5.1.3 Regulatory Requirements

Project activities are expected to generate nonhazardous waste, NMED-regulated special wastes, and potentially hazardous wastes. As such, the following federal and state regulations are applicable and must be complied with during implementation of planned project activities:

- 40 Code of Federal Regulations (CFR) Parts 190—256 EPA regulations for Solid Waste
- 40 CFR Parts 260—299 EPA Regulations for Identification and Management of Hazardous waste
- 49 CFR Parts 100—177 DOT Rules For Hazardous Materials Transport
- New Mexico Solid Waste Management Regulations
- New Mexico Hazardous Waste Management Regulations
- New Mexico Air Quality Control Regulations
- New Mexico Water Quality Control Commission Regulations
- New Mexico Underground Storage Tank Regulations

Petroleum-contaminated soil in excess of applicable Holloman AFB remediation standards has been identified during previous RFIs conducted at Holloman AFB at Table 2 sites (Radian 1994), and Table 3 sites (Radian 1995). More specifically, the following number and types of affected sites by table for this project activity and type are as follows:

- Table 2—Total number of sites is 9. Project activities include 1 soil excavation operation, 6 OWS removals, and 2 WOTs removals

- Table 3—Total number of sites is 14. Project activities include 10 soil excavation operations, 7 OWS removals, 1 OWS replacement, and, 2 WOTs removals

As previously indicated in the Work Plan, the purpose of this project is to achieve site closure objectives, either through removal or removal/replacement of OWSs/WOTs or remediation of POL-contaminated soil at the specified SWMUs as timely and cost-effectively as possible. The volume of overexcavated soil will be minimized using on-site analytical testing and field screening techniques. By combining multiple sites in one project mobilization, site efficiencies will be realized for plan preparation, construction mobilization, sampling and analysis, project reporting, disposal costs, and/or treatment costs of soil, sludge, pumpable liquids, and debris.

A more detailed discussion of the specific remedial activities to be implemented during this POL project at Holloman AFB is presented in Section 4.0 of the Work Plan. The RFIs for the affected sites indicated no contaminants present in excess of New Mexico Environmental Department (NMED) remediation action levels (RALs). The RALs have been defined and identified in the Holloman AFB Management Action Plan (MAP) dated April 1995. Table 5-1 lists the site screening levels (i.e., risk-based standards for hazardous waste/constituents in soil currently in effect at Holloman AFB. Applicable regulatory action levels for TPH, metals, VOCs, and semivolatile organic compounds (SVOCs) are summarized in Table 5-1. These levels are derived from three primary sources:

- Various NMED correspondences to Holloman AFB confirming negotiated remediation standards for Holloman AFB (e.g, TPH in soil standard).

- The Basewide Background Study for Holloman AFB (Radian 1993).

- EPA Region III, Risk-Based Concentration Table (EPA 1994).

Table 5-1 Site Screening Levels Applicable at Holloman AFB

METHOD	PARAMETER	SOIL CONCENTRATION (mg/kg)
Modified EPA 8015/418.1	TPH	≥ 1,000[1]
EPA Method 8240: Volatile Organic Compounds	Acetone	100,000[4]
	Benzene	25[2]
	Bromodichloromethane	46[4]
	Bromomethane	1,400[4]
	Carbon disulfide	100,000[4]
	Carbon tetrachloride	22[4]
	Chlorobenzene	20,000[4]
	Chloroethane	410,000[4]
	2-Chloroethyl vinyl ether	26,000[4]
	Chloroform	470[4]
	Chloromethane	220[4]
	Dibromochloromethane	34[4]
	1,2-Dichlorobenzene	92,000[4]
	1,3-Dichlorobenzene	91,000[4]
	1,4-Dichlorobenzene	120[4]
	1,2-Dichloroethane (EDC)	31[4]
	cis-1,2-Dichloroethene	10,000[4]
	trans-1,2-Dichloroethene	20,000[4]
	1,1-Dichloroethane	100,000[4]
	1,1-Dichloroethene (1,1-DCE)	4.8[4]
	1,2-Dichloropropane	42[2]
	cis-1,3 Dichloropropene	16[4]
	trans-1,3-Dichloropropene	NA[6]
	Ethyl benzene	100,000[4]
	2-Hexanone	NA[6]
EPA Method 8240: Volatile Organic Compounds (Continued)	Methylene chloride	380[4]
	2-Butanone (methyl ethyl ketone)	610,000[4]
	4-Methyl-2-pentanone (methyl isobutyl ketone)	82,000[4]
	Styrene	200,000[4]
	1,1,2,2-Tetrachloroethane	14[4]
	Tetrachloroethene (PCE)	55[4]
	Toluene	200,000[4]
	Tribromomethane (Bromoform)	360[4]
	1,1,1-Trichloroethane	92,000[4]
	1,1,2-Trichloroethane (1,1,2-TCA)	50[4]
	Trichloroethene (TCE)	260[4]

METHOD	PARAMETER	SOIL CONCENTRATION (mg/kg)
	Vinyl acetate	1,000,000[4]
	Vinyl chloride	1.5[4]
	Xylenes (total)	1,000,000[4]
EPA 6010/7000 series. Target Analyte List (TAL) Metals	Aluminum	8,764.4972[3]
	Antimony	7.2844[3]
	Arsenic	6.8833[3]
	Barium	84.3632[3]
	Beryllium	0.4000[3]
	Cadmium	1.0359[3]
	Chromium (total)	6.6049[3]
	Cobalt	2.4852[3]
	Copper	4.8438[3]
	Cyanide	NA
	Iron	6,361.6519[3]
EPA 6010/7000 series Target Analyte List (TAL) Metals (Continued)	Lead	2.3221[3]
	Magnesium	14,656.3132[3]
	Manganese	146.9104[3]
	Mercury	0.0006[3]
	Nickel	5.6125[3]
	Potassium	2,501.3873[3]
	Silver	0.7342[3]
	Sodium	5,000.0000[3]
	Thallium	11.3153[3]
	Vanadium	15.4597[3]
	Zinc	20.2464[3]
SW 9040/9045	pH	6 to 9[3]
EPA 8270 Semivolatil Organic Compounds	Acenaphthene	61,000[4]
	Anthracene	310,000[4]
	Benzo(a)pyrene	0.39[4]
	Benzo(b)fluoranthene	3.9[4]
	Benzo(k)fluoranthene	39[4]
	Benzo(a)anthracene	3.9[4]
	Chrysene	390[4]
	Dibenz(ah)anthracene	0.39[4]
	Fluoranthene	41,000[4]
	Fluorene	41,000[4]
	Indeno(1,2,3-cd)pyrene	3.9[4]
	Indeno(1,2,3-cd)pyrene	3.9[4]
	Naphthalene	41,000[4]

METHOD	PARAMETER	SOIL CONCENTRATION (mg/kg)
EPA Method 8270 Semivolatile Organic Compounds (continued)	Pyrene	31,000[4]
	Phenol	610,000[4]
	2-Nitroaniline	61[4]
	3-Nitroaniline	3,100[4]
	4-Nitroaniline	3,100[4]
	Nitrobenzene	510[4]
	4-Nitrophenol	63,000[4]
	N-Nitrosodiphenylamine	580[4]
	N-Nitroso di-n-propylamine	0.41[4]
	Hexachlorobenzene	1.8[4]
	Hexachlorobutadiene	37[4]
	Hexachlorocyclopentadiene	7,200[4]
	Isophorone	3,000[4]
	2,4,5-Trichlorophenol	100,000[4]
	2,4,6-Trichlorophenol	260[4]
	2-Chlorophenol	5,100[4]
	4-Chloroaniline	4,100[4]
	Benzoic acid	1,000,000[4]
	Benzyl alcohol	310,000[4]
EPA 8270 Semivolatil Organic Compounds (continued)	Bis(chloromethyl)ether	0.013[4]
	Bis(2-chloro-1-methylethyl)ether	41[4]
	Bis(2-ethylhexyl)phthalate	200[4]
	Bis(chloroethyl)ether	2.6[4]
	4-Bromophenyl phenyl ether	59,000[4]
	Butyl benzyl phthalate	200,000[4]

1 NMED USTB Correspondence to Holloman AFB, dated November 2, 1992.
2 NMED USTB Correspondence to Holloman AFB, dated January 25, 1993.
3 Established Background Levels (Radian 1993).
4 EPA Region III, Risk-Based Concentrations (EPA 1994).
5 New Mexico Water Quality Control Commission (WQCC) Regulations, August 18, 1991, Standards For Groundwater of 10,000 mg/l TDS Concentration Or Less.

These standards are currently being used at Holloman to determine the need for remedial actions. In addition, Holloman AFB has an agreement with NMED regarding the remediation of TPH contaminated soil. If the contamination, measured as a TRPH concentration in the soil, is less than 1,000 mg/kg, then NMED requires that no further action be taken. The agreed upon RAL applicable to PCS and groundwater at Holloman AFB as established by the NMED are as follows:

- For petroleum-contaminated soil, TPH < 1,000 milligrams per kilogram (mg/kg) and benzene < 25 mg/kg
- Removal of LNAPL from groundwater

As a result of the established RAL, if the TRPH concentration detected exceeds 1,000 mg/kg, the soil must be remediated or taken off site to an approved special waste TSDF for disposal. If contaminant concentrations are present in excess of applicable closure standards, affected soil will be removed by additional excavation.

Because of the high total dissolved solids (TDS) concentration in groundwater at the Base, there are no applicable dissolved groundwater standards. However, EPA and NMED require Holloman AFB to delineate the nature and extent of sorbed and dissolved-phase compounds present in the subsurface above established background levels.

In accordance with New Mexico Environmental Improvement Board Underground Storage Tank (UST) Regulations (NMEIB/USTR) Part I, Section 103 (C), Parts II through XIV of the NMEIB/USTR are not applicable to wastewater treatment tanks, sumps, hydraulic lift tanks, and any UST system with a capacity of 110 gallons or less. In addition, per NMEIB/USTR Part I, Section 102 (CCC), the term UST does not apply to septic tanks, surface impoundments, pits, ponds or lagoons, stormwater or wastewater collection systems, flow-through process tanks, or related piping. The NMEIB/USTR are not applicable to any of the tanks or separators identified in this Work Plan due to their use, size, or construction. However, the UST cleanup standards are applicable to the remediation of SWMU 128, which is the result of a previous UST release.

With regard to SWMU 128, 40 CFR 261.4(b)(10) applies and, as such, petroleum-contaminated media (e.g., soil) at SWMU 128 that exhibit a toxicity characteristic in excess of the regulatory limit for waste codes D018-D043 are classified solid wastes and hence not hazardous wastes.

5.2 PROJECT WASTE DESCRIPTIONS

5.2.1 Anticipated Waste Streams

The anticipated waste streams associated with the OWS removal activities can be categorized as follows:

- OWSs/WOTs demolition materials
- Pumpable liquids from OWSs/WOTs (Holloman AFB to remove prior to project activities)
- Solids/sludge from OWSs/WOTs (Holloman AFB to remove prior to project activities)
- Contaminated soil
- Decontamination fluids used to decontaminate field equipment and personal protective equipment (PPE)
- Disposable PPE and equipment
- Waste associated with sampling activities

In addition to the waste descriptions below, Table 5-2 presents detailed waste management, transportation, and disposal requirements for each waste category.

5.2.2 Waste Descriptions

The following descriptions pertain to OWSs/WOTs demolition materials, pumpable liquids from OWSs/WOTs, solids/sludge OWSs/WOTS contaminated soil, decontamination fluids, disposable PPE, and waste associated with sampling activities.

As a note, pumpable liquids and solids/sludge from OWSs/WOTs while listed and discussed, are not expected to be present during the start of actual remedial activities, as these materials should

Table 5-2 Summarized Project Regulatory Requirements

WASTE TYPES	CHARACTERIZATION REQUIREMENTS	APPLICABLE REGULATIONS	ALLOWABLE CONTAINMENT	STORAGE REQUIREMENTS	TRANSPORTATION REQUIREMENTS	DISPOSAL REQUIREMENTS
Soil	Need to determine whether excavated soil is a hazardous waste. Can run total analysis[1] or a Toxicity Characteristic Leaching Procedure (TCLP). Need to determine whether excavated soil is a New Mexico Environment Department (NMED) Special Waste, i.e., a petroleum-contaminated soil (PCS). 500 ppm will be used as a screening level. TPH analysis required a TPH > 500 ppm soil considered a PCS. If determined to be a PCS, then must also be analyzed for ignitability, and a paint filter test. If generator knowledge used in lieu of analysis supporting documentation must be kept.	EIB/HWMR-7 Part II.201 and Part III.301 - "Identification & Listing of Hazardous Waste" and "Stds. Applicable to Generators of Hazardous Waste." 40 CFR 268.48 - Land Disposal Restriction (LDR) - Universal Treatment STDs (UTS). 40 CFR 262 - Generator STDs. EIB/SWMR-4 Part VII "Special Waste Requirements Sections 701, 702, 703, 704, 708, and 712".	Department of Transportation (DOT) approved 55-gal. metal drums (1A1 or 1A2) or DOT-approved portable tanks (DOT 51,52,53,56,57 and 60). Must be sealed when not being filled. Can be stored temporarily on-site in a bermed area on an impermeable liner, then covered or in a manner that will not contaminate environmental media, i.e., soil, ground, and surface water.	90-day storage limit if determined to be a hazardous waste. Must be labeled with a completed hazardous waste label. Maximum on-site storage for PCS special waste is 45 days. Storage clock starts from the date that waste is first put into the container.	Hazardous waste manifest DOT placarding. Must use an EPA-permitted transporter. Must also have LDR certifications as necessary. 40 CFR 262 Subpart C PCS shipped off-site must be accompanied by a NMED Special Waste manifest. Containers must be labeled indicating contents and the potential health, safety, and environmental hazards associated with the waste. Individuals involved in overseeing or shipping hazardous materials must meet HM-181 & HM-126F training requirements.	If a HW, must be disposed at an approved RCRA TSDF having approval to receive CERCLA off-site waste be treated prior to landfilling by solidification to pass paint filter test. PCS special waste can only be disposed in an approved solid waste facility authorized for special wastes. PCS special waste containing free liquid cannot be sent to a landfill and must pass the paint filter test before it can be landfilled. Regulatory Affairs Advisor (RAA) must approve TSDF and transporter prior to shipment of waste.
Debris	Debris not in contact with a hazardous waste (HW) and decontaminated debris will be managed as a solid waste (SW). Debris not decontaminated will have to be sampled to characterize as hazardous waste. Run TCLP analysis for analytes that may be present based on historical knowledge of OUS use.[4]	EIB/HWMR-7 Part II.201 and Part III.301 - "Identification & Listing of Hazardous Waste" and "Stds. Applicable to Generators of Hazardous Waste." 40 CFR 268.48 - LDR Stds (UTS). 40 CFR 268.45 - Debris Stds. 40 CFR 262 - Generator STDs.	DOT-approved roll-offs or DOT-approved 55-gal. metal drums (1A1 or 1A2) or DOT- approved portable tanks (DOT 51,52,53,56,57 and 60). Must be sealed when not being filled.	90-day storage limit if determined to be a hazardous waste. Must be labeled with a completed hazardous waste label. Storage clock starts from the date that waste is first put into the container.	Hazardous waste manifest DOT placarding. Must use an EPA-permitted transporter. Must also have LDR certifications as necessary. Individuals involved in overseeing or shipping hazardous materials must meet HM-181 & HM-126F training requirements.	If not treated, must be disposed at an approved RCRA TSDF having approval for CERCLA off-site waste. If a solid waste can be disposed of at an approved SW landfill RAA must approve TSDF and transporter prior to shipment of HW or SW off site.
Decon Water	Need to determine whether decontamination water is a hazardous waste. Can run a total analysis[1] for specified TCLP analytes. Also need to determine whether water contains free oil or can generate toxic fumes. In lieu of analyzing collected water samples, can use soil analysis results, i.e., if soil is not determined to be a hazardous waste then decontamination water can also be managed as a solid waste.	EIB/HWMR-7 Part II.201 and Part III.301 - "Identification & Listing of Hazardous Waste" and "Stds. Applicable to Generators of Hazardous Waste." 40 CFR 268.48 - LDRs (UTS). 40 CFR 262 - Generator STDs. EIB/SWMR -4 "Solid Waste Management Regulations."	DOT-approved 55 gal. metal drums (1A1 or 1A2) or DOT-approved portable tanks (DOT 51,52,53,56,57 and 60). Must be sealed when not being filled.	90-day storage limit if determined to be a hazardous waste. Must be labeled with a completed hazardous waste label. Storage clock starts from the date that waste is first put into the container.	Hazardous waste manifest DOT placarding. Must use an EPA-permitted transporter. Must also have LDR certifications as necessary. Individuals involved in overseeing or shipping hazardous materials must meet HM-181 & HM-126F training requirements.	If a HW, must be disposed at an approved RCRA TSDF having been approved CERCLA off-site waste. If a non-HW can be discharged into Base's wastewater treatment facility (WWTF) or a wastewater treatment unit, i.e., an oil/water separator (OWS). If non HW and below RAL can discharge to ground. No NOI required. RAA must approve TSDF and transporter prior to shipment of waste.

Table 5-2 Summarized Project Regulatory Requirements

WASTE TYPES	CHARACTERIZATION REQUIREMENTS	APPLICABLE REGULATIONS	ALLOWABLE CONTAINMENT	STORAGE REQUIREMENTS	TRANSPORTATION REQUIREMENTS	DISPOSAL REQUIREMENTS
Organic Phase Material	Need to determine whether recovered organic-phase material is a hazardous waste. Can run total analysis[1] or a TCLP[3].	EIB/HWMR-7 Part II.201 and Part III.301 - "Identification & Listing of Hazardous Waste" and "Stds. Applicable to Generators of Hazardous Waste." 40 CFR 268.48 - LDRs (UTS). 40 CFR 262 - Generator STDs.	DOT-approved 55-gal. metal drums (1A1 or 1A2) or DOT-approved portable tanks (DOT 51,52,53,56,57 and 60). Must be sealed when not being filled.	90-day storage limit if determined to be a hazardous waste. Must be labeled with a completed hazardous waste label. Storage clock starts from the date that waste is first put into the container.	Hazardous waste manifest DOT placarding. Must use an EPA-permitted transporter. Must also have LDR certifications as necessary. Individuals involved in overseeing or shipping hazardous materials must meet HM-181 & HM-126F training requirements.	If a HW, must be disposed at an approved RCRA TSDF having approval for CERCLA off-site wastes. RAA must approve TSDF and transporter prior to shipment of waste. If not a HW, may dispose of into Base's WWTF or to a wastewater treatment unit, i.e., an OWS, or may be sent off-site to an approved fuel blending facility.
Disposable Personal Protective Equipment (PPE)	Decontaminated PPE will be handled as a SW and no analysis required. If not decontaminated then need to determine whether the PPE is a hazardous waste or not. Can run total analysis[1] or a TCLP.	EIB/SWMR -4 "Solid Waste Management Regulations." EIB/HWMR-7 Part II.201 and Part III.301 - "Identification & Listing of Hazardous Waste" and "Stds. Applicable to Generators of Hazardous Waste." 40 CFR 268.48 - LDRs (UTS). 40 CFR 261.7 - RCRA Empty container rule. 40 CFR 262 - Generator STDs.	Double plastic bags. DOT-approved 55-gal. metal drums (1A1 or 1A2) or DOT-approved portable tanks (DOT 51,52,53,56,57 and 60). Must be sealed when not being filled. If a container involved and is "empty," i.e., < 1 liquid then container is not a HW	Once bagged, keep separate from other waste. 90-day storage limit if determined to be a hazardous waste. Must be labeled with a completed hazardous waste label. Storage clock starts from the date that waste is first put into the container.	None DOT placarding. Must use an EPA-permitted transporter. Must also have LDR certifications as necessary. Individuals involved in overseeing or shipping hazardous materials must meet HM-181 & HM-126F training requirements.	Dispose at approved landfill. If a HW, must be disposed at an approved CERCLA Off-Site TSDF. RAA must approve TSDF and transporter prior to shipment of waste.

NOTE:

1) If a total analysis is chosen and the results indicate that a constituent is more than 20x the appropriate TC level then a TCLP will have to be run.
2) Analyze samples for TCLP constituents as indicated in the FSAP.
3) TCLP will be performed if > 5% solids are present.
4) If decontamination of concrete OWS debris is not feasible and visual staining is present, concrete samples will be collected for analysis.

have been previously removed from the affected units by Holloman AFB personnel, who were following their normal maintenance procedures for managing these materials.

OWSs/WOTs Demolition Materials

Concrete or asphalt surfaces over or under each structure to be removed will be saw cut and removed approximately 3 feet around the perimeter of the tank or OWS. Asphalt, concrete, and associated construction rubble that contains nonhazardous materials, was not exposed to contamination, or has been decontaminated will be transported to an approved off-site Subtitle D landfill for disposal.

Emptied OWSs/WOTs will be decontaminated, as necessary, with a pressure washer to remove sludge and contaminated debris prior to demolition. The OWS demolition materials will consist of demolition-generated concrete and possibly metal. Loose dirt will be scraped off the outside of the OWS/WOT units removed. Decontamination rinsate will be containerized and handled as a decontamination fluid. The decontaminated demolition debris will be stockpiled or containerized in roll-offs to be later disposed in an off-site landfill.

Contaminated Soil

Contaminated soil will consist of soil removed from areas adjacent to and beneath OWSs and WOTs (including associated structures) and from PCS sites requiring remediation. As the removal activities are conducted, soil will be segregated on the basis of visual observations and PID field headspace screening as well as existing analytical and historical process knowledge and any information that identifies the potential presence of characteristic hazardous constituents. For field screening purposes, soil exceeding 500 mg/kg will be segregated as potential petroleum-contaminated soil requiring further analytical sampling. PCS-segregated soil will be temporarily stockpiled until final disposition in a bermed area on an impermeable liner. One composite sample will be collected per each 100 cubic yards of petroleum-contaminated soil removed for TRPH analysis. Petroleum-contaminated soil not characterized as a special waste (i.e., containing less than 1,000 mg/kg) will be used as backfill material. PCS having a TRPH concentration greater

than 1,000 mg/kg will be disposed at an approved off-site special waste landfill. Closure samples for the OWSs/WOTs and the TPH-impacted soil excavations will be collected from the bottom of the excavation and from each sidewall. After removing visually impacted soil and/or using organic headspace vapor screening results, one soil sample will be collected with the backhoe bucket or soil auger from each sidewall and from the bottom of each excavation. Once an excavation is deemed complete, closure verification samples will be collected for laboratory analysis.

Following confirmation of clean closure or the determination that no additional excavation will be conducted, the excavation will be backfilled.

Material excavated at the site is generally considered usable for grading and backfill purposes, provided that the TRPH concentration is less than 1,000 mg/kg. Additional fill will be imported from an off-site location. If necessary, fill material obtained from off-site sources will either be tested to ensure that it is not contaminated or will have a "clean certification" indicating that it is free of contamination.

Although no RCRA hazardous waste generation is anticipated, if characterization indicates that the affected soil is hazardous waste, the waste will be temporarily stored in a roll-off container to be later disposed of at a fully permitted RCRA Subtitle C facility that is in compliance with EPA's CERCLA Off-Site Rule requirements for Subtitle C facilities. The facility must meet LDR requirements and must provide treatment of wastes prior to disposal as required under the LDR. Prior to shipment, a brief review will be conducted by the Regulatory Affairs Advisor (RAA) to determine disposal facility compliance with the CERCLA Off-Site Rule.

Decontamination Fluids

Equipment will be decontaminated as described in the Work Plan. Decontamination water will be containerized in drums or tanks and will be sampled, analyzed, and characterized prior to disposal. An alternate method for the characterization of decontamination fluids is the use of analytical

results from contaminated soil samples whereby process knowledge of the contaminants present in the soil at the site(s) is used (i.e., if the soil contaminants are below RAL levels then the decontamination water will be assumed to be nonhazardous). If the soil analysis indicates that no hazardous waste is present then the decontamination fluid(s) can be disposed at a designated OWS or at the Holloman AFB wastewater treatment facility. An alternate disposal method for nonhazardous waste meeting RAL levels would be to discharge the water directly into the ground (a Notice of Intent to Discharge will not be required per the Holloman AFB/NMED agreement). Wastewater that is characterized as a hazardous waste will be disposed at an approved, fully permitted RCRA Subtitle C TSDF.

Personal Protective Equipment (PPE)

Disposable PPE includes the following:

- Tyvek full-body coveralls
- Chemically resistant surgical-type gloves
- Cotton work gloves
- Chemical resistant boot covers
- Respirator filters (respirators may be needed at Building 377 based upon air monitoring action levels)

Protective clothing and sampling equipment is typically collected on a daily basis in plastic garbage bags and disposed in a drum or storage container dedicated for this type of waste. Personal protective equipment worn by observers or other site personnel who do not come in any contact with contaminated media can be disposed of as domestic waste. Properly decontaminated PPE, clothing, and/or miscellaneous sampling equipment solid wastes may be considered nonhazardous. If disposable PPE and equipment are used to manage characteristic hazardous waste, the PPE itself should be managed as a solid waste unless extremely contaminated. The proposed classifications will be reviewed and approved by Holloman AFB.

Pumpable Liquids From OWSs/WOTs

If present, pumpable liquids in OWSs/WOTs are to be removed. If possible, removal of the OWSs/WOTs and associated structure contents will be coordinated with the existing Base OWS Maintenance Contractor. Pumpable liquids will be pumped into DOT-approved containers. A representative sample of the top floating layer (if present) and the middle/water layer will be collected for each site where pumpable liquids are generated. The samples will be analyzed for the parameters indicated in the FSP. The drums will be appropriately labeled and marked before being transported to the IDW Compound or Defense Reutilization and Marketing Office (DRMO) facility.

When the analysis is completed, the liquids will be characterized and managed appropriately. Hazardous liquids will be sent to the DRMO upon approval by Holloman AFB or to an approved off-site hazardous waste TSDF. Nonhazardous liquids will be discharged to a designated OWS following approval by Holloman AFB wastewater treatment facility.

OWS/WOT Solids/Sludge-Phase Material

Sludge may be present in the OWSs/WOTs and associated structures. If so, removal of sludge will be performed by the existing Base OWS Maintenance Contractor. If this is not possible, sludge will be removed from the structure and placed in DOT-approved containers. The bottom/solids will be sampled and analyzed as indicated in the Field Sampling Plan. Drums will be labeled, marked, and immediately transported to the IDW Compound or the DRMO. When analysis is completed, the sludge will be characterized and managed appropriately as either hazardous or special waste. If characterized as a hazardous waste, the solids/sludge will be transported to an approved off-site hazardous waste TSDF. If characterized as a nonhazardous waste, the solids/sludge will be disposed in an approved off-site landfill for special wastes.

5.3 WASTE MANAGEMENT ACTIVITIES

The construction services associated with this project will be conducted by EBASCO and, thus, EBASCO is responsible for the characterization sampling of pumpable liquids, sludges, and

excavated soil and for closure verification sampling. Samples will be shipped to EBASCO's subcontract laboratory, using standard chain-of-custody procedures, for data analysis during which the samples will be analyzed according to the protocol detailed in the FSP (Section 7.0).

In addition, EBASCO will conduct the following construction/removal activities:

- Preconstruction activities, such as (1) marking and clearing sites, (2) obtaining Base digging permits, and (3) establishing staging areas.

- Removal of pumpable liquids and sludge (if present) from OWSs/WOTs and removal of associated piping and lines. Liquids will either be collected and discharged to a designated OWS or be drummed and transported to the IDW Compound pending analytical results. Sludge will be drummed and transported to the IDW Compound pending analytical results.

- Decontamination of OWSs/WOTs and associated structures as necessary.

- Removal of concrete or asphalt surfaces over each subsurface structure and transportation to an approved off-site Subtitle D landfill for disposal.

- Removal of decontaminated OWSs (and replacement if required), WOTs, and associated equipment, which will then be (1) broken into manageable pieces and (2) transported to an approved off-site Subtitle D landfill for disposal.

- Excavation of soils surrounding any removed structures or designated SWMUs requiring soil remediation. Based on visual inspection and field screening using a PID, soil will be segregated into petroleum-contaminated and nonpetroleum-contaminated soil categories; and petroleum-contaminated soil (PCS) will be stored within a temporary protected (lined) bermed area, and soil that may the potentially be hazardous waste will be stored in drums or roll-offs. PCS may be stored on site for up to 45 days.

- Sampling and analysis of all stored soil and confirmatory closure sampling of all excavations for TRPH and RCRA waste components. Replacement of OWSs following closure verification sampling and analysis.

- Resurfacing of areas, including asphalt, concrete, or soil, to match the adjacent surface.

- Disposal of soil, liquids, and sludges as follows:

    - Petroleum-impacted soil with TPH concentrations less than 1,000 mg/kg will be used as backfill in the OWS excavations. Petroleum-impacted soil with TRPH

concentrations greater than 1,000 mg/kg will be transported off site to a special waste landfill for disposal.

- RCRA hazardous wastes will be sent either to the Holloman AFB IDW Compound or DRMO RCRA storage facility and then to an off-site TSDF, which has been approved by the base and U.S. Army Corps of Engineers (USACE).

5.3.1 Waste Characterization/Classification

All waste streams including but not limited to sludge, soil, and recovered waste oil will be sampled and characterized in accordance with 40 CFR 262.11 and New Mexico's Environmental Improvement Board's Solid Waste Management Regulations (EIB/SWMR4-704), which require the generator to determine if a solid waste is a listed or characteristic hazardous waste or a New Mexico special waste. To meet these testing requirements, representative samples will be taken in accordance with federal and New Mexico Hazardous Waste Management Regulations (HWMR) and SWMR. Waste streams including but not limited to soil, pumpable liquids, sludges/solids, and decontamination fluids will be sampled and/or characterized in accordance with 40 CFR 262.11 and New Mexico's HWMR as indicated in the FSP and QAPP (Section 8.0).

To determine proper waste management requirements for waste generated during POL remedial activities, hazardous waste characterization is necessary. Wastes are determined to be characteristically hazardous on the basis of their chemical constituents or physical properties. Listed wastes are specifically identified in 40 CFR 261 Subpart D. With the use of process knowledge and supporting data as established in RFIs conducted at the identified Table 2 and 3 SWMUs, no constituents are present in soil in excess of site screening levels or established background levels with the exception of TPH contamination at the vast majority of the sites and polychlorinated biphenyls (PCBs) and pesticides at SWMU 118/132.

Characteristic hazardous waste exhibits toxicity in excess of the values indicated in 40 CFR 261 Subpart C, presented herein as Table 5-3. An exceedance of a toxicity characteristic is generally determined through waste constituent comparisons with Toxicity Characteristic Leaching Procedure (TCLP) listed levels (see Table 5-3). In lieu of a TCLP test, a total analysis of a waste may be performed to indicate that individual analytes are not present at concentrations greater

than 20 times the listed toxicity characteristic values in Table 5-3. Consequently, TCLP analyses may not have to be performed on all samples because total analysis may provide adequate analytical data to characterize the waste (1988). Because the RFI data indicate that any contaminants present are well below Table 5-3 levels, the total analysis approach for waste characterization is proposed.

Representative samples will be taken in accordance with federal and New Mexico's HWMR and SWMR, and documentation of all proposed waste classifications will be provided to Holloman AFB. Waste testing necessary to characterize and manage wastes generated during remedial activities has been reduced by using RFI-generated analytical data. Consequently, testing requirements for hazardous waste and special waste classification as presented in the FSAP and QAPP have been established to include the following testing protocols:

- Ignitability (for PCS)
- TCLP analytes (for SWMUs 118/132 only)
- Paint filter test (for SWMUs 118/132 only)
- TRPH (for PCS)
- PCB (for SWMUs 118/132 only)
- Pesticides (for SWMUs 118/132 only)

Sample analytical results will be compared against the results listed in Table 5-1 to establish the presence of characteristic hazardous wastes.

TABLE 5-3 RCRA Toxicity Characteristic Criteria

EPA Hazardous Waste Code	Constituent	TCLP Leachate Maximum (mg/l)	Maximum Total Conversion for Solids (mg/kg)
	Metals		
D004	Arsenic	5.0	100
D005	Barium	100.0	2,000
D006	Cadmium	1.0	20
D007	Chromium (total)	5.0	100
D008	Lead	5.0	100
D009	Mercury	0.2	4
D010	Selenium	1.0	20
D011	Silver	5.0	100
	Insecticides/Herbicides		
D012	Endrin	0.02	0.4
D013	Lindane	0.4	8
D014	Methoxychlor	10.0	200
D015	Toxaphene	0.5	10
D016	2,4-D	10.0	200
D017	2,4,5-TP Silvex	1.0	20
	Other Organics		
D018	Benzene	0.5	10
D019	Carbon tetrachloride	0.5	10
D020	Chlordane	0.03	0.6
D021	Chlorobenzene	100	2,000
D022	Chloroform	6.0	120
D023	o-Cresol*	200.0	4,000
D024	m-Cresol*	200.0	4,000
D025	p-Cresol*	200.0	4,000
D026	Cresols*	200.0	4,000
D027	1,4-Dichlorobenzene	7.5	150
D028	1,2-Dichloroethane	0.5	10
D029	1,1-Dichloroethylene	0.7	14
D030	2,4-Dinitrotoluene	0.13	2.6
D031	Heptachlor (and epoxide)	0.008	0.16
D032	Hexachlorobenzene	0.13	2.6
D033	Hexachlorobutadiene	0.5	10
D034	Hexachloroethane	3.0	60
D035	Methyl ethyl ketone	200.0	4,000
D036	Nitrobenzene	2.0	40
D037	Pentachlorophenol	100.0	2,000
D038	Pyridine	5.0	100
D039	Tetrachloroethylene	0.7	14
D040	Trichloroethylene	0.5	10
D041	2,4,5-Trichlorophenol	400.0	8,000
D042	2,4,6-Trichlorophenol	2.0	40
D043	Vinyl chloride	0.2	4

* If cresol isomers cannot be differentiated, total cresols is used.

5.3.2 Hazardous Waste Management

New Mexico's HWMR are found in EIB/HWMR-7. RCRA Subtitle C and the New Mexico HWMR govern hazardous wastes from the point of generation, through treatment and storage, to ultimate disposal. All waste streams must be classified in order to determine proper management practices. The NMED Hazardous Waste Bureau oversees management of the hazardous waste program in New Mexico.

Hazardous waste must comply with the following requirements:

- Any waste generated during the OWSs/WOTs removals and soil remediations must be characterized to determine if it is a hazardous waste.
- Hazardous waste must be managed in accordance with 40 CFR 262 "Standards Applicable to Generators of Hazardous Waste."
- Hazardous waste transported off site must be manifested in accordance with 40 CFR 262 Subpart B "Manifests" and accompanied by land disposal restriction (LDR) certification notices as per 40 CFR 268.7 "Waste Analysis and Recordkeeping."
- Hazardous waste must be stored in accordance with 40 CFR 265 Subpart I "Use and Management of Containers."
- All containers of hazardous waste to be stored or disposed will be clearly marked with a completed hazardous waste label, indicating the starting date of accumulation, EPA identification number, EPA waste code, etc., and Department of Transportation (DOT) markings.
- Hazardous waste may be stored on-site for a maximum of 90 days. The 90 days begin on the date that the waste is first generated and containerized (i.e., the first drop of waste is in a container).
- Hazardous waste must be disposed only at a permitted hazardous waste disposal facility permitted for the disposal of the particular type of hazardous waste generated.

5.3.3 New Mexico Special Waste Management

New Mexico Special Waste Regulations are found in EIB/SWMR-4. Management of special wastes is under the control of the Solid Waste Bureau.

With regard to this project, defined New Mexico Special Wastes, i.e., solid wastes that have unique handling transportation, or disposal requirements to assure protection of the environment and the public's health and safety include the following:

- Sludges
- Petroleum-contaminated soil

As previously discussed, for Holloman AFB, New Mexico has defined PCS as special waste if the TRPH concentration is greater than 1,000 mg/kg and benzene is greater than 25 mg/kg. Sludge is defined as any solid, semisolid, or liquid waste excluding treated effluent generated from a municipal, commercial, or industrial wastewater treatment plant, water supply treatment plant, or air pollution control device.

Special wastes must comply with the following requirements:

- Special wastes must either be treated prior to disposal and/or isolated in their disposal to ensure a minimum of exposure to the public.

- All special wastes must be disposed only at solid waste facilities permitted for disposal of special wastes.

- All special wastes must be manifested in accordance with Section 712 of the New Mexico Special Waste Requirements Regulations.

- Storage of special wastes will occur only at an approved special wastes storage area in a bermed area containing an impermeable membrane liner. Special wastes will not be stored longer than 45 days, unless approved in advance by the NMED.

- All containers of special wastes to be stored or disposed will be clearly labeled, indicating the contents and potential health, safety, and environmental hazards associated with the waste.

- The physical and chemical characteristics of all special wastes will be documented prior to storage, transportation, or disposal, by means of the following:

  — Records of the results of analysis performed in accordance with Section 704 as applicable.

— Detailed descriptions of the generator's knowledge of specific wastes.

Transporters of any type of waste must be registered.

5.3.4 Waste Containerization Practices

Container selection will be performed by DOT-trained personnel, based on type and quantity of waste to be generated. Containers may include either DOT-specification drums or roll-offs for regulated hazardous material. DOT-specification containers are not required for material that does not meet a DOT hazard class (such as PCS, which may be transported in a dump truck).

All hazardous waste will be stored on wooden pallets in DOT-approved containers at Holloman AFB's IDW Compound. The area will be secured with a standard Holloman AFB chain link fence, and a sign reading "DANGER-UNAUTHORIZED PERSONNEL KEEP OUT" will be posted at the entrance and on all sides of the enclosure. An inventory of waste containers will be maintained for later submittal to and inspection by the USACE and Holloman AFB.

Containers of hazardous waste will be inspected and logged weekly while the field work is in progress. Inspection will encompass proper labeling, secure closure, and noting the condition of each container, number of containers, and condition of the storage area. Any signs of deterioration, leaking, or dents will be noted, and containers will be immediately overpacked, if necessary. Standing water will be removed from the containment area as necessary. Inspection results will be provided to the USACE and Holloman AFB. The containers will be transferred over to Holloman AFB after waste characterization, as defined in this Section.

Waste material must be classified according to EPA and DOT criteria prior to affixing labels. Upon classification, the Regulatory Affairs Supervisor will direct the application of appropriate hazardous/nonhazardous waste and DOT labels, complete with proper information specific to each waste stream. Each container will be marked and labeled as required by EPA and DOT, if applicable. All DOT functions will be conducted by trained personnel as required by 49 CFR 172 Subpart H.

At the time of generation, all waste containers will be labeled, using indelible ink, with the following information:

- Source and location
- Contents and quantity of material in the container
- Potential health, safety and environmental hazards
- Accumulation start date (the date the first drop of material was put in the container)
- Date container sampled
- Parameters analyzed for
- "ANALYSIS PENDING - POTENTIALLY HAZARDOUS"

Containers determined to contain hazardous waste will immediately be labeled with a completed commercial EPA "HAZARDOUS WASTE" label, which will include the accumulation start date and other requested information. Figure 5-1 presents a typical hazardous waste label. All containers will be checked to ensure labels and markings are in good condition.

DOT information for hazardous materials, including proper shipping descriptions and hazard class labels, will be added prior to shipping.

5.4 REPORTING SPILLS AND RELEASES

Policy and Procedure RC 6 "Reporting Spills and Releases," presented in Appendix A.

Precautions shall be taken to prevent oil and hazardous material spills, including daily inspection by the site personnel of equipment, structure(s), and containers. Personnel using hazardous material will inspect the container before and after use. In the event of a spill/release, the Holloman AFB Emergency Response Coordinator will be immediately notified. Spill response will be in accordance with federal, state, local, and Holloman AFB regulations.

Emergency Response

Emergency response procedures are specified in the Holloman Air Force Basewide Health and Safety Plan.

Client Notification

The following chain of communications should be used in case of a spill:

- Designated EBASCO Spill and Release Reporting Site Representative

  — Dan Holmquist has been designated as the EBASCO on-site representative for spill and release reporting. Mr. Holmquist has received training in Procedure RC 6, and in the event of a spill or release shall immediately notify the DOM. The DOM shall notify the Holloman AFB Emergency Response Coordinator.

- Unless dictated by a project-specific requirement, EBASCO policy for responding to large spills and significant environmental releases will be to immediately notify the Holloman AFB Fire Department, extension 7228 on Base.

- Contact on-site representative:
  — Warren Neff (505)-475-5395 or Jim Hendricks (505) 479-0456

- Site personnel must contact the EBASCO DOM. If the DOM cannot be located, contact the RAA:

  — EBASCO DOM: Ron Versaw
  — Phone: (303) 980-3598
  — Fax: (303) 980-3539

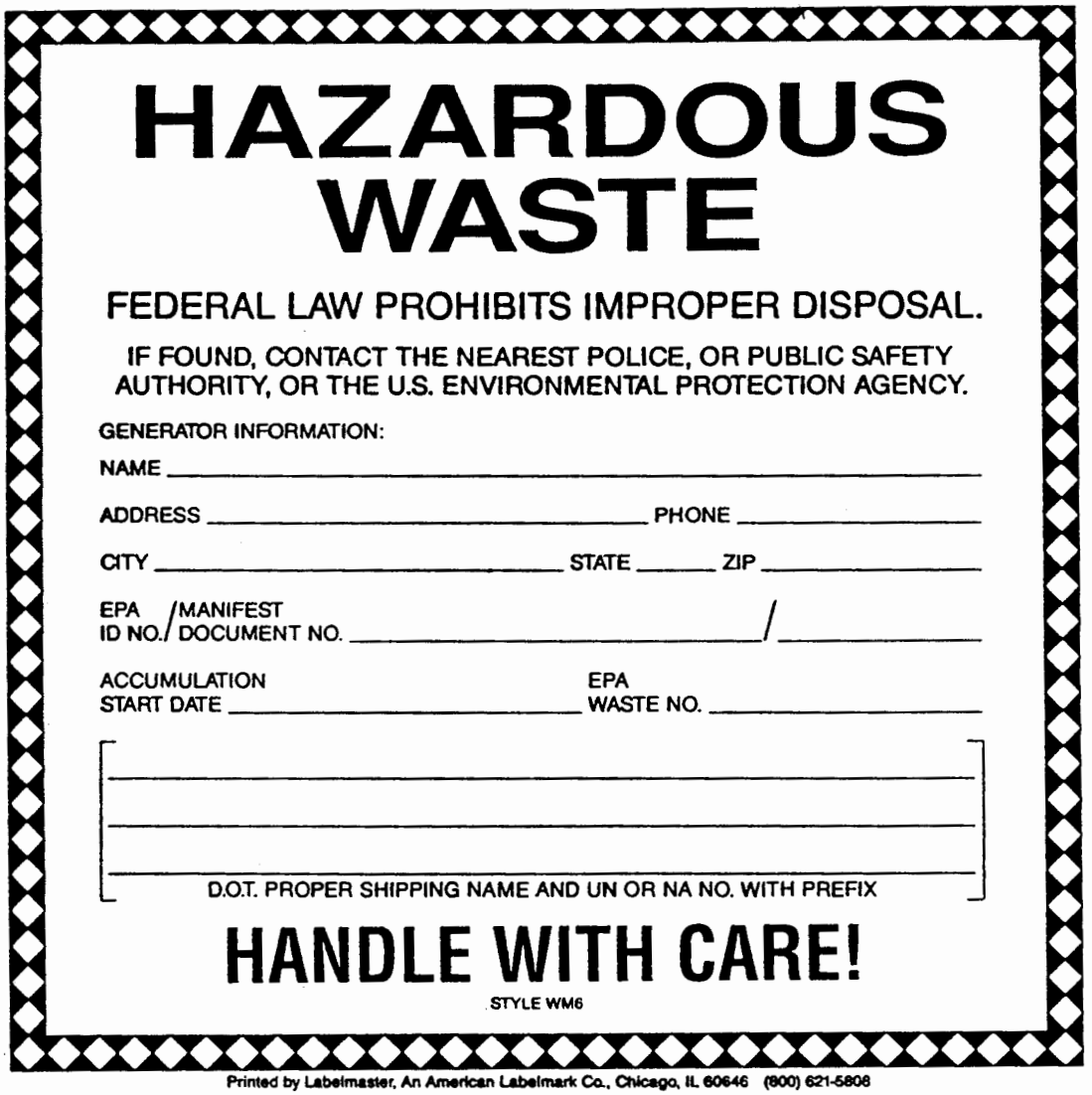
  — EBASCO RAA: Lee Snowhite
  — Phone: (303) 980-3579
  — Fax: (303) 980-3539

- The DOM or RAA must notify Barbara Walz, Western Region Compliance Manager ([303] 988-2202), of any spills and/or releases.

5.5 TRAINING/CERTIFICATION REQUIREMENTS

This section presents both DOT and Occupational Safety and Health Administration (OSHA) training and certification requirements for personnel involved in the POL remediation project.

Figure 5-1 HAZARDOUS WASTE LABEL



5.5.1 DOT

All personnel who perform or oversee DOT-related activities must be DOT trained. DOT training records will be maintained in project files on site. A copy of the DOT training records should also be sent to the Compliance Officer for the regulatory compliance files.

5.5.2 OSHA

All field personnel must receive OSHA 40-hour training prior to going on site. Documentation of training must be kept on site.

5.6 INSPECTION PROCEDURES

The following section describes inspection procedures to be followed by field personnel in the event that a regulatory agency or third party attempts to conduct an on-site inspection.

5.6.1 Inspections by Regulatory Agencies

Inspections by regulatory agencies will be conducted in accordance with EBASCO Environmental Compliance Procedure No. RC 8 for Environmental Inspection by Regulatory Agencies. Dan Holmquist has been designated as the EBASCO on-site representative for inspections by regulatory agencies. Mr. Holmquist has received training on this procedure and is familiar with implementation of the procedure. Mr. Holmquist must be notified first. These procedures require that, in addition to contacting the client as described below, site personnel or the DOM must notify Patsy Meehan, Director, Regulatory Affairs and Remediation Compliance or Barbara Walz, Western Region Compliance Manager, at ([303] 988-2202).

The DOM or his deputy will notify the client if contacted by a regulatory agency for site inspection (Holloman AFB Contact Warren Neff (505) 475-5395).

5.6.2 Inspections by Third Parties

Any outside party requesting access to inspect the site must be referred to the client for access. EBASCO personnel must not grant access or answer the questions of unauthorized personnel.

Individuals requesting access must be directed to contact Holloman AFB. Notify the DOM and the client of any attempts to gain access to the site (Holloman AFB Contact: Warren Neff (505) 475-5395).

If members of the media pose questions or attempt to access the site, notify the EBASCO Corporate Media Specialist, Patsy Meehan, Director, Regulatory Affairs and Remediation Compliance, or Barbara Walz, Western Region Compliance Manager.

5.7 DOCUMENTATION AND RECORDS RETENTION

This section presents project requirements relating to documentation and records and their retention.

5.7.1 Documentation

The information contained in this section applies to all waste managed during environmental data collection activities. Field records will be kept of all disposal activities. The logs and records will include the following information as required for the type of waste generated:

- Description of generating activities
- Location of generation (including depth, if applicable)
- Type of waste
- Date and time of generation
- Date and time of disposal of each type
- Disposal location of each type
- Disposal method
  - — Description of any waste sampling, including:
  - — Type of test
  - — Laboratory where sample is to be sent
  - — Sampling method
  - — Name of sampler
- Name of person recording information

- Name of field manager at time of generation and at time of disposal
- Test results
- Inspection logs
- Waste documentation, including:
  - — Waste profile sheets
  - — LDR certification
  - — Hazardous waste manifest
  - — Trip tickets or bills of lading
- Copies of any state or local permits or approvals

Transportation

Transportation documentation will comply with DOT regulations (49 CFR 100-177) and will be prepared by personnel trained according to the requirements of HM-181 and HM-126F.

Containers will be marked, labeled, and/or placarded prior to off-site transport. TSDF waste profile sheets, LDR notifications, waste manifests, and shipping documents will be prepared for Holloman AFB officials to review and sign.

All waste transporters used for Holloman AFB projects will be registered with NMED and approved in accordance with EBASCO procedures for TSDF and transporter approvals.

Hazardous and Special Waste Manifests and LDR Certification

Hazardous waste generated at the site will be stored on site for a maximum of 90 days prior to transportation for treatment or disposal. The 90-day accumulation period will begin when contaminated material is first put into a container.

All hazardous waste transported from the site will be accompanied by a Hazardous Waste Manifest. New Mexico does not provide a standard state manifest, so the receiving state

manifest must be used unless that state does not have a state manifest, and then a Uniform Hazardous Waste Manifest may be used.

Holloman AFB personnel will be responsible for reviewing and signing all waste documentation, including waste profiles, manifests, and LDR notifications (manifest packages). Prior to signing the manifest, the designated Holloman AFB official will ensure that pretransport requirements of packaging, labeling, marking, and placarding are met according to 40 CFR 262.30-262.33 and 49 CFR 100-177.

For special waste, a manifest containing the following information will accompany each load of special waste originating from or to be disposed in New Mexico, as specified in Section 702.C:

- Name, address, and phone number of the generator
- Name, address, and phone number of any and all transporters in the order each will be transporting the waste
- Name, site address, phone number, and identification number of the solid waste facility to which the waste is to be delivered
- Type and proper name of waste being shipped
- Total weight or volume of waste prior to shipment from generator
- Total weight or volume of waste received at solid waste facility
- Type and number of containers in shipment
- Any special handling instructions
- Date and location the waste was delivered
- Date of receipt from the generator and total weight or volume of the Special Wastes to be provided by the transporter

If more than one transporter is used, each transporter will provide the date of receipt and total weight or volume of said waste received from the previous transporter, to be provided by the current transporter.

The manifest will be signed by the generators each transporter of the special waste, and the solid waste facility operator. All signatories will be duly authorized agents of their organizations. Significant discrepancies will be reported to the NMED Solid Waste Bureau within 24 hours of discovery.

Holloman AFB will receive one copy of the manifest; the remaining copies will be given to the transporter. The manifest will be returned to the Holloman AFB signatory official to be placed on file.

Copies of all manifests for waste generated at the site will also be kept in a central file. The state copy of the manifest will be sent to the state by Holloman AFB.

A LDR form will accompany the shipment of hazardous waste to the TSDF. The TSDF must be notified prior to sending the waste. The following items must accompany the notification and are included in one of the following facility specific forms:

- EPA and New Mexico Hazardous Waste Generator ID number (provided by Holloman AFB)
- Manifest number, including state disposal application number
- Waste analysis data
- If the waste is also restricted, corresponding concentration-based or technology-based treatment standards or prohibition

5.7.2 RCRA Records Retention

The designated Holloman AFB manifest signatory official will be responsible for ensuring that all RCRA record-keeping requirements are met according to 40 CFR 262.20-262.44, including

retention of signed copies of manifests from the designated facility that received the waste. The copy must be maintained for a period of at least 3 years from the date the waste was accepted by the initial transporter. Additionally, biennial and exception reporting must be submitted, as necessary, according to 40 CFR 262.41 and 262.42, respectively. Additional reporting may be required according to 40 CFR 262.43.

Compliance files will be maintained by the DOM in the project files. The compliance file must contain a completed project questionnaire, this plan, and any updates to this plan or the questionnaire. Filing of project documents shall conform to EBASCO Regulatory Compliance Program Manual Policy and Procedure RC 7 "Documentation and Records Retention - Environmental Compliance File Index."

5.8 UPDATING THE REGULATORY COMPLIANCE PLAN

The RCP will be updated as changes in site activities or changes in applicable regulations occur.

6.0 SITE-SPECIFIC HEALTH AND SAFETY PLAN

This addendum to the basewide SSHP has been written to address the POL remediation project at Holloman AFB, New Mexico and is for the exclusive use of EBASCO, its employees, subcontractors, and personnel. If any conditions or scope of work covered by this addendum change, the project health and safety manager will be notified and field changes initiated.

6.1 KEY PERSONNEL AND RESPONSIBILITIES

The roles and responsibilities for the implementation of the EBASCO health and safety program are provided in Section 2.0 of the basewide SSHP.

6.2 PROJECT DESCRIPTIONS

A description of the work to be performed on this project is provided in Section 4.0 of this Work Plan.

6.3 HAZARD ASSESSMENT

This section provides information that identifies the anticipated chemical and physical hazards that are expected to be encountered during the performance of this project. Table 6-1 presents the hazards associated with various tasks of the POL remediation project.

6.3.1 Chemical Contaminants

During the performance of this project, work will be performed at 20 different sites. Review of historical sampling results indicates that hazards present at these sites may be grouped into 1 of 6 categories with respect to chemical hazards: metals, pesticides, PCBs, TPH and BTEX compounds, other solvents, and polynuclear aromatic hydrocarbons (PNAs). Table 6-2 provides a listing of contaminants present at each site. Exposure limits and physical properties and the signs and symptoms of overexposure for each chemical are defined in the basewide SSHP. The following subsections discuss the hazards presented by each category.

Table 6-1 POL Remediation, Activity Hazard Analysis

Major Phase	Sequence of Events	Potential Hazards	Controls/ Precautions
POL Remedial Construction	Site Mobilization	See basewide Plan, Attachment A, Remedial Construction, Site Mobilization	N/A
	Separator/Tank Excavation	Hazards listed for site mobilization	Hazard controls listed for site mobilization'
		Injuries due to use of heavy equipment	Heavy Equipment Procedures per Section 8.13*
		Striking Overhead Utilities	Overhead Utility Procedures per Section *
		Noise	Noise Monitoring per Section 7.8
		Airborne chemical exposures	Monitoring per section 7.0, PPE per section 6.2
		Dermal contact with contaminants	PPE per section 6.2, Contamination avoidance per section 8.1
		Injuries due to excavation hazards	Excavation precautions per section 8.2
		Injuries or spills from un-isolated tanks & separators	Structure isolation per section 8.3
	Separator/Tank Removal, contaminated soil removal, separator installation, excavation backfilling.	Hazards listed for the excavation phase	Controls listed for the excavation phase
		Exposure to volatilized contaminants & fires when cutting influent & effluent	Cold cutting of lies using powered hacksaw
		Exposure to pooled vapors in excavation	Excavation procedures per section 8.2
		Injuries & property damage from incorrect hoisting & rigging	Hoisting & rigging per Section 8.5
		Hot work during splicing of re remaining lines	Hot work procedures per Section 8.6
		Confined Space entry into tanks	

Table 6-1 POL Remediation, Activity Hazard Analysis

Major Phase	Sequence of Events	Potential Hazards	Controls/ Precautions
		Other hazards listed for remedial construction in basewide plan	Other hazard controls listed for remedial construction in basewide plan.
	Site Demobilization	Hazards listed for remedial construction site demobilization in basewide plan	Hazard controls listed for remedial construction, site demobilization in basewide plan.
			*Denotes reference to basewide plan.

Metals

Naturally occurring heavy metals were detected at most sites. The analytical data indicates that concentrations are generally just above detection limits. Good work practices, implementation of dust control measures, and decontamination practices will minimize the potential risk of exposure.

Pesticides

At SWMU 118/132 and AOC-A, a variety of organophosphate and organochloride pesticides were observed. Review of the sampling data indicates that pesticides were detected at very low concentrations. All compounds detected possess extremely low vapor pressures and low volatility. Overexposure to airborne vapors is not anticipated because of the low concentrations and volatility of the pesticide compounds. However, many of the pesticides have skin notations in the OSHA and American Conference of Governmental Industrial Hygienists (ACGIH) exposure limits indicating the potential for exposure from skin contact. Because of these properties dermal exposure is anticipated to present the primary exposure hazard. Because dermal exposures will be of concern, upgraded chemical protective clothing will be used on the site and more stringent decontamination procedures will be followed.

Polychlorinated Biphenyls

Arochlor 1260 PCBs were noted at SWMU 118/132 and AOC-A. While sampling data indicates concentrations are relatively low, the results were above cleanup criteria. Since PCBs are of low volatility, routes of exposure that may pose a concern are inhalation of contaminated dusts and skin contact. To prevent over exposures, dust control, chemical protective clothing, and more stringent decontamination procedures will be followed.

TPH and BTEX Compounds

Elevated TPH levels were detected at all sites with the exception of SWMU 1. Elevated levels of BTEX compounds were detected at SWMUs 1, 11, 28,12 and 13, 31, 39, 41, 118/132 and AOC-A, 7, 23, 27, 14, and Building 805 WOT. Of these sites, benzene was present at SWMUs 11,

Table 6-2 Chemical Contaminants by Site

	Dibutylphthalate	2,4-Dimethylphenol	Butylbenzlyphthalate	1,2-dichlorobenzene	1,3-dichlorobenzene	1,4-dichlorobenzene	1,1-dichloroethane	2-butanone	2-Chloroethylvinyl ether	4-Methyl-2-Pentone	2-Methylnapthalene	2-Methylphenol	4-methylphenol	2.4-D	2,4-BD	4,4,4-DDD	4,4-DDE	4,4-DDT	2,4,5-T	2,4,5-TP (Silvex)
SWMU 1											X									
SWMU 11				X	X	X	X	X			X	X								
SWMU 28											X									
SWMU 12 & 13								X			X									
SWMU 41																				
SWMU 118/132 & AOC-A				X	X	X								X	X	X	X	X	X	X
SWMU 7				X	X	X		X			X	X	X							
SWMU 23																				
SWMU 31									X		X									
SWMU 27									X		X	X	X							
SWMU 14											X		X							
SWMU 2			X								X									
SWMU 17																				
SWMU 121																				
SWMU 21										X										
SWMU 126	X	X	X								X	X	X							
SWMU 128																				
SWMU 29																				
SWMU 19/638OWS																				
SWMU 39											X									
Bldg 805 WOT																				
Bldg 903 WOT																				

	Acenaphthalene	Acetone	Aldrin	Alpha BHC	Anthracene	Antimony	Arsenic	Barium	Benzene	Benzo(a)anthracene	Benzo(b)Fluoranthene	Benzen(g,h,9)perylene	Benzo(k)fluoranthene	Benzo(a)pyrene	Benzoic Acid	Beryllium	Bis(2-ethylhexy)phtalate	Cadmium	Carbon Disulfide	Chorobenzene
SWMU 1		X				X	X	X											X	
SWMU 11	X	X			X	X	X	X	X	X	X	X	X	X		X	X	X	X	X
SWMU 28		X				X	X	X	X							X		X	X	
SWMU 12 & 13		X					X	X						X				X	X	
SWMU 41		X					X	X												
SWMU 118/132 & AOC-A		X	X	X					X								X		X	X
SWMU 7		X				X	X	X							X	X			X	
SWMU 23		X				X	X	X									X		X	
SWMU 31		X					X	X								X				
SWMU 27		X					X	X	X							X	X		X	
SWMU 14		X				X	X	X	X							X			X	
SWMU 2	X	X					X	X									X	X		
SWMU 17		X					X	X									X		X	
SWMU 121																				
SWMU 21		X					X	X												
SWMU 126		X					X	X									X			
SWMU 128																				
SWMU 29																				
SWMU 19/638OWS																				
SWMU 39	X	X			X		X	X	X									X	X	
Bldg 805 WOT																				
Bldg 903 WOT																				

	Chloroethane	Chloroform	Chloromethane	Chlorpyrifos(Dursban)	Chrysene	Chromium	Cis-1,2-dichloroethene	Cobalt	Copper	Coumaphos	Delta-BHC	Diazinon	Dibenzofuran	Dibromomethane	Dicamba	Dichlorprop	Dichloroos	Diethylphthalate	Di-n-butylphthalate	Dinoseb	Dieldrin
SWMU 1						X		X	X												
SWMU 11					X	X	X	X	X				X						X		
SWMU 28						X		X	X										X		
SWMU 12 & 13						X		X	X												
SWMU 41						X			X		X								X		
SWMU 118/132 & AOC-A	X		X	X	X					X		X			X	X	X			X	X
SWMU 7						X		X													
SWMU 23						X		X	X										X		
SWMU 31						X													X		
SWMU 27						X		X	X				X						X		
SWMU 14		X				X		X	X										X		
SWMU 2						X							X						X		
SWMU 17						X															
SWMU 121																					
SWMU 21						X															
SWMU 126						X															
SWMU 128																					
SWMU 29																					
SWMU 19/638OWS																					
SWMU 39						X							X	X					X		
Bldg 805 WOT																					
Bldg 903 WOT																					

	Indene	Endosulfan I	Endosulfan II	Endosulfan Sulfate	Endrin	Endrin Aldhyde	Ethoprop	Ethyl benzene	Fensulfothion	Fenthion	Fluoranthene	Fluroene	Gamma-BHC	Heptachlor	Heptachlor Eponside	Indo (1,2,3-CD)Pyrene	Lead	Methylethylketone	MCPA	Mercury	Merphos B	Methylazinphos	Methylene chloride	Methoxychlor	Mevinphos	Nated	Naphthalene	PCB1260	p-Chloroanilene	Phenanthrene	Phorate	Pyrene	Selenium	Silver	Sulprofos (Bolstar)	TRPH	Tetrachloroethene	Tetrachlorvinphos	Thallium	trans-1,2-dichloroethene	Trichloroethene	Toluene	Vinyl Acetate	Vanadium	Xylene	Zinc	Phenol
SWMU 1								X									X			X			X								X	X			X						X		X	X	
SWMU 11								X			X	X				X	X						X				X			X		X				X				X	X	X	X	X	X	X	
SWMU 28																	X			X			X				X						X	X		X								X	X	X	
SWMU 12 & 13																	X			X			X				X									X						X	X	X		X	
SWMU 41								X									X						X													X						X		X	X	X	
SWMU 118/132 & AOC-A		X	X	X	X	X	X	X	X	X	X	X	X	X	X				X		X	X	X	X	X	X		X		X	X	X		X	X		X				X		X			
SWMU 7								X									X						X				X						X			X						X		X	X	X	
SWMU 23								X									X										X						X			X						X		X	X	X	
SWMU 31																	X						X							X			X			X					X	X		X	X	X	
SWMU 27								X				X					X						X				X			X			X	X		X						X	X	X	X	X	
SWMU 14								X									X						X				X									X	X					X	X		X	X	X	
SWMU 2								X			X	X					X	X					X				X			X		X	X			X						X			X		
SWMU 17																	X	X					X										X			X											
SWMU 121																	X	X					X										X	X		X					X						
SWMU 21	X										X						X	X		X			X				X					X	X			X											X
SWMU 126																																				X												
SWMU 128																																				X												
SWMU 29																																				X												
SWMU 19/638OWS																																				X												
SWMU 39								X			X	X					X	X		X			X				X		X	X		X	X			X						X			X		
Bldg 805 WOT																																				X												
Bldg 903 WOT																																				X												

28, 118/132 and AOC-A, 27, and 41. Benzene is a carcinogen and so has special monitoring requirements that are addressed in 29 CFR 1910.1028. Compliance with 29 CFR 1910.1028 will be achieved using a PID and colorimetric tubes as outlined in Section 7.0 of the basewide SSHP and Table 6-5, respectively.

Solvents

A variety of solvents were detected at low levels at different sites. These solvents are easily detected with a PID and do not pose an unusual inhalation or dermal absorption hazard. However, because of the low exposure limits for vinyl acetate, methyl phenols, and chloroform, colorimetric tubes will be used for monitoring as outlined in Section 7.0 of the basewide SSHP. Action levels for each chemical are provided in Table 6-5.

Polynuclear Aromatic Hydrocarbons

PAHs were detected at very low concentrations at SWMUs 7, 11, 12 and 13, 118/132 and AOC-A, 31, 23, 27, 28, 19/628 OWS, 14, 2, 21, and 39. Review of analytical results for previous soil sampling indicates that contaminant concentrations are low at all sites with the exception of SWMU 12 and 13. At SWMU 12 and 13, benzo(a)pyrene was detected at 0.152 mg/kg. Subsequent reviews conducted for human health hazards determined that benzo(a)pyrene did not pose an excessive health risk at this concentration. PAHs also possess low vapor pressures and volatility. Because of the low volatility and contaminant concentrations, overexposures to airborne vapors are not anticipated. Because of the toxic effects of PAHs through dermal contact, however, personal hygiene, work practices to prevent contact with contaminated soils, and decontamination will be enforced.

6.3.2 Physical Hazards

Anticipated physical hazards include those normally associated with the mobilization and use of construction equipment and construction activities. Activity Hazard Analysis (AHA) covering site mobilization, clearing and grubbing, general construction safety hazards, and site demobilization are provided in the basewide SSHP. The attached AHA identifies the hazards

and hazard controls for site mobilization, tank excavation and removal, tank installation, and backfilling of the excavation. Where the basewide SSHP addresses a particular hazard the AHA provides a reference to Section 8.0 of the basewide SSHP, where implementation of the control is described. Where a hazard or hazard control is not addressed by the basewide SSHP, or if additional information is required, the AHA references an appropriate section of this addendum.

6.4 TRAINING

Training requirements for project personnel are provided in Section 5.0 of the basewide SSHP.

6.5 WORK ZONES, PERSONNEL PROTECTION, AND COMMUNICATIONS

This section addresses project requirements for work zones, personnel protection, and communications.

6.5.1 Work Zones

If Level C work is required, the work zones will be defined as follows:

- Exclusion Zone: Area restricted to essential workers wearing the appropriate PPE
- Contamination Reduction Zone: Area where gross decontamination and removal of PPE occurs
- Support Zone: Area where support equipment, facilities, and personnel are located

In addition, barricades may be set up for site control during project activities to prevent unauthorized personnel from entering the work area.

6.5.2 Personnel Protection

Personal protective equipment will be used as outlined in Section 6.4 of the basewide SSHP with the following changes:

- Work will begin on each site using level D as the base level of protection with the exception of SWMU 118/132 and AOC-A. Work in SWMU 1148/132 and AOC-A will begin in level D modified PPE.

- Dermal protection will be upgraded from level D to level D modified when visible staining, obviously contaminated soils, or if air monitoring results are above action levels.

- Tyvek ® will be used for Level D modified when working with dry materials.

- Saranex-coated Tyvek will be used for Level D modified when site materials are wet and for level C operations.

- Nitrile gloves will be used for all sites.

6.6 MONITORING

During operations, real-time monitoring will be conducted using a PID with a 10.2 ev probe and a combustible gas indicator (CGI). If readings of 100 parts per million are obtained in the excavation, the CGI will be used to monitor oxygen content and % LEL. Colorimetric indicator tubes will be used at selected sites as noted in Table 6-4. Action levels for the PID, oxygen levels, LEL, and colorimetric tubes are provided in Section 7.0 of the basewide SSHP and Table 6-3. Calibration and maintenance procedures for real-time instrumentation are provided in Section 7.0 of the basewide SSHP.

6.7 SAFETY CONSIDERATIONS FOR SITE OPERATIONS

6.7.1 Contamination Avoidance

In order to minimize necessary exposure to contaminants the following practices will be implemented:

- Cleaning of tanks or oil/water separators and sampling activities will be done without actually entering excavations, tanks, or separators where feasible.

- Where it is necessary to enter areas with obvious signs of contamination, clean barriers will be used to avoid contaminated soils or sludges. (Examples include covering stained areas with clean fill or placing plywood over contaminated mud and sludge.)

Table 6-3 Action Levels[1]

Instrument	Reading	Action
Benzene[2]	0–0.5 ppm	Continue Work
	0.5–25 ppm	Level C
	> 25 ppm	Stop work
Vinyl Acetate[2]	0–5 ppm	Continue Work
	5.1–25 ppm	Level C
	> 25 ppm	Stop work
Methyl Phenol[2]	0–2.5 ppm	Continue Work
	2.6–25 ppm	Level C
	>25 ppm	Stop work
Chloroform[2]	0–1 ppm	Continue Work
	1.1–25 ppm	Level C
	> 25 ppm	Stop work

1 Reflects consistent readings in workers breathing zones of 1 minute or longer.

2 Colorimetric indicator tubes to be used when a consistent reading greater than 1 ppm is obtained using a PID. Tube will be selected and used in accordance with Table 6-6

ppm Parts Per Million
LEL Lower Explosive Limit
CGI Combustible Gas Indicator
PID Photoionization Detector

Table 6-4 Colorimetric Indicator Tube Use

Colorimetric Tubes	Sites
Benzene	11, 28 118/132 & AOC-A, 27, 14 39
Vinyl Acetate	11, 12 & 13, 27
Methyl Phenol (cresol isomers)	1, 11, 28, 12 & 13, 7, 31, 27, 14, 2, 126, 39
Chloroform	14

- Personnel will shower daily after work and wash hands and face on breaks prior to eating or drinking.

6.7.2 Excavation Safety

Excavation of soils will be completed in accordance with 29 CFR 1926, Subpart P, and EBASCO HS 6-4, Excavations and Trenching. To implement these requirements on site the following actions will be completed:

- The EBASCO site manager and Project Health and Safety Manager (PHSM) will appoint a competent person, qualified by experience and training, to implement excavation safety at the site.

- All excavations will be classified as having Type C soils and sloped at minimum of 34 degrees (1 ½ : 1) unless a geotechnical engineer classifies the soils differently. If the soil classification is verified by a geotechnical engineer to be other than Type C, a different protection criteria will be applied as per the OSHA requirements.

- Open excavations will be inspected daily by the competent person for accumulation of liquids and stability using the checklist provided in Attachment A of HS 6-4. Problems identified will be corrected prior to entry by site personnel.

- Monitoring for hazardous atmospheres will be completed in accordance with HS 6-4.

6.7.3 Tank and Separator Isolation

Prior to beginning excavation and removal of tanks or separators, an inventory of all hazardous energy sources will be completed. The inventory will specify the sources, control points, control positions, and responsible parties for isolation. Prior to beginning work, the control points will be secured and tagged in accordance with HS 6-5, Lockout/Tagout.

6.7.4 Tank and Pipe Cutting

When cutting or welding on tanks or pipes is required, the following will be completed:

- A competent person shall be appointed by the EBASCO site manager and PHSM, based upon a combination of training and experience, to implement all cutting and welding safety requirements.

- Where possible, cutting will be done using cold methods such as powered hacksaws.

- When necessary to use hot cutting or welding equipment, the work will be done in accordance with HS 6-6, Welding/Hot Work.

- Prior to performing hot work, the structures atmosphere shall be monitored for oxygen concentration and LEL. Where necessary mechanical ventilation or inerting with dry ice will be used to render the internal atmosphere safe for hot work.

- When the potential for hazardous atmospheres is present, continuous monitoring will be performed during all hot or cold cutting.

- Lockout/tagout of energy sources will be required prior to cutting pipelines.

- Lockout/tagout will be implemented in accordance with Section 8.18 of the basewide SSHP and HS 6-5 of EBASCO's corporate health and safety plan.

6.7.5 Hoisting and Rigging

All hoisting and rigging will be done in accordance with 29 CFR 1926.550 and EM-385-1-1, Sections 15 and 16. Prior to beginning any lifting operations, the EBASCO site manager and PHSM will designate a competent person based upon training and experience to complete the following:

- Determine the load center of gravity and lifting points

- Select and place slings or chains

- Verify lifting capacity of cranes or other hoisting machines.

- Implement related safety practices, such as use of taglines or placement of barriers, at each site.

- Perform inspections of all hoisting and rigging equipment.

6.7.6 Confined Space Entry

Confined space entry into tanks and separators will not be performed as part of this project. If entry becomes necessary as the last means to completing the work, the PHSM will be contacted for guidance and modifications to this addendum.

6.8 DECONTAMINATION

Decontamination requirements are provided in Section 9.0 of the basewide SSHP.

6.9 EMERGENCY RESPONSE PLAN

Emergency response requirements and project personnel are provided in Section 10.0 of the basewide SSHP. Changes in project personnel from the basewide SSHP are given below:

Project Manager: Bryan Walz (303) 988-2202

EBASCO Site Manager and PHSM: Dan Holmquist (505) 479-2668

6.10 AUTHORIZATIONS

A project authorization form will be completed for the project in accordance with Section 11.0 of the basewide SSHP.

6.11 MEDICAL DATA SHEETS

Medical Data Sheets will be completed for project personnel in accordance with Section 12.0 of the basewide SSHP.

6.12 FIELD TEAM REVIEW SHEET

Field team reviews of the basewide SSHP and this site-specific addendum will be completed in accordance with Section 13.0 of the basewide SSHP.

7.0 FIELD SAMPLING PLAN

All sampling will be conducted in accordance with the previously produced FSAP included in the Draft Final Project Plans for the Remediation of POL-Contaminated Sites and Oil/Water Separator Removals (EBASCO 1995). The types and quantities of samples to be collected at each site are presented in Table 4-1. Regulatory sampling requirements for disposal are presented in Table 5-2. The QA objectives, container types, preservation, holding times, and analytical procedures are discussed in the QAPP, Section 8.0.

Samples will be collected for TRPH analysis at all sites where contamination was detected by screening or visual observation of staining. Samples for OCP/PCB analysis will be collected at SWMU 132 and samples for VOC (BTEX only), SVOC, and lead analyses will be collected at SWMU 27. Liquid samples will be collected from the containment tank in which all decontamination water will be consolidated. The liquids will be analyzed by Method 8240 for VOCs and Method 8270 for SVOCs. Soil samples will be collected from each excavation and contaminated soil stockpile. Soil samples will be collected from all four sides and the bottom of each excavation. Also, a composite sample will be collected for every 100 cy of contaminated soil. The composite samples will be collected from stockpiles by methods outlined in the FSAP (EBASCO 1995a).

Samples will be assigned a unique identification by which the site and sample location, depth of sample collection, and matrix can be identified. For example, the field sample identification number SWMU-27-01/3-5S represents:

- SWMU 27 is the site location
- 01 is the sample location (01, 02, 03 etc.)
- 3-5 is the depth soil was excavated

- S is the matrix (W would be used for water)

8.0 QUALITY ASSURANCE PROJECT PLAN

8.1 INTRODUCTION

This QAPP has been prepared to address the specific chemical QA requirements for sampling and analysis conducted for the remediation of POL-contaminated soil, and for the OWS and WOT removal project. A description of the project activities and the project organization and management are contained within Sections 3.0 and 9.0, respectively, of this Work Plan.

The activities covered by this QAPP include sampling and analysis for waste characterization of the soil and for decontamination fluid generated during construction activities. QC activities for construction activities related to this project are discussed in the CQC Plan (EBASCO 1995).

All sampling and on-site screening will be performed by either EBASCO personnel or an authorized individual qualified for the task.

8.2 PROJECT ORGANIZATION AND RESPONSIBILITIES

The project organization is discussed in Section 9.0 of this Work Plan.

8.3 QUALITY ASSURANCE OBJECTIVES FOR MEASUREMENT DATA

8.3.1 Data Quality Objectives

Sampling and analysis will be conducted to determine the proper disposal options for soil, liquids, sludges, LNAPL, and decontamination fluid.

8.3.1.1 Analytical Support Levels

Analytical Level I, as defined in the EPA Data Quality Objectives (EPA 1987), will be used for on-site monitoring during sampling. Analytical Level III will be required for the characterization of soil, liquids, sludges, LNAPL, and decontamination fluid.

8.3.2 Data Quality Indicators

Laboratory precision and accuracy data are contained in the QA plans of the specific laboratories that will be used during this project. These plans also contain reporting limits and method descriptions for each of the analyses required for the project. These data are provided as Table 8-1.

Table 8-1 Quality Assurance Objectives

Method Water/Soil	Parameter	Precision (%) Water/Soil	Accuracy (% Range) Water/Soil	PQL (mg/l-mg/kg) Water/Soil
EPA 418.1/9071	TRPH	70/50	60-140/40-140	0.5/20
EPA 9095	Paint Filter	NA	NA	NA
EPA 150.1	pH	10/NA	NA	0.2/NA
EPA 8021	VOCs (BTEX only)	NA/Table A-5[1]	NA/Table A-4[1]	NA/Table 3-3[1]
EPA 8240	VOCs	Table A-5[1]/NA	Table A-4[1]/NA	Table 3-3[1]/NA
EPA 8270	SVOCs	Table A-5[1]	Table A-4[1]	Table 3-3[1]
EPA 7421	Lead	20	75-125	4/0.4
EPA 1010	Ignitablity	+/- 4^{0}C/NA	+/- 4^{0}C/NA	60-200^{0}F/NA
EPA 8080	OCP/PCB	Addendum[2]	Addendum[2]	Addendum[2]

1 EBASCO 1995c
2 EBASCO 1195d
OCPs Organochlorine Pesticides
PCBs Polychlorinated Biphenyls
TRPH Total Recoverable Petroleum Hydrocarbons
PQL Practical Quantitation Limit
mg/l-mg/kg milligrams per liter-milligrams per kilogram

8.3.3 Level of Field Quality Control Effort

Field duplicates will be collected for soil samples at a frequency of 5 percent. One QA split will be collected for each duplicate sample for analysis by the USACE MRD laboratory.

8.4 FIELD INVESTIGATION PROCEDURES

8.4.1 Sampling Protocols

Sampling procedures for collection of soil, liquid, and decontamination fluid are discussed in the FSP, Section 7.0, and in Appendix B of this Work Plan. Appendix B includes the following SOPs:

- SOP B-1
  - — Drum Sampling

All additional SOPs related to this project are discussed in the FSAP (EBASCO 1995).

8.4.2 Sample Volume, Holding Times, Containers, and Preservation

Table 8-2 lists the sample containers, holding times, and preservation methods for the analytical methods required for the analyses conducted.

8.5 SAMPLE CUSTODY AND RECORD KEEPING

8.5.1 Transfer of Custody and Shipment

The EBASCO Sample Tracking System will be used for this project. Each site identification number will be entered into this system with the associated analytical requirements.

Sample tags and C-O-C records will then be generated for each site. Examples of a C-O-C and sample tag are included in Figures 8-1 and 8-2, respectively.

Table 8-2 Sample Container, Preservation, and Holding Time Requirements

				Maximum Holding Times[3]	
Matrix	Parameter	Container[1]	Preservation[2]	Extraction	Analysis
D.I. Water	Trip Blank	1 x 40 ml VOA	HCL pH < 2, Ice to 4°C		
Liquid	Flash Point	1 x 8 oz G	Ice to 4°C	--	28 d
Liquid	pH	1 x 4 oz P	Ice to 4°C	--	immediately
Liquid	VOC	3 x 40 ml VOA	HCL pH < 2, Ice to 4°C	--	14 d
Liquid	SVOC	2 x 1 L G	N/A	7 d	40 d
Liquid	Lead	1 x 1 L P	HNO_3, Ice to 4°C	--	180 d
Liquid	TRPH	1 x 1 L G	H_2SO_4 pH < 2, Ice to 4°C	--	28 d
Solid	VOC	1 x 4 oz G	--	--	14 d
Solid	SVOC	1 x 8 oz G	--	14 d	40 d
Solid	Lead	1 x 8 oz G	--	--	180 d
Solid	TRPH	1 x 8 oz G	Ice to 4°C	--	28 d
Solid	Paint Filter Test	1 x 8 oz G	Ice to 4°C	--	--
Solid	OCPs	1 x 8 oz G	Ice to 4°C	14d	40d
Solid	PCBs	1 x 8 oz G	Ice to 4°C	14d	40d

1. All containers must have Teflon-lined lids (Teflon-lined septa for VOA vials).
2. Sample preservation will be done in the field immediately upon sample collection.
3. When only one holding time is given, it implies total holding time from sampling until analysis.

d Day
L Liter
ml Milliliter
mo Month
oz Ounce
G Amber Glass
P High Density Polyethylene
OCPs Organochlorine Pesticides
PCBs Polychlorinated Biphenyls
TRPH Total Recoverable Petroleum Hydrocarbons
HCL Hydrochloric Acid
HNO_3 Nitric Acid
H_2SO_4 Sulfuric Acid

8.5.2 Laboratory Data Deliverables

Level III deliverables are required for this project. Hard copies of the data deliverables will be provided. Electronic data formats consistent with the Installation Restoration Program Management Information System (IRPIMS) are not required.

FIGURE 8-1 C-O-C

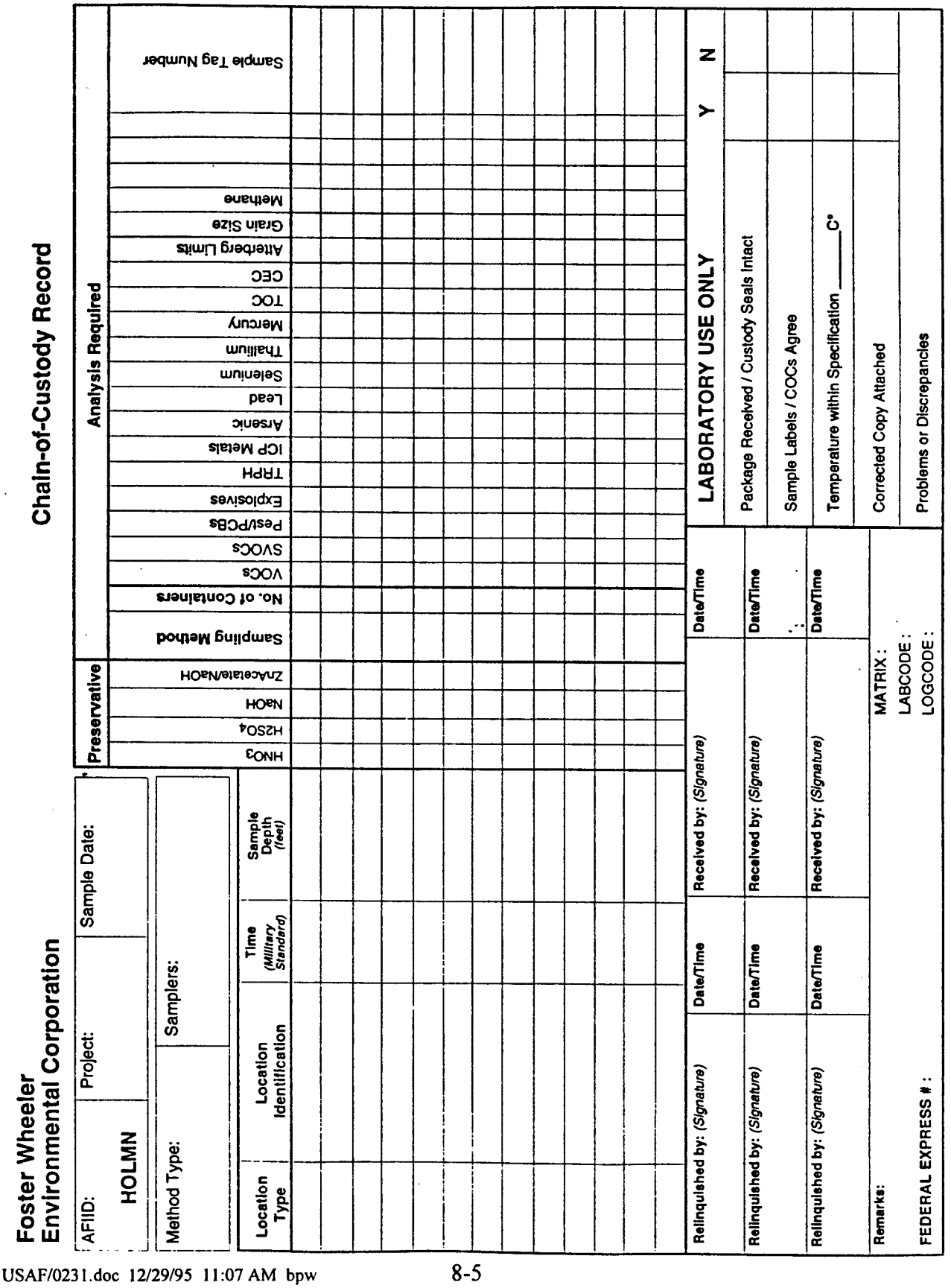


FIGURE 8-2 SAMPLE TAG

ANALYSES REQUESTED	TAG NO:	SITE IDENTIFICATION:
	SITE TYPE:	REMARKS:
	DATE:	
	DEPTH (FT):	
	TECHNIQUE:	FOSTER WHEELER ENVIRONMENTAL 143 Union Blvd. Lakewood, CO 80228
(Signatures)	TIME:	ENVIRONMENTAL PROGRAM

8.6 ANALYTICAL PROCEDURES

The analytical program for this project will consist of off-site chemical testing. Laboratory analytical method detection limits and quality control acceptance criteria are contained in the laboratory QAPP.

8.6.1 Laboratory Analyses

Analytical methods for chemical analysis are taken from the latest revision and update of Test Methods for Evaluating Solid Waste, SW-846 Third Edition (EPA 1986), and Methods for Chemical Analysis of Water and Wastes, EPA Manual 600/4-79-020. The chemical analytical procedures to be used for liquid and solid samples are specified in Table 8-3.

8.6.1.1 Volatile Organics

The method for analysis of volatile organics is provided in Table 8-3. Volatile organics will be analyzed using Method 8021 for soil and Method 8240 for water. The volatile organics to be analyzed for soil include the BTEX compounds only.

8.6.1.2 pH

The method specified for pH electrometrically determines the pH of aqueous wastes with the use of either a glass electrode in combination with a reference potential or a combination electrode. The measuring device is calibrated using a series of standard solutions of known pH.

8.6.1.3 Semivolatile Organics

The method for analysis of SVOCs is provided in Table 8-3. SVOCs will be analyzed using Method 8270, which is a Gas Chromatography/Mass Spectrometry (GC/MS) method. This method encompasses the general classes of compounds such as phenols, nitrosamines, polynuclear aromatic hydrocarbons, phthalate esters, and nitroaromatic compounds.

8.6.1.4 Total Recoverable Petroleum Hydrocarbons

The method for analysis of TRPH is provided in Table 8-3. TRPH will be analyzed using Method 9071/418.1.

8.6.1.5 Paint Filter Liquids Test

Paint filter liquids test is used to determine the presence of free liquids in a representative sample. Method 9095 measures any portion of liquid that passes through a 60-mesh filter cone within a 5-minute time period. Paint filter liquids test will only be performed on soils excavated from SWMU 132 for disposal purposes.

8.6.1.6 Lead

Lead will be analyzed using graphite furnace atomic absorption (GFAA). The GFAA method number is 7421.

8.6.1.7 Ignitability

The method specified for ignitability (Method 1010) is used to determine the flash point of liquids. The sample is heated at a slow but constant rate. A small flame is injected into the cup of sample at regular intervals. The flash point is the lowest temperature at which the flame ignites the vapor above the sample.

8.6.1.8 Organochlorine Pesticides/Polychlorinated Biphenyls

The method for analysis of OCPs/PCBs is SW 846 Method 8080 which uses gas chromatography with electron capture detection.

Table 8-3 Analytical Procedures for the POL-Remediation Project

		Extraction and Analysis Method	
Parameter	Technique	Liquid	Solid
TRPH	IR	NR	9071/418.1
Paint Filter	Volumetric	NA	9095
Flash Point	Closed Cup	1010	NA
VOCs	GC	5030/8021	5030/8021
VOCs	GC/MS	5030/8240	5030/8240
SVOCs	GC/MS	3510/8270	3550/8270
Lead	GFAA	3020A/7421	3050A/7421
PCBs/OCPs	GC/ECD	3510/8080	3550/8080
pH	Electrometric	150.1	NA

TRPH Total Recoverable Petroleum Hydrocarbon
IR Infrared Spectrophotometry
NA Not Applicable
OCPs Organochlorine Pesticides
PCBs Polychlorinated Biphenyls
GC/ECD Gas Chromatography/electron Capture Detector
GFAA Graphite Furnace Atomic Absoprtion
GC/MS Gas Chromatography/mass Spectrometry
NR Not Required

8.7 INTERNAL QUALITY CONTROL CHECKS

One field duplicate sample for each media will be collected and analyzed for every 20 samples collected for the same parameters. The analytical laboratories will adhere to the internal QC checks specified in their QA plans.

8.8 DATA VALIDATION, REDUCTION, AND REPORTING

Data deliverables in IRPIMS format are not required for this project. A hard copy of all data will be provided. Validation of the data will be conducted according to QA/QC procedures for precision, accuracy, representativeness, comparability, and completeness (PARCC). Precision and accuracy data are presented in Table 8-1 and representativeness, comparability, and completeness are discussed in the following sections.

Accuracy of field measurements will be assessed by conducting daily instrument calibration and calibration checks. Precision will be assessed on the basis of reproducibility by multiple readings of a single sample point and on the basis of duplicate sample readings.

8.8.1 Representativeness

Representativeness is a quality characteristic and is a goal to be achieved rather than a qualitative measurement. Representativeness describes the degree to which the analytical results of a specific sample set are representative of the results that are expected based on other samples obtained from the same or similar sized samples etc. It is a function of sample composition and/or sample splitting in the field as well as laboratory procedure for compositing and homogenizing samples prior to analysis. The process in which the data are correlated to the specific sampling episode and sampling site are also considered when evaluating representativeness. No sample splitting will be performed on this project.

8.8.2 Comparability

Comparability is an evaluation of the confidence with which one set of data can be compared to another. The factors that produce comparability include the following:

Use of standard and approved methodology

- Use of analytical standards and calibration standards from certified sources, i.e., EPA or NIST
- Application of appropriate level of quality control
- Laboratory performance evaluation through interlaboratory studies and other proficiency testing programs

The data set package should be reviewed for compatibility of the analytical process with the above factors.

8.8.3 Completeness

The data is evaluated for completeness by determining the percent of samples collected (according to the sampling plan, C-O-C, etc.) that yield validated data that meets predetermined quality criteria. The data and the associated documents are reviewed to obtain the necessary information on the quality of the data. For example, the tabulated data, the C-O-C forms, case narrative, quality control results, sample log sheets, and lab work sheets may be reviewed to obtain the necessary information.

The factors that affect the completion objectives include following:

- Condition of sample and container as received by the laboratory
- C-O-C form and sample integrity confirmation
- Adequate sample volume
- Holding time
- Analytical methods used
- Analyst error (laboratory or calculation)
- Instrument performance
- Container cleanliness
- QA/QC criteria

The completeness objective is 95 to 100 percent.

8.9 QUALITY ASSURANCE REPORTS TO MANAGEMENT

The Daily Quality Control Report (DQCR) to be used is presented in the CQC Plan (EBASCO 1995).

9.0 PROJECT MANAGEMENT PLAN

The proposed removal activities will be managed by a project team consisting of the contractor, USACE, and the Base. This section briefly describes the proposed project management activities and the project implementation schedule.

9.1 PROJECT SCHEDULE

The proposed project implementation schedule is presented in Figure 9-1. The schedule allows 5 months for the performance of all removal activities (excluding plan preparation) and submittal of a final report to the NMED and EPA Region VI. This is a tentative schedule that is subject to change, depending on regulatory review periods, actual work required, and contractor scheduling. Soil removal will be conducted at Table 1 and Table 2 SWMUs, followed by removal of the Table 3 OWSs. Where possible, site work will be planned such that construction equipment is mobilized from geographically adjacent sites.

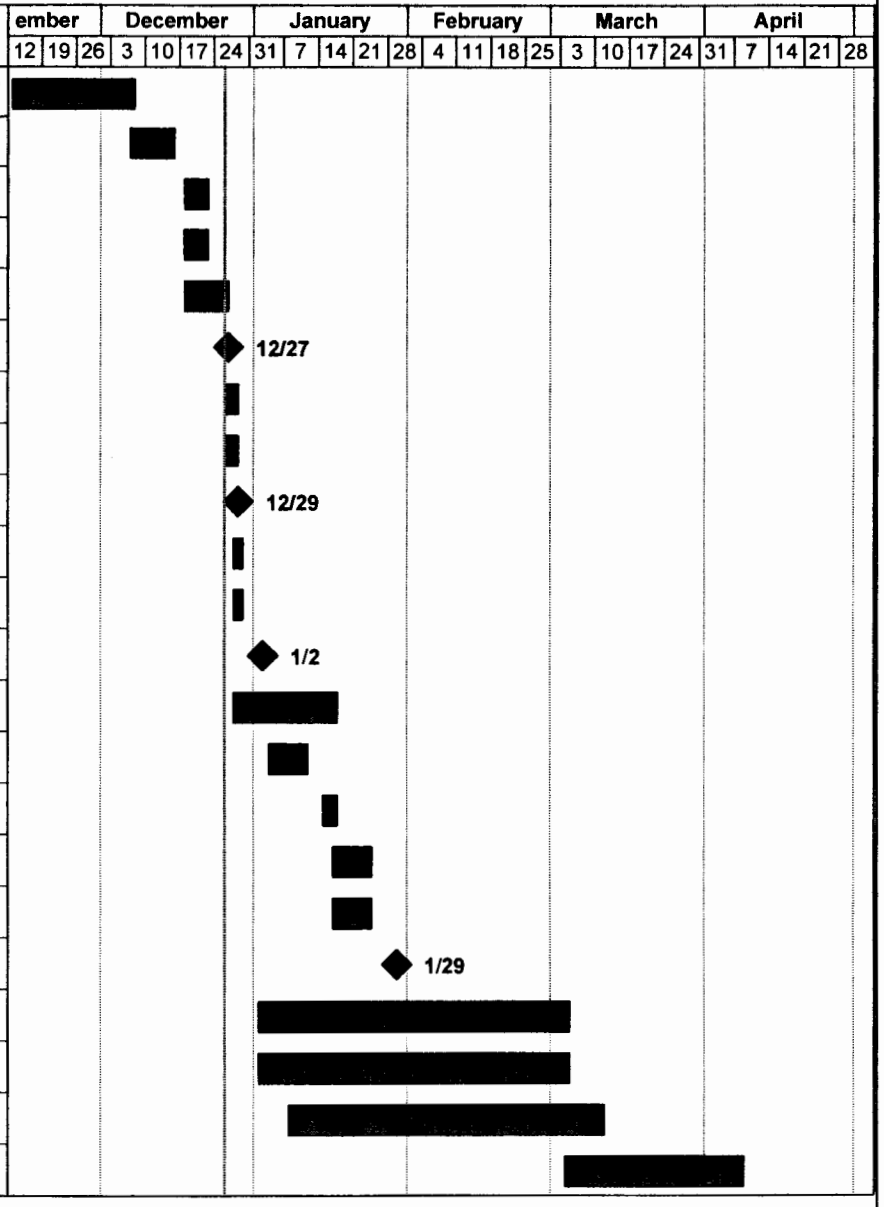
9.2 PROJECT PERSONNEL

The following personnel will be involved in the proposed scope of work.

- USACE Project Manager
  - — Ray Heckathorn
- USACE Resident Engineer (On-Site Representative)
  - — James Hendricks
- Base Project Manager
  - — Warren Neff
- EBASCO Delivery Order Manager
  - — Ron Versaw, Ebasco

POL Remediation Project at Holloman AFB

ID	Task Name	Duration	Start	Finish
1	Prepare Draft Work Plan	19d	11/13/95	12/7/95
2	FWENC Work Plan Review	7d	12/7/95	12/15/95
3	USACE Work Plan Review	5d	12/18/95	12/22/95
4	Holloman AFB Work Plan Review	5d	12/18/95	12/22/95
5	Prepare Cost Estimate	7d	12/18/95	12/26/95
6	Submit Cost Estimate	0d	12/27/95	12/27/95
7	Respond to Comments for Work Plan	3d	12/26/95	12/28/95
8	Prepare Final Work Plan	3d	12/26/95	12/28/95
9	Submit Final Work Plan	0d	12/29/95	12/29/95
10	USACE Cost Estimate Review	2d	12/28/95	12/29/95
11	Holloman AFB Cost Estimate Review	2d	12/28/95	12/29/95
12	Begin Field Activities	0d	1/2/96	1/2/96
13	Design of OWS for SWMU 14	15d	12/28/95	1/17/96
14	Prepare OWS Design Drawings	6d	1/4/96	1/11/96
15	FWENC Design Review	3d	1/15/96	1/17/96
16	USACE Design Review	6d	1/17/96	1/24/96
17	Holloman AFB Design Review	6d	1/17/96	1/24/96
18	Submit Final Design	0d	1/29/96	1/29/96
19	Cleanup of Table 2 and 3 Sites	45d	1/2/96	3/4/96
20	Sampling	45d	1/2/96	3/4/96
21	Laboratory Analysis	46d	1/8/96	3/11/96
22	Prepare Draft Closure/Removal Report	26d	3/4/96	4/8/96



Project:
Date: 12/26/95

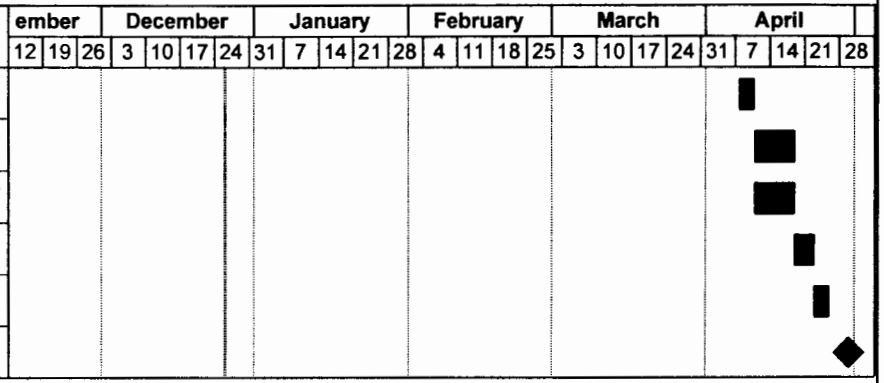
Task

Milestone

Figure 9-1 Project Implementation Schedule

POL Remediation Project at Holloman AFB

ID	Task Name	Duration	Start	Finish
23	FWENC Draft Closure/Removal Report Review	3d	4/8/96	4/10/96
24	USACE Draft Closure/Removal Report Review	6d	4/11/96	4/18/96
25	Holloman AFB Draft Closure/Removal Report Review	6d	4/11/96	4/18/96
26	Respond to Comments for Closure/Removal Report	2d	4/19/96	4/22/96
27	Prepare Final Closure/Removal Report	3d	4/23/96	4/25/96
28	Submit Final Closure/Removal Report	0d	4/29/96	4/29/96



Project:
Date: 12/26/95

Task

Milestone

Figure 9-1 Project Implementation Schedule

- EBASCO Site Manager and PHSM

  — Dan Holmquist, Ebasco

- EBASCO CQC Systems and Construction Project Managers

  — Herman Kalvo

- EBASCO Project Engineer

  — Bryan Walz

The designated individuals, minimum qualifications, and roles and responsibilities of each individual are detailed in the CQC Plan (EBASCO 1995).

9.3 PROJECT MEETINGS

Two project meetings are anticipated throughout the course of this project:

- A premobilization meeting, scheduled 1 to 2 weeks prior to fieldwork
- A fieldwork progress meeting, scheduled 1 week following the start of fieldwork

9.4 DATA MANAGEMENT

This section of the Work Plan provides a comprehensive guide for the management of all data generated during closure activities. This includes analytical data, field notebooks, project files, progress reports, and the project closure report. The contractor will use field notebooks, sample custody forms, daily quality control reports, sample labels, sample inventories, and laboratory log books to track and document project progress. DQCR, monthly progress reports, USACE monthly exposure reports, and a draft and final closure report will be provided throughout the course of the project. A submittal register is provided in Table 9-1. The following data management activities and reporting will be conducted:

- Field data management
- Laboratory data management

- Project reporting

Each of these activities are described in detail in the following sections.

9.4.1 Field Data Management

Field data will be recorded in a bound field log book. In addition, a DQCR will be prepared by the QC Construction Officer and submitted to the USACE representative at the end of each day's activities. Field data will include the data record (log books, etc.), results of field analysis and screening, sample C-O-C documentation, site photographs, compaction test results, bills of lading, waste manifests, weigh receipts, tank certificates of destruction, field health and safety reports, incident reports, and any other field documentation prepared. Site photographs will be taken prior to conducting any site activities, during each site activity, and following completion of all site work. Site photographs will be 3 1/2-inches by 5 inches and labeled with the date, time of photograph, site name, photographer's name, compass direction of photo, and brief description of photographed activities.

9.4.2 Laboratory Data Management

The contractor laboratory will maintain laboratory results in hardcopy and electronic forms. This data will be used to permanently record all laboratory data, including sample identification, analytical results, detection limits, analytical methods, and other related data.

9.5 REPORTS

9.5.1 Daily Reports

During construction activities, a DQCR will be prepared. The DQCR will be submitted to the contractor project manager and the USACE project manager at the end of each work day or at the beginning of the subsequent day if the project manager(s) are not available.

9.5.2 Monthly Reports

Throughout the course of the project, monthly progress reports will be prepared and submitted. The monthly progress report will be submitted by the 15th day of the month following the reporting period and will contain the following information:

- Estimates of the percentage of the investigation completed
- Summary of work accomplished during the reporting period
- Summary of the sampling and analytical activities
- Summary of problems encountered during the reporting period and actions being taken to rectify problems
- Projected work for the next reporting period
- Any preliminary or final results obtained during removal activities
- Any changes in key personnel
- Summaries of actual or proposed changes to the Work Plan or its implementation

In addition to a monthly progress report, a USACE monthly exposure report will be prepared for each month that construction occurs. This report will be submitted to the USACE Resident Engineer.

9.5.3 Project Record Documents and Record Drawings

Following completion of all site activities, a closure report will be prepared. Data will be portrayed graphically and in tabular format to illustrate closure sampling results. Site diagrams will be prepared illustrating the extent of excavation, approximate sample collection locations, and final site disposition (i.e. record drawings). The characterization and disposition of all waste will be documented in the report. Project record documents and record drawings are described in more detail in Section 01300 of the specifications in Appendix D.

TABLE 9-1 SUBMITTAL REGISTER
POL-REMEDIATION AND OWS/WOT REMOVALS

SUBMITTAL	A	B	C	D	E	F	G	TOTAL[1]
Project Record Documents/Record Drawings	2	5	4	0	0	0	2	13
Draft Closure Report	3	5	2	0	0	0	0	10
Final Closure Report	3	4	2	1	1	1	1	13

1 Number of copies

A. Mr. James Hendricks
USACE-Albuquerque District
CESWA CO-HM
P.O. Drawer A
Holloman AFB, NM 88330-0041

B. Mr. Warren Neff
49 CES/CEVR
550 Tabosa Avenue
Holloman AFB, NM 88330-5000

C. Mr. Mark Mercier
USACE-Omaha District
ATTN: CEMRO-MD-HF
215 North 17th Street
Omaha, NE 68102-4978

D. Mr. Lowell Seaton
U.S. EPA Region VI
1445 Ross Avenue
Dallas, Texas 75202-2733

E. Mr. David Morgan
NMED Toxic Site Bureau
1190 St. Francis Drive
Santa Fe, NM 87503

F. Mr. Steve Pullen
NMED Hazardous Waste Bureau
1190 St. Francis Drive
Santa Fe, NM 87503

G. USACE-MRD
HTW-MCX
ATTN: HTRW Document Distribution
12565 West Center Road
Omaha, NE 68144-3869

10.0 REFERENCES

EPA (Environmental Protection Agency)
1994 Risk-Based Concentration Table, Fourth Quarter, EPA Region III, November 8.

1992 Correspondence, November 2.

New Mexico Environment Department/Underground Storage Tank Bureau)
1993 Correspondence, January 25.

Radian
1995 Table 3 RFI Report, Holloman AFB, NM, July.

1994 Table 2 RFI Report, Holloman AFB, NM, October.

1993 Phase I - Groundwater Assessment Monitoring Report for Holloman AFB, New Mexico, Appendix B.2 "Statistical Analysis of Metals Data for Phase I Assessment Monitoring," December.

1992 Remedial Investigation (RI) Report, Investigation, Study, and Recommendation for 29 Waste Sites, Holloman AFB, NM, October. 1993

EBASCO
1995a Project Plans (Work Plan, FSAP, and CQC Plan) for the Remediation of POL-Contaminated Sites and Oil/Water Separator Removals, June.

1995b Holloman AFB Basewide Site Safety and Health Plan, September.

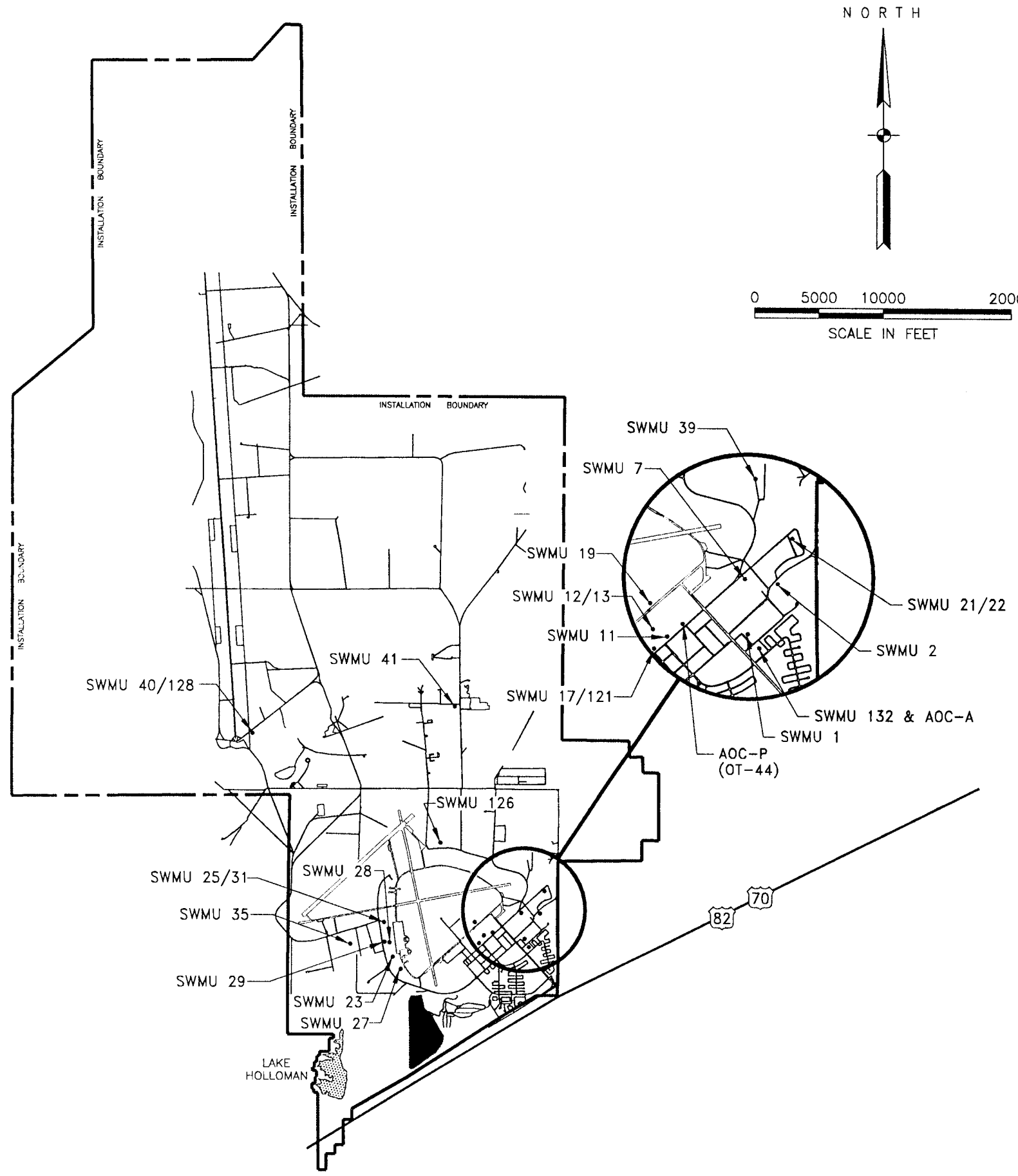
1995c Volume II — Quality Assurance Project Plan, September.

1995d Addendum to Volume II — Quality Assurance Project Plan, Revision 1, December.

1988
National Oil and Hazardous Substances Pollution Contingency Plan, Proposed Rule, S3FR51444, December 21.

APPENDIX A

SITE AND FACILITY LOCATION MAPS



SITES

AOC-P (OT-44)	BLDG. 301 FUEL TANK LEAKS
SWMU 1	BUILDING 55 OWS
SWMU 2	BUILDING 121 OWS
SWMU 7	BUILDING 198 OWS
SWMU 11	BUILDING 300 OWS
SWMU 12/13	BUILDINGS 304 AND 304A OWSs
SWMU 17/121	BUILDING 316 OWS AND WASTE OIL TANK
SWMU 19	BUILDING 638 OWS
SWMU 21/22	ABONDONED OWSs FOR BUILDINGS 702 AND 704
SWMU 23	BUILDING 800 OWS
SWMU 25	BUILDING 805 WOT
SWMU 27	BUILDING 810 OWS
SWMU 28	BUILDING 822 OWS
SWMU 29	BUILDING 827 OWS
SWMU 31	BUILDING 855 OWS
SWMU 35	BUILDING 903 WOT
SWMU 39	BUILDING 1092 OWS
SWMU 40	BUILDING 1166 OWS AND WASTE OIL TANK
SWMU 41	BUILDING 1266 OWS
SWMU 126	BUILDING 1001 WASTE OIL TANK
SWMU 128	BUILDING 1166 OWS AND WASTE OIL TANK
SWMU 132/AOC-A	FORMER DRAINAGE PIT AND, TRANSFORMER AND GENERATOR PADS AT THE FORMER BUILDING 21 ENTOMOLGY SHOP

Prepared for:
U.S. Army Corps of Engineers
for Holoman A.F.B.

Prepared December 1995

Figure 1

Phase II POL – Contaminated Sites Location Map

Holloman A.F.B., New Mexico
Prepared by: Ebasco Services Incorporation

A1225-4 11/02/1995

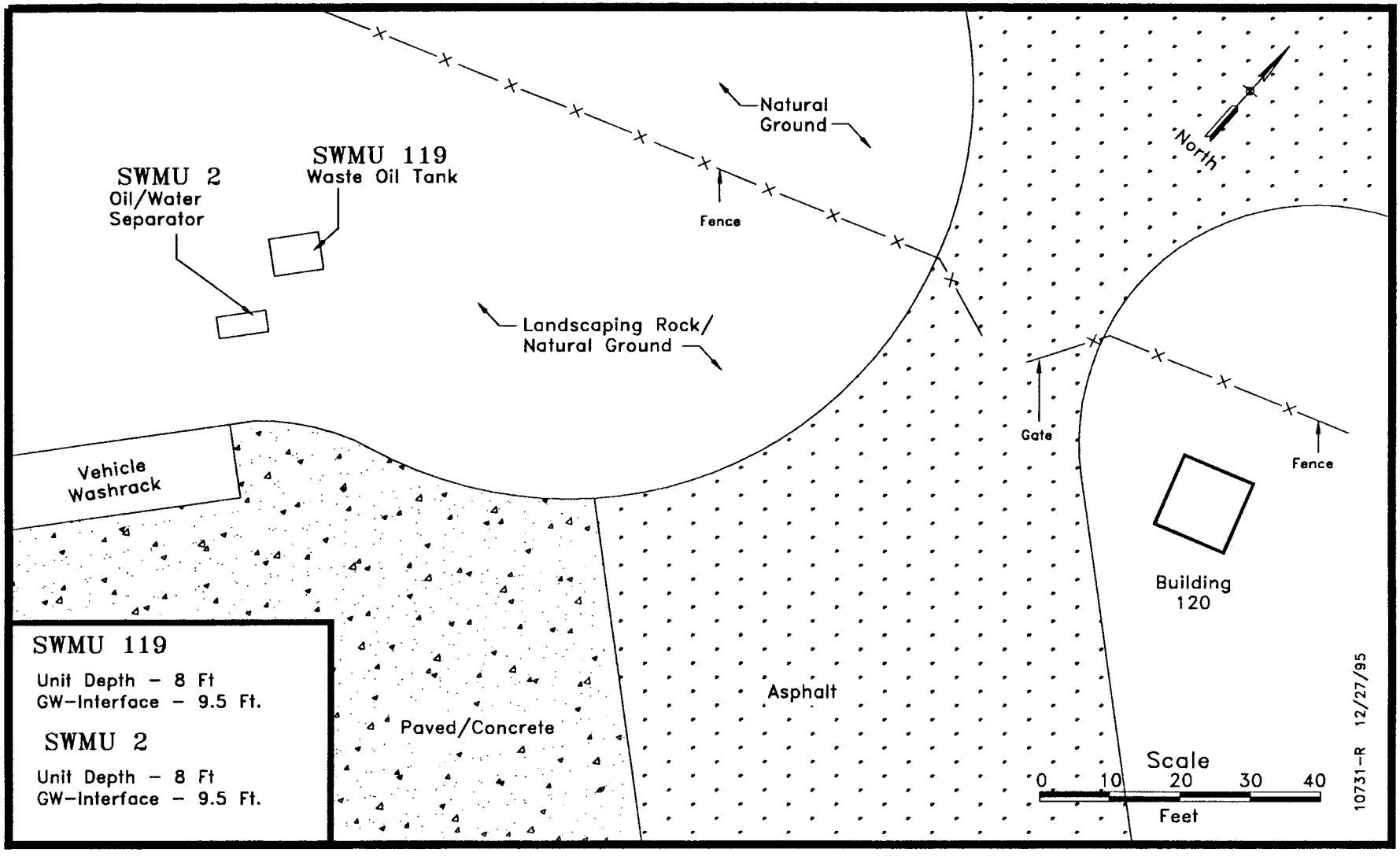


Figure 2. SWMU 2 – Site Map

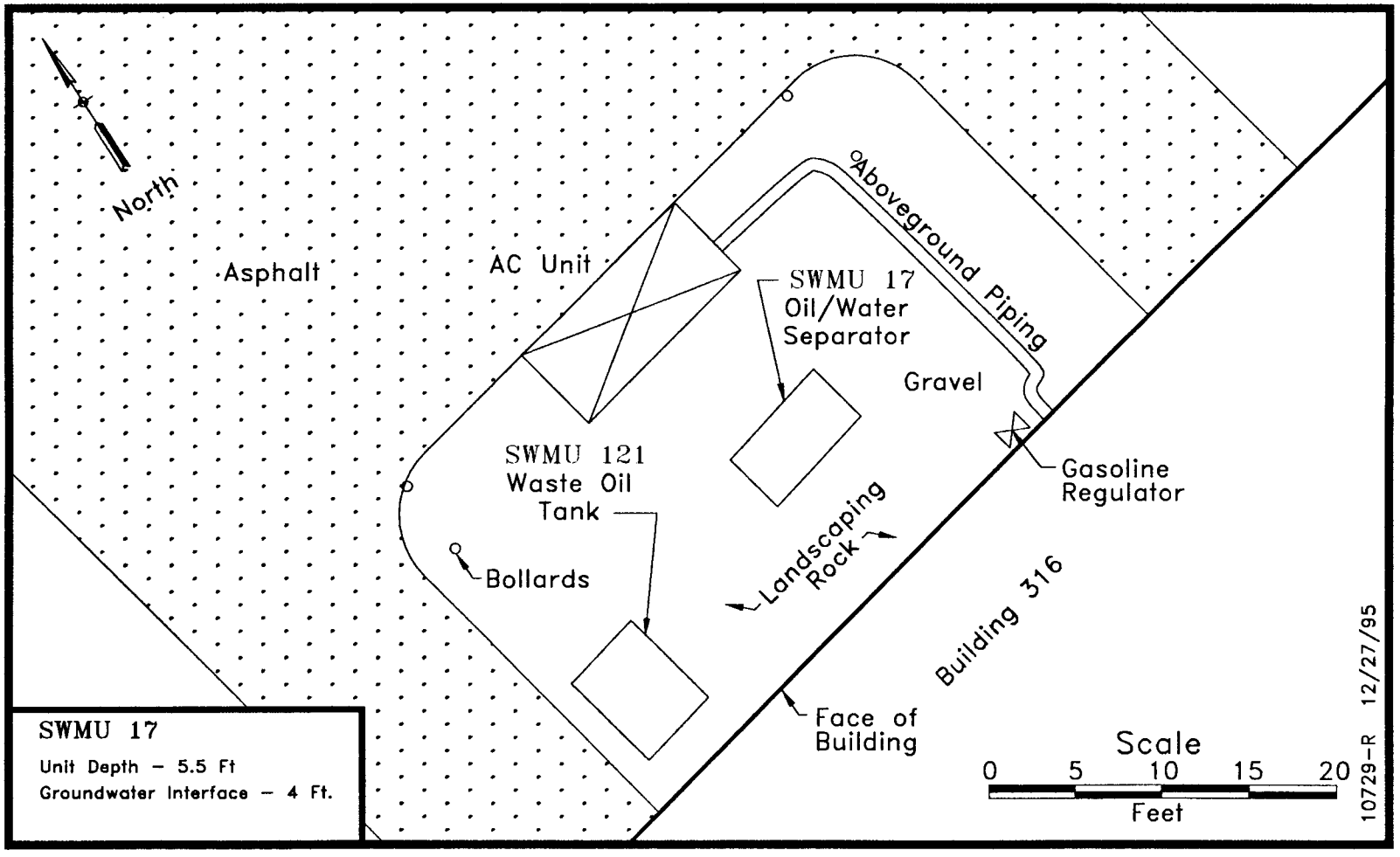


Figure 3. SWMU 17 and 121 – Site Map

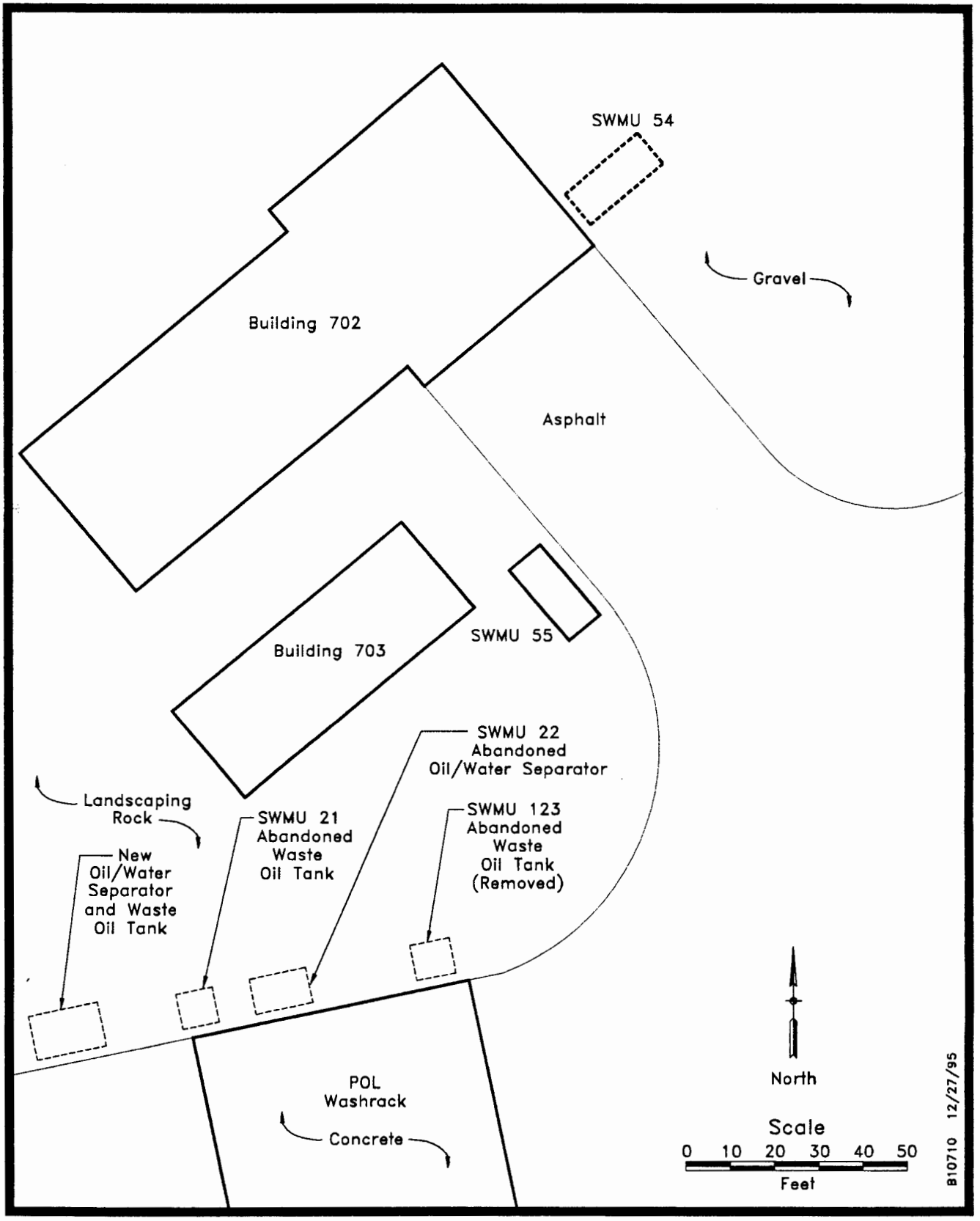


Figure 4. SWMU 21 and 22 – Site Map

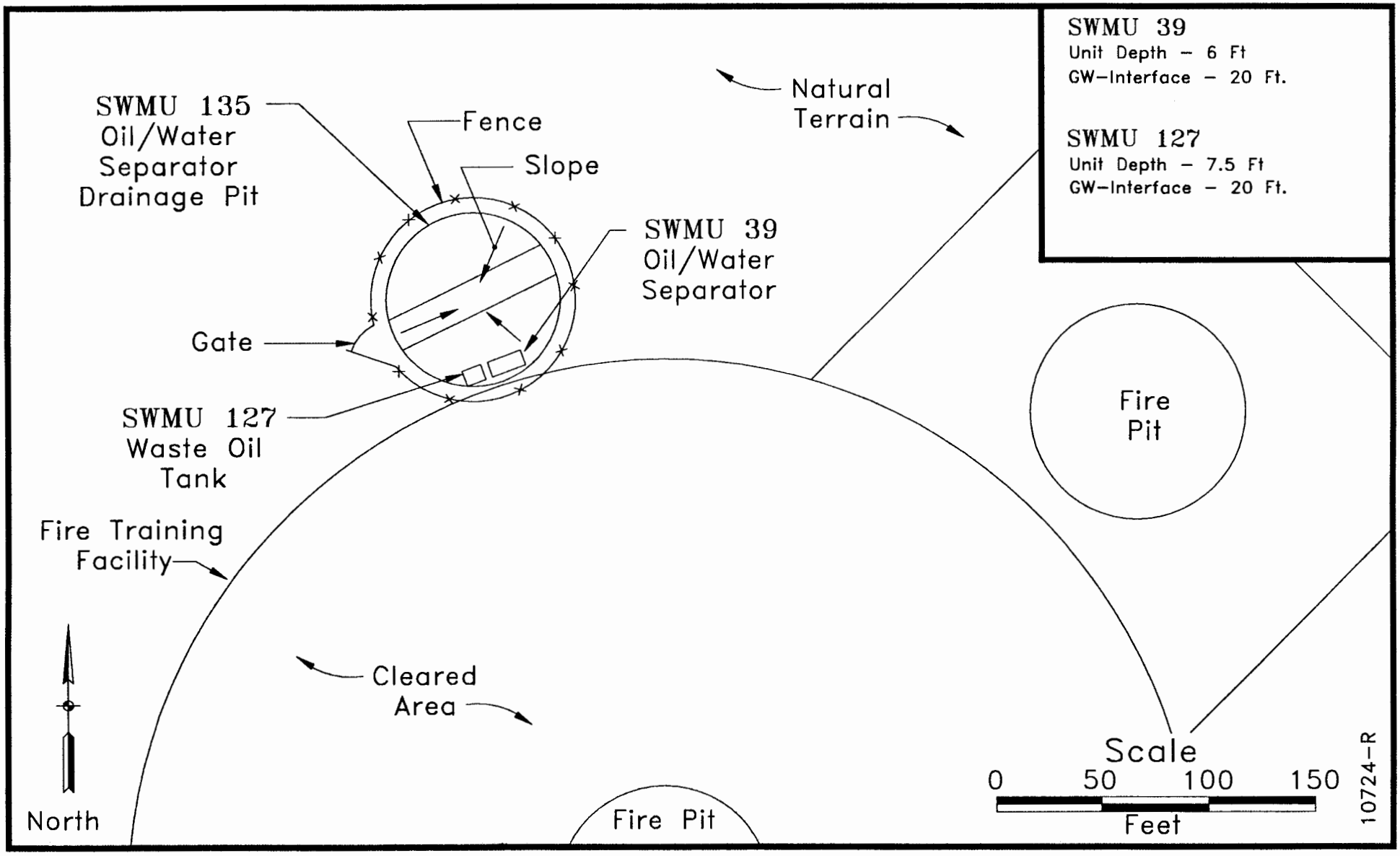


Figure 5. SWMU 39 – Site Map

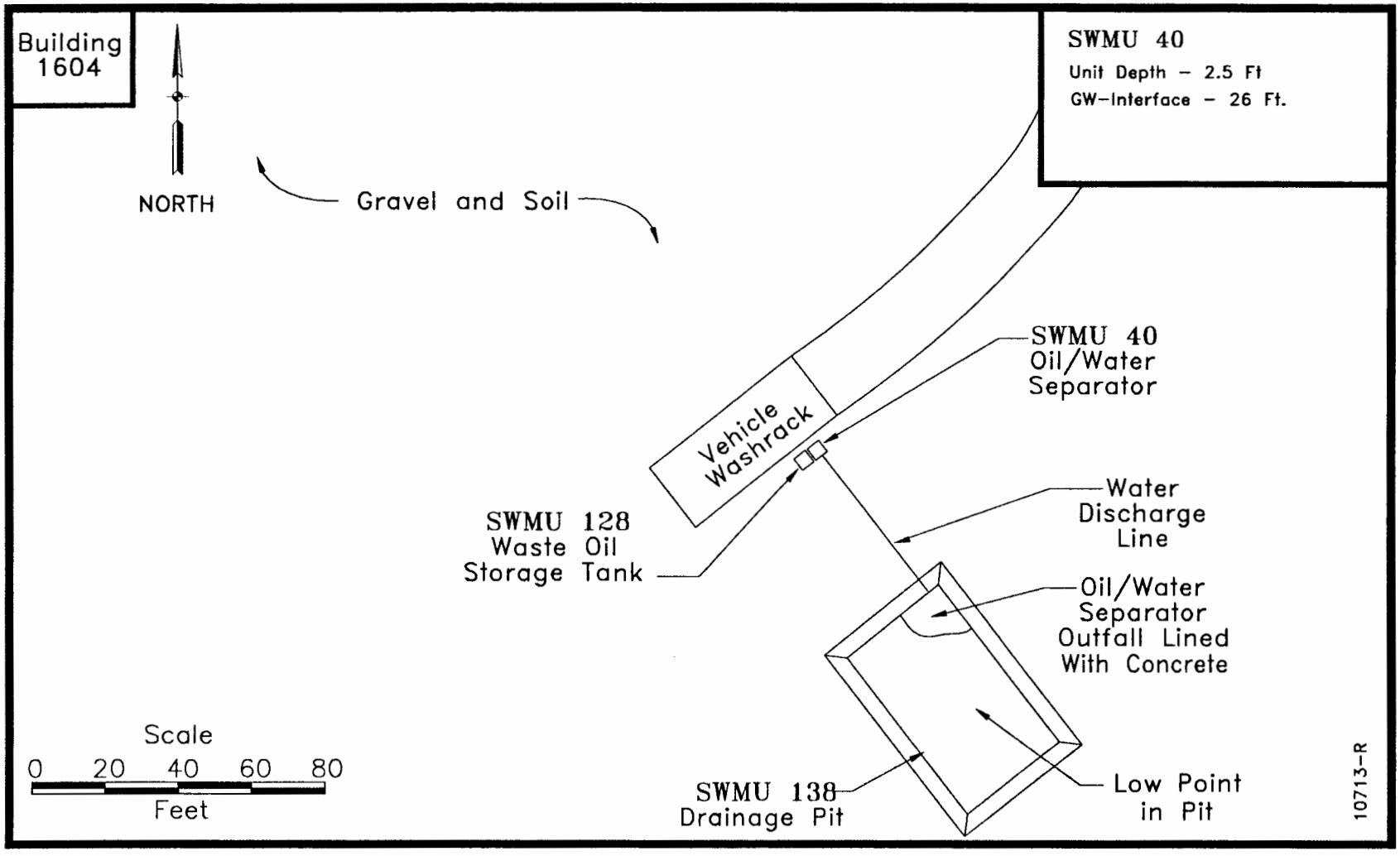


Figure 6. SWMU 40 and 128 – Site Map

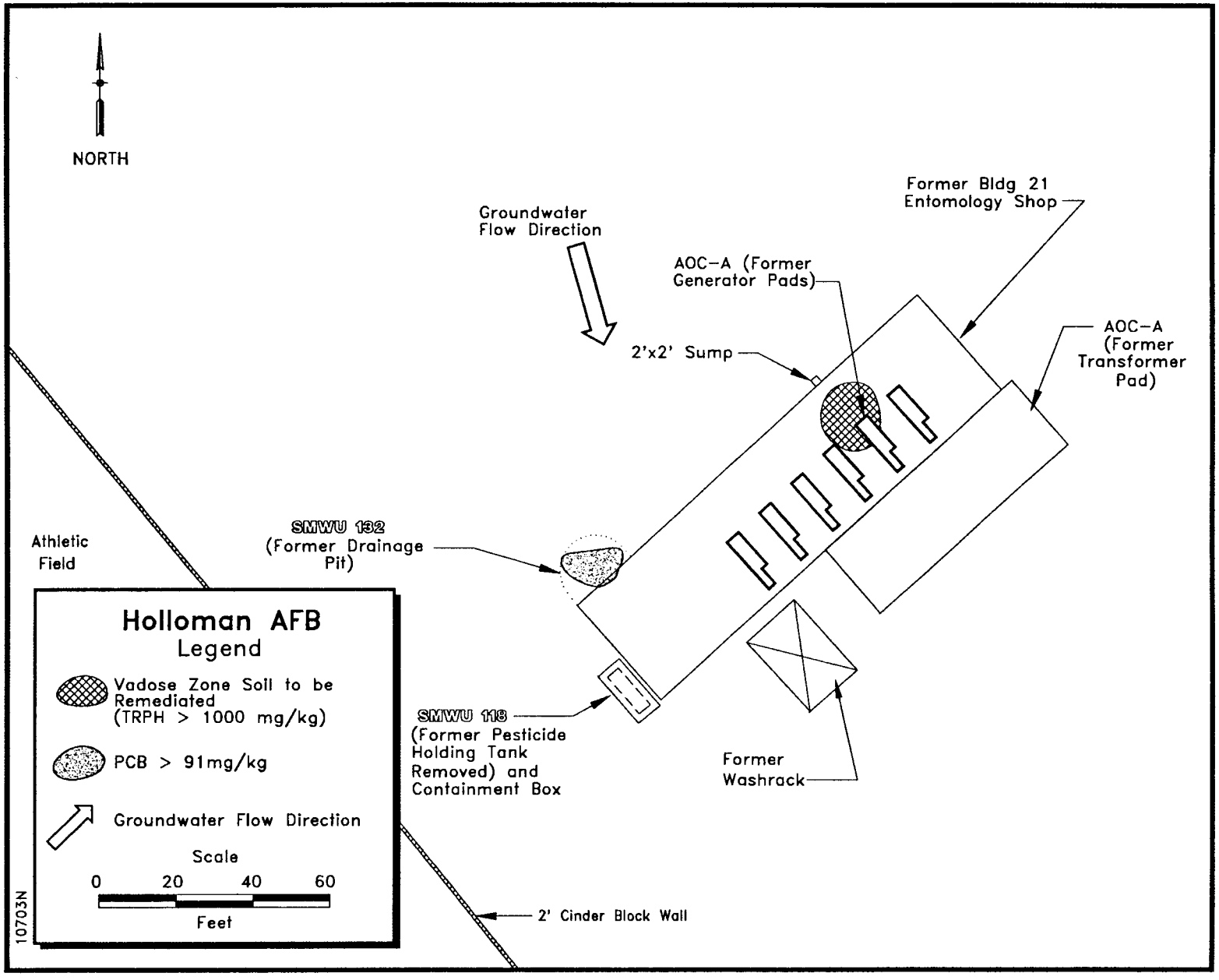


Figure 7. SWMU 132, and AOC-A Site Map

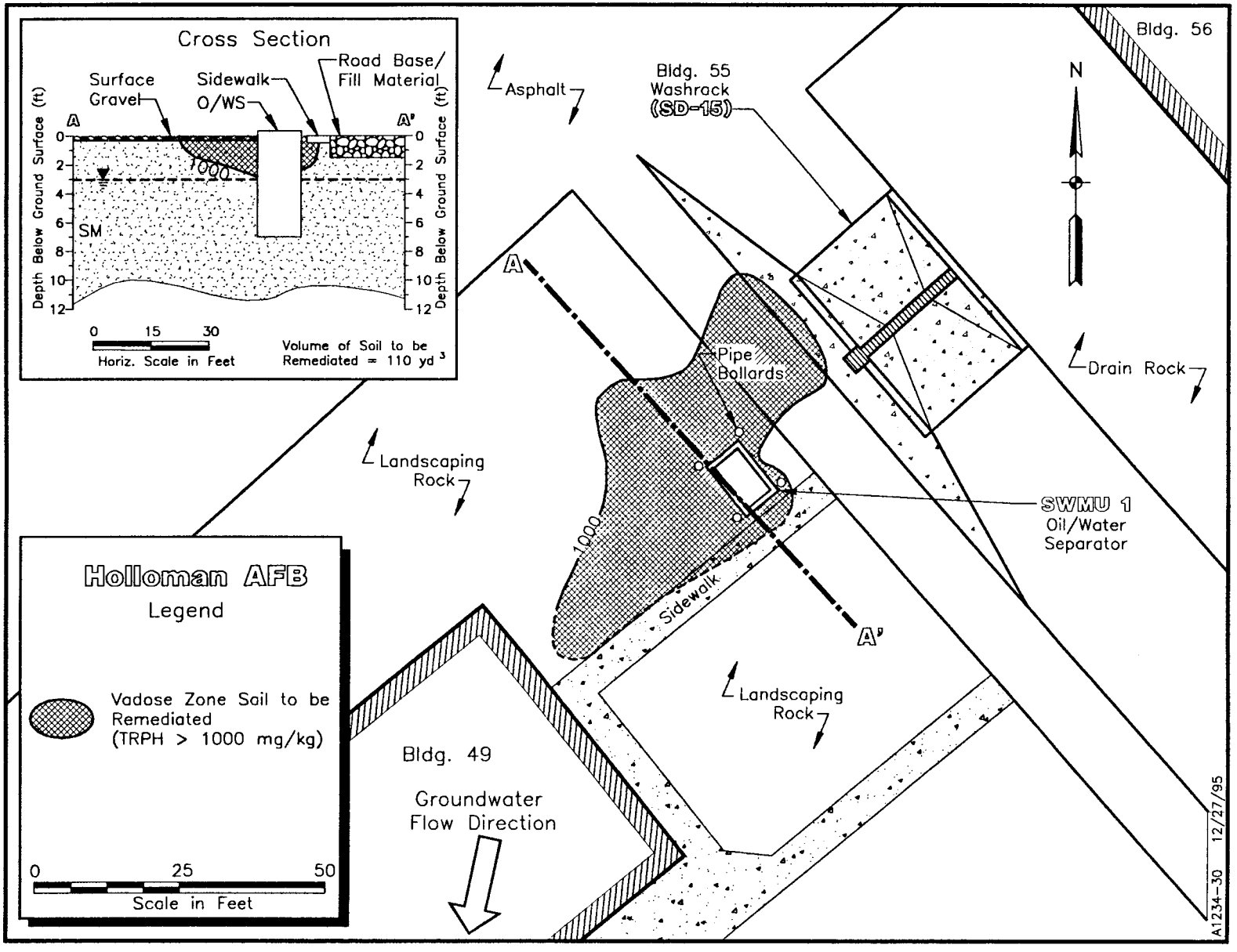


Figure 8. SWMU 1 – Site Map

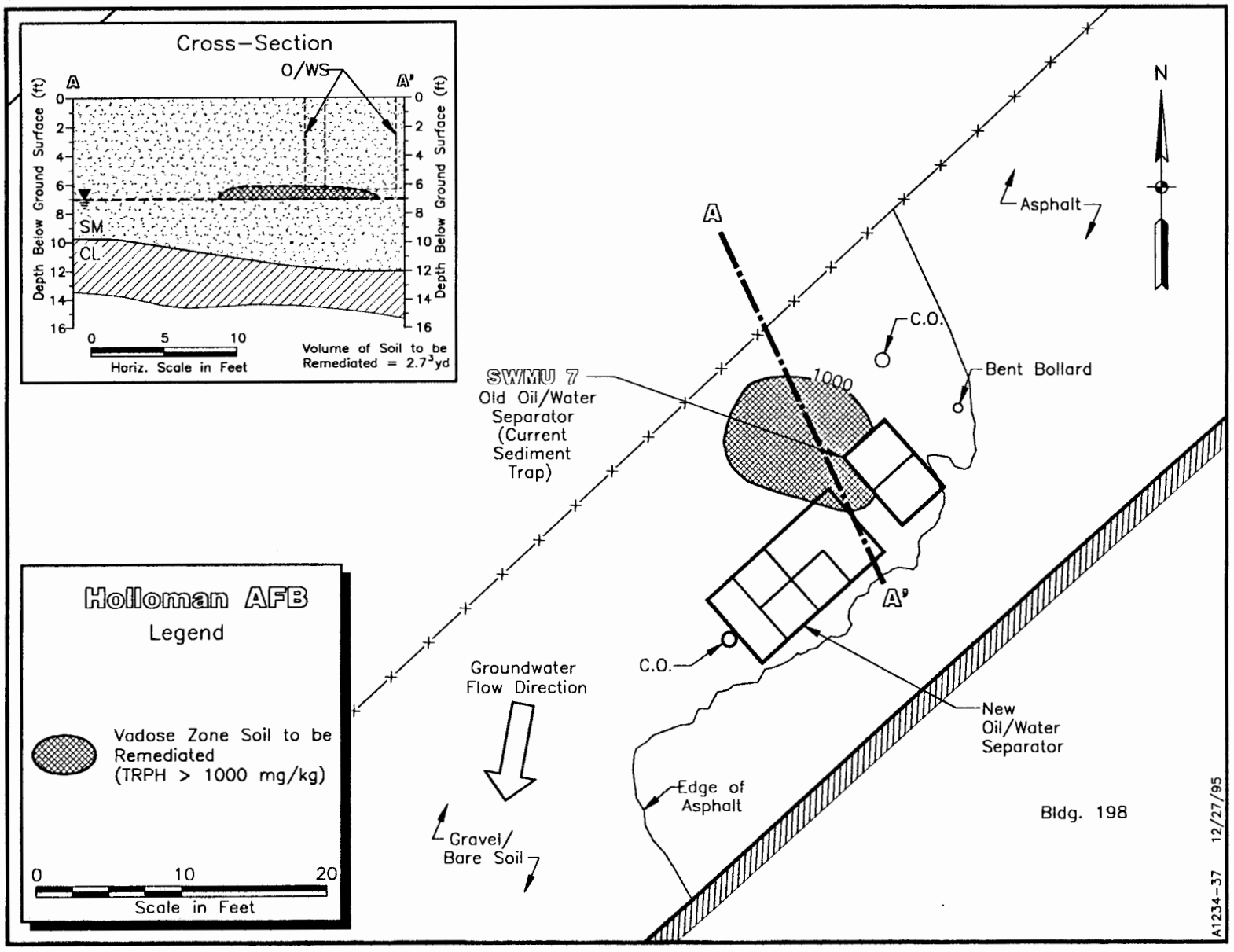


Figure 9. SWMU 7 – Site Map

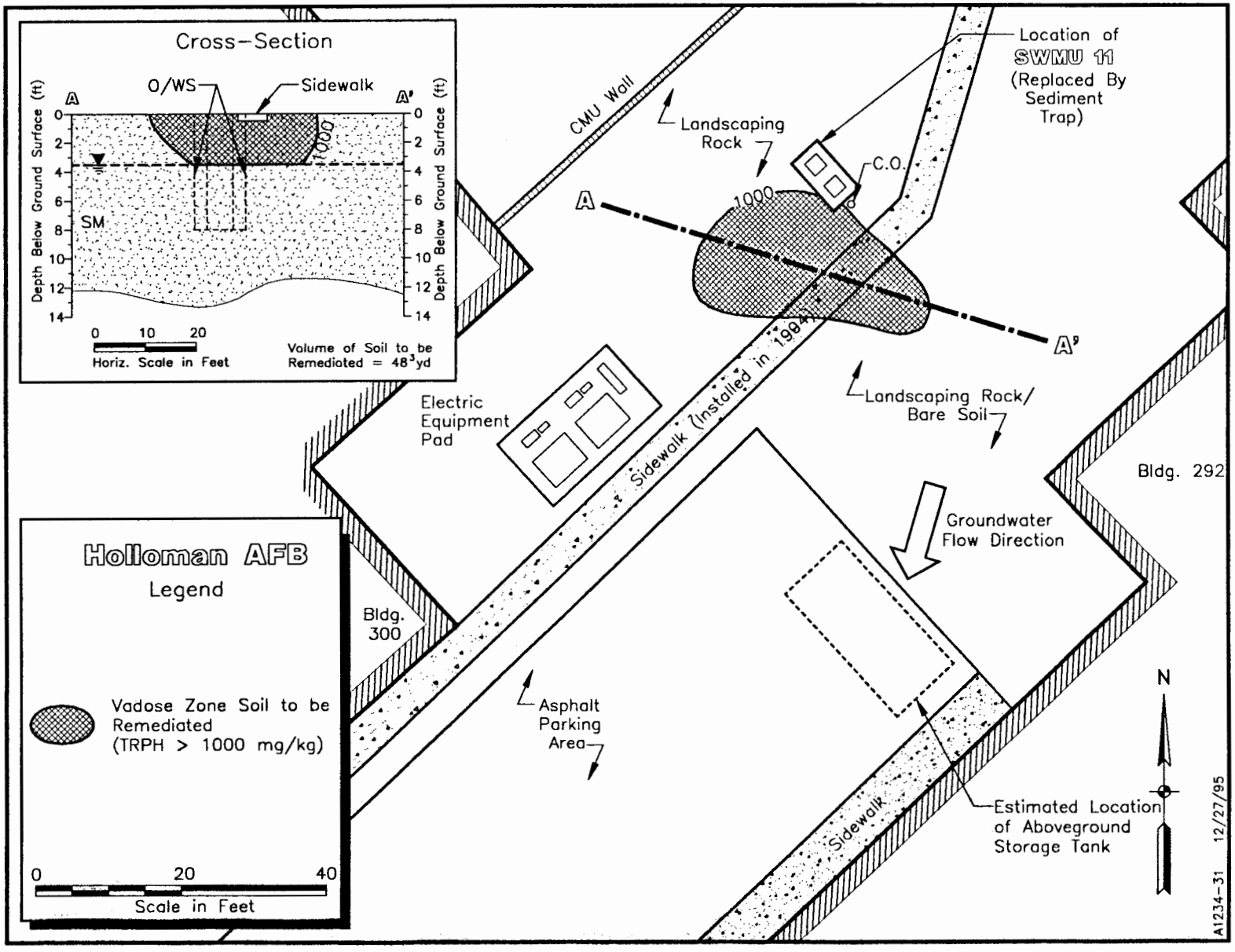


Figure 10. SWMU 11 – Site Map

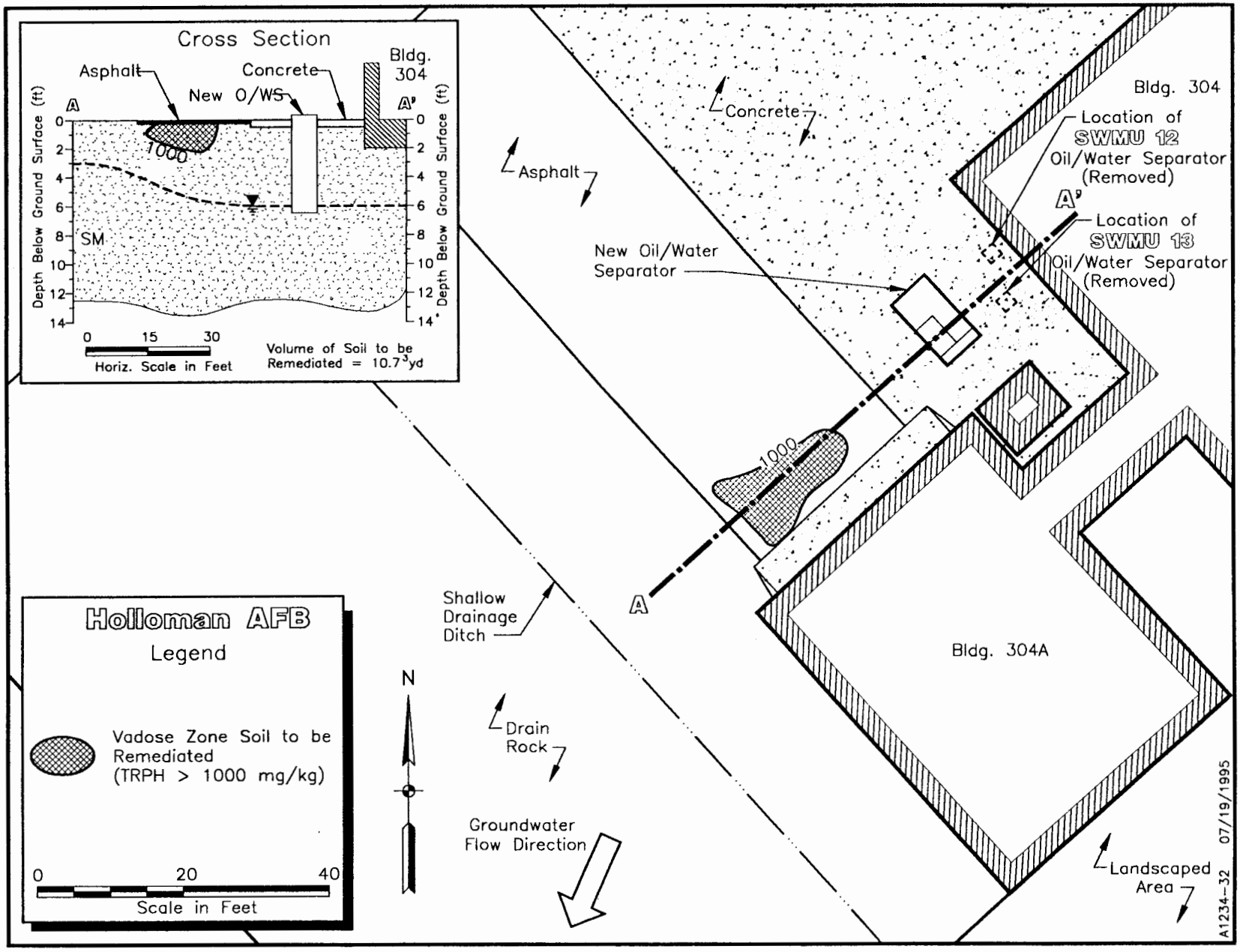


Figure 11. SWMUs 12 & 13 – Site Map

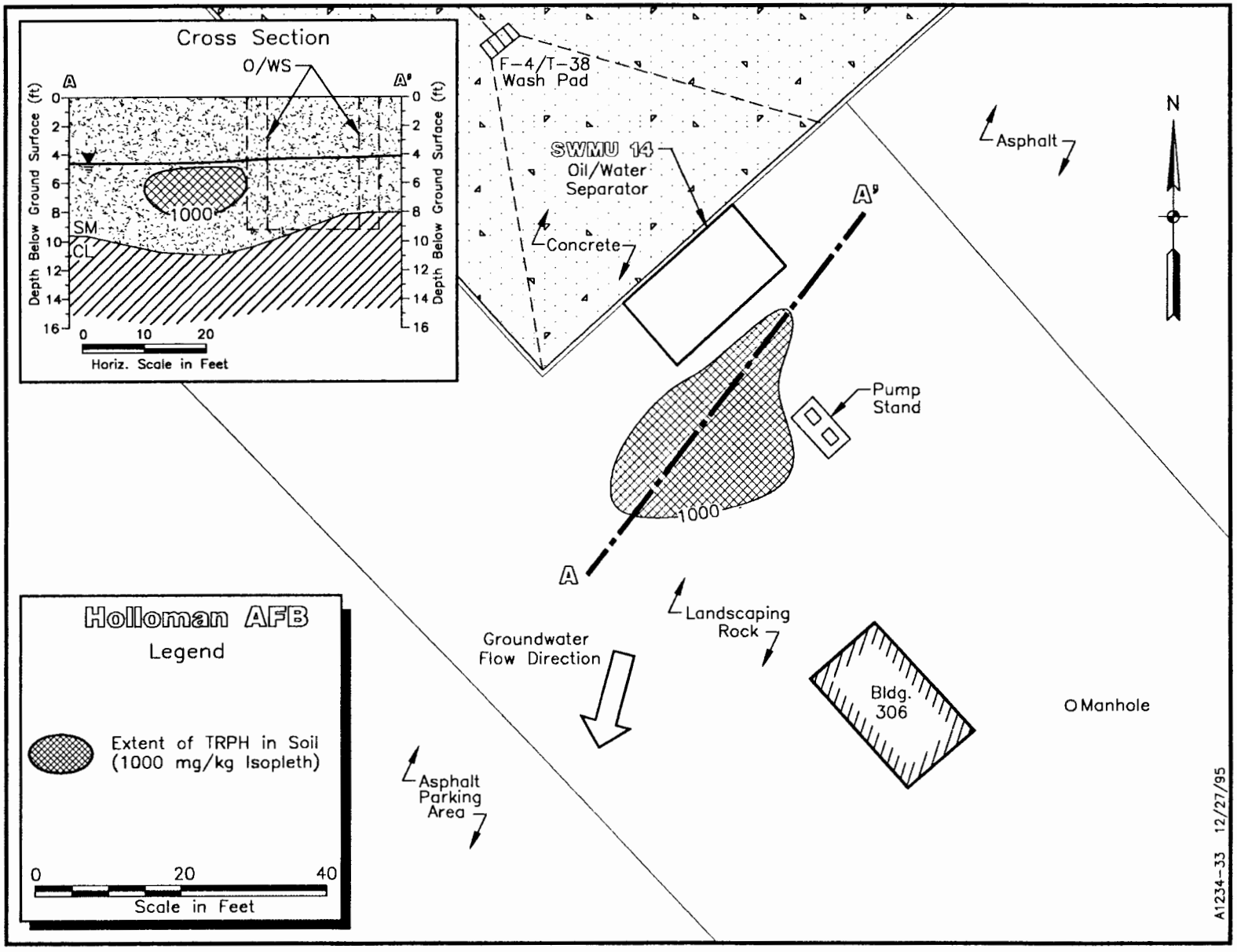


Figure 12. SWMU 14 – Site Map

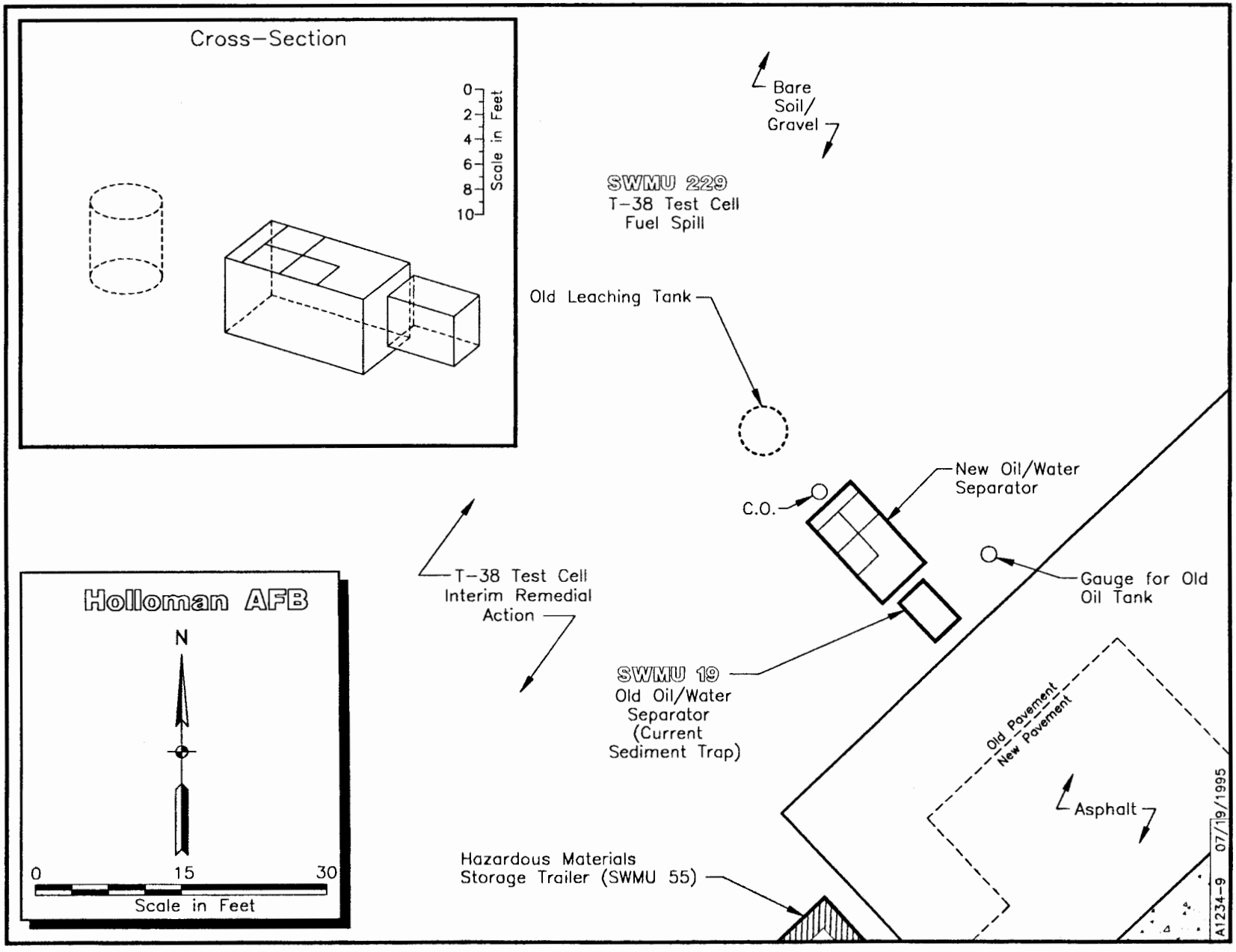


Figure 13. SWMU 19 – Site Map

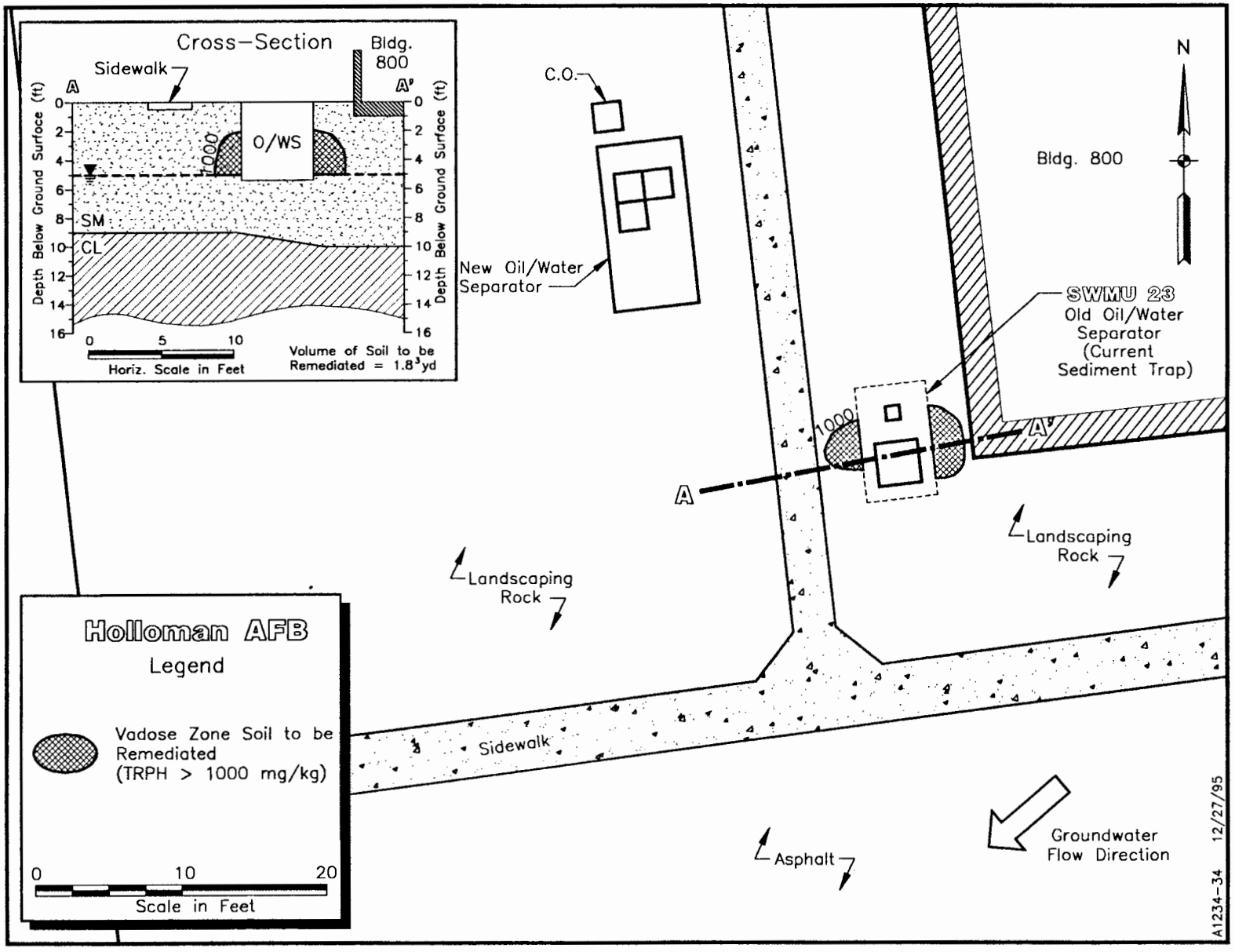


Figure 14. SWMU 23 – Site Map

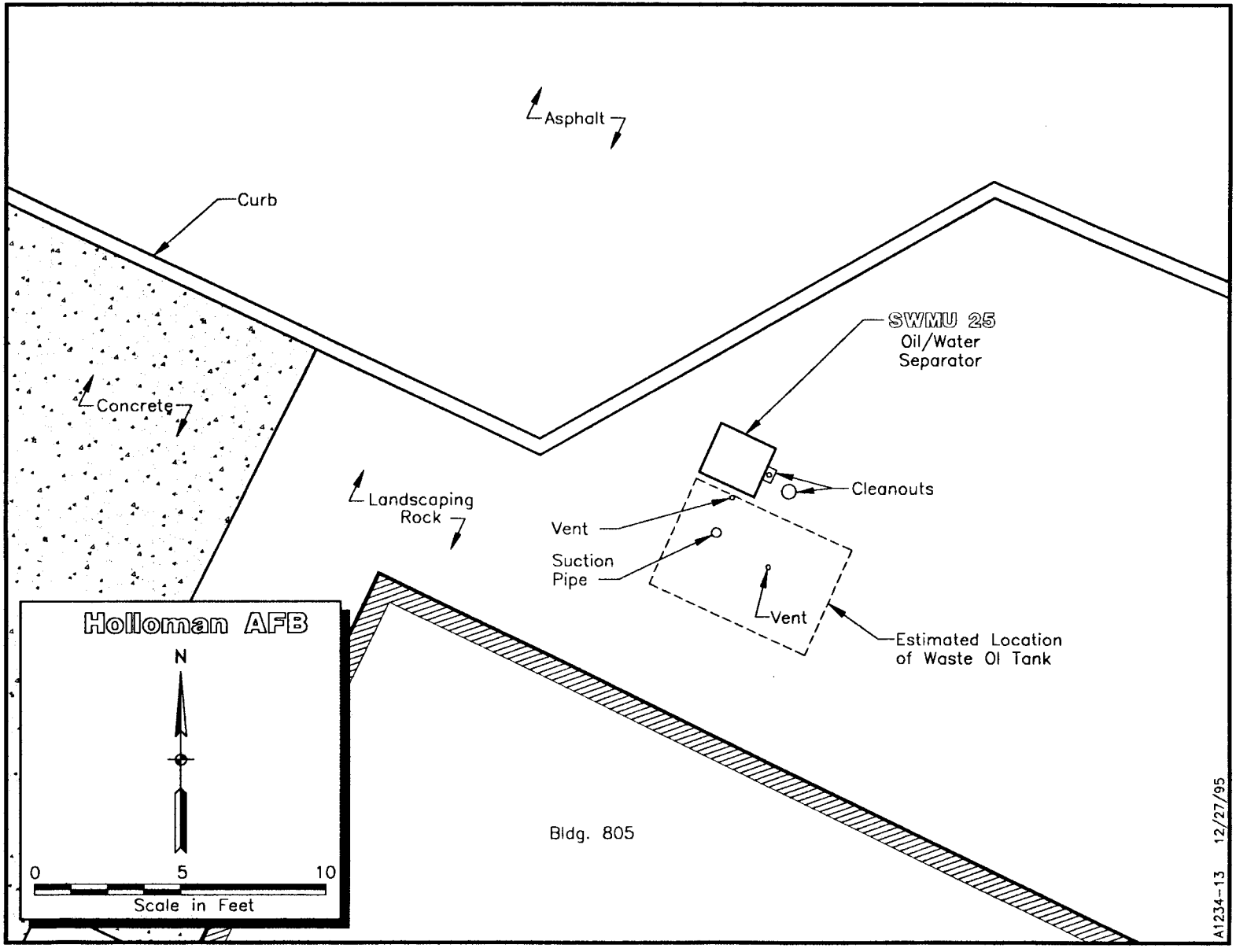


Figure 15. SWMU 25 – Site Map

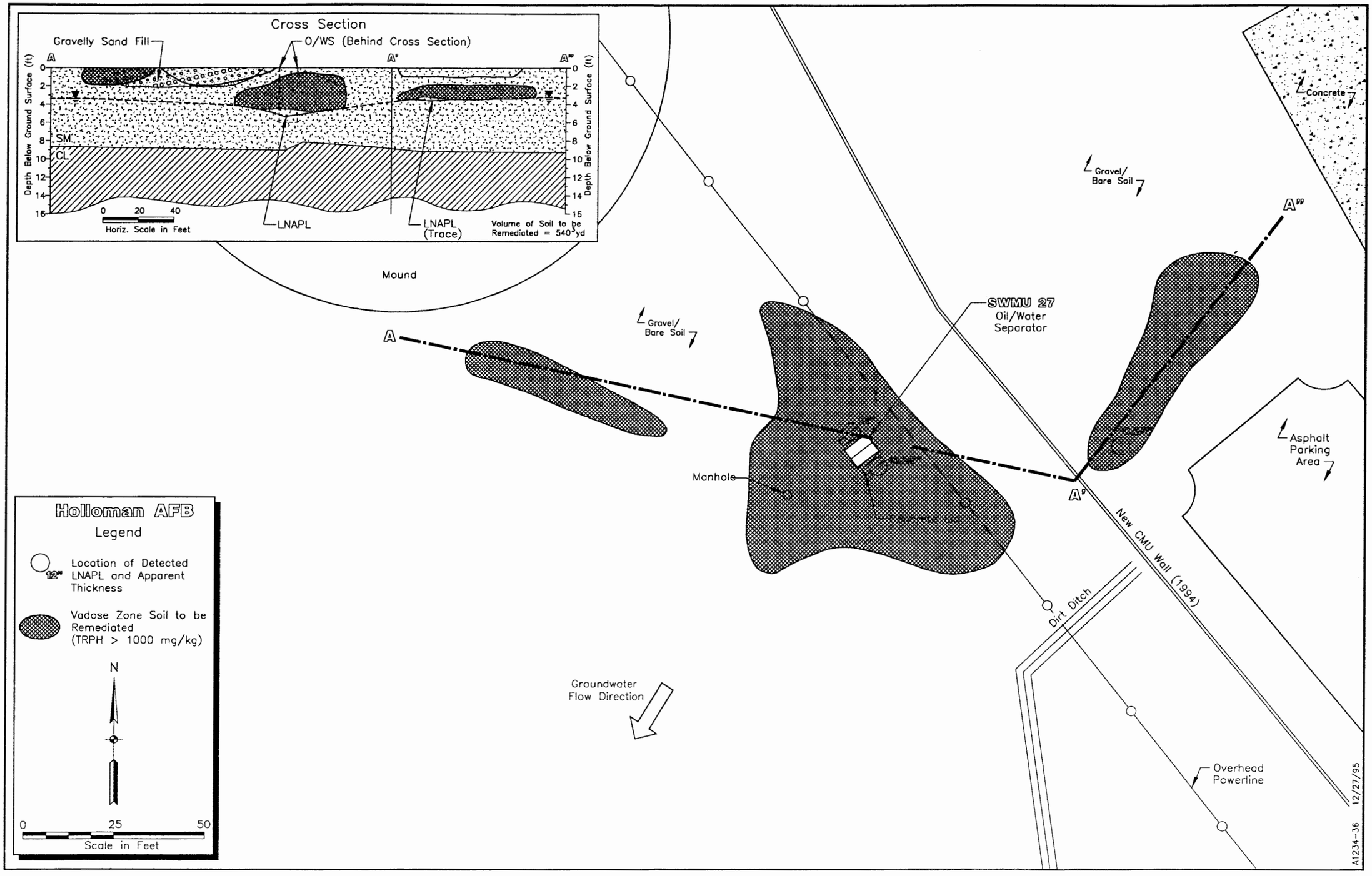


Figure 16. SWMU 27 – Site Map

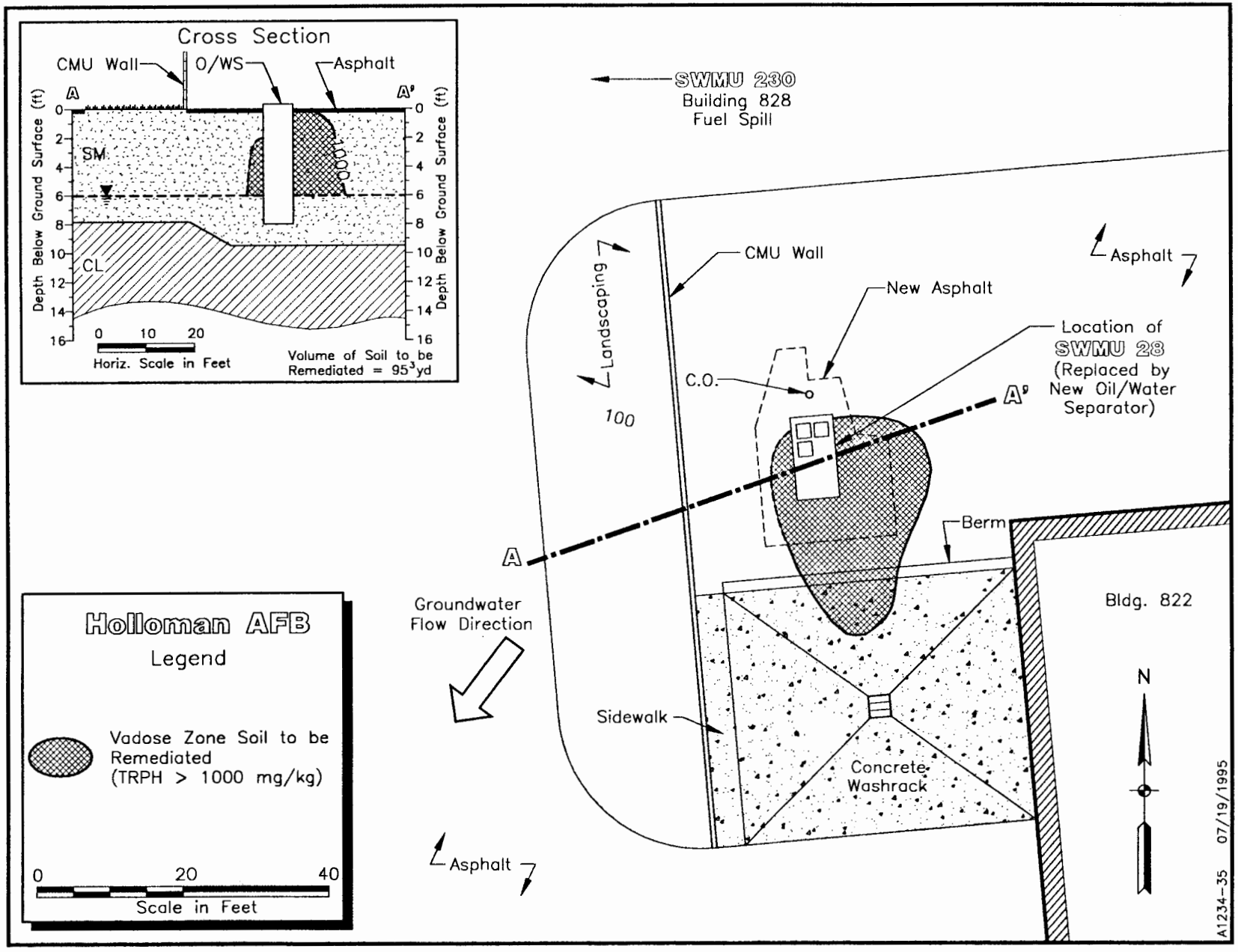


Figure 17. SWMU 28 – Site Map

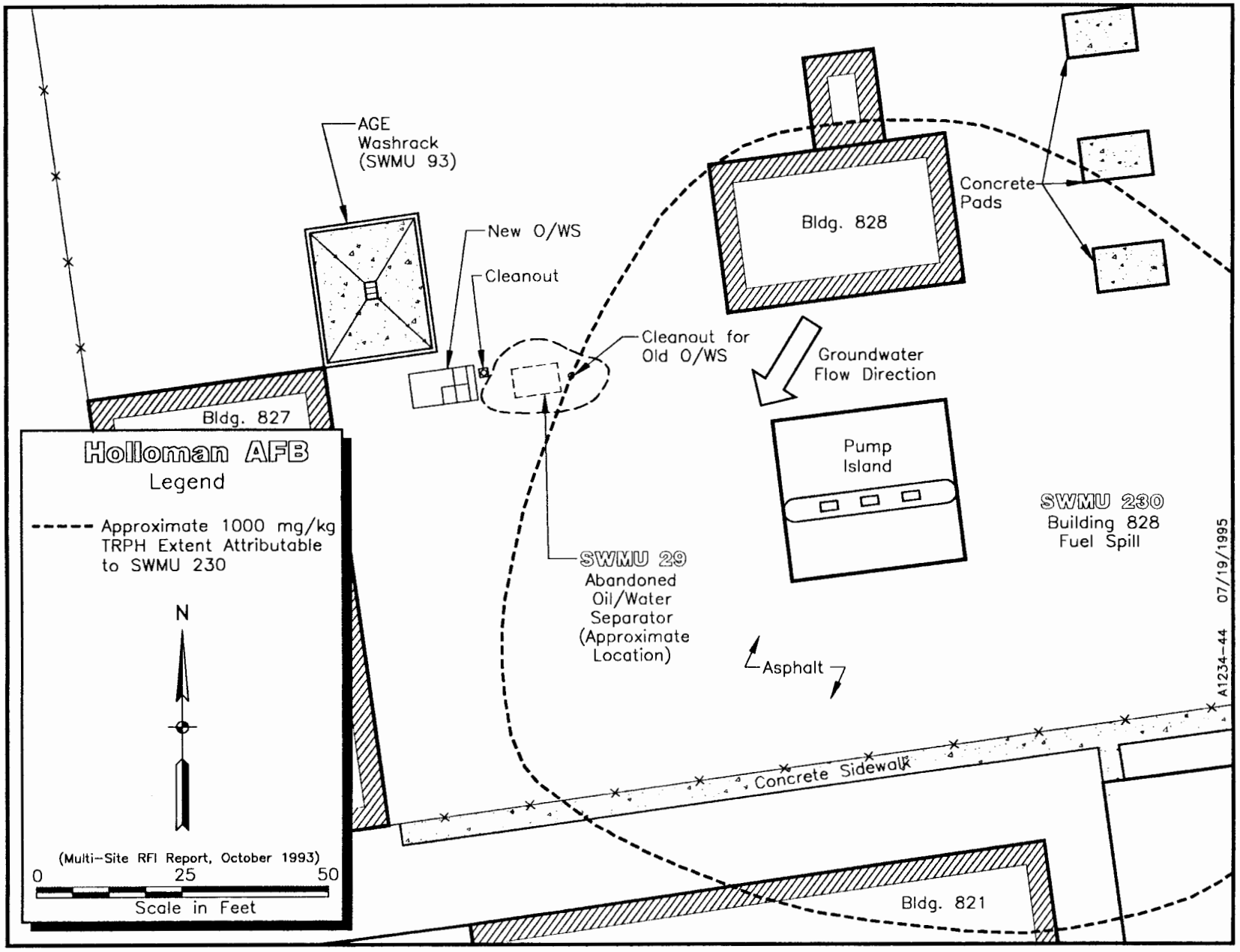


Figure 18. SWMU 29 – Site Map

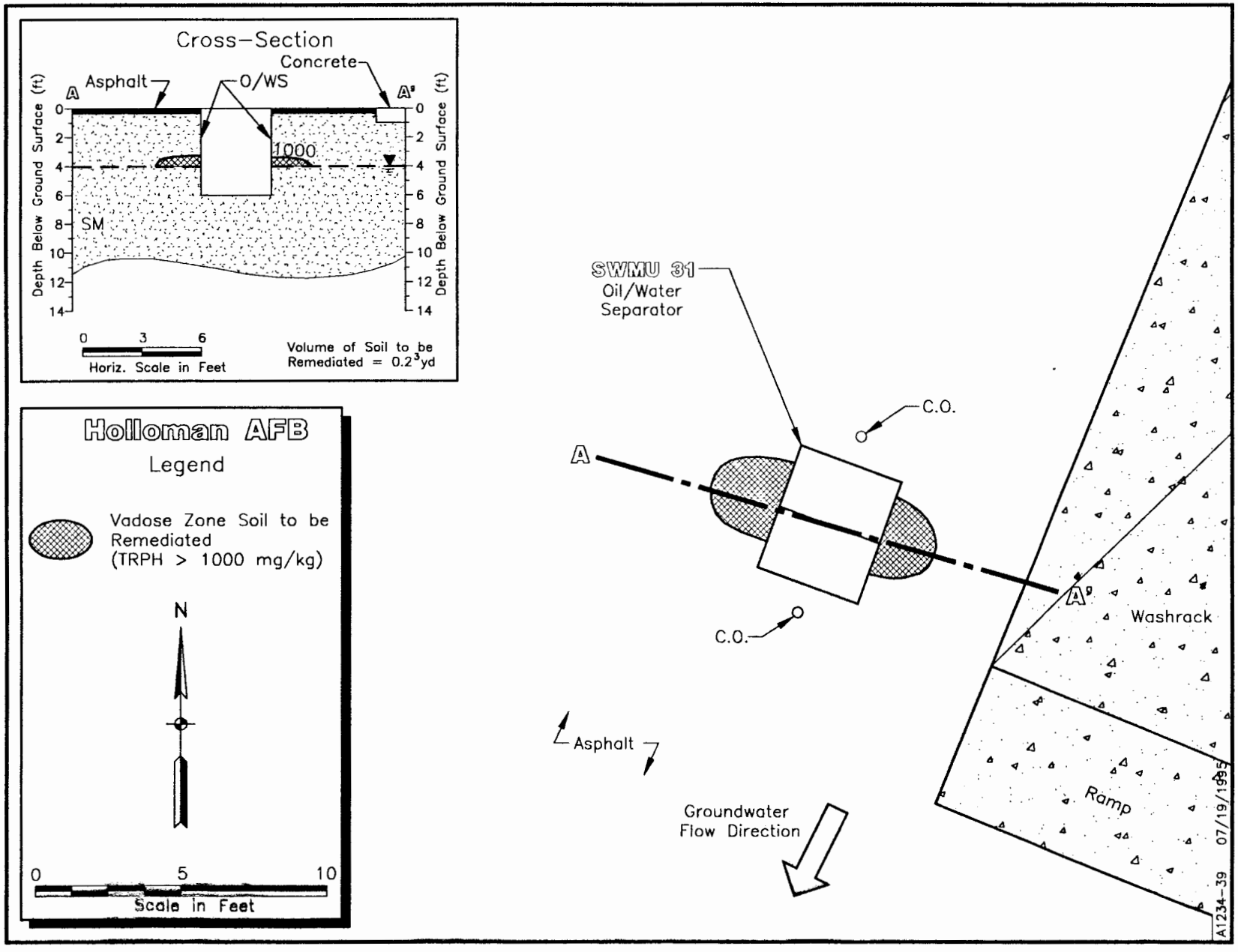


Figure 19. SWMU 31 – Site Map

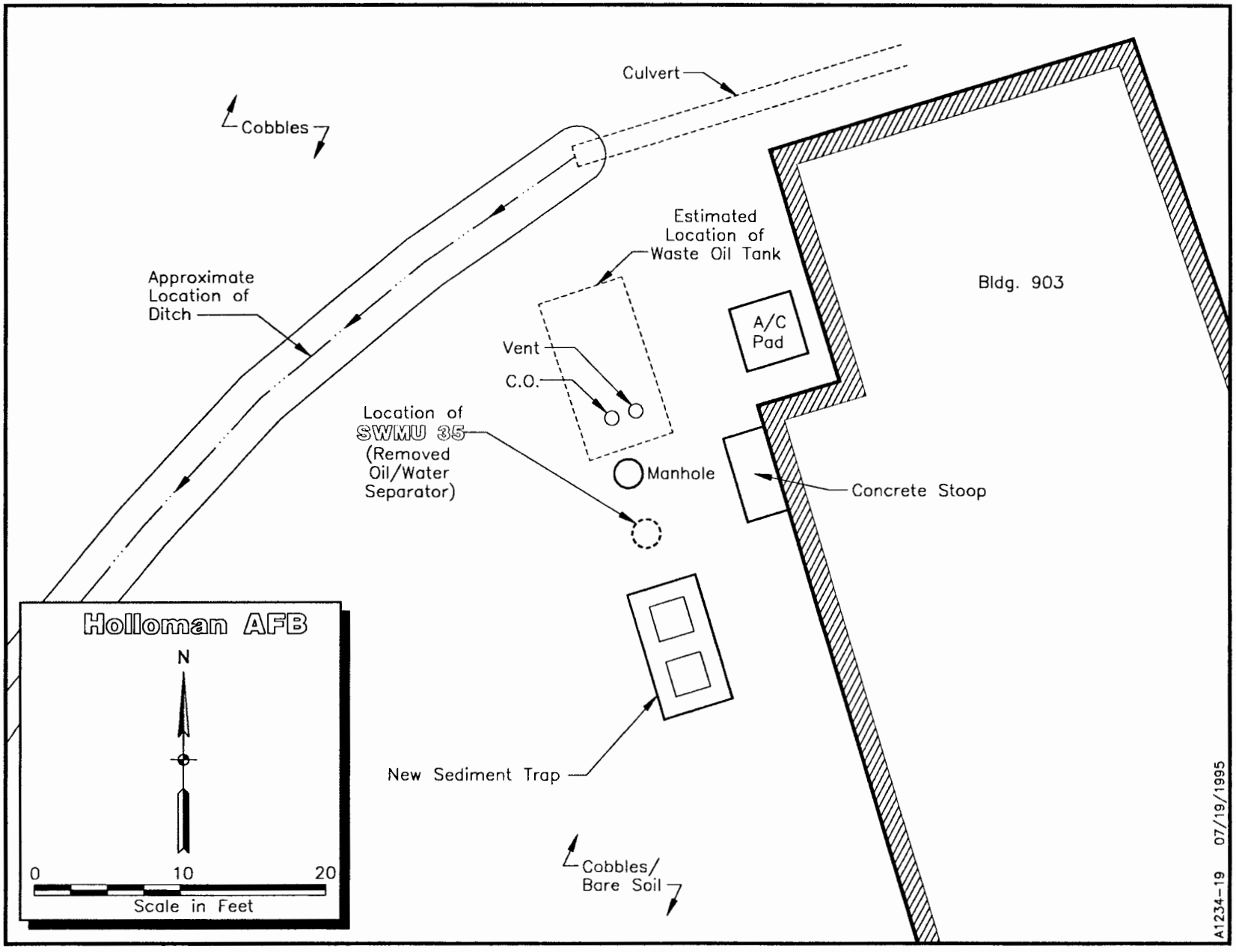


Figure 20. SWMU 35 – Site Map

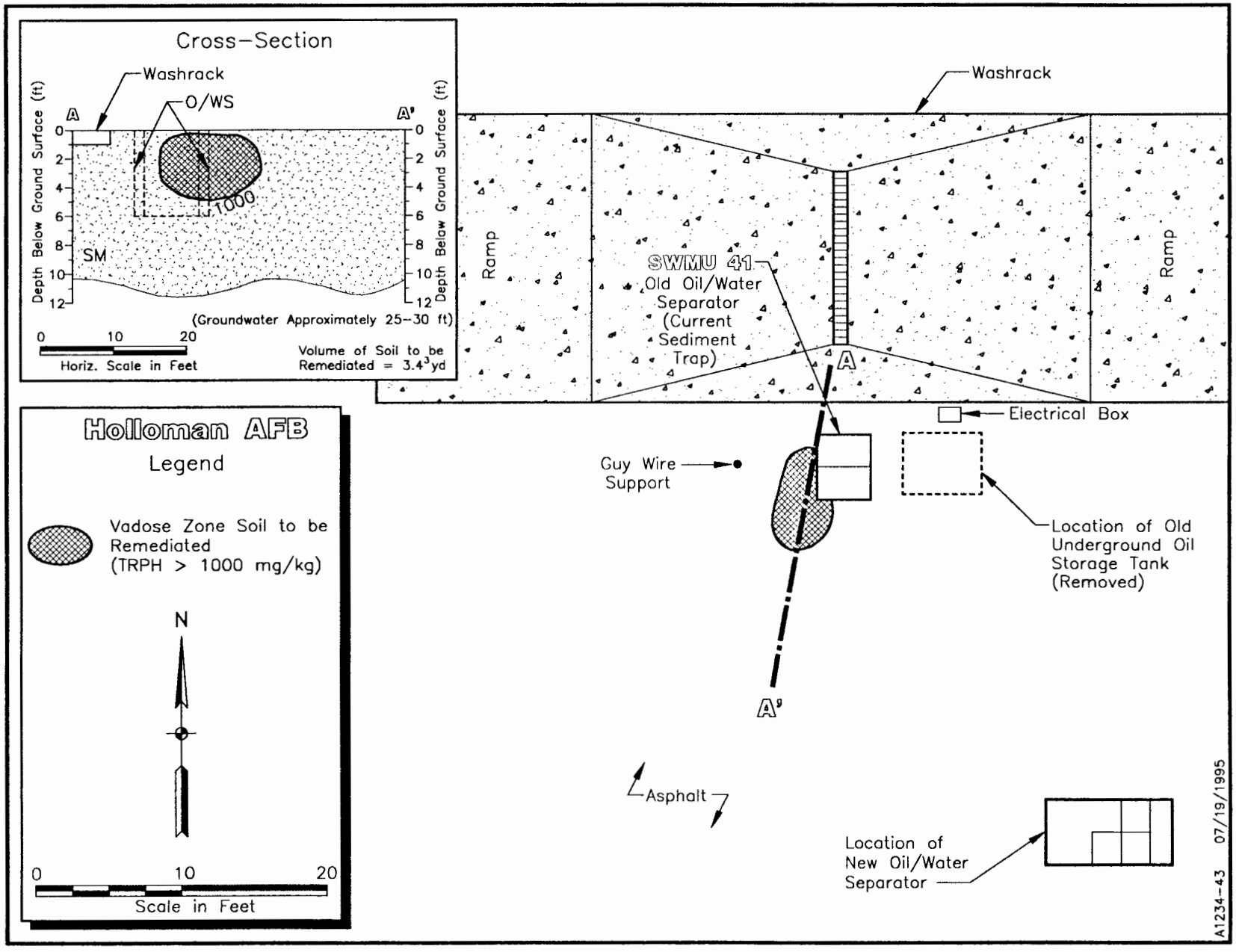


Figure 21. SWMU 41 – Site Map

APPENDIX B

COMPLIANCE PROCEDURE FOR REPORTING SPILLS AND RELEASES

1.0 PURPOSE

The purpose of this procedure is to implement Foster Wheeler Environmental Corporation's policy of strict compliance with all reporting requirements. This procedure describes the four categories of spills that Foster Wheeler Environmental employees must report, and identifies the specific reporting process to follow for each category.

Numerous federal, state, and local regulatory requirements govern spill/release reporting and response activities. Depending upon the circumstances, reporting may be necessary under federal (CWA, CERCLA, SARA Title III, RCRA, TSCA), state, and/or local spill reporting programs. Some programs specify minimum quantities, others do not. Some programs apply to virtually any spill, others are very specific.

Spill/release reporting can be complex. Outside contractor employees have been indicted and convicted of criminal violations of federal spill/release reporting requirements. This obligation may hold even though the spill was made by the client and not the contractor. In the absence of such requirements, money damages may still be imposed by a court for failure to disclose knowledge of spills that present a hazard to human health.

2.0 SCOPE

This procedure applies to all Foster Wheeler Environmental employees who learn of the existence of a spill or release during the course of a project. The procedure is to be implemented *immediately* once a Foster Wheeler Environmental employee learns of the existence of a spill or release, regardless of who may have caused the spill or when the spill may have occurred.

As noted in the Project Regulatory Compliance Procedure (RC 1), it is critical that spill reporting procedures be coordinated with the client prior to initiation of the project. If the procedures are modified and a mutually agreeable criteria to responding to spills are developed with the client, the Regulatory Compliance Manager must be advised of and must approve of these modified procedures.

3.0 DEFINITIONS

None.

4.0 RESPONSIBILITIES

4.1 PROJECT PERSONNEL

The Project Manager shall present these procedures to the client prior to beginning the project. The Project Manager shall assign an On-Site Spill/Release Coordinator to each remediation and waste management project. The On-Site coordinator shall be identified in the project Regulatory Compliance Plan or Waste Management Plan, and shall be trained in these procedures by the assigned Regulatory Affairs Advisor.

4.2 REGULATORY COMPLIANCE PERSONNEL

The Regulatory Affairs Advisors must train the assigned On-Site Coordinators in these procedures and document that training. Any client questions or concerns regarding these procedures shall be referred to the Regulatory Affairs Advisor or the Regulatory Compliance Manager.

5.0 PROCEDURE

The On-Site Coordinator, in conjunction with the assigned Regulatory Affairs Advisor and the Regulatory Compliance Manager, must determine the following:

- *Who* caused the spill/release;
- *Whether* it is reportable;
- *Who* must report;
- *How* to report, if required.

The following steps must be followed to determine the answer to these questions and determine the appropriate reporting requirements.

STEP 1: DETERMINE WHO CAUSED THE SPILL - FOSTER WHEELER ENVIRONMENTAL OR CLIENT

Foster Wheeler Environmental Spill/Release

A spill/release is considered a "Foster Wheeler Environmental spill/release" if the following conditions are met:

- The spill/release is physically caused by, or is suspected to have been caused by, a Foster Wheeler Environmental or Foster Wheeler Environmental subcontractor employee.

- The spill/release is from, or is suspected to have been from, a facility or equipment that meets one of the following criteria:

  - owned by Foster Wheeler Environmental or a Foster Wheeler Environmental subcontractor

  - operated by Foster Wheeler Environmental or a Foster Wheeler Environmental subcontractor

  - under Foster Wheeler Environmental's direct or indirect control as a construction manager, oversight contractor, or similar capacity.

Client Spill/Release

All other spills/releases are considered "client spills/releases" for purposes of this procedure.

STEP 2: DETERMINE IF THE SPILL OR RELEASE IS REPORTABLE

After responding to the spill as directed in the Foster Wheeler Environmental Health and Safety procedures, the On-Site Coordinator assigned to the project must contact the Regulatory Affairs Advisor to determine if the spill or release is subject to any federal, state, or local reporting requirements. The on-site coordinator must provide an estimate of quantity and concentration of the material spilled or released, and other details of the spill/release. The Regulatory Affairs Advisor will identify what agencies need to be notified and the type of notification (i.e., written or verbal) required.

STEP 3: DETERMINE IF THE SPILL OR RELEASE POSES A THREAT TO HUMAN HEALTH

If ***no*** reporting requirement is identified in Step 2, the Regulatory Affairs Advisor will contact the Regulatory Compliance Manager. The Regulatory Compliance Manager will determine if the spill or release poses a threat to human health. For purposes of this procedure a spill/release is considered to present a hazard to human health if the following criteria are met:

- The spill or release results, or may result, in downgradient groundwater contamination that has entered, or is about to enter, known drinking water sources (wells or surface water bodies)

- The spill or release has caused, or is about to cause, contamination of surface soils or other materials in areas accessible to the general public

- The spill or release has caused, or is about to cause, odors/air contamination detectable in areas accessible to the general public.

STEP 4: REPORT THE SPILL OR RELEASE

Spills or releases that are either "reportable" (Step 2) or determined to pose a "hazard" (Step 3) must be reported as specified in Table 1 below. Spills or releases which are ***not*** "reportable" (Step 2) or determined ***not*** to pose a "hazard" (Step 3) **need *not* be reported** to an agency, but response information should be provided to the client and retained in the project file. These determinations and how the release was reported, if applicable, must be documented in the project file.

TABLE 1 - CATEGORIES AND ACTIONS FOR REPORTING SPILLS OR RELEASES

PARTY WHO CAUSED SPILL	REPORTABLE TO AGENCY	NOT REPORTABLE BUT THREAT TO HUMAN HEALTH
Foster Wheeler Environmental	■ Immediately report to the client and regulatory agencies. ■ Regulatory Affairs Advisor must provide Regulatory Compliance Manager with verbal and written notification of the spill.	■ The Project Manager and Regulatory Compliance Manager will report to client. ■ Regulatory Compliance Manager and client will determine whether to report to agencies.
Client	*Real-Time Spill Release.* If Foster Wheeler Environmental personnel observe the occurrence of the spill or release or learn of it *immediately* after it happens: ■ Project Manager shall *immediately* contact the client to give the client a "right of first refusal" to report the spill/release, and notify the Regulatory Compliance Manager. ■ If the client cannot be reached or declines to report, Project Manager shall report to the regulatory agencies as specified in Step 2 above. *Historic Spill or Release.* If Foster Wheeler Environmental personnel observe or learn of evidence that a spill or release has occurred in the past: ■ Regulatory Affairs Advisor will immediately notify the Regulatory Compliance Manager. ■ The Regulatory Compliance Manager along with Project Manager will notify the client and evaluate whether the spill or release has been reported or whether to report to regulatory agencies.	■ The Project Manager and Regulatory Compliance Manager will report to client. ■ Regulatory Compliance Manager and client will determine whether to report to agencies.

6.0 TRAINING

All project personnel must be trained in this and other Regulatory Compliance Procedures and Policies. The assigned project Spill/Release Coordinator may contact the Regulatory Affairs Advisor if additional training is required in order to implement this procedure.

7.0 REFERENCES

None.

---End of Section---

APPENDIX C
STANDARD OPERATING PROCEDURES

SOP B-1 Drum Sampling

Field sampling procedures for the collection of drum contents using a glass pipette are as follows:

NOTE: If drum is bulging, leaking, or indicates a potential to rupture, the drum shall not be approached. Only remote opening and sampling shall be performed in this case.

1. Drums to be sampled are to be identified by placing colored index cards on the top of the drums. Care is to be taken to avoid any physical contact with the drums.
2. Drums to be opened manually will be opened via a bung cap or lid using a spark-proof wrench.
3. After opening the drum, a liquid phase sample will be collected using a glass pipette, 3 to 4 ft. in length. The sample will be transferred to a sample bottle via the pipette. Care is to be taken not to spill any sample onto the ground surface.
4. Upon completion of sampling, the pipette is to be decontaminated and disposed of as nonhazardous waste.
5. After decontamination of the pipette, the opening on the drum will be closed by replacing the bung cap or lid. Red flagging tape will then be tied around the drum indicating that the drum was sampled. The drum will be marked, with an indelible marker such as a paint marker, to indicate details such as sample date, drum number, accumulation date, etc.
6. At the completion of the drum sampling program, all of the drums will be moved to the 90 day storage area.
7. Place analytical samples in cooler and chill to 4°C. Samples will be shipped within 24 hours to a laboratory.
8. Fill out field notebook, sample log sheet, custody seals, labels and Chain-of-Custody forms. Examples of the forms are included in the QAPP, Section 8.0 of the Work Plan.

Drums in a deteriorated condition such that a potential for release is evident will be packed in a salvage drum or in an overpack drum, with the latter being preferred. Drums with openings sealed with a fiberglass epoxy mixture will be overpacked.

Note: Sampling of drums containing solid material such as IDW (i.e. excess soil, soil cuttings, excess groundwater, decon water, etc.) will proceed according to the Standard Operating Procedures outlined in the FSAP (Ebasco, June 1995).

APPENDIX D
SPECIFICATIONS

TABLE OF CONTENTS

SECTION 01300
SUBMITTALS

1.0 GENERAL

This section outlines the submittal requirements for submittals related to Project Record Documents and Project Drawings.

Project Record Documents will include submittals of materials used in construction such as backfill, pavement, concrete, piping and base aggregate. These materials will be in accordance with the specifications of this Work Plan.

The Record Documents will also include the Closure Report, field log books, and monthly progress reports. The Closure Report will include laboratory analyses results, field test results, DQCRs, NCRs, FCRs, inspection checklists, site record drawings, screening results, volumes of excavated soil and quantities of soil, water, debris, and piping disposed and replaced.

Record drawings will include site diagrams and OWS design drawings. The site diagrams will include all relevant information pertinent to the site at the time of construction completion.

2.0 MATERIALS

Submittals for equipment and materials shall be provided by vendors or Subcontractors supplying these items or services. The Subcontractor will include laboratories, asphalt and concrete companies, and any companies required to perform field testing and services. The equipment and materials shall meet the specifications as outlined in this Work Plan. Asphalt and concrete specifications are included in Sections 02520, and 02510 and 03300, respectively.

3.0 EXECUTION

3.1 Submittal Register

Table 9-1 presents the submittals required from the Contractor throughout the project. This table lists all submittals currently required for the POL remediation project. Additional submittals may be required, and the Contractor is required to provide these submittals as required.

3.2 Submittal Process

Engineering data covering all equipment, fabricated materials, and all other materials which will become a permanent part of the work shall be submitted to the Contractor at the following address:

Bryan Walz
Foster Wheeler Environmental Corporation
143 Union Blvd. Suite 1010
Lakewood, Colorado 80228

The submittal shall include drawings and descriptive information in sufficient detail to show the kind, size, arrangement and operation of component materials and devices; the external connections, anchorage, and supports required; performance characteristics; and dimensions needed for installation and correlation with other materials and equipment.

All submittals regardless of origin, shall be stamped with the approval of the Subcontractor. Each submittal shall indicate the intended use of the item in the work. When catalog pages are submitted, applicable items shall be clearly identified.

The Subcontractor's stamp of approval is a representation to the Contractor that the Subcontractor accepts full responsibility for determining and verifying all quantities, dimensions, field construction criteria, materials, catalog numbers, and that he has reviewed or coordinated each submittal with the requirements of the work and the drawings and specifications. Four copies of each drawing and necessary data shall be submitted the Contractor. The four copies will be distributed by the Contractor as follows:

- Subcontractor — One copy returned with comments or approval
- EBASCO Denver Office — One copy
- EBASCO Holloman Field Office — One copy
- Jim Hendricks — One copy

3.3 Drawing Submittals

Each required submittal which is in the form of a drawing shall be submitted as one reproducible and one print of each drawing.

3.4 Control of Submittals

The Subcontractor shall carefully control his operations to assure that each individual submittal is made on or before the date materials and equipment are delivered. Laboratory submittal requirements are discussed in Section 01430.

3.5 Submittals Review

Asphalt and concrete submittals will require prior approval and will need to be delivered to the EBASCO field office one day in advance of delivery for this approval.

3.6 Certificates of Compliance

Any certificates required for demonstrating proof of compliance of materials with drawing, specification, and project plan requirements such as bituminous or concrete materials shall be executed in four copies. Each certificate shall be signed by an official authorized to certify on behalf of the manufacturing or testing company and shall contain the name and address of the manufacturer or testing company, the project name and location, and the quantity and data or dates of shipment or delivery to which the certificates apply. Copies of laboratory test reports submitted with certificates shall contain the name and address of the testing laboratory and the date or dates of the tests to which the report applies. Certification shall not be construed as relieving the Subcontractor from furnishing satisfactory material, if, after tests are performed on selected samples, the material is found not to meet the specified requirements. Asphalt and concrete pavements shall be covered by warranty by the their respective Subcontractors for one year.

SECTION 01430
TESTING AND TESTING LABORATORY SERVICES

1.0 GENERAL

Any testing requested in the specifications that involves the services of a laboratory shall be performed by an independent commercial testing laboratory acceptable to the Contractor. The laboratory shall be staffed with experienced technicians, properly equipped, and fully qualified to perform the tests in accordance with the specified standards. The laboratory shall be qualified in accordance with Sections 4.0 and 8.0 of the Work Plan and Field Sampling Analysis Plan.

The Contractor shall be responsible for all testing laboratory services, and shall pay all costs for services. Testing related to asphalt and concrete mix designs will be paid for by the Subcontractor to fulfill the requirements of the submittal procedure.

2.0 SUBMITTALS

The Subcontractor shall submit written reports of tests performed in accordance with Section 1300 - Submittals.

The testing laboratory retained by the Contractor shall furnish four copies of a written report of each test performed by laboratory personnel in the field or laboratory. These copies shall be transmitted to the Contractor within three days of when the test is completed.

SECTION 02060
DEMOLITION

1.0 GENERAL

This Work includes demolition and removal of material from the following types of areas:

- Oil/water separators, waste oil tanks and associated piping
- Parking pavements
- Sidewalks

The locations of oil/water separators, waste oil tanks and piping to be removed are shown on the figures included in the Work Plan.

All demolished materials, asphalt pavement, and broken concrete resulting from the demolition work shall be visually evaluated for contamination and shall be hauled to the on-site landfill for disposal. If the material has the visual appearance of being contaminated, it shall be stored, tested, and disposed of in accordance with Sections 4.0, 8.0 and 5.0 of the Workplan, respectively.

The Contractor shall protect the existing utilities and appurtenances and shall repair any damages. The Contractor is cautioned to exercise great care in protecting existing structures and adjacent property while proceeding with work. All damages shall be repaired at once.

As deemed necessary by the Contractor, a berm shall be constructed around each excavation to prevent unnecessary surface water runoff from entering the excavation. If water is present in the excavation, the water must be removed from the excavation prior to commencing work. If contamination was encountered in the excavation, the water must be drummed and sampled.

2.0 MATERIALS

The Contractor shall furnish all materials and equipment necessary to perform the Work. Proper equipment shall be selected and used to minimize disturbance and damage to areas not slated for demolition.

3.0 EXECUTION

The Contractor shall execute all demolition work in a careful, orderly manner.
The Contractor shall maintain the work areas free from excess dust to such reasonable degree as to avoid causing a hazard or nuisance to the Base personnel. Dust control shall be performed as the work proceeds and whenever a potential for dust nuisance or hazard exists.

Contaminated soil stockpiles will need to be covered with plastic and the plastic properly anchored with sand bags to avoid dispersion of the soil during windy conditions.

SECTION 02200
EARTHWORK

1.0 GENERAL

This section covers earthwork operations involved in the removal of existing oil/water separators, waste oil tanks, and piping, installation of piping, and backfilling of excavations. The following earthwork operations are included in this section:

- Site Clearing and Preparation
- Excavation and Handling of Clean Material
- Excavation and Handling of Contaminated Material
- Grading
- Backfilling

2.0 MATERIALS

The Contractor shall furnish all materials and equipment necessary to perform the Work. Proper equipment shall be selected to remove and replace materials in accordance with the following sections.

3.0 EXECUTION

3.1 Site Clearing and Preparation

Areas at the locations of existing and new oil/water separators be completely cleared of all timber, brush, stumps, roots, grass, weeds, rubbish, concrete, asphalt, aggregate surfacing, and all other objectionable obstructions resting on or protruding through the surface of the ground. Clearing operations shall be conducted in a manner that prevents damage to existing structures and installations, those under construction, and provides for the safety of site personnel. Grubbing shall consist of the complete removal of all stumps, roots larger than 2 inches in diameter, matted roots, brush, and any other organic or structure, or equipment debris resting on, under, or protruding through the surface of the ground, to a depth of 18 inches and within the areas to be excavated as defined on the Figures in the Work Plan.

All material and debris, cleared, grubbed and removed by the clearing and grubbing operation shall be segregated and shall be stockpiled on-site as directed by the Contractor. No clearing and grubbing material or debris shall be used as backfill material.

The Contractor shall contact Holloman AFB personnel to field locate all existing utilities within the work zones and take all precautions to protect them during construction. If active

utility lines are encountered, necessary steps shall be taken to assure that any service interruption, if required, is kept to a minimum.

The Contractor shall maintain all work areas free from excess dust to such reasonable degree as to avoid causing a hazard or nuisance to others. Dust control shall be performed as the work proceeds and whenever a dust nuisance or hazard occurs. Contaminated soil stockpiles will need to be covered with plastic and the plastic properly anchored with sand bags to avoid dispersion of the soil during windy conditions.

All material resulting from clearing and grubbing activities shall be visually inspected for contamination and shall be hauled to an off-site landfill for disposal. If the material has the visual appearance of being contaminated, it shall be stored and disposed of in accordance with Sections 4.0 and 5.0 of the Workplan, respectively.

3.2 Excavation and Handling of Clean Material

All clean material excavated will remain in the staging area during excavation activities, at a temporary soil stockpile awaiting use for backfilling, or at a temporary soil stockpile awaiting on-site disposal.

Excavation will be performed in a manner that avoids damage to existing structures such as footings, concrete pads, existing utilities, etc.

Excavation of soils will cease when the groundwater is encountered and the extent of contaminated soil remaining in the excavation will be noted. The Base personnel will be notified and the excavation backfilled pending the approval of the Base personnel.

3.3 Excavation and Handling of Contaminated Material

In areas where contamination is expected, the Contractor shall perform the excavation in such a manner to prevent cross-contaminating of clean material and minimize equipment contamination. All material excavated from areas of suspected contamination shall be stockpiled in the staging areas, which will be located upgradient from the prominent direction of site drainage. Waterproof covers shall be utilized to cover the stockpile and effectively minimize precipitation infiltration as described in Section 4.0 of the Work Plan. All precautions shall be taken not to damage the liners during the entire course of the project. If the liner is damaged, the liner will be repaired immediately.

3.4 Grading

Final grading and surfacing shall be smooth, even, and free from clods and stones larger than two inches in greatest dimension, or other debris.

3.5 Backfilling

Soils placed in backfill operations shall be placed in layers not to exceed 16 inches in uncompacted thickness, and thoroughly compacted to 95 percent of the maximum density at optimum moisture content as determined by ASTM D698, standard proctor. If the material fails to meet the density specified, compaction methods shall be altered. No backfill, fill, or embankment materials shall be installed on frozen surfaces, nor shall frozen materials be placed in any backfill, fill, or embankment. All soft or otherwise unsuitable materials shall be removed and replaced with suitable material. Compaction by rolling will be permitted, provided the desired compaction is obtained and damage to adjacent structures is prevented. Compaction of materials by water inundation will not be permitted. No backfill shall be deposited or compacted in water.

The Contractor shall use hand methods and exercise care when compacting earth and aggregate backfill adjacent to the oil/water separators, buried piping, buildings and other structures.

The Contractor shall be responsible for all settlement of backfill, fills, and embankments which may occur within a period of one year after the project is accepted. The Contractor shall make all repairs or replacements necessary within 30 days after notice from the Base personnel.

4.0 SUBMITTALS

The Contractor shall submit all laboratory soil test and field compaction test reports in accordance with Section 01300 - Submittals. These reports will include preliminary review of materials, moisture-density (Proctor) tests, relative density tests, and all in-place field density tests.

SECTION 02205
SOIL MATERIALS

1.0 GENERAL

Soil materials intended for use as backfill shall meet the following specifications.

2.0 MATERIALS

All uncontaminated, excavated soil shall be reused to the maximum extent practical. Contaminated soil shall not be used for backfill material, nor shall clearing and grubbing material be used for backfill material. Additional soil materials required for backfilling shall be classified as fine-grained and similar in composition to the soil excavated, but free of obstacles larger than 6 inches in greatest dimension, debris, and organic material. The backfill must also be certified as being clean (without contamination) and free of swelling clays. If approved by Base personnel, a self-compacting material may be substituted in areas not adjacent to buildings or other structures where repaving is not required.

3.0 EXECUTION

The placement of soil is described in Section 02200 - Earthwork.

SECTION 02207
AGGREGATE MATERIALS

1.0 GENERAL

This section covers aggregate materials placed as base course under areas to be paved with asphalt or concrete and as pipe bedding.

2.0 MATERIALS

The source of materials shall be acceptable to the Contractor. The aggregate materials shall conform to the following table.

AGGREGATE MATERIALS

APPLICATIONS	AGGREGATE SPECIFICATION
Aggregate Base Course Layer under Pavement Sections	NMDOT Class I-B Aggregate Base Course
Pipe Bedding Material	Pea Gravel

NMDOT CLASS I-B GRADATION

Sieve Size	Total Percent Passing by Weight
1 inch	100
3/4 inch	80-100
No. 4	30-60
No. 10	20-45
No. 200	3-10
FF	$\geq$ 50%

FF Fractured Faces

PEA GRAVEL GRADATION

Sieve Size	Total Percent Passing by Weight
3/8 inch	100
No. 200	0-5

3.0 EXECUTION

Aggregate material shall be stockpiled prior to placement in such a manner to prevent particle size segregation and unnecessary material loss. Aggregate material shall be placed and tested in the same manner as the soils discussed in Section 02200 - Earthwork.

4.0 SUBMITTALS

The Subcontractor shall submit all laboratory gradation test and field compaction test reports in accordance with Section 01300 - Submittals. These reports will include preliminary review of materials, moisture-density (Proctor) tests, relative density tests, and all in-place density tests.

SECTION 02510
CONCRETE PAVEMENT, SIDEWALKS, CURBS, AND GUTTERS

1.0 GENERAL

This section covers the construction of concrete pavement, sidewalks, curbs, and gutters. All construction location and types shall be constructed to the lines and grades as indicated on the drawings.

2.0 MATERIALS

Equipment and facilities for storage, measuring, mixing, transporting, spreading, compacting, and other operations shall be in accordance with Section 03300. Paving machines shall be used and equipped with automatic screed controls and traveling string lines and/or sensing devices riding on previously placed pavement. All equipment and facilities shall be acceptable to the Contractor.

The sources of materials shall be acceptable to the Contractor. All Materials shall conform with the specifications of Section 03300.

3.0 EXECUTION

Concrete shall not be placed where the air temperature at the time of placement or the anticipated temperature temperatures for the following 24 hours is lower than 40 ^{0}F or higher than 100 ^{0}F. No concrete shall be placed when the underlying surface is muddy, has frost, or water thereon. When the temperature is anticipated to be less than 40 degrees, concrete placement methods shall be modified in accordance with ACI 306. If temperatures exceed 100 ^{0}F, hot weather placement procedures will need to be followed as specified in Section 03300.

All subgrade areas shall be firm, dense, and thoroughly compacted and consolidated.

All field tests to determine moisture content, compaction, density, slump, and amount of entrained air of the materials used will be made by and at the expense of the Subcontractor.

3.1 Concrete Pavement

Where new pavement abuts existing, the existing pavement shall be saw cut full depth for a smooth, regular edge that new pavement in-fill or new adjoining areas create a new straight line with no feathering. Existing concrete pavement that is damaged during construction shall be saw cut and replaced.

3.2 Curbs and Gutters

The concrete pavement, sidewalks, and gutters shall be constructed to the lines and grades shown on the drawings. The pavement shall be constructed upon a compacted subgrade in accordance with NMDOT Specifications. All operations of the Subcontractor shall be such as will prevent any structure or adjacent concrete from being damaged or discolored. Any damage or discoloration shall be satisfactorily repaired and cleaned.

3.3 Sidewalks

Concrete walks shall be constructed to the width, thickness, and at the locations indicated on the drawings. Forms will be clean of all loose material prior to placement of concrete. Expansion joints shall be provided where walks abut a structure, at changes in directions, and at intervals of not more than 50 feet. Except where otherwise shown, expansion joints shall be filled to within 3/4 inch of the surface with bituminous expansion joint material and then filled flush to the surface with urethane sealant. The joint sealing compound shall be finished slightly concave and not be allowed to overflow the joint. Concrete walks shall be edged and grooved with the grooves dividing each walk into equal length sections approximately equal to the width of the walk. Walks shall be floated smooth and even and given a light broom finish at the right angles to the length of the walk.

In addition to the requirements for protection set forth in the governing specifications, the Subcontractor shall protect all work covered in this specification so that no damage will occur as the result of subsequent construction operations. All damage or other irregularities shall be repaired to the satisfaction of the Contractor before the work will be accepted.

4.0 SUBMITTALS

Delivery tickets for all concrete and aggregate materials delivered to the site shall be submitted to the Contractor at the end of each day during the progress of the work.

.

SECTION 02520
BITUMINOUS PAVING

1.0 GENERAL

This section covers bituminous paving. All construction location and types shall be performed as indicated on the drawings.

All subgrade areas shall be firm, dense, and thoroughly compacted and consolidated. Before any aggregate base or surfacing materials are placed, the subgrade shall be leveled to the grades and elevations shown on the drawings and proof-rolled to determine if any soft spots exist. The subgrade shall be proof-rolled with a loaded dump or water truck or other equipment acceptable to the Contractor. Any soft spots or unacceptable material shall be removed and replaced with base course material and compacted to 95 percent of the maximum density at optimum moisture content as determined by ASTM D698, standard proctor. All excavated materials shall be tested, handled, and disposed of in accordance with the Workplan. The entire subgrade shall be proof-rolled again until no additional unstable areas are encountered.

Any material used to raise grade under the area to be paved shall be placed in horizontal layers not exceeding 16 inches in uncompacted thickness. Material deposited in piles or windrows by excavating and hauling equipment shall be spread and leveled prior to compaction. Each layer shall be thoroughly compacted to 95 percent of the maximum density at optimum moisture content as determined by ASTM D698, standard proctor. If the material fails to meet the density specified, compaction methods shall be altered. The subcontractor shall exercise care when compacting material near any existing concrete construction.

All materials, equipment, details, and construction methods shall comply with the applicable provisions of the various sections of the New Mexico Department of Highways "Standard Specifications for Highway and Bridge Construction", latest edition (Sections 401 and 402). In case of conflict between this section and the governing specifications, the requirements of this section shall be met. All references in the governing specifications to separate measurement and payment on a unit price basis shall be disregarded, and all costs in connection with the work to be performed under this section shall be included in the vendor's lump sum contract price.

2.0 MATERIALS

Equipment and facilities for storage, measuring, mixing, heating, transporting, spreading, compacting, and other operations shall be in accordance with the applicable requirement of the governing specifications. Paving machines shall be equipped with automatic screed controls and traveling string lines and/or sensing devices riding on previously placed pavement. All equipment and facilities shall be acceptable to the Contractor.

The sources of materials shall be acceptable to the Contractor. Materials shall conform to the following and to the requirements of the referenced sections of the governing specifications.

	Project Specification Section	NMDOT Specification Section	ASTM Specification
Aggregate Base Course[1]	02207	304 Class I-B	
Bituminous Materials[1]	02520	401 Class B	
Viscosity Grade of Bituminous Material	02520	402 AC-20	
Expansion Joint Filler			D1751
Hot Poured Joint Sealing Compound for Bituminous Pavement			D1190

[1]Aggregate Base Course is discussed in Section 02207 of the Specifications in Appendix D.

GRADATION REQUIREMENTS FOR BITUMINOUS PAVEMENT AGGREGATE

Sieve Size	Percent Passing for Class B
3/4 inch	100
1/2 inch	80-98
3/8 inch	70-90
No. 4	50-65
No. 10	32-45
No. 40	10-22
No. 200	3-8

3.0 EXECUTION

3.1 Submittals

The submittals will be conducted in accordance with Section 01300-Submittals of the specifications in Appendix D.

The submittal for bituminous materials will include the following:

- The name and address of the testing organization and the person responsible for the testing.
- The specific location(s) of the source(s) of aggregate and blending sand.
- The supplier, refinery and type of asphalt cement, and the source and type of mineral filler and the percentage of each to be used.
- The mineral aggregate gradation in each stockpile.
- The proposed mix design gradation.
- The results of all testing, determinations, etc. such as: Specific gravity of each component, water absorption, sand equivalent, loss on abrasion (LA Wear), soundness loss, fractured

faces, immersion compression results, Marshall Stability and flow, asphalt absorption, percent air voids, voids in mineral aggregate, and bulk density.
- A quality control plan in accordance with New Mexico Highway Department procedures.
- Copies of quality control test data representing the last three months of production from the plant.

3.2 Testing

No in field testing will be performed on the bituminous pavement per James Hendricks request. Testing will only be performed on materials to fulfill the requirements of the submittal.

3.3 Asphalt Placement Requirements

Minimum temperature under which bituminous pavement may be constructed is 45^0F or 35 ^{0}F, including wind chill factor. No materials shall be placed when the underlying surface is muddy, has frost, or water thereon.

All field tests to determine moisture content, compaction, and density of the materials used will be made by Contractor.

Bituminous pavements shall be installed at the locations and dimensions indicated on the drawings.

Delivery tickets for all materials delivered to the site shall be submitted to the Contractor at the end of each day during the progress of the work.

In addition to the requirements for protection set forth in the governing specifications, the Subcontractor shall protect all work covered in this specification so that no damage will occur as the result of subsequent construction operations. All damage or other irregularities shall be repaired to the satisfaction of the Contractor before the work will be accepted.

The pavement shall be constructed to the lines and grades shown on the drawings. The pavement shall be constructed upon a compacted subgrade in accordance with NMDOT Specifications (Sections 401 and 402). All operations of the Subcontractor shall be such as will prevent any structure or adjacent concrete from being damaged or discolored. Any damage or discoloration shall be satisfactorily repaired and cleaned.

Immediately after the bituminous mixture has been spread, struck-off and surface irregularities adjusted, it shall be thoroughly and uniformly compacted.

Rollers shall be operated at speeds less than 3 mph and slow enough to minimize displacement of the bituminous mixture. The use of equipment which results in excessive crushing of aggregates will not be permitted. Either a steel faced drum roller or pneumatic tire compactor will be adequate for performing asphalt compaction. The steel drums or tires must me kept moist with water to prevent adhesion of asphalt.

Any displacement occurring as a result of the reversing of the direction of a roller, or from other causes, shall be corrected immediately by the use of rakes and addition of fresh bituminous mixture when required.

Where new pavement abuts existing pavement, the existing pavement shall be saw cut full depth for a smooth, regular edge that new pavement in-fill or new adjoining areas create a new straight line with no feathering. A tack coat sealant (Type SS-1 or CSS-1) will be used to treat the contact surfaces between existing bituminous or concrete pavement and new bituminous pavement to prevent infiltration of water. Existing bituminous or concrete pavement that is damaged during construction shall be saw cut and replaced.

SECTION 03300
CAST-IN-PLACE CONCRETE

1.0 GENERAL

This section covers all cast-in-place concrete for sidewalks and pavement replacement, and oil/water separator installation, including reinforcing steel, forms, finishing, curing, and other appurtenant work. This section also includes ready mixed flowable fill.

All cast-in-place concrete shall be accurately formed and properly placed and finished as indicated on the drawings and specified in this specification. All submittals of data and drawings shall be in accordance with the submittals section unless otherwise noted herein.

2.0 MATERIALS

All cast-in-place materials shall conform to the standards and specifications presented in the following tables.

Cement	ASTM C150, Type I or II.
Fly Ash	ASTM C618, Class F, except loss on ignition shall not exceed 4 percent.
Fine Aggregate	Clean natural sand, ASTM C33. Artificial or manufactured sand will not be acceptable.
Coarse Aggregate	Crushed rock, washed gravel, or other inert granular material conforming to ASTM C33
Water	Clean and free from deleterious substances
Retarder	ASTM C494, Type D, nonair-entraining solution of metallic salts of hydroxylated carboxylic acids
Plasticizer	ASTM C494, Type A, nonair-entraining solution of metallic salts of hydroxylated carboxylic acids
Air-Entraining Agent	ASTM C260
Reinforcing Steel	ASTM A615, Grade 60, deformed
Welded Wire Fabric	ASTM A185 or A497
Membrane Curing Compound	Fed Spec TT-C-800, Type I, Class 1; min 18 percent solids; non-yellowing; unit moisture loss

2.2 Testing

All tests and reports required for preliminary review shall be made by an independent testing laboratory at the expense of the Subcontractor. Reports covering the source and quality of concrete materials and the concrete proportions proposed for the work shall be submitted to the contractor for review before concrete work is started.

2.3 Mix Design

Using concrete materials acceptable to the Contractor, a tentative concrete mixes for cast-in-place concrete and flowable fill shall be submitted to the Contractor for review.

The report for each tentative concrete mix submitted shall contain the following information:

- Slump on which design is based
- Total gallons of water per cubic yard
- Brand, type, composition, and quantity of cement
- Brand, type, composition, and quantity of fly ash
- Specific gravity and gradation of each aggregate
- Weight (surface dry) of each aggregate per cubic yard
- Brand, type, ASTM designation, active chemical ingredients, and quantity of each admixture
- Air content
- Compressive strength based on 7-day and 28-day compression tests
- Time of initial set

3.0 TESTING

The following tests shall be performed on the proposed concrete mix.

- Aggregates shall be sampled and tested in accordance with ASTM C33.
- Two sets of compression test cylinders, three cylinders per set, shall be made from the proposed concrete mix. One set of three cylinders shall be tested at an age of 7 days and the other set shall be tested at an age of 28 days. Concrete test specimens shall be made, cured, and stored in conformity with ASTM C192 and tested in conformity with ASTM C39.
- Slump shall be determined in accordance with ASTM C143
- Total air content shall be determined in conformity with ASTM C231.
- Initial set tests shall be made at ambient temperatures of 70^0F and 90^0F to determine compliance with the initial set time specified herein. The test at 70^0F shall be made using concrete containing the specified plasticizing and air-entraining admixtures. The

test at 90^0F shall be made using concrete containing the specified retarding and air-entraining admixtures. Initial set shall be determined in accordance with ASTM C403.

4.0 CAST-IN-PLACE CONCRETE LIMITING REQUIREMENTS

The quantity of portland cement, expressed in pounds per cubic yard, shall be as indicated in the following table.

CAST-IN-PLACE CONCRETE PORTLAND CEMENT QUANTITY

	Coarse Aggregate Size from No. 4 Sieve to		
Concrete Slump (in.)	1/2"	3/4"	1"
2	573	545	517
3	592	564	536
4	611	583	555
5	630	602	573
6	649	620	592

In addition, the concrete mix shall meet the following additional limiting requirements.

CAST-IN-PLACE CONCRETE LIMITING REQUIREMENTS

Total Water Content	Shall not exceed 5.7 gallons of water per hundred pounds of cement in the mix, or equivalent cement weight if fly ash is added
Slump	Slump shall not exceed 4 inches
Initial Set	5-1/2 hours plus or minus one hour after the water and cement are added to the aggregates per ASTM C403
Total Air Content	6 percent plus or minus one percent.
Admixtures	A water-reducing admixture shall be included in all concrete

The minimum acceptable compressive strengths as determined by ASTM C39 shall be:

CAST-IN-PLACE CONCRETE MINIMUM COMPRESSIVE STRENGTHS

Age (days)	Minimum Strength (psi)
7	2,500
28	3,750

5.0 REINFORCEMENTS

Reinforcements shall be accurately formed and shall be free from loose rust, scale, and contaminants which reduce bond. Unless otherwise indicated on the drawings or specified herein, the details of fabrication shall conform to ACI 315 and 318.

Splices shall conform to the details indicated on the drawings. Splices at locations other than those indicated on the drawings shall be acceptable to the Contractor.

6.0 BATCHING AND MIXING

Concrete shall be furnished by an acceptable ready-mixed concrete supplier and shall conform to ASTM C94.

A delivery ticket shall be prepared for each load of ready-mixed concrete and flowable fill. A copy of each ticket shall be handed to the Contractor by the truck operator at the time of delivery. Tickets shall show the mix identification, quantity delivered, the amount of each material in the batch, the outdoor temperature in the shade, the time at which the cement was added, and the numerical sequence of the delivery.

7.0 EXECUTION

The surface of hardened concrete upon which fresh concrete is to be placed shall be rough, clean, sound, and damp. The hardened surface shall be cleaned of all laitance, foreign substances (including curing compound), washed with clean water, and wetted thoroughly preceding placement of fresh concrete.

Except as modified herein, hot weather concreting shall comply with ACI 305. At air temperatures of 90°F or above, concrete shall be kept as cool as possible during placement and curing. The temperature of the concrete when placed in the work shall not exceed 90°F.

Plastic shrinkage cracking, due to rapid evaporation of moisture, shall be prevented. Concrete shall not be placed when the evaporation rate (actual or anticipated) equals or exceeds 0.2 pound per square foot per hour, as determined by Figure 2.1.5 in ACI 305.

8.0 TESTING

The Subcontractor or laboratory personnel shall perform the following field control tests.

Test	Test Frequency	Test Standard
Slump	Each 25 cubic yards of concrete or one test per day minimum	ASTM C143
Air Content	One of the first three batches mixed each day	ASTM C231
Compression Tests	Two sets of four concrete compression test cylinders shall be made each day when concrete is placed. Two cylinders of each set shall be tested at an age of 7 days and the other cylinders shall be tested at an age of 28 days	ACI 214 and 318

Testing of concrete will not be required for sidewalk repair; however, the Subcontractor will be required to warranty the construction for a period of one year and provide testing information on previous work conducted with the specified mix design. Test reports shall be prepared in three copies and shall be distributed by the testing laboratory directly to the Contractor.

9.0 CURING

Concrete shall be protected from loss of moisture for at least seven days after placement. Film curing will not be allowed

10.0 REPAIRING DEFECTIVE CONCRETE

Defects in formed concrete surfaces shall be repaired within 24 hours, to the satisfaction of the Contractor, and defective concrete shall be replaced within 48 hours after the adjacent forms have been removed. All concrete which is honeycombed or otherwise defective shall be cut out and removed to sound concrete, with edges square cut to avoid feathering.

Concrete repair work shall conform to Chapter 9 of ACI 301 and shall be performed in a manner that will not interfere with thorough curing of surrounding concrete. Repair work shall be adequately cured.

Tie holes in all formed surfaces shall be cleaned, wetted, and filled with patching mortar. Tie hole patches shall be finished flush and shall match the texture of the adjacent concrete.

11.0 DATA TO BE SUBMITTED

The Subcontractor shall submit the following in accordance with Section 01300 - Submittals:

1. Concrete mix design reports
2. Report of tests made on proposed mix design samples
3. Copies of test reports from concrete on placed on project

SECTION 15020
PIPES AND PIPE FITTINGS

1.0 GENERAL

The Contractor shall supply and provide all materials, installation, and as specified in this section and/or on the drawings for complete installation and proper operation of all pipes and fittings.

This section covers the requirements for the functional design, performance, materials, construction features, testing, quality and handling of the equipment described herein.

Pipes and fittings shall be supplied for the following services and locations.

Pipe Type	Service	Location
Cast iron pipe	Vent service	Above and below grade
Cast iron pipe	Gravity flow service	Buried under structures
PVC pipe	Gravity flow service	Buried
Corrugated Steel Pipe	Oil/Water Separator Access	Buried

2.0 MATERIALS

All piping materials shall meet the following requirements.

Piping	Class	Joints	Coatings	Specification
Cast iron soil pipe		Hub and spigot with compression gaskets	Medium Consistency Coal Tar	ASTM A74
PVC pipe	Sch 40	Bell and spigot push on type per ASTM D3212	N/A	ASTM D3034
Corrugated Steel Pipe	Sch 40	N/A	Galvanized	ASTM A760

Field-cut joints and connections to other piping materials shall be made with French "Flexible Couplings" or Mission "Eastern Standard Band-Seal Couplings", with stainless steel shear rings, or Contractor approved equal. All cast iron pipe fittings shall be installed complete with a 32 lb magnesium sacrificial anode connected by an exothermic weld through a No. 12 AWG copper wire.

Manhole connection gaskets shall be include manhole waterstop gasket, stainless steel clamp, and assembly as recommended by the pipe manufacturer.

All materials supplied including gaskets and fasteners shall be compatible with water containing variable concentrations of petroleum products.

3.0 EXECUTION

All equipment shall be properly and securely installed such that undue stresses are not exerted on equipment and connections. All pipes and fittings shall be installed true to alignment, rigidly supported and fitted accurately.

Bolts should be tightened using proper bolt torque as recommended by the manufacturer. Threads must be clean and well lubricated and washers should be used to ensure correct torque. Bolts should be tightened alternatively and evenly.

Mechanical joint pipes and fittings shall be joined in accordance with Section 9b of the AWWA Standard C600, latest edition, and also in accordance with the "Notes on Method of Installation" included at the end of ANSI Specification A21.11, 1972.

3.1 Testing and Inspections

All gravity service piping shall be subjected to low pressure air testing in accordance with ASTM C828. The time elapsed for a one psi drop in air pressure shall not be less than 5 minutes. Leaks shall be located by testing short sections of pipe. Leaks shall be repaired and the reach of gravity pipe retested.

4.0 SUBMITTALS

The Contractor shall submit information on all of the piping and accessories to be installed on the project including connections and gasketing materials.