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REMEDIATION WORK PLAN FOR THE CHEVALIER FIELD, NAVAL AIR STATION PENSACOLA, FLORIDA

N00204.AR.000775
NAS PENSACOLA
5090.3a

DELIVERY ORDER 0006, TASK 1, SITE 2662W
and
DELIVERY ORDERS 0006 AND 0017, TASK 2
PSC 36, CATEGORY VIII, BUILDING 3380

Prepared for
DEPARTMENT OF THE NAVY
SOUTHERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
Under Contract No. N62467-93-D-0936

Prepared by
BECHTEL ENVIRONMENTAL, INC.
OAK RIDGE, TENNESSEE



Bechtel Job No. 22567



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PENSACOLA DELIVERY ORDER 0006, TASK 1
SITE 2662W

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SEPTEMBER 1994

REVISION 0

Bechtel Job No. 22567

Prepared:



Senior Scientist

9/26/94
Date

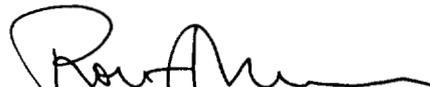
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Project Manager

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Navy Contracting Officer

9-28-94
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ACRONYMS AND INITIALISMS

ABB-ES	ABB Environmental Services, Inc.
ARAR	Applicable or Relevant and Appropriate Requirements
AVGAS	Aviation Gasoline
BEI	Bechtel Environmental, Inc.
BLS	Below Land Surface
BRAC	Base Realignment And Closure
CFR	Code of Federal Regulations
CS	Confirmation Study
ECB SOPQAM	Environmental Compliance Branch Standard Operating Procedures and Quality Assurance Manual (US EPA)
E/A&H	EnSafe/Allen & Hoshall
F	fahrenheit
FDEP	Florida Department of Environmental Protection
FFA	Federal Facilities Agreement
FID	Flame ionizing detector
GC	Gas Chromatograph
IAS	Initial assessment study
IR	Installation Restoration
IRA	Initial Remedial Action
IW	Industrial Waste
NADEP	Naval Aviation Depot
NIRP	Navy Installation Restoration Program
OU	Operable unit
PAH	Polyaromatic Hydrocarbon
PCB	Polychlorinated biphenyls
POTW	Publicly owned treatment works
ppb	Parts per billion
PSC	Possible source of contamination
PSHP	Program Safety and Health Plan
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
RI/RA	Remedial Investigation/Risk Assessment
ROICC	Resident Officer In Charge of Construction
RWP	Remediation work plan
SMP	Site Management Plan
SOP	Standard operating procedure
SOUTHNAVFACENGCOM	Southern Division, Naval Facilities Engineering Command
SSHP	Site Safety and Health Plan
SVOC	Semi-volatile organic compound
TRPH	Total Recoverable Petroleum Hydrocarbons
UST	Underground Storage Tank
VS	Verification Study
VOA	Volatile organic aromatics
VOC	Volatile organic compound

FOREWORD

This Remediation Work Plan (RWP) has been prepared to describe the scoping and planning for Initial Remedial Action activities being performed by the **U.S.** Navy at Chevalier Field, Naval Air Station (**NAS**) Pensacola, Escambia County, Florida. **NAS** Pensacola is on the National Priorities List, and a negotiated, signed Federal Facilities Agreement (FFA) is in place for the site.

Three major environmental investigations have been conducted under the Navy's Installation Restoration Program (NIRP) to support the decision-making process for evaluating interim measures and remedial action alternatives at NAS Pensacola. The three investigations **are**: (1) the Initial Assessment Study (IAS); (2) the Verification Study (VS); and (3) the Confirmation Study (**CS**).

The **FFA** for **NAS** Pensacola requires a Site Management Plan (**SMP**) to be submitted annually. The SMP includes a schedule for the Potential Sources of Contamination (PSC) Installation Restoration (IR) Program, which describes the disposition of the 42 **PSCs** that have been identified at **NAS** Pensacola. A separate Underground Storage **Tank** (UST) Program has been established for NAS Pensacola under the Florida Administrative Code, Section 17-770, for investigation and remediation of above ground and underground storage tanks and related piping systems.

Remedial action is necessary in selected areas of possible source of contamination (PSC) and UST sites for the protection of human health and the environment. This RWP describes the approach that will be used to conduct initial remedial action at Site 2662W under the UST **Program**.

1.0 INTRODUCTION

The U.S. Navy is conducting environmental programs at NAS Pensacola, Florida, through the Southern Division, Naval Facilities Engineering Command (SOUTHNAVFACENGCOM), and has adopted the format of the Installation Restoration (IR) program, an environmental program conducted at military installations nationwide to address areas of potential sources of contamination (PSC) from past operations. A separate UST program addresses sites related to petroleum USTs. The purpose of the program is to define these areas and remediate them to current acceptable standards. Bechtel Environmental, Inc. (Bechtel), the Environmental Response Action Contractor, will perform interim remedial action (IRA) and remedial action on selected PSC and UST Program sites.

This Remediation Work Plan (RWP) documents the scope of the remediation effort and the procedures to be used to perform an IRA at Site 2662W, Chevalier Field, NAS Pensacola, Florida, under the UST Program. This RWP has been prepared by Bechtel for Southern Division, Naval Facilities Engineering Command, under contract N00204 4019-01C/02C.

The activities described in this Plan are based on the following:

- The Contamination Assessment Report, Site 2662W, Naval Aviation Depot, Naval Air Station, Pensacola, Florida, April 1994, Final Draft.
- The Initial Remedial Action Technical Memorandum for Site 2662W, Naval Aviation Depot, NAS Pensacola, Florida, as prepared by ABB, dated June 1994.
- The Pre-Construction Investigation, Chevalier Field, NAS Pensacola, Pensacola, Florida, as prepared by Ecology and Environment, Inc., dated January 1994.
- The Approval of Alternate Procedures Order for Naval Aviation Depot Site 2662W Naval Air Station, Pensacola, issued by FDEP dated 13 June, 1994.
- The Statement of Work dated 19 May, 1994 describing Site 2662W at NAS Pensacola issued by NAVFAC to Bechtel.
- The Statement of Work dated 18 July, 1994 describing the addition of the Building 607 site at NAS Pensacola to the scope of this task, issued by NAVFAC to Bechtel on 20 July, 1994.
- Observations made during a site visit by Bechtel, ABB, and Navy personnel to NAS Pensacola on 21 and 22 June, 1994.
- Discussion and conclusions from a site visit on 25-28 July, 1994, by Bechtel and SOUTHDIV personnel at NAS Pensacola.

Bechtel will supply qualified personnel and equipment to the project; coordinate, manage, and supervise construction activities onsite, and ensure compliance with contract and regulatory requirements. Documentation provided to the Navy will include a summary of the services provided and a project completion summary for each of the sites where work is performed. The approach to complete these tasks is presented in the following sections of this Plan.

1.1 GENERAL SITE INFORMATION

NAS Pensacola is located in Escambia County in the panhandle region of the state of Florida as shown in Figure 1-1. Chevalier Field is located on about 190 acres on the eastern edge of NAS Pensacola, and has been used as a Naval Aviation Depot (NADEP) facility, primarily for helicopter testing and maintenance. This facility is scheduled for closure under the Base Realignment and Closure (BRAC) Act of 1993. Operations at this facility will end on or about 1 September, 1994, and construction of a technical training complex is scheduled to begin on this site in January 1995. All remediation activities related to this scope of work are intended to be completed by 16 December, 1994.

Site 2662W consists of a contaminated soil plume at the former location of a 1,000 gallon underground storage tank (UST), a smaller plume of petroleum contaminated soil that may be related to other underground pipelines in the area, and a petroleum hydrocarbon plume near Building 607. The UST was for storage of used oil and contaminated fuel, and was removed during the tank removal program in 1989 and 1990. The smaller plume is near an abandoned aviation gasoline (AVGAS) pipeline valve pit in this area, and the active bilge waste water pipeline that runs through this area to the waste treatment plant. The plume identified near Building 607 on the southern perimeter of Chevalier Field may also be related to the AVGAS pipeline. These areas of highly contaminated soil have been identified for remediation under the NAS Pensacola UST Program.

1.2 JUSTIFICATION AND OBJECTIVES FOR THE PROPOSED ACTION

The primary threat to human health and the environment associated with Site 2662W is related to the potential for contamination of the groundwater from high levels of petroleum hydrocarbons adsorbed to surface and vadose zone soil in the vicinity of the former UST and the abandoned AVGAS pipeline and valve pit. Groundwater contamination from these sources appears to be moving toward Pensacola Bay, but there is no evidence of contamination from these sources having migrated off the facility. The goal of the IRA is reduction of the soil contamination by excavation and thermal treatment of the contaminated soil according to criteria set forth in Florida Administrative Code (FAC) Chapter 17-775. Soil from the plumes will be treated separately. The treated soil will be returned to the excavations and compacted in preparation for future construction on the site.

2.0 ORGANIZATION AND RESPONSIBILITIES

2.1 PROJECT ORGANIZATION

Bechtel is the Environmental Response Action Contractor for the Southern Division Naval Facilities Engineering Command, Bechtel is teamed with General Engineering Laboratories (GEL), who will perform the analytical services required for NAS Pensacola. A project organization chart is provided in Figure 2-1.

2.2 COORDINATION AND RESPONSIBILITIES FOR FIELDWORK

As the Environmental Response Action Contractor for the Navy, Bechtel provides support to the implementation and management of remedial action field activities, which includes all activities

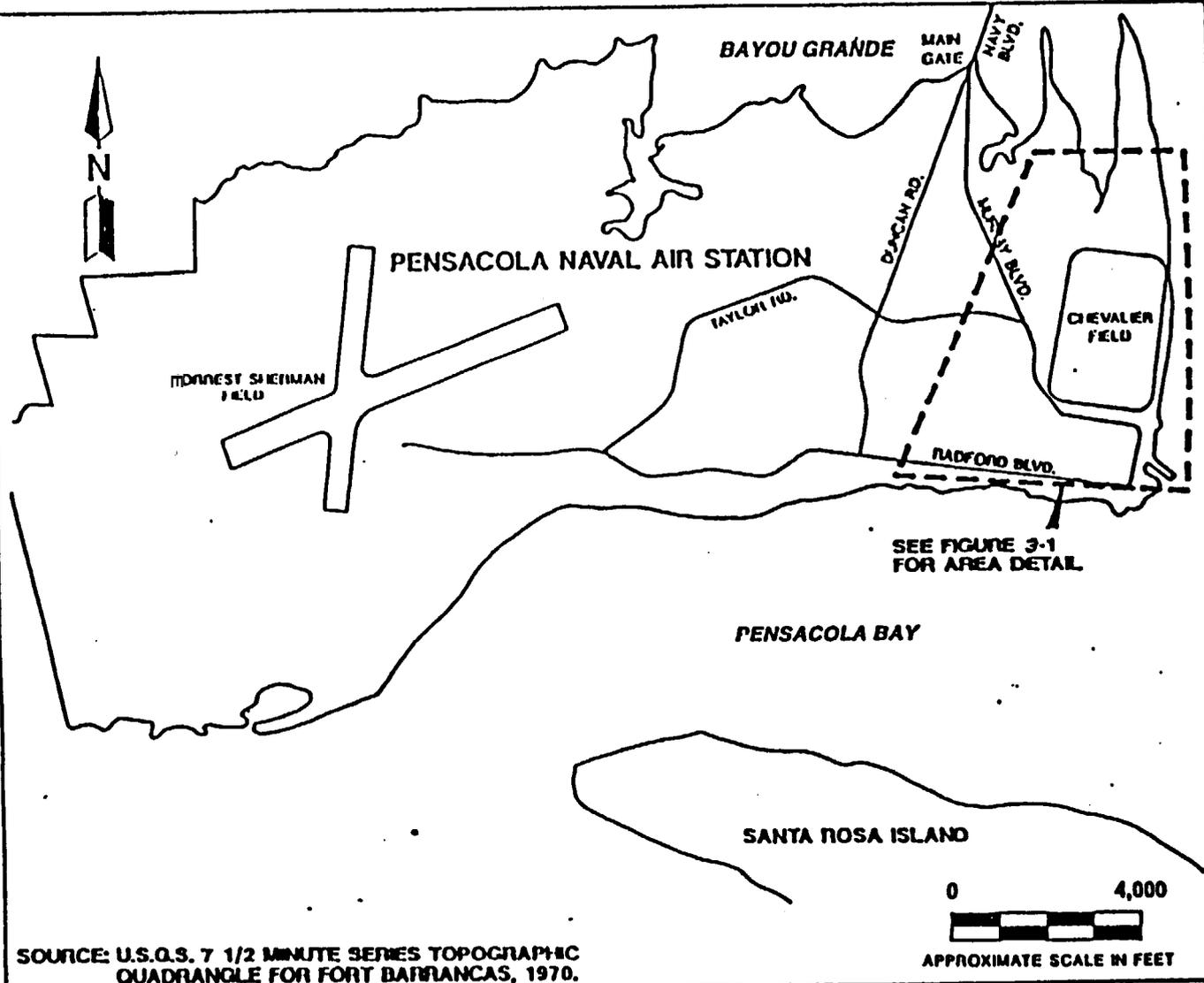
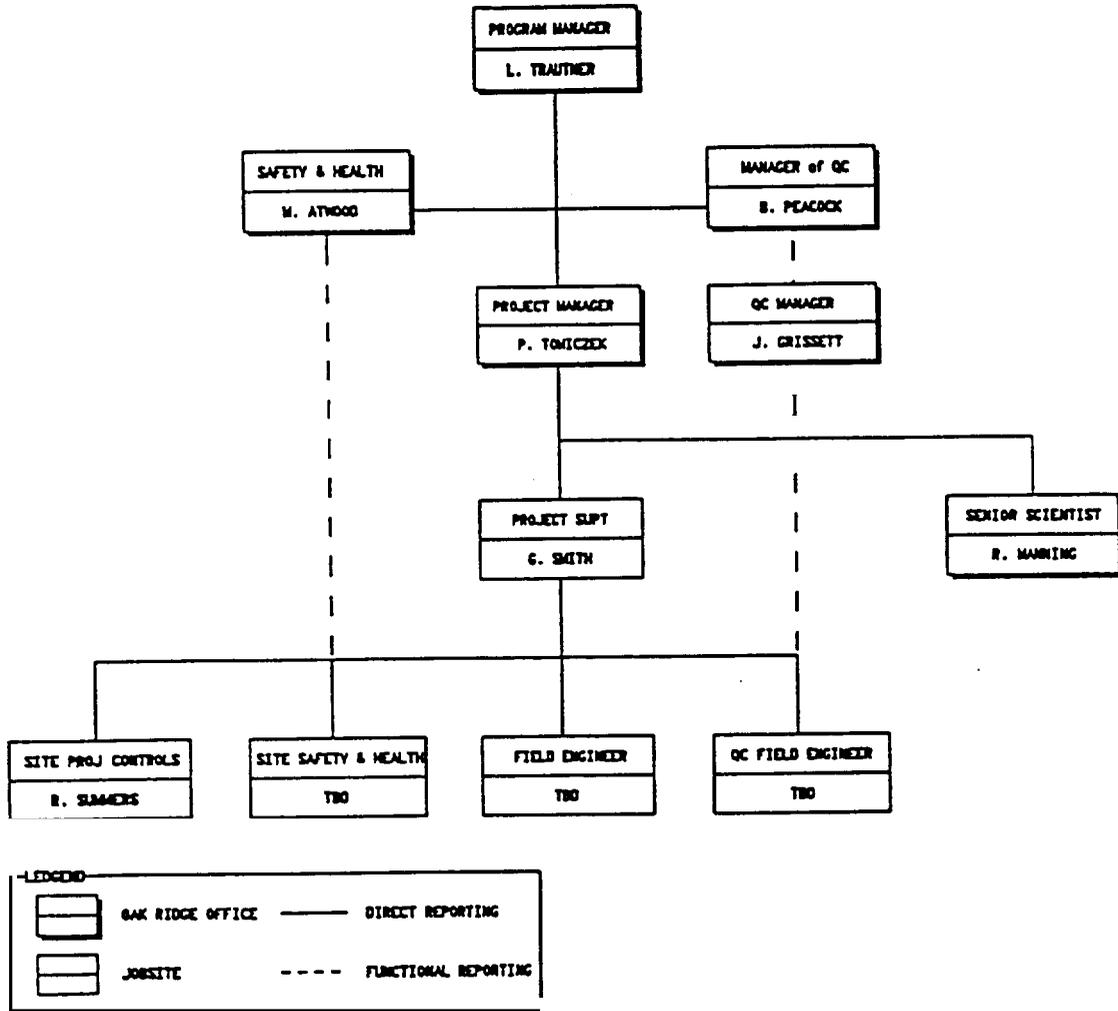


FIGURE 1-1
FACILITY LOCATION MAP

SOURCE: U.O.I. STATE OF FLORIDA, 1962





Organization Chart

necessary to implement field work delineated in the work plan. Typically, these activities include development and procurement of subcontract services; materials; development, implementation, and overview of work plans; collection and review of data, including sampling results, quality assurance/quality control submittals, and sample tracking and custody; technical guidance to onsite personnel; report preparation; cost management; and schedule control.

The Bechtel program manager is responsible to the Navy for the completion of all aspects of the work. The program manager is supported by a project manager **and** representatives from engineering, construction, environmental safety and health, contract administration, quality control, project administration, and project controls. **A** brief description of the responsibilities of the project manager and each group are described below.

2.2.1 Project Manager

- Implements overall guidance provided by the Bechtel program manager on a site-specific basis
- Manages a team of professionals from each of the disciplines described below to accomplish the goals of the Naval Facilities Engineering Command Southern Division project managers and the Bechtel program manager
- Interfaces directly with Navy project managers to implement directions on a site-specific basis

2.2.2 Engineering

- Develops bid packages and technical specifications needed to subcontract any remedial action work
- Provides site interface/coordination with regulatory agencies
- Modifies technical specifications and drawings, as required
- Provides geotechnical field support to remedial action efforts
- Provides onsite waste management and identification
- Participates in technology selection
- Develops work plans for remedial action
- Manages and evaluates chemical and radiological data obtained during remedial action activities

2.2.3 Project Superintendent

- Reviews all site plans for constructibility
- Provides field engineering services to monitor onsite work

- Administers subcontracts to complete work plans (i.e., cost, completion)
- Obtains manual craft
- Directs craft to implement work plans
- The project superintendent is responsible to the Bechtel project manager for day-to-day operations at the site.

2.2.4 Environmental Safety and Health

- Develops plans, objectives, evaluations, and documentation for all environmental compliance, safety, and health matters
- Ensures that all applicable federal, state, and local regulatory requirements are met
- Supports onsite waste management
- Provides site-specific safety and health training
- Provides a site safety and health representative (**SSHR**)
- Performs audits of site activities to ensure implementation of the Safety and Health Plan and to assess the effectiveness of the program.

2.2.5 Contract Administration

- Identifies bidders for subcontract work
- Coordinates bid and subcontract bid and award process
- Manages revisions to subcontracts
- Ensures compliance with Prime Contract

2.2.6 Quality Control

- Prepares site-specific quality control (QC) plan
- Implements the QC plan
- Audits quality assurance system and performance
- Conducts periodic reviews of program plans

2.2.7 Project Controls

- Provides cost and schedule support, including budgeting and monitoring
- Provides site automation services

2.2.8 Project Administration

- Provides administrative services such as document control, reproduction, archival, and mail distribution
- Provides document editing services

3.0 SITE BACKGROUND AND SETTING

3.1 GENERAL SITE DESCRIPTION

NAS Pensacola is an active facility in Escambia County in the northwest panhandle area of Florida. Chevalier Field is located on about 190 acres of the eastern edge of NAS Pensacola (Figure 3-1). In recent years, it has functioned as a NADEP used for repairs, maintenance, and testing of military helicopters. Located on the southeast corner of Chevalier Field, Site **2662W** includes the area around Building **2662**, a rigid frame steel building used as a hangar in which aircraft maintenance and repairs were performed. Also located in the area is Building **3380**, a rigid frame steel building used for the storage of hazardous waste contained in drums.

Adjacent to the northwest side of Building **2662** is a concrete helicopter maintenance and defueling pad, with a perimeter trench system (inner and outer peripheral concrete-lined trenches). The inner trench drains into the industrial waste (IW) system, and the outer trench drains into the oil/water separator which in turn drains the separated oil into the IW system. The clean water from the oil/water separator discharges via a permitted outfall into Pensacola Bay, about **250** yards to the east. A **UST** was previously located adjacent to Building **2662** under the defueling pad. Additional abandoned sewer lines and wastewater lines are located in the immediate vicinity, and an active underground bilge waste water pipeline runs from north to south along the eastern edge of the site.

An area of soil covered in a separate RWP described as "Task **2** Site **36**, Category VIII Building **3380**" under this Remedial Action Contract (RAC) program is located in the southeast corner of Site **2662W**, north of Building **3380**. This area of petroleum hydrocarbon contamination is being remediated separately as part of the IR program rather than the UST program because of the presence of solvent contamination in the underlying groundwater.

An abandoned AVGAS pipeline is located along the south and west perimeter of Chevalier Field, and is being remediated in the near future under two separate projects. One of these projects is described in a separate RWP for this site, described as "Task **2** AVGAS Pipeline" under a separate delivery order. The second AVGAS pipeline project involves removal of valve pits and valves along the pipeline by others, and is not a part of this RAC program.

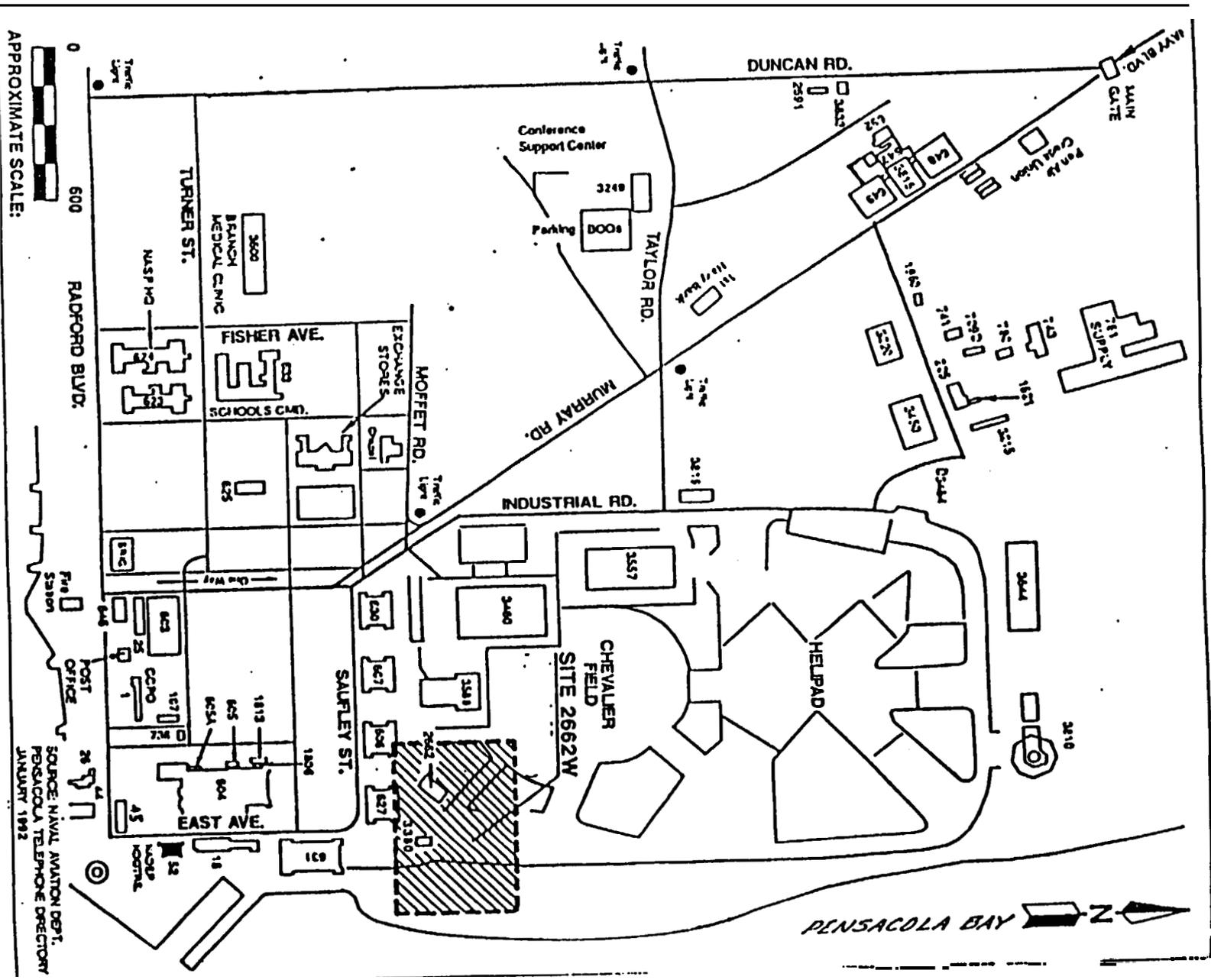


FIGURE 3-1
SITE LOCATION MAP

3.2 SITE HISTORY

The UST at Site **2662W** was installed in **1983**. It was used for storage of water-contaminated JP-5 jet fuel and used oil. The UST was located in a concrete paved area on the northwest side of Building **2662**, beneath a pad where helicopter defueling and maintenance operations were performed. The UST was removed during a tank removal program in **1989-1990**, at which time contaminated soil was discovered in the excavation. The contaminated soil was returned to the excavation with clean backfill and covered with a concrete pad to conform to the surrounding slab.

A contamination assessment (CA) was conducted by ABB Environmental Services, Inc. (ABB-ES) at the site from January **1992** through March **1994**. Soil contamination was assessed by organic vapor analyzer (OVA) headspace analysis of samples collected from ninety-five soil borings. During the CA free product was observed up to a maximum thickness of **0.1** foot in four wells in the vicinity of Building **2662**, but no free product was observed in any monitoring well during sampling conducted in the most recent phase, January through March **1994**. Two plumes were delineated indicating the 50 ppm Volatile Organic Compound (VOC) isoconcentration line, and the soil in these areas was identified for remediation in the Draft Initial Remedial Action Technical Memorandum (TM), Site **2662W** dated June, **1994** prepared by **ES**.

3.3 SITE 2662W ENVIRONMENTAL DESCRIPTION

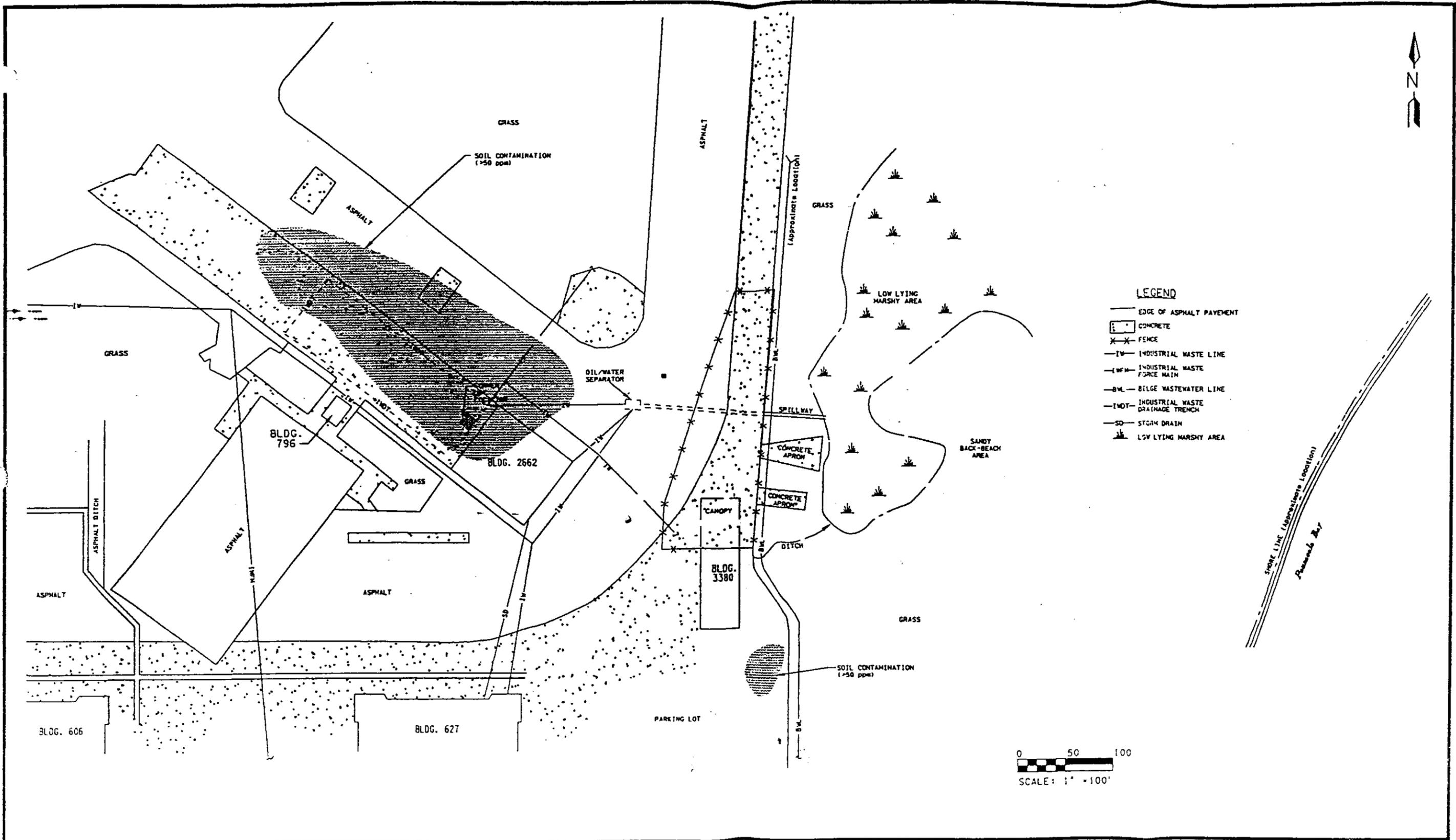
The areal extent of the petroleum hydrocarbon plumes (bounded by the > 50 ppm VOC isoconcentration line) described in the TM for Site **2662W** is shown in Figure **3-2**. The plume to the northwest of Building **2662** is approximately **400** feet by **150** feet, and partially underlies the building. The area is paved with concrete and asphalt. The plume to the southeast of Building **3380** is approximately **80** feet by **45** feet and is also lies beneath concrete. The local water table is reported to be **2** to **4** feet below land surface (BLS). The soil consists primarily of fine sand. Soil in the vicinity of Building **607** on Saufley Street (Figure **3-1**) is also reported to be highly contaminated and will be remediated as a part of the Task 1 IRA.

The IRA TM identifies approximately **5,827** cubic yards of highly contaminated soil (> 50 ppm VOC) from the two plumes that is to be remediated as a source of groundwater contamination. An estimated additional **150** cubic yards of soil will be removed from the area around Building **607**, treated, and returned to the excavation.

4.0 SCOPE OF WORK

The remedial action objective for NAS Pensacola **Task 1** at Site **2662W** is to perform an IRA using low temperature thermal treatment for soils with petroleum hydrocarbon contamination. To accomplish this objective, the following services will be performed:

- mobilization
- civil surveying
- removal of concrete and asphalt pavement
- soil excavation and backfill
- onsite low temperature thermal treatment
- compaction, grading and reseeding



22567 401 FIG3-2.DGN

FIGURE 3-2
SOIL CONTAMINATION PLUMES
TASK 1 SITE 262W

- waste management
- safety and health
- quality control

A detailed scope for Site 2662W Task 1 is presented in Section 4.1, and Sections 4.2 through 4.11 provide descriptions of the services to be performed.

4.1 SITE 2662W TASK 1 SCOPE OF WORK

The scope for Task 1 includes site preparation; excavation, thermal treatment of contaminated soil; backfill of treated soil and clean fill compaction and regrading of the site; disposal of construction debris including concrete and asphalt paving; control and containerization of hazardous waste for disposal in coordination with Public Works Division; and removal of all remedial activity construction-related facilities, debris, and artifacts.

Site preparation will include civil survey, creation of a laydown and soil staging area for a mobile thermal treatment unit, and installation of drainage control materials and facilities.

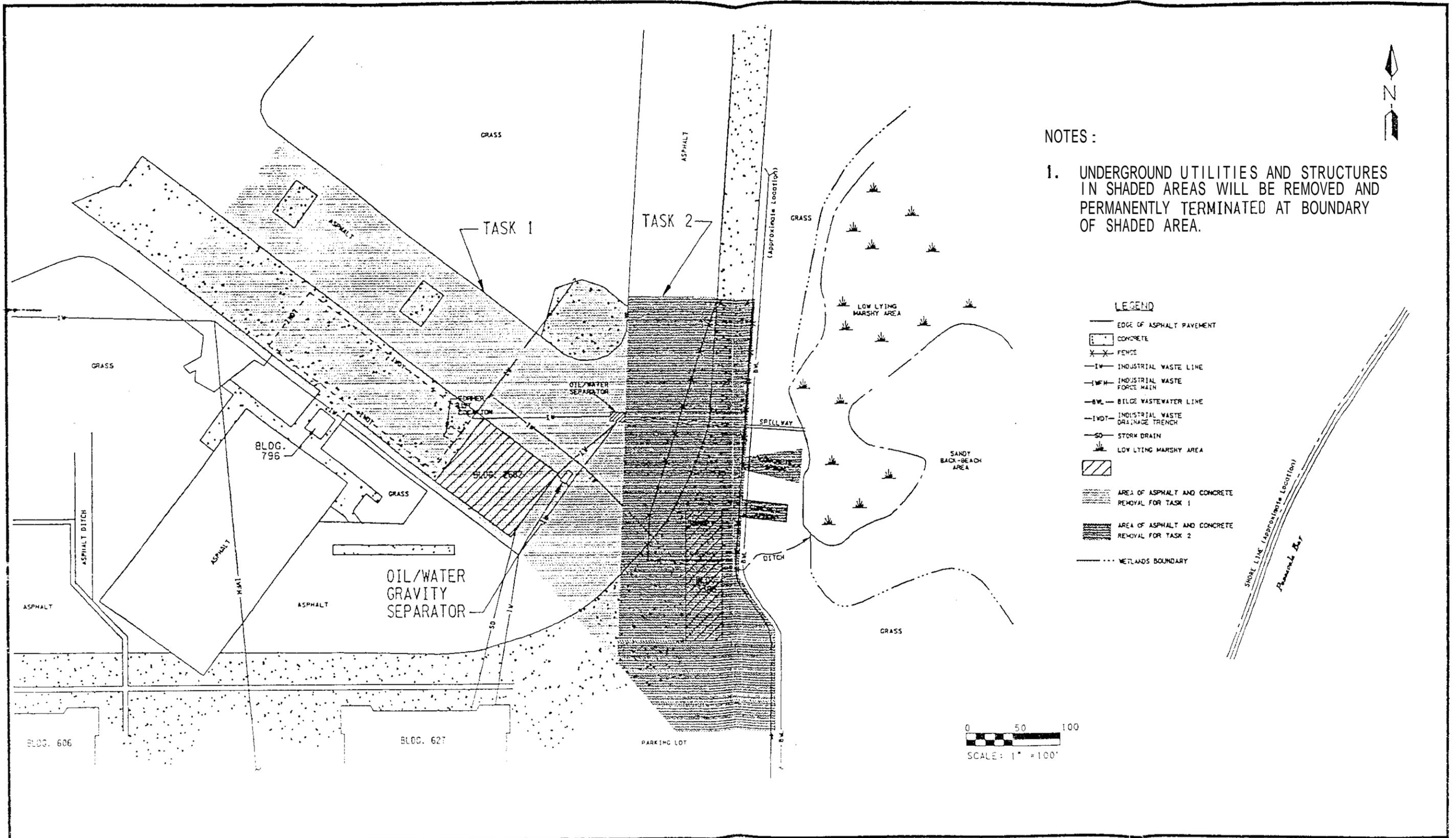
The buildings to be demolished and removed from the site as part of Task 2 Site 36, and the concrete and asphalt pavement to be removed are shown in Figure 4-1; all paving for both Task 1 and Task 2 will be removed during the first sequence of work, and costs for each will be allocated as directed by the SOUTHNAVFACENCOM. Underground structures and utilities to be removed in this phase of work for Task 2, and the demarkation lines of the adjacent designated wetlands area are also indicated in Figure 4-1. The criteria for site demolition work and debris removal are provided in Appendix A, Technical Specification for Demolition Services.

The preliminary locations for the exclusion zone, contamination reduction zone, thermal treatment process equipment laydown area, pre- and post-treatment soil staging area, ingress and egress routes, and office and decontamination trailers are shown in Figure 4-2. The boundaries of these areas and the excavation site near Building 607 will be adjusted to conform to site specific needs during mobilization.

A site map of the Task 1 soil contamination plumes plotted to the 50 ppm VOC isoconcentration line, showing site drainage control features is shown in Figure 4-3. Additional petroleum contaminated soil near Building 607 will be excavated and thermally treated. Building 607 is located on the south perimeter of Chevalier Field on Saufley Street (see Figure 3-1).

A Flame Ionizing Detector (FID) will be used to guide the excavation of contaminated soil, beginning at the northwest edge of the plotted plumes, and working toward the southeast. Soils with 50 ppm or greater concentrations of VOCs will be excavated to a minimum depth of three feet below the original top of grade, or to the local water table, whichever is deeper. The water table elevation will be established prior to excavation to establish the actual required depth for soil removal.

Contaminated soil will be handled, treated, and sampled according to the requirements established in FDEP Regulation 17-775 for soil treatment facilities. Criteria for the mobile low temperature thermal treatment unit are provided in Appendix B, Technical Specification for Thermal



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FIGURE 4-1
D&D ACTIVITIES
TASK 1 SITE 2662W

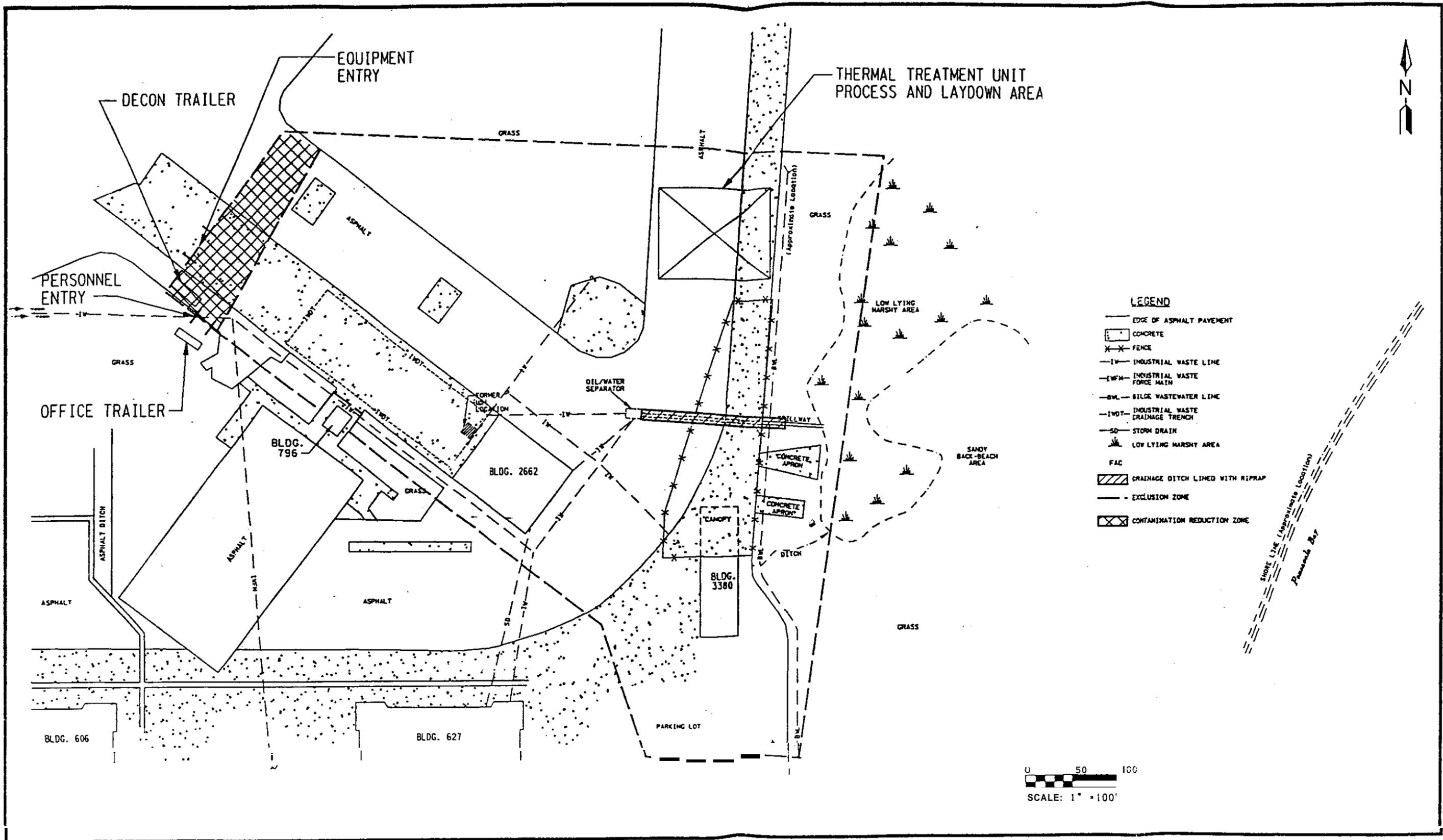


FIGURE 4-2
TEMPORARY FACILITIES
TASK 1 SITE 2662W

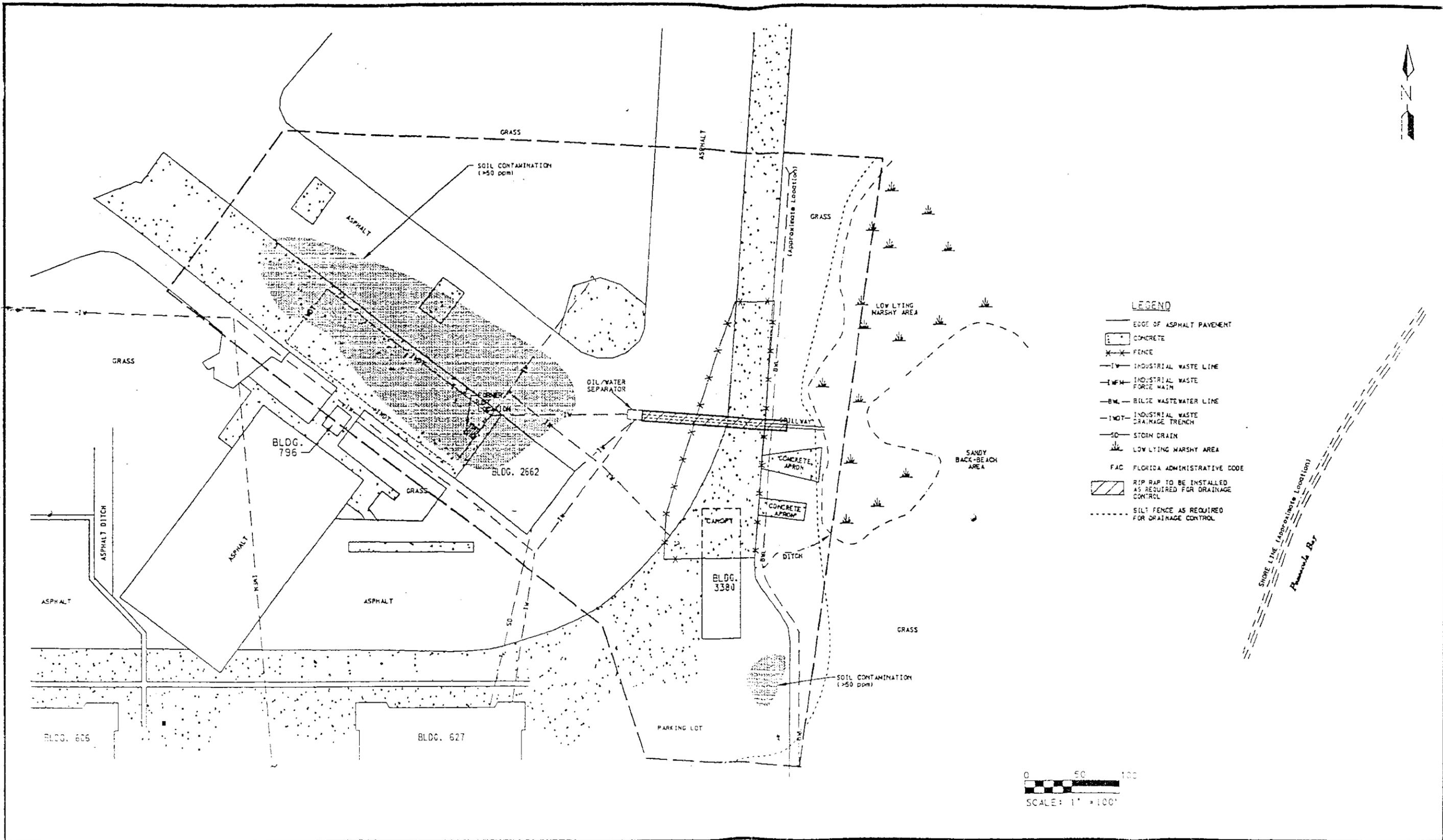


FIGURE 4-3
DRAINAGE AND EROSION CONTROL
TASK 1 SITE 2662W

Treatment Services. Sampling will be performed in accordance with the sampling and analyses plan described in Section **5.0**.

4.2 MOBILIZATION

Mobilization will include delivery to the jobsite and work areas all construction equipment, tools, materials, supplies and miscellaneous articles, **and** establishing **a** work force sufficient to commence and **sustain** remediation activities **as** required.

4.3 EARTHWORK CONSTRUCTION

Uncontaminated earthwork required for backfill compaction and grading of clean soil, and for site drainage control will be performed in accordance with the technical specification for Uncontaminated Earthwork provided in Appendix **C**. Site restoration will be accomplished according to the Technical Specification for Turf Establishment in Appendix D.

4.4 WASTE MANAGEMENT

Hazardous waste storage, transport, and disposal will be coordinated through the ROICC. The Hazardous Waste Management Plan for the Southern Division Naval facilities Engineering Command will be used as guidance for all hazardous waste management activities at NAS Pensacola. Section 6.0 describes the hazardous waste management activities that will be performed for Task 1.

4.5 CIVIL SURVEYING

Civil surveying will be performed in accordance with the Technical Specification for Surveying Services, included in Appendix **E**.

4.6 DECONTAMINATION AND DEMOLITION OF BUILDINGS

All demolition activities will be performed as part of Task **2** Site **36**.

4.7 REMOVAL OF CONCRETE AND ASPHALT PAVING

The pavement that will be removed from the remediation area consists **of** asphalt and reinforced concrete as shown on Figure **4-1**; the pavement for Task **1** and Task **2** will be removed consecutively during execution of the Task **1** RWP as directed by the Bechtel Project Superintendent. Paving that is not hazardous waste will be recycled (asphalt) or stockpiled on site as directed by the ROICC for future disposition.

4.8 REMOVAL OF UNDERGROUND STRUCTURES AND UTILITIES

All underground utilities and other man-made structures that exist in the demolition area will be removed and disposed of as construction debris as part of Task **2**. It is assumed that none of this debris will be hazardous waste. Active utilities in the remediation **zone** will be permanently terminated as directed by the ROICC. The bilge wastewater line will not be removed (see Figure **4-1**) but will be temporarily supported as required to maintain its structural integrity

during excavation and backfill work. It is assumed that this pipeline is in sound structural condition, not leaking, and not excessively corroded. The IW pipeline that is removed from service will be handled as described in Section 6.0 Waste Management.

4.9 EXCAVATION OF CONTAMINATED SOIL

The TM for the Site 2662W IRA requires removal and thermal treatment of soil that is contaminated with VOC in concentrations of 50 ppm or greater as determined by an FID in the field. The areal extent of the plumes to be excavated is shown in Figure 3-2. The depth of the excavation as required in the TM is a minimum of three feet below land surface (BLS) or to the water table, whichever is greater; land surface is interpreted as the top of existing pavement. The remediation area around Building 607 is not yet determined, but is estimated to include 150 cubic yards of soil to be removed and treated.

Surface elevations in the remediation area will be determined by civil survey. A laser level will be used as a benchmark, referenced to the civil survey to guide the depth of the excavation. Determination of the depth of the water table at the beginning of the excavation activity will be accomplished by measuring the water table in existing monitoring wells in the remediation area. The depth of the excavation will be planned based on this water table elevation according to the IRA TM requirements described above.

The technical specification for Excavation of Contaminated Soil is provided in Appendix F. Soil with VOC concentrations of 50 ppm or higher will be excavated from the three contaminated areas and stockpiled in the process and laydown area shown in Figure 4-2. Excavation and stockpiling of soil will be coordinated with the thermal treatment subcontractor such that the performance and productivity of the thermal treatment process is not impeded or otherwise negatively affected. The Bechtel Project Superintendent or designee will designate the starting point and direction for excavation based on efficient layout and work flow patterns determined during the remediation, and will determine the areal extent of contaminated soil to be excavated based upon concurrent FID headspace analyses performed before and during excavation. Preburn sampling, confirmation sampling and other field sampling criteria are described in Section 5.0 of this RWP.

In order to minimize soil slumping and washout, it may be necessary to control the local water table, but it is not anticipated that a groundwater extraction system will be required. Localized water table control will be accomplished with a portable bladder pump. Water will be pumped as necessary from the working excavation to permit safe removal of the soil down to the water table. Water that is removed from the excavation will be pumped directly into the IW system. The water table will be controlled as required in the immediate vicinity of the contaminant plumes shown in Figure 4-3.

The presence of free product is not anticipated, but is possible. In the event that free product is encountered, a hold point will be declared and the ROICC will be contacted immediately for direction. A floating skimmer attachment for the suction hose will be available on site for free product recovery from excavated areas. Free product and water will be disposed of as directed by the ROICC (either pumped directly into the IW system, or collected and containerized for offsite disposal).

4.10 LOW TEMPERATURE THERMAL TREATMENT

The remediation method selected for the petroleum contaminated soil IRA is low temperature thermal treatment (desorption). The Florida Administrative Code (FAC), Chapter **17-775** provides specific requirements for thermal treatment of petroleum contaminated soils as defined in Rule **17-775.200**, FAC to ensure that the soils are properly handled and are treated to levels that will not endanger public health or cause future contamination of other soils, groundwater, or surface water.

Bechtel will issue a subcontract to provide and operate a mobile low temperature thermal treatment unit at Site 2662W. The thermal treatment unit will be licensed and permitted in the state of Florida. The subcontract will be administered and controlled by the Bechtel Project Superintendent. The thermal treatment unit will be set up at the site in the Process and Laydown Area shown in Figure **4-2**.

Technical specifications and a site specific scope of work for the mobile low temperature thermal treatment unit are provided in Appendix B. Sampling will be performed in accordance with the sampling and analyses plan described in Section 5 of this RWP and will conform to requirements specified in Chapter **17-775**.

A typical thermal desorption unit consists of a metered feed conveyor system, inclined rotary kiln dryer, bag house, fan and afterburner. Specific mechanical design details of the system vary according to the manufacturer. The contaminated soil is screened for removal of debris larger than two inches, and automatically weighed as it is conveyed into the upper end of the dryer drum. The dryer is typically fired with #2 fuel oil or propane. The flame is positioned at the bottom of the dryer, to fire counter to the direction of travel of soil through the rotating drum. Flights inside the drum lift the soil and drop it into the heated air stream as the soil travels from the high end of the drum to the low end. Heat from the burner is absorbed by the soils and causes the volatile compounds to be released into the air stream and carried out of the kiln. Kiln temperatures are controlled for optimum efficiency of desorption based upon contaminant concentration and soil characteristics. Samples are obtained from the treated soil hourly during the process, and composited once every eight hours for laboratory analysis.

The air stream exiting the dryer passes through a baghouse where dust is removed. The cleaned vapor-laden air then passes through the afterburner at **1600** degrees fahrenheit (F) with a retention time adjusted to maintain a destruction rate of more than 99% of the vapors in the air stream. The soils exit the system at a temperature of 600 to 800 degrees F and are rehydrated with water sprays to suppress fugitive dust. Soils are stockpiled in a controlled area on and beneath impermeable barriers to prevent potential contaminant leaching until analytical laboratory results confirm that the soil meets criteria for return to the excavation.

4.11 SAFETY AND HEALTH

A Program Safety and Health (**PSHP**) defines policies for work on the Navy **RAC** Project. A Safety and Health Plan has been prepared for the Navy **RAC** Bases. Addendum No. **7** to the SSHP, defines task-specific requirements for remediation at NAS Pensacola.

4.12 QUALITY CONTROL

The Quality Control Plan (QCP) and the Quality Control Plan Addendum have been prepared and describe the quality control (QC) activities that will be implemented for work associated with Delivery Order (DO) No. 006 for NAS Pensacola. The QCP provides a detailed description of the QC requirements for Navy RAC program. The QCPA provides additional site-specific requirements. Both documents will be used to insure that the QC requirements of the BEI and Navy RAC Program associated with this Work Plan are met.

5.0 SAMPLING AND ANALYSIS PLAN

This section describes the sampling and analysis for field screening, thermal treatment, and soil for Task 1 at Site **2662W**. Sampling methodology and procedures described in this Sampling and Analysis Plan (SAP) are based on FDEP requirements as found in the Florida Department of Environmental Protection *Standard Operating Procedures for Laboratory Operations and Sample Collection Activities (DER -QA-00 1/92)* and *Quality Assurance Standard Operating Procedures for Petroleum Storage System Closure Assessments*.

As outlined in FDEP's *Quality Assurance Standard Operating Procedures for Petroleum Storage System Closure Assessments*, field screening techniques (EPA DQO Level I) using an FID will be used to delineate the area where soil remediation is required. EPA DQO Level III data will be required for thermal treatment, soil, and groundwater sampling to confirm that remediation and/or treatment goals have been achieved.

BEI will conduct confirmatory sampling for evidence of work completion. Verification sampling will be conducted by independent contractors to document waste cleanup.

5.1 SAMPLING PROTOCOL

5.1.1 Decontamination

Sampling equipment will be decontaminated prior to collection of each sample. Decontamination will be completed in accordance with Section 4.1, "Decontamination," of FDEP's *Standard Operating Procedures for Laboratory Operations and Sample Collection Activities*. Used decontamination fluids will be containerized, stored and disposed of as directed by the Navy Public Works Department.

5.1.2 Collection

Sampling, with the exception of field screening, will be performed in accordance with Section 4.0, "Sampling Procedures," of FDEP's *Standard Operating Procedures for Laboratory Operations and Sample Collection Activities*. Field screening will be performed in accordance with Section IV, "Field Measurements," of FDEP's *Quality Assurance Standard Operating Procedures for Petroleum Storage System Closure Assessments*.

5.1.3 Sample Identification

Sample identification will be in accordance with BEI Project Procedure 6003, Sample Identification and Data Encoding.

5.1.4 Logbooks

Field logbooks will be used for recording all field activities. Entries will include sufficient detail to reconstruct all significant activities. Logbook entries will be completed in accordance with Section 5.0, "Sample Custody and Documentation," of FDEP's *Standard Operating Procedures for Laboratory Operations and Sample Collection Activities*. This SOP includes the minimum requirements for recordkeeping.

5.1.5 Chain-of-Custody Records

In order to maintain sample traceability, each sample for offsite analysis will be properly documented on a chain-of-custody record. Chain-of-custody documentation will be completed in accordance with Section 5.0, "Sample Custody and Documentation", of the FDEP's *Standard Operating Procedures for Laboratory Operations and Sample Collection Activities*. This SOP includes the minimum requirements for recordkeeping.

5.1.6 Packaging and Holding Times

Sample volume requirements, preservation techniques, minimum holding times, and container material requirements for samples are given in Table 5-1. The Field Engineer or designated person is responsible for ensuring that a sufficient volume of each sample is collected and placed in the appropriate container with the proper preservation.

The preparation of sampling containers and the container types, preservatives, and holding times are specified in the FDEP's *Standard Operating Procedures for Laboratory Operations and Sample Collection Activities*, Section 4.4 of the FDEP standard operating procedures contains the recommended container, preservation, and holding times for water, wastewater, soil, and sediment samples. Sample containers will meet all specifications outlined in the above-mentioned procedures.

5.1.7 Data Verification

All confirmatory data will be subject to a 100 percent verification. This includes data generated by field activities or as a result of laboratory analyses. The data verification process will begin with manual entry or electronic loading of the data. Printouts of this information from the project database will be compared with the original hard copy of the data and resolved.

Documentation of all data verification activities will be performed by the individual performing the verification. This documentation will consist of a signature of the person who performed the verification in the hard copy printouts from the project database. These signed data verification printouts will be forwarded to the database manager or designee.

5.2 FIELD SAMPLING AND ANALYSIS

Sampling protocol for samples identified in this section will be in accordance with FDEP's standard operation procedures as outlined in Section 5.1.2. Analysis of these samples will be in accordance with Florida Department of Environmental Protection's *Standard Operating Procedures for Laboratory Operations and Sample Collection Activities*. Table 5-1 provides a summary of the data requirements for Site 2662W.

T 5-1
Data Requirements for Site 2662W

Sample Event*	Analytical Method	DQO Level	Sample Volume	Sample Container	Preservative	Holding Time	QC Samples Required ¹
Field Screening Sampling							
TVOC	Head Space	I	fill jar 1/2 full	16 oz. canning jar	None	Analyze immediately following temperature equilibration	Dup: 1/10
Thermal Treatment Sampling							
TRPH	EPA 418.1	III	20 g	Glass, 4 oz. widemouth w/ Teflon lined cap	Cool @ 4-c	14 days	TB: 1/cooler shipment RB: 1/20 or weekly FB: 1/20 Dup: 1/20 MSIMSD: 1/20
TVOA	EPA 5030/8020	III	10 g	Glass, 40 mL vial or 4 oz. widemouth w/ Teflon/silicone septum	Cool @ 4°C	14 days	TB: 1/cooler shipment RB: 1/20 or weekly FB: 1/20 Dup: 1/20 MSIMSD: 1/20
TVOX	EPA 5030/8010	III	10 g	Glass, 40 mL vial or 4 oz. widemouth w/ Teflon/silicone septum	Cool @ 4°C	14 days	TB: 1/cooler shipment RB: 1/20 or weekly FB: 1/20 Dup: 1/20 MSIMSD: 1/20
As,Ba,Cd,Cr, Pb,Hg,Se,Ag	EPA 6010 and ¹ 7471 ²	III	200 g	Glass or plastic, 8 oz. widemouth	Cool @ 4-c	6 months (28 days for Hg)	RB: 1/20 or weekly FB: 1/20 Dup: 1/20 MS/MSD: 1/20
PAH	EPA 8100	III	30 g	Glass, 8 oz. widemouth w/Teflon lined cap	Cool @ 4.c	14 days	RB: 1/20 or weekly FB: 1/20 Dup: 1/20 MSIMSD: 1/20
TCLP	EPA 1311	III	100 g	2.5 L glass bottle w/Teflon lined cap	Cool @ 4°C	14 days	RB: 1/20 or weekly FB: 1/20 Dup: 1/20

¹ TCLP : Toxicity Characteristic Leaching Procedure; TRPH : Total Recoverable Petroleum Hydrocarbons; TVOA : Total Volatile Organic Aromatics; TVOC : Total Volatile Organic Compounds; TVOX : Total Volatile Organic Halocarbons; BTEX : Benzene, Toluene, Ethylbenzene, and Xylenes; EDB : 1,2-dibromoethane; Total NAPS : Sum of naphthalene and methyl naphthalenes; BNA : Base/Neutral/Acid Extractables; PAH: Polynuclear Aromatic Hydrocarbons.
² TB : Trip Blank, RB : Equipment Rinse Blank, FB : Field Blank, Dup : Duplicate, MS/MSD : Matrix Spike/Matrix Spike Duplicate
³ Acid digestion procedure by method 3050, except mercury
⁴ Sum of naphthalene and methyl naphthalenes
⁵ Request total xylene to target list
⁶ Specify .02 ug/l detection limit
⁷ Request dichlorodifluoromethane be added to EPA 624 target list

A summary of all field sampling activities is required to be included in the monthly report to SOUTHNAVFACENGC.COM.

5.2.1 Field Screening Sampling

Field screening of samples for volatile organics will be used to guide remediation activities. Soil samples will be collected for analysis using a flame ionization detector (FID) in accordance with Section IV, "Field Measurements," of FDEP's SOPs. Each sample will be collected from the vadose zone and screened with and without a carbon filter to determine whether naturally occurring organic (methane) vapors are affecting the FID levels detected. A Photoionization Detector (PID) may be used after documentation is made of that instrument's equivalent response to a FID.

Field screening will be performed at locations as specified in Section 4.5 to guide excavation of contaminated soil. Soil will be excavated in the areas identified as over 50 ppm VOCs (see Figure 3-2) and as discussed in Section 4.5, after which field screening will be used to guide excavation. Final confirmation samples will be collected and analyzed one foot from the outer limits of the excavated area on approximately 6 foot centers. In the event additional stained soil is discovered, additional sampling may be completed as required to complete remediation.

5.2.2 Thermal Treatment Sampling

Thermal treatment sampling includes samples taken prior to and following thermal treatment.

Prior to thermal treatment, a composite sample will be collected. The frequency with which composite samples are to be collected is based on the expected quantity of material to be treated (see Table 5-2). Sampling will take place in-situ before the soil is excavated for Task 1 Site 2662W.

The composite samples will be analyzed for Volatile Organic Aromatics, Total Recoverable Petroleum Hydrocarbons, Volatile Organic Halocarbons, total metals and metals for TCLP. Each composite sample will consist of soil samples taken from a minimum of four locations, with the exception of volatile organics for which composite samples will not be taken. Each sample shall be collected from locations equally distributed throughout the soil surface area and from a depth of at least six inches below the surface. The thermal treatment unit subcontractor will be responsible for analysis of all thermal treatment samples.

After thermal treatment, a soil sample will be collected at least hourly and composited over an eight operational hour maximum time interval or at least once every 400 tons, whichever is less. Each composite sample will be analyzed for Volatile Organic Aromatics, Total Recoverable Petroleum Hydrocarbons, total metals, and metals, for TCLP. This procedure and analyses follows that in FAC 17-775.410(5) and 17-775.400 with the exception that TRPH will be analyzed using EPA Method 418.1 instead of EPA Draft Method 9073. Table 5-3 provides the criteria for acceptance of the treated soil as clean. The cleanup criterion for the primary target contaminant, TRPH, is 10 mg/kg (ppm).

Table 5-2
Composite Sample Quantities Prior to Thermal Treatment

Amount of Soil		Quantity of Composite Samples
by Volume (cubic yards)	by Weight (tons)	
Less than 100	Less than 140	1
100 to 500	140 to 700	3
500 to 1000	700 to 1400	5
For each additional 500	For each additional 700	1

• From **FAC 17-775.410, Table II**

Table 5-3
Criteria for Thermally Treated Clean Soil

Parameter	Cleanup Level	
Total Volatile Organic Aromatics	100 µg/kg	
Total Recoverable Petroleum Hydrocarbons	10 mg/kg or if exceeded then go to ^a below	
Metals	TCLP^b	Total^c
Arsenic	5 mg/l	10 mg/kg
Barium	100 mg/l	4940 mg/kg
Cadmium	1 mg/l	37 mg/kg
Chromium	5 mg/l	50 mg/kg
Lead	5 mg/l	108 mg/kg
Mercury	.2 mg/l	23 mg/kg
Selenium	1 mg/l	389 mg/kg
Silver	5 mg/l	353 mg/kg

^a If exceeded, then the Total Recoverable Petroleum Hydrocarbons will not exceed 50 mg/kg (EPA Draft Method **3540/9073**) provided the total of the Polynuclear Aromatic Hydrocarbons does not exceed 1 mg/kg (EPA Method **8100, 8250, 8270, or 8310**) and the total of the Volatile Organic Halocarbons does not exceed 50 µg/kg (EPA Method **5030/8021 or 5030/8010**).

^b Toxicity Characteristic Leaching Procedure

^c The acid indigestion procedure by EPA Method **3050** will be used to prepare soil samples for total metal analyses except mercury, and the extraction procedure by EPA Method **1311** TCLP will be used to determine leachability characteristic of metals.

5.2.3 Confirmatory and Verification Soil Sampling

For Task 1 Site **2662W**, samples will be taken during the excavation process to confirm the removal of contamination below the required action level. **ABB-ES** will be responsible for conducting verification sampling to be taken on the sidewalls of the excavation.

6.0 WASTE MANAGEMENT

Waste management will be performed as directed by the Resident Officer in charge of Construction (ROICC). Waste management practices, as defined in the Program Hazardous Waste Management Plan, will be used as guidance and appropriately followed for this work.

Hazardous waste will be identified and managed in accordance with RCRA, **40 CFR** Parts **260, 261, 262, 264, 265, 270, and 271**. As directed by the Navy, an EPA identification number, received from the EPA Region IV Administrator, will be obtained from the Navy before treatment, storage, disposal, or transportation of hazardous wastes. In addition, hazardous waste will not be offered to any transporters or treatment, storage, or disposal facilities that do not have an EPA identification number.

Waste minimization practices will be implemented during operations to minimize the amounts of materials that must eventually be eliminated. These practices will include, but not be limited to:

- (1) No extraneous materials taken into contamination control areas;
- (2) Decontamination and free release of equipment used to support onsite activities, to the extent practicable;
- (3) Use of consumables that can be compacted or otherwise volume reduced, to the extent practicable.

Personal protective equipment (PPE) that is not visibly soiled will be disposed of as conventional waste. Contaminated portions of PPE will be managed as hazardous waste.

All soils and other materials that are generated during the remediation activities that are thermally treated and meet cleanup standards and comply with **40 CFR 268** will be redeposited into the excavated areas at Site **2662W**. Material not achieving cleanup standards will be retreated, disposed of as directed by the Navy, or remain onsite for future treatment by alternative methods as directed by the **ROICC**.

All water recovered from the excavations during the remediation activity will be pumped directly into the IW pipeline for processing.

Upon direction **from** the ROICC, all hazardous waste will be packaged, labeled, marked, and transported offsite in accordance with applicable Department of Transportation hazardous material shipping regulations (**49 CFR 171-179**). Proper manifest documentation will be required at the time of shipping per **40 CFR 262**.

All nonhazardous solid waste that is generated as a result of mobilization and clearing activities will be properly disposed onsite or offsite as directed by the Navy. Any petroleum hydrocarbon

contaminated debris and waste that cannot be treated onsite to specified cleanup levels will be analyzed for hazardous waste characteristics, packaged, labeled, and handled as directed by the ROICC in accordance with approved procedures. All waste material will be packaged in U.N. Class 1A2 55 gallon drums and labeled with the container's contents, date generated, and location from where it was derived. Section of the active IW pipeline that are removed from service will be properly labeled and delivered to the Public Works division for decontamination.

DEPARTMENT OF THE NAVY

SOUTHERN DIVISION

TECHNICAL SPECIFICATION

FOR

DEMOLITION OF STRUCTURES, PAVEMENT, AND UTILITIES

0		Issued for Review					
NO.	DATE	REASON FOR REVISION	BY	CHECK	EGS	PE	
ORIGIN 		DEMOLITION SERVICES	JOB NO. 22567				
			SPECIFICATION			REV	
			401-SP085-001			0	
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FIGURES

Figure

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Figure1 **6**

1.0 GENERAL

This specification **and** the attached information together with the **Scope** of Work, presents the requirements for the demolition activities required **at** the site. This specification is intended to give a general description of the services required; it does not, however, **cover** all details of equipment and procedures, which may vary by supplier. All equipment and procedures required **to** complete the demolition **as** required in the **Scope** of Work and attached drawings shall **be** furnished by **the** Subcontractor, who shall **be** responsible for **the** proper functioning of equipment and **the** execution of **the** Scope of Work.

1.1 REGULATIONS

Prior to the commencement of any and all demolition of buildings, **structures**, or pavement, the Contractor shall determine which permits are **normally** required for this type of activity and which will be applicable to **this** site. Permits determined to be applicable shall be filed with the appropriate agencies. The **fees** for these permits shall be the Contractor's responsibility. At a minimum, the Contractor shall comply with the spirit and requirements of all normally required permits, even though permit application may be exempted at this site.

- 1.1.1 The Contractor shall comply with the respective building codes and ordinances in force in the area of the work. Such building codes shall control the demolition, modification or alteration of the existing **buildings/structures**, or utilities.
- 1.1.2 All Federal, **State**, and Local regulations regarding hauling and **disposal** shall apply.
- 1.1.3 Unless **otherwise** specified or shown, the latest edition **at** the time of bid of the following Codes and Standards shall apply to the extent indicated herein:

OSHA 29 CFR 1910

Occupational Safety and Health Regulations for General Industry

OSHA 29 CFR 1926

Occupational Safety and Health Regulations for Construction

1.2 TRAFFIC AND ACCESS

- 1.2.1 Conduct demolition operations and the removal of **equipment** and debris **to** ensure minimum interference with roads, streets, and **walks**. Routine activities will **be** ongoing at the Naval Air Station.
- 1.2.2 Do not **close** or obstruct streets, walks or other occupied or used facilities without permission from Bechtel. Provide alternate routes around closed or **obstructed** traffic access ways.
- 1.2.3 The Contractor shall pay special attention to maintaining safe and convenient access for other subcontractors **and** site visitors.

20 PRODUCTS AND EQUIPMENT

- 2.1.1 All construction equipment, tools, and materials used in the execution of this work shall be in good working condition and will be inspected to assure compliance with all safety requirements. Any equipment that must be repaired to a safe working condition will be removed from the site immediately.
- 2.1.2 Submit list of equipment for use in all demolition activities. The list shall include the type, size, and rated capacity of the equipment proposed.

3.0 EXECUTION

3.1 CONCRETE AND ASPHALT DEMOLITION

- 3.1.1 All concrete and asphalt inside the boundary identified on Figure 1 shall be removed. Thickness of asphalt and concrete is estimated at 6 in.
- 3.1.2 Concrete must be rubbled (no pieces larger than 2 ft³ in size) and will be disposed of on the N.A.S. as directed by Bechtel. There will not be a disposal fee for the concrete disposed of on the N.A.S. Hauling to the onsite disposal area will be the responsibility of the Subcontractor.
- 3.1.3 Asphalt must be rubbled (no pieces larger than 2 ft³ in size). Hauling and disposal will be the responsibility of the Subcontractor. Disposal must be at a landfill or recycler approved by Bechtel.
- 3.1.4 At all boundaries where asphalt or concrete are to remain in place, cuts shall be made straight and clean.
- 3.1.5 Contractor shall provide storm water and sediment control during removal of the paving.

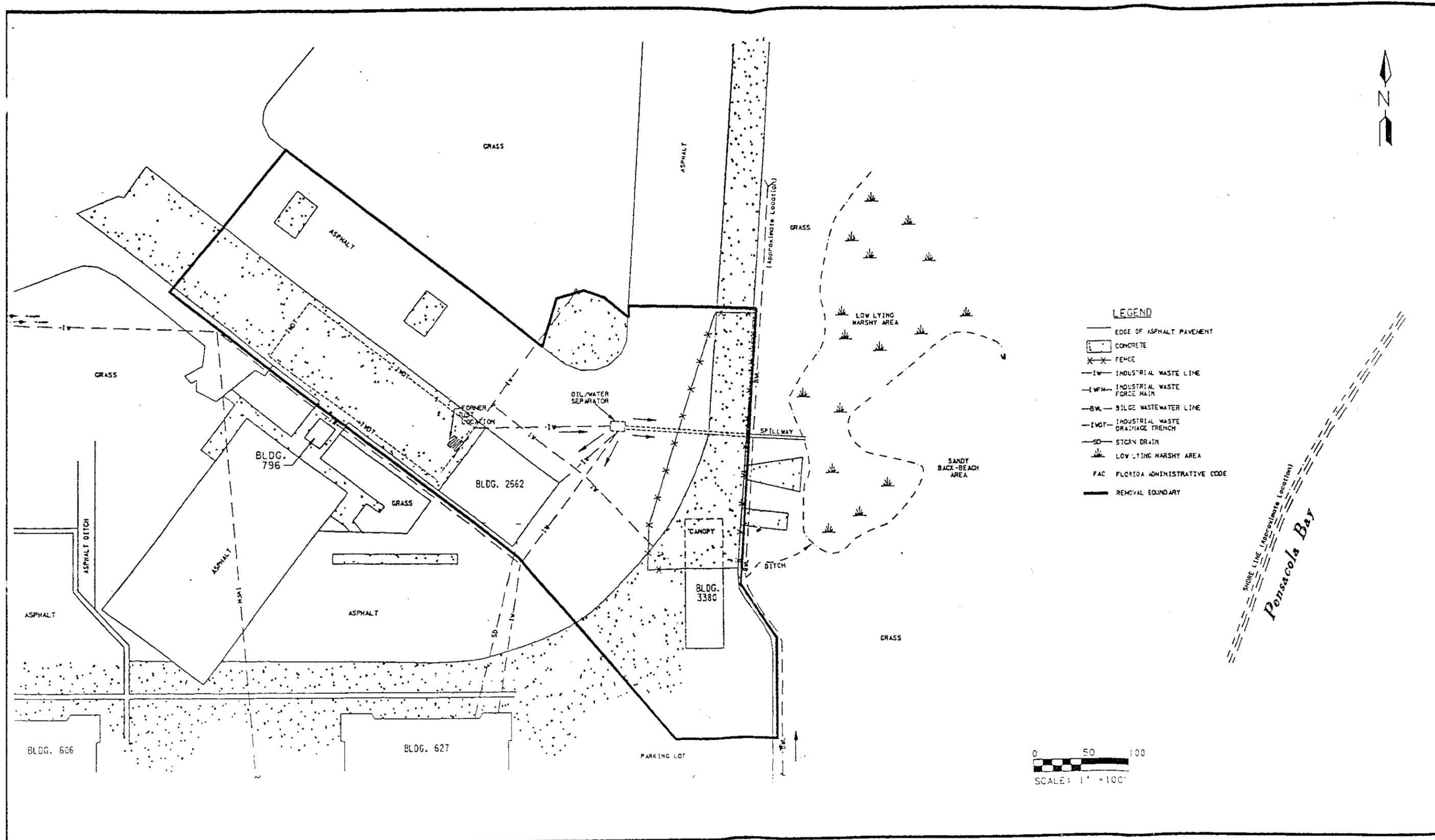
Materials used for sediment barriers shall consist of straw bales, hay bales, geotextile filter fabric made expressly for use as a silt screen, or other materials approved by Bechtel prior to their use. Straw and hay bales shall not be used for permanent sediment barriers unless approved by Bechtel.

Baled hay or straw shall be laid end to end such that no gap exists between bales. Reinforcing bars shall be #4 bar and a minimum of 2½ ft long.

Filter fabric shall be a material made expressly for the purpose of sediment control such as Exxon GTF 101S Silt Screen or approved equal.

Erosion control blankets shall be Curlex Blankets manufactured by American Excelsior Company, or approved equal.

Contractor shall submit proposed drainage and sediment design for approval.



22557_401 FIGURE1.DGN

FIGURE 1
LIMITS OF UNDERGROUND UTILITY REMOVAL

3.2 BUILDINGS 2662 AND 3380 DEMOLITION

3.2.1 The floor of building **2662** consists mainly of deteriorating concrete and asphalt with **an** area approximately **12 ft x 25 ft** of newer-concrete. The present concrete floor, approximately **4 in.** thick, has been poured over **an** existing **6-in.** slab. The top surface of the floor is considered hazardous waste because of the solvents **that** were used in this building. Removal of at least the **top 1/4 in.** of concrete will **be** required, before **the** remaining concrete **can be** disposed of **as** clean construction debris.

This cleanup method is being addressed under **the** "debris rule," which is found under Federal regulation **40 CFR 26 and 57 Federal Register 37194**. The subcontractor shall propose the method of removal for approval by Bechtel.

3.2.2 Complete structural removal shall **be** performed on buildings **2662** and **3380**. Structural details for building **2662** are shown on drawing **958145**. Structural details are not available for building **3380**, but it is of similar construction.

3.2.3 Employ water sprays for work during demolition operations as required to prevent dust from becoming airborne, Use of water shall **be** minimized to prevent runoff and accumulation of wastewater.

3.2.4 Demolition debris resulting from demolition of these structures shall **be** disposed of **an** approved landfill.

3.2.5 Demolition of building **2662** will include the removal of the oil and grease **trap** on the northeast corner of the building. Construction details of the trap are included on drawing **958145**.

3.3 UTILITIES

3.3.1 Do not **interrupt** existing utilities serving occupied or **used** facilities, except when authorized by Bechtel.

3.3.2 Isolate **and remove** or cap all lines **as** indicated on the drawings. Energized piping systems shall **be** shall **'be**turned off, locked and tagged out **in** accordance with the Base standard Lock Out Procedure.

3.3.3 All pipe, connections, valves, and meters shall be disposed of **as** construction debris **by** **the** subcontractor unless directed otherwise by Bechtel.

3.3.4 When utilities are encountered that are not indicated on the drawings, Bechtel shall **be** notified.

3.3.5 Power sources shall be turned off, locked and tagged out in accordance with the Base standard Lock Out Procedure. Electrical wires and cables shall be disconnected, isolated, and pulled back to the nearest termination point or manhole and properly terminated.

3.4 PROTECTION OF EXISTING WORK

- 3.4.1 Before beginning any cutting or demolition work, the Contractor shall carefully review the existing work and examine the drawings and specifications to determine the extent of the work.
- 3.4.2 The Contractor shall take all necessary precautions to ensure against damage to existing work which is to remain in place, and any damage to such work shall be repaired or replaced as approved by Bechtel at no additional cost to Bechtel.
- 3.4.3 The Contractor shall carefully coordinate the work of this section with all other work and construct and maintain shoring, bracing and supports, as required.

3.5 EXCAVATIONS

- 3.5.1 Remove all buried piping and manholes shown on drawings _____ and encountered during excavation, unless otherwise noted on the drawings or directed by Bechtel. Pipes indicated to be abandoned shall have open ends plugged as close as practical to the main supply or distribution line or as directed by Bechtel. Capping or closure method shall be in accordance with Base and industrial standards and be approved by Bechtel. Flushing of lines to remain in place may be required and will be directed by Bechtel.

The Industrial Waste (IW) piping to be removed shall be transported to a site on the Base for cleaning and disposal.

All other uncontaminated piping shall be disposed of in an approved landfill.

- 3.5.1 Excavation slopes shall be established in strict accordance with Subpart P, "Excavation, Trenching, and Shoring," of 29 CFR 1926. Side slopes shall be protected to prevent materials from eroding or sloughing. Any additional material removal and handling caused by erosion or sloughing shall be performed at the expense of the Subcontractor.
- 3.5.2 Shoring, including temporary sheet piling, shall be furnished and installed as necessary to protect workers, slopes, and adjacent paving, structures, and utilities. Shoring design and installation plans including engineering calculations shall be developed by the Subcontractor in accordance with 29 CFR 1926 Subpart P and submitted to Bechtel for review. Shoring, bracing, and sheeting shall be removed as excavations are backfilled in a manner to prevent cave-ins.

Alternate methods (e.g., benching, sloping, trench boxes, etc.) may be used where applicable. Alternate methods proposed by the Subcontractor shall be developed in accordance with 29 CFR 1926 Subpart P and submitted to Bechtel for review.

Provide a shoring inspector that is qualified in accordance with 29 CFR 1926, Subpart P. The scope and frequency of inspections shall be in accordance with 29 CFR 1926 Subpart P.

Care shall be taken to minimize exposure of shoring or other slope protection devices to contamination. These items shall not be released from the site until they have been decontaminated in accordance with this specification.

3.6 OILYWATER SEPARATORS

3.6.1 The oilywater separators shall be demolished and removed. Clean concrete shall be disposed of per paragraph 3.1.2 above. Uncontaminated equipment, piping, instrumentation, etc. shall be disposed of in an approved landfill.

Contaminated materials shall be transported to a site on the Base for cleaning and disposal.

3.6.2 The concrete trench and closed culvert from the oilywater separator shall be removed as described in paragraph 3.6.1. The resulting ditch shall be lined with "rip rap" to provide storm water runoff erosion control from the removed separator. Proper grading is to be provided to ensure the existing storm water control is maintained.

3.7 CLEANUP

3.7.1 Debris and rubbish shall be removed from all work areas including excavations at the end of each work day.

3.7.2 Uncontaminated debris shall be removed and transported to an approved landfill facility in a manner that will prevent spillage on streets or adjacent areas.

3.7.3 Contaminated debris will be disposed of onsite as directed by Bechtel.

DEPARTMENT OF THE NAVY
 SOUTHERN DIVISION
 TECHNICAL SPECIFICATION
 FOR
 THERMAL TREATMENT SERVICES

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NO.	DATE	REASON FOR REVISION	BY		
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1.0 GENERAL

This specification and the attached information together with the Scope of Work, presents the requirements for the furnishing of thermal treatment services. This specification is intended to give a general description of the services and equipment required; it does not, however, cover all details of the equipment, which may vary with the supplier or manufacturer. **All** components and functions required for thermal treatment services specified herein shall be furnished by the Subcontractor who shall be responsible for the proper functioning of the equipment and the execution of the scope of work to achieve the treatment criteria contained herein.

1.1 REFERENCES

1.1.1 Codes and Standards

The Codes and Standards referenced below are minimum requirements and are not intended to be a comprehensive list. Some standards may not apply to all situations. Other codes and standards may be required by Federal, State, or local regulations. The Subcontractor is required to comply with all applicable codes and standards regardless of their listing in this section.

The equipment furnished under this specification shall conform to the latest editions, including any current addenda, of the following Codes and Standards unless otherwise noted:

American National Standards Institute (ANSI)

ANSI B16.5 Steel Pipe Flanges, Flanged Valves and Fittings
ANSI B31.3 Chemical Plant and Petroleum Piping

American Petroleum Institute (API)

API 5-L Lined Pipe

American Society of Mechanical Engineers (ASME)

ASME Boiler and Pressure Vessel Code, Section VIII, Division 1
ASME Boiler and Pressure Vessel Code, Section X

American Society for Testing Materials (ASTM)

ASTM A-36 Standard Specification for Structural Steel
ASTM A-366 Steel, Sheet, Carbon, Cold Rolled Commercial Quality
ASTM C-27 Fireclay and High- Alumina Refractory Brick
ASTM C-401 Alumina and Alumina-Silicate Castable Refractory
ASTM C-612 Mineral Fiber Block and Board Thermal Insulation

American Welding Society (**AWS**)

AWS B2-1 Welding Procedures and Performance Qualifications
AWS D1-1 Structural Welding Code-Steel

National Electrical Manufacturers Association

NEMA ISC-1 Industrial Controls and Systems
NEMA **ISC-6** Enclosures for Industrial Control and Systems
NEMA MG-1 Motors and Generators

National Fire Protection Association

NFPA 30 Flammable and Combustible Liquids
NFPA **54** National Fuel Gas Code
NFPA 70 National Electrical Code
NFPA 85A Prevention of Furnace Explosions in Fuel Oil-Fired and Natural Gas-Fired Single Burner Boiler-Furnaces
NFPA 85B Prevention of Furnace Explosions in Gas-Fired Multiple Burner Boiler-Furnaces
NFPA 85D Prevention of Furnace Explosions in Fuel Oil-Fired Multiple Burner Boiler-Furnaces
NFPA 211 Chimneys, Fireplaces, Vents and Solid Fuel Burning Appliances

Occupational Safety and Health Administration (**OSHA**)

OSHA 1910 D Part 1910 Subpart D Walking-Working Surfaces

Steel Structures Painting Council (SSPC)

SSPC-SP5 White Metal Blast Cleaning
SSPC-SP 10 Near White Metal Blast Cleaning

Underwriters Laboratories

UL-296 **UL** Burners

1.1.2 Regulatory Requirements

The Subcontractor shall supply services in compliance with applicable federal, state, and local regulations. The following listing of regulations is intended to list potentially applicable regulations for a variety of thermal treatment systems treating a wide range of waste types. This listing may not be complete for all situations. The Subcontractor is required to meet all applicable regulations and requirements regardless of their listing in this section.

Federal Requirements

29 CFR 1910	Occupational Safety and Health (OSHA)
40 CFR 50	National Ambient Air Quality Standards (NAAQS)
40 CFR 60	Air Quality Test Methods
40 CFR 61-63	National Emission Standards for Hazardous Air Pollutants (NESHAP)
40 CFR 260-271	Resource Conservation and Recovery Act (RCRA)
40 CFR 370,372	Emergency Preparedness and Community Right to Know
40 CFR 761,763	Toxic Substances Control Act (TSCA)
49 CFR 171-180	Transportation of Hazardous Materials

State Regulations

See Attachment 1

Local and **County** Regulations

See Attachment 1

1.2 SUBMITTALS

The **submittals** required for thermal treatment systems vary with regulatory requirements and site-specific requirements. A general and comprehensive list of submittals for thermal treatment systems is included in this section. Not all of the submittals listed below may be required of a Subcontractor for this particular application of thermal treatment services. The **engineering** documentation and submittals shown in Exhibit F, "Subcontractor Submittal Requirements Summary," are **minimum** submittal requirements for this procurement activity. Bechtel will determine if Subcontractor documentation is complete and reserves the right to reject submittals and require the resubmittal of any submittals or documents that do not meet the Subcontractor requirements.

- Thermal Treatment System Organizational **Structure**
- Detailed Schedule of Thermal Treatment Activities
- Quality Assurance / Quality **Control Plan**
- Sampling and Analysis **Plan**
- Health and Safety Plan
- Contingency Plan
- Mobilization and Demobilization Plan
- Data Management Plan
- Fugitive Emissions and Odor Control **Plan**
- Description of Safety Features
- Decontamination Procedures
- Evidence of Licenses, Permits, and Certifications
- Description of Noise Abatement **Controls**

- Listing of Regulatory Reporting Requirements
- Subcontractor Equipment Data Sheets
- Resumes of Key Personnel Responsible for Installation, Start-up, and Operation
- Personnel Training Requirements and Certifications
- Description of System Downtime, Failures, and Releases
- HAZOPS Analysis and Failure Mitigation Measures

As a minimum, the following engineering documentation shall be supplied. Diagrams and balances shall cover the equipment operating range ~~from~~ maximum capacity to **minimum** turndown of the system. The performance and acceptance test plan criteria will be specified by Bechtel based on the contents of the Subcontractor's engineering document submittals.

- e Process **Flow** Diagrams (PFDs)
- e Piping and Instrumentation Diagrams (P&IDs)
- Heat **and** Material Balances
 - Fugitive Emissions Estimates
 - Process Emissions Estimates
- Utility Descriptions and Interface Requirements
- Performance and Acceptance Test Plan
 - Previous Test Results
- Trial Burn Plan
 - Previous Trial Burn Results
- o Standard Operating Procedures (SOPs)
 - Start-up and Shutdown Procedures
 - Emergency Operating Procedures
- o Detailed Engineering Description of the Thermal Treatment Unit, Including:
- e Manufacturer's Name and Model Number
 - Type of Thermal Treatment Unit
 - Linear Dimension of the Thermal Treatment Unit/Combustion Chamber Cross sectional Area
 - Description of Fuel Systems
 - Burner Design
 - Construction Materials
 - Location and Description of Temperature, Pressure, **and Flow** Indicating and **Control** Devices
- Equipment and Outline Drawings Including Weights
- e **Layout Plan** and Elevation Drawings
- Equipment List
- Connected **Electrical** Loads
- o Description **of** the Process Control **System**
- e Instrumentation List
- Description of Continuous Emission Monitors (CEMs)
- Instrumentation Calibration and Maintenance Procedures
- e Equipment Inspection, Repair, and Maintenance Procedures

-Spare ~~Parts~~ Inventory

1.3 DELIVERY AND STORAGE

The Subcontractor shall be responsible for delivery of **all** equipment and accessories **in** accordance **with** the schedule. The Subcontractor shall be responsible for **all packing and** delivery so that the equipment shall reach the site in proper operating condition.

2.0 PRODUCTS

2.1 MATERIAL AND EQUIPMENT REQUIREMENTS

2.1.1 General

The Subcontractor shall supply the materials and equipment necessary to perform the services described **in** this specification. The thermal treatment system **shall** meet the performance requirements specified in the attached data sheet.

The equipment shall be trailer mounted or skid mounted for **minimal** completion assembly on site. The Subcontractor shall indicate if site work is required to accommodate the Subcontractor's equipment.

Equipment shall be furnished free of contamination **as** complete units that require **minimum** field erection and assembly consistent with shipping and handling restrictions.

The Subcontractor shall design, fabricate, and furnish **all** materials, appurtenances, and accessories **as** specified **herein** to constitute a complete system.

The Subcontractor shall provide drawings of the completed assembly and data sheets containing the technical engineering specifications **of** the system.

2.1.2 Mechanisms

All mechanisms shall be designed to operate continuously.

All parts of the mechanisms **shall** be designed to withstand **all** stresses that could occur during operation and **any** additional stresses that **might** occur during fabrication, shipment, or erection.

2.1.3 Thermal Treatment Unit

The thermal treatment unit shall be designed to treat the **waste** specified **in** the attached data sheet.

The unit **shall** be energy efficient to the **maximum** extent practical, to minimize **the quantity** of fuel required.

The unit is to be designed to **maximize** reliability, availability, and **maintainability**, and **shall** be capable of operating continuously **24** hours per day.

Auxiliary systems that operate continuously or are essential to thermal treatment Unit operation shall be designed to have redundant capability for operation provided by a off-line backup or a rapidly replaceable spare part. Generally, a backup component shall be started automatically on loss of the primary system, or on indication of degraded primary component performance.

The thermal treatment unit shall meet the treated product and flue gas effluent requirements **as** specified in the attached data sheet.

The thermal treatment system shall be designed to have an availability of 80%. Availability **is** defined **as follows**:

$$A = (T - PO - UO) / T$$

where A is Availability
 T is 8760 hours per Year
 PO is Hours of Planned Outages per Year
 UO is Hours of Unplanned Outages per Year

2.2 ELECTRICAL REQUIREMENTS

Electrical motor-driven equipment required shall be provided complete with motors, motor starters, and controls. Motors shall conform to the NEMA MG 1 with enclosures. Electrical characteristics shall be specified by the Subcontractor. Motor starters **shall** be provided complete with thermal overload protection and other appurtenances necessary for the motor control supplied. Manual or automatic control and protective or signal devices specified by the manufacturer, but not shown, shall be provided.

2.3 OPERATING AND PERFORMANCE REQUIREMENTS

2.3.1 Operation

The Subcontractor shall provide all necessary operators and supervisors required for **the** operation of the thermal treatment system.

The Subcontractor shall incorporate operating procedures or equipment designed to minimize start-up and shutdown time and **off** specification discharges.

2.3.2 Feed Conditions

The feed to the thermal treatment system **shall** have characteristics **as** shown in the attached **data** sheet.

2.3.3 Performance

The performance and acceptance of the thermal treatment **system will** be subject to a **formal** test **as** outlined by Bechtel based on engineering documents supplied by the Subcontractor. The test criteria will be specified such that a **minimum** level of performance **is** available to treat the waste streams listed **in** the attached data sheet to this specification. The Subcontractor may submit previous testing information of **high** quality for consideration. **If** the information **is** adequate, the **data** may be accepted **in** lieu of performing this performance test.

2.4 CONSTRUCTION

The equipment shall be constructed **in** accordance with minimum **engineering** standards **as** specified **in** section 1.1.

Equipment shall be of high quality for superior performance **in** an environment associated with hazardous materials.

2.5 AUXILIARY EQUIPMENT AND SERVICES

Auxiliary equipment and services **furnished** by the Subcontractor shall include, but not be limited to, those listed below.

- Waste Staging
- Waste Pretreatment
- Waste Feeding
- Ash** Handling
- ~~Gas~~ Cleaning System Equipment
- Continuous **Emission** Monitoring Equipment
- Process Sampling Equipment
- Decontamination Equipment
- Process **Chemicals** and Utilities
- Communications Equipment
- Safety Equipment
- Personal Protective Equipment
- Mobilization **and** Demobilization Equipment
- Spare Parts
- Instrument Calibration Equipment

2.6 INSTRUMENTATION AND CONTROLS

The instrumentation and control system supplied **will be an integrated system** of centralized control, data management, **and** data reporting. **The system will** provide the control elements required for the immediate system needs and be capable of expansion.

Locally mounted, key-operated local-off-remote switches **will be** utilized to select local or automatic control mode of operation.

All instruments and controls shall be state-of-the-art, accessible for testing, calibration, and servicing, and they **must** be readily accessible for maintenance procedures. The design of the equipment **shall be such** that testing, calibration, and servicing procedures may be carried out with a minimum of disruption of plant operations. The **instruments and controls** shall be designed for outdoor usage and shall be NEMA 3/3R.

2.7 OPERATING TOOLS

All necessary tools and spare parts that are required for routine maintenance and adjustment **shall** be provided by the Subcontractor and kept **at** the site for ready access.

2.8 EQUIPMENT APPEARANCE

The equipment shall be furnished in a neat and professional appearance, free of contamination, and **fully** ready to operate.

3.0 EXECUTION

The Subcontractor **shall** execute these specified services **in** accordance with the associated scope of work and following the plans submitted by the Subcontractor in section 1.2 of **this** specification.

3.1 INSTALLATION

The Subcontractor **shall** be required to **mobilize** and demobilize the **thermal** treatment system **and** accessories to **and from** the site. The Subcontractor **shall** decontaminate the unit prior to demobilization.

The Subcontractor shall restore the area to a satisfactory condition during demobilization.

3.2 ADJUSTING AND TESTING

The Subcontractor **shall** be responsible for all inspection, testing, and continuous operations of the thermal treatment system.

Technical Specification
Spec. No.: 401-SP080-001
Rev No.: 0

The Subcontractor shall be required to take samples at periodic intervals during the operation. The samples shall be collected at the locations indicated on the Subcontractor's drawings and at a frequency provided in the attached data sheet. Analyses shall be in accordance with methods defined in the attached data sheet.

Technical Specification
Spec. **No.:** 401-SP080-001
Rev **No.:** 0

ATTACHMENT 1

STATE AND LOCAL REGULATIONS

State Regulations (Florida)

FAC 17-2	Air Permits
FAC 17-4.510	General Permit
FAC 17-775	Soil Thermal Treatment Facilities

Local **and County** Regulations

To Be Determined (Reserved)

SERVICE Thermal Treatment	MANUFACTURER				
EQUIPMENT NOS:	P&I DIAGRAM NO:				
Location	Pentacola NAS; Pensacola, Florida				
Type of Treatment Unit	■				
Skid or Trailer Information*	Length	Width	Height	Weight	
1					
2					
3					
Dimensions of Assembled Unit'					
Waste Quantity to be Treated	5200 cy				
Waste Form	Petroleum Hydrocarbon Contaminated Soil				
Contaminants of Concern	VOA		TRPH		
Maximum Concentration	220 ppm		19,000ppm		
Other Contaminants	See Attached Data Sheets - Attachment 2				
Environmental Interface Requirements	Treated Soil	Flue Gas		Water	
VOC	100 ppb (Note 1)	■ ■		NA	
TRPH	10 ppm (Note 2)			NA	
Metals	See attached sheets, Attachment 3			NA	
NO _x		•••		NA	
HCl		•••		NA	
CO		•••			
Organic Compounds		•••			
Metals		•••			
Utility Requirements' *					
Sampling Frequency	TBD				
Methods of Analysis	TBD				
'Subcontractor supplied information					
••All utilities are to be provided by the Subcontractor					
•**Subcontractor to provide predicted performance					
Note 1: Use the analysis identified in Rule 17-775.410(1)(a), F.A.C.					
Note 2: Use the analysis identified in Rule 17-775.410(1)(b), F.A.C.					
	THERMAL TREATMENT DATA SHEET		Job No. 22567		
			Specification	REV	
			401-SP080-001	0	
			Sheet 1 of 1		

Technical Specification
Spec. No.: 401-SPO80-001
Rev No.: 0

ATTACHMENT 2
SOIL ANALYSIS

Table 5-4
Summary of Soil Sample Laboratory Analyses,
January 1992

Contamination Assessment Report
Site 2662W, Naval Aviation Depot
Pensacola, Florida

Compound	Regulatory' Standard	SB-4	SB-5	SB-9	Trench
Volatile Organics (USEPA Method 8240, ppm)					
Benzene		c54	<11	<8	<700
Ethylbenzene		220	<11	<8	1,200
Toluene		c54	<11	<8	c700
Xylene (total)		<54	<11	<8	4,800
Total VOA	0.1	220N	<44	<32	6,000N
Methylene chloride		c54	² 13	² 22	c700
Base-Neutral Acid Extractables (USEPA Method 8270, ppm)					
Naphthalene		12	<0.33	c1.1	15
1-Methylnaphthalene		16	<0.33	c1.1	32
2-Methylnaphthalene		20	<0.33	c1.1	35
Total Naphthalenes		48	c0.99	c3.3	82
Total Recoverable Petroleum Hydrocarbons (TRPH) (USEPA Method 418.1, ppm)					
TRPH	10	17,000	<5	770	19,000
TCLP Metals (USEPA Methods 200.7, 245.1, and 270.2, ppm)					
Silver	5	c0.05	c0.05	<0.05	<0.05
Barium	100	0.61	0.59	0.20	1.2
Mercury	0.2	c0.002	c0.002	c0.002	c0.002
Selenium	1	<0.5	c0.5	c0.5	c0.5
<p>¹ Chapter 17-775.400, Florida Administrative Code, cleanup level. ² Methylene chloride was detected in the method blank associated with this sample.</p> <p>Notes: All samples were collected between 2 and 3 feet below land surface (bls). USEPA = U.S. Environmental Protection Agency. ppm = parts per million. Total VOA = total volatile organic aromatics; sum of benzene, ethylbenzene, toluene, and xylenes. Total naphthalenes = sum of naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene. TCLP = Toxicity Characteristic Leaching Procedure. N = actual value may be greater than summed value.</p>					

**Table 5-5
Summary of Soil Sample Metals Analyses,
January through August 1992**

Contamination Assessment Report
Site 2662W, Naval Aviation Depot
Pensacola, Florida

Compound	SB-1	SB-2	SB-3	SB-4	SB-5	SB-6	SB-7	SB-8	SB-9	SB-11
Arsenic	ND	0.5	1.5	ND	1.5	ND	ND	ND	ND	ND
Cadmium	ND	ND	2.4	ND	ND	ND	ND	ND	ND	ND
Chromium	ND	ND	9.4	ND	ND	ND	ND	ND	ND	ND
Lead	91	62	59	37	280	<2.5	3.5	<2.5	25	16
Compound	SB-12	SB-13	SB-14	SB-15	SB-16	SB-17	SB-18	SB-19	SB-20	SB-21
Arsenic	ND	ND	0.5							
Cadmium	ND	ND	0.5							
Chromium	ND	5.7	ND	0.5						
Lead	3.8	61	140	13	90	24	35	16	27	46
Compound	SB-22	SB-23	SB-24	SB-25	SB-26	SB-27	SB-29	SB-30	SB-31	SB-32
Arsenic	0.8	ND	ND	1.2	1.2	ND	ND	ND	ND	ND
Cadmium	2.5	ND	ND	0.6	ND	ND	ND	ND	ND	ND
Chromium	7.3	ND	ND	ND	5.9	3.6	ND	ND	ND	ND
Lead	130	46	32	48	80	6.8	32	92	12	190
Compound	SB-33	SB-34	SB-35	SB-36	SB-37	SB-38	SB-39	Trench		
Arsenic	ND	0.9	0.7	ND	ND	ND	0.0	2.7		
Cadmium	ND									
Chromium	ND	ND	ND	ND	ND	ND	3.2	3.5		
Lead	10	16	24	18	<2.5	6.1	15	1,200		

Notes: Concentrations reported in parts per million (ppm).
All samples were collected between 2 and 3 feet below land surface (blr).
ND = not detected.

Technical Specification
Spec. No.: 401-SP080-001
Rev No.: 0

ATTACHMENT 3
SOIL TREATMENT CRITERIA

**Table 5-3
Criteria for Thermally Treated Clean Soil**

Parameter	Cleanup Level	
Total Volatile Organic Aromatics	0.1 mg/kg	
Total Recoverable Petroleum Hydrocarbons	10 mg/kg or if exceeded ^a	
Metals	TCLP^b	Total'
Arsenic	5 mg/l	10 mg/kg
Barium	100 mg/l	4940 mg/kg
Cadmium	1 mg/l	37 mg/kg
Chromium	5 mg/l	50 mg/kg
Lead	5 mg/l	108 mg/kg
Mercury	0.2mg/l	23 mg/kg
Selenium	1 mg/l	389 mg/kg
Silver	5 mg/l	353 mg/kg

Source: FAC 17-775.400(1),(2)(a),(2)(b), and FAC 17-775.400Table I

"If exceeded, then the Total Recoverable Petroleum Hydrocarbons will not exceed 50 mg/kg (EPA Draft Method 3540/9073) provided the total of the Polynuclear Aromatic Hydrocarbons does not exceed 1 mg/kg (EPA Method 8100, 8250, 8270, or 8310) and the total of the Volatile Organic Halocarbons does not exceed 50 mg/kg (EPA Method 5030/8021 or 5030/8010).

^bToxicity Characteristic Leaching Procedure

The acid digestion procedure by EPA Method 3050 will be used to prepare soil samples for total metal analyses except mercury, and the extraction procedure by EPA Method 1311 TCLP will be used to determine leachability characteristic of metals.

DEPARTMENT OF THE NAVY
 SOUTHERN DIVISION

 TECHNICAL SPECIFICATION
 FOR
 UNCONTAMINATED EARTHWORK

0	7/21/94	Issued for Use	JK	PD	[Signature]	LBB
NO.	DATE	REASON FOR REVISION	BY	CHECK	SUPV	PE
ORIGIN	 Uncontaminated Earthwork		IOB NO. 22567			
			TECHNICAL SPECIFICATION			REV
			001-SP000-006			0

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**TECHNICAL SPECIFICATION
FOR
UNCONTAMINATED EARTHWORK**

1.0 GENERAL

This specification defines the technical requirements for uncontaminated earthwork. Not all operations defined herein are necessarily required for **this** Subcontract; reference is directed to the contract Scope of Work for specific services required.

This specification includes requirements for

- a) Filling and backfilling for general site work
- b) Building perimeter and site structure backfilling
- c) Consolidation and compaction
- d) Miscellaneous earthwork
- e) Trenching and backfilling for utilities

This specification does not provide requirements for construction of low-permeability clay liners and closure caps, roadway **and** railroad earthwork, and contaminated earthwork, except as referenced by specifications for those activities.

2.0 QUALITY STANDARDS

Publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only. The latest edition at the time of bid, including addendum, shall be effected as a part of **this** specification.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 1556 (1990) Density of **soil in** Place by the Sand-Cone Method

ASTM D 1557 (1991) Moisture-Density Relations of **soils and** Soil-Aggregate Mixtures **Using** 10-lb (4.54-kg) Rammer and 18-in. (457-mm) Drop

ASTM D 2167 (1984) Density and Unit Weight of **soils in** Place by the Rubber Balloon **Method**

ASTM D 2216 (1992) Laboratory Determination of Water (Moisture) Content of **soil**, Rock, and Soil-Aggregate Mixtures

ASTM D 2487 (1992) Classification of **soils** for Engineering Purposes

ASTM D 2922 (1991) **Density** of Soil and Soil-Aggregate in Place by Nuclear Methods
(**Shallow** Depth)

ASTM D 3017 (1988) Water Content of Soil and Rock in Place by Nuclear Methods (**Shallow**
Depth)

ASTM D 4253 (1988) Minimum Index Density of **Soils Using** A Vibratory Table

ASTM D 4254 (1983) Minimum Index Density of **Soils and** Calculation of Relative Density

ASTM D 4318 (1984) Liquid Limit, Plastic Limit, and Plasticity Index of **Soils**

OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION

OSHA 29 CFR 1910 Occupational Safety and Health Regulations for General Industry

OSHA 29 CFR 1926 Occupational Safety and Health Regulations for Construction Industry

3.0 DEFINITIONS

3.1 COHESIONLESS MATERIALS

Cohesionless materials include materials classified in ASTM D 2487 as GW, GP, SW, and SP. Materials classified as GM and SM will be identified as cohesionless **only** when the fines are nonplastic.

3.2 COHESIVE MATERIALS

Cohesive materials include materials classified as GC, SC, ML, CL, MH, and CH.

3.3 DEGREE OF COMPACTION

Degree of compaction required is expressed as a percentage of the maximum density obtained in accordance with **ASTM D 1557** for cohesive materials and as a percentage of relative density obtained in accordance with **ASTM D 4253** and **ASTM D 4254** for cohesionless **materials**.

3.4 EXPANSIVE SOILS

Soils that have a plasticity index equal to or greater than **20** when tested in accordance with **ASTM D 4318**.

3.5 UNYIELDING MATERIAL

Unyielding materials are rock and gravelly soils with stones greater than 6 inches in any dimension or as defined by the pipe manufacturer, whichever is smaller.

3.6 UNSTABLE MATERIAL

Unstable materials are materials too wet to properly support the utility pipe, conduit, or appurtenant structure.

3.7 ROCK

Rock shall consist of (1) boulders measuring approximately 1/2 cubic yard or more, (2) materials that cannot be removed without systematic drilling and blasting, such as rock material in ledges, bedded deposits, unstratified masses, and conglomerate deposits, and (3) below-grade concrete or masonry structures, exceeding 1/2 cubic yard in volume and greater than 9 inches in thickness. Asphaltic or portland cement pavements will not be considered as rock.

3.8 UNSATISFACTORY FILL AND BACKFILL

Unsatisfactory fill and backfill material is defined as material that is (1) too wet or too soft to properly support the associated construction as determined by Bechtel, (2) expansive soils (Section 1.3.4), (3) contaminated, or (4) materials classified in accordance with ASTM D 2487 as PT, OH, and OL (5) stones larger than 3 inches in any dimension, or (6) man-made fills, refuse, or backfills from previous construction.

3.9 BEDDING MATERIAL FOR UTILITIES

Bedding material for utilities shall consist of select granular material or satisfactory materials free from rocks 2 inches or larger in any dimension or free from rocks of such size as recommended by the pipe manufacturer, whichever is smaller. When the pipe is coated or wrapped for corrosion protection, the initial backfill material shall be free of stones larger than 1 inch in any dimension or as recommended by the pipe manufacturer, whichever is smaller.

4.0 SUBMITTALS

4.1 GENERAL

Not all submittals defined herein may be required. Only engineering document requirements as summarized in Exhibit F, Subconnector Submittals Requirements Summary (SSRS), shall apply. Submittals identified shall meet the detailed requirements herein. Bechtel will determine if

documentation is complete as submitted by the Subcontractor and reserves the right to disapprove and require the resubmittal of any submittal that does not meet the specified requirements. Unless indicated otherwise submittals shall be made to Bechtel at least two weeks prior to delivery, use, or implementation.

4.2 TESTING REPORTS

Submit testing reports within **24 hours** of conclusion of physical tests. Submittals shall include two unbound copies of test results, including calibration curves and results of calibration.

4.3 TESTING LABORATORY CERTIFICATIONS AND QUALIFICATIONS

Submit qualifications and certifications of the commercial testing laboratory.

4.4 LIST OF EQUIPMENT

Submit a list of equipment proposed for use. This list shall include the type, size, and rating of the equipment proposed to be used. For compactive rollers, the weight, drum, or wheel size and cleat size, if any, shall also be given.

4.5 ONSITE BORROW PIT OPERATION

Bechtel will provide the information on onsite borrow pit location and available test reports on the borrow material. Proposed operation plans for any onsite borrow pit(s) shall be submitted. The operation plan shall include proposed procedures and plans for water control, erosion and dust control, access road construction and maintenance, equipment type and purpose, and borrow excavation.

4.6 OFFSITE BORROW PIT MATERIALS

Submit the following information on the proposed offsite borrow pit: (1) borrow pit location and address, (2) owner's name and state permit/licensing number, and (3) reports of the **ASTM tests** required to satisfy requirements listed in Section **5.0**.

4.7 AGGREGATE SOURCE

Submit the following information on the proposed offsite aggregate source: (1) aggregate source location and address, (2) owner's name and state permit/licensing number, and (3) reports of the **ASTM tests** required to satisfy the requirements listed in Section **5.0**.

4.8 PROTECTION OF EXISTING FOUNDATIONS

Submit proposed modifications to protect existing foundations in accordance with Section 6.7.4.

4.9 SHORING DESIGN AND CALCULATIONS

Submit proposed shoring design or alternate slope protection methods in accordance with Section 6.7.4.

4.10 SOILS LABORATORY TEST RESULTS

Submit the following laboratory tests results (1) Proctor curves, (2) soil classification test results, (3) relative density test results.

5.0 PRODUCTS

5.1 COARSE AGGREGATE

Coarse aggregate shall consist of clean, well-graded crushed stone with all particles passing the 3" sieve and no more than 5% passing the 1½" sieve. Fines shall be limited to not more than 2 percent by weight passing the No. 4 size sieve.

5.2 BACKFILL

5.2.1 General Backfill

General backfill shall include cohesive or cohesionless materials free of trash, debris, roots or other organic matter, frozen material, stones or other material larger than 4 inches in any dimension, and contamination.

5.2.2 Structural Backfill

Structural backfill shall include materials classified in accordance with ASTM D 2487 as GW, SW, GC, GM, SC, and SM and shall be free of trash, debris, roots or other organic matter, frozen material, and contamination. It shall have no more than 15 percent of the material passing a number 200 sieve, and no material shall exceed 2 inches in any dimension.

5.3 TEMPORARY SEDIMENT BARRIERS

Materials used for sediment barriers shall consist of straw bales, synthetic sediment fencing, geotextile filter fabric made expressly for use as a silt screen, or other suitable materials

reviewed by Bechtel prior to use. Straw bales **shall** not be used for permanent **sediment** barriers unless specifically required by Bechtel.

5.4 SELECT GRANULAR MATERIAL

Select **granular** material shall consist of well-graded sand, gravel, crushed gravel, **crushed** stone, or crushed slag composed of hard, tough, and durable particles and shall contain not more **than** 10 percent by weight of material **passing** a No. **200** mesh sieve and no less than **95** percent by weight **passing** **the** 1-inch sieve. The **maximum** allowable aggregate size shall be **3/4-inch** or the maximum **size** recommended **by** the pipe manufacturer, whichever is smaller.

5.5 PLASTIC MARKING TAPE

Plastic marking tape shall be acid and alkali-resistant polyethylene **film**, 6-inches wide with minimum thickness of 0.004 inch. Tape shall have a minimum strength of 1750 psi lengthwise and 1500 psi crosswise. The tape shall be manufactured with integral wires, foil **backing**, or other means to enable detection **by** a metal detector when the tape is buried in **soil** up to 3 feet deep. The tape shall be of a type specifically manufactured for marking and locating underground utilities. The metallic core of the tape shall be encased in a protective jacket or provided with other metallic core type **to** protect it from corrosion. Tape color shall be as specified below and shall bear a continuous **printed** inspection describing the specific utility.

<u>Tape Color</u>	<u>Utility</u>
Red	Electric
Yellow	Gas, Oil , Dangerous Materials
Orange	Telephone, Telegraph, Television, Police, Fire and Communication
Blue	Water Systems
Green	Sewer Systems

6.0 FIELD OPERATIONS

6.1 PRE-EARTHWORK EVALUATION

Before beginning **any** earthwork, carefully **examine** the work area to identify **any pre-existing** conditions (e.g., overhead power lines, access, etc.) that could **impact** the **performance** and completion of work. Bechtel will provide available **information** concerning the location of underground utilities, and **the** Subcontractor **shall** verify those locations, **coordinate** any required inspection with **utility** companies, provide support to utility companies, and provide **structural** support to utility lines. **Unless** noted otherwise, the Subcontractor shall maintain the services of all underground utilities encountered during excavation activities and shall restore the services to

their **original** condition. The Subcontractor shall obtain **all** applicable **permits** prior to commencing work, unless noted **otherwise in** the contract documents.

6.2 EROSION AND SEDIMENT CONTROL

Erosion and sediment control shall be provided and maintained **in** accordance with the engineering drawings.

Temporary sediment barriers shall be installed and maintained during the construction period until permanent sediment barriers are **in** place. Permanent sediment barriers shall be installed **in** accordance with the engineering drawings.

6.3 CLEARING AND GRUBBING

Clearing and grubbing shall be performed **in** accordance with specification 22567-001-SP000-002.

6.4 TOPSOIL REMOVAL

Topsoil within the designated excavations and grading lines shall be stripped and stockpiled in the designated onsite areas. **The** actual depth of stripping will be determined in the field by Bechtel. Measures (e.g., erosion control, stable slopes, adequate compaction, etc.) shall be taken to prevent **loss** of stockpiled topsoil.

6.5 DRAINAGE, DEWATERING, AND STREAM DIVERSION

6.5.1 Drainage

Surface water shall be directed away from excavation and construction areas. Diversion ditches, check dams, dikes, and/or grades shall be developed and **maintained as** necessary during construction. Excavated slopes and **backfill** surfaces shall be protected to prevent erosion and sloughing.

6.5.2 Dewatering

Unless noted otherwise, all excavations shall be kept **in a** dewatered condition. Groundwater flowing toward or into excavations shall be controlled to prevent sloughing of excavation slopes and walls; boils, uplift, and heave **in** the excavation; and to **eliminate any interference with** the orderly progress of excavation. French drains, sumps, ditches, or trenches will **not** be permitted within three feet of the foundation of **any** existing structure, and **only** with **written Bechtel** approval. Water control measures shall be taken prior to **excavating to** groundwater level **in**

order to ~~maintain~~ the integrity of the ~~in situ material~~. Water collected during dewatering shall be pumped or collected and transported to designated onsite discharge points.

6.5.3 Stream Diversion

Stream diversion(s) shown on engineering drawings shall be developed and maintained.

6.6 BLASTING

Blasting will not be permitted.

6.7 EXCAVATION

6.7.1 General

Excavations shall include the removal of materials to the lines, grades, and elevations indicated on contract documents. Grading shall conform with the typical sections shown on the engineering drawings and the tolerances specified herein. Positioning of heavy equipment, stockpiles, etc. shall be outside the edges of excavation a distance equal to or greater than the full depth of the excavation, unless otherwise allowed by Bechtel.

Excavations shall be maintained until final acceptance of the work by Bechtel.

6.7.2 Classification of Excavation Materials

Materials from uncontaminated excavations shall be unclassified regardless of the nature encountered. Disintegrated rock will not be considered as rock excavation. Excavation materials shall include all materials encountered (e.g., soils, concrete, rock, asphalt, stumps, rubbish, etc.).

6.7.3 Excavation Slopes

Excavation slopes shall be established in strict accordance with OSHA 2207, specifically 29 CFR 1926, Subpart P, "Excavation, Trenching, and Shoring." Slopes shall be protected to prevent erosion or sloughing. Remove and handle any additional material caused by erosion or sloughing.

6.7.4 Shoring

Shoring, including temporary sheet piling, shall be furnished and installed as necessary to protect workers, slopes, adjacent paving structures, and utilities. Shoring design and installation plans, including engineering calculations, shall be developed in accordance with OSHA 2207,

specifically **29 CFR 1926 Subpart P**, and submitted to Bechtel for review. **Shoring, bracing, and sheeting** shall be removed as excavations are backfilled in a manner to prevent cave-ins.

Alternate slope protection methods (e.g., benching, sloping, trench boxes, etc.) may be used where applicable. Proposed alternate methods, including plans and calculations, shall be developed by the Subcontractor in accordance with **29 CFR 1926 Subpart P** and submitted to Bechtel for review prior to implementation.

Shoring inspections, including qualifications and frequency, shall be in accordance with **29 CFR 1926 Subpart P**.

6.7.5 Excavation for Foundation Systems of Structures

Excavations shall extend a sufficient distance from walls and footings to allow for placement and removal of forms. Excavation to final grade shall be performed within **48** hours of subsequent concrete placement. Only excavation methods that will leave the foundation soils in a solid condition shall be used.

6.7.6 Excavation for Utilities

Trench Excavation

Trench walls below the top of the pipe shall be sloped or made vertical as recommended by the manufacturer of the pipe to be installed subject to conformance to **OSHA 2207**, specifically **29 CFR 1926**, Subpart P, "Excavation, Trenching, and Shoring." Trench walls more than **5** feet deep shall be shored, cut back to a stable slope at least equal to the angle of repose, or provided with equivalent means of protection for employees who may be exposed to moving ground or cave in. Special attention shall be given to slopes that may be adversely affected by construction vibration forces, weather conditions, or moisture content. Slopes shall be protected to prevent erosion or sloughing. Remove and handle any additional material caused by erosion or sloughing.

Excavation Widths

The trench width below the top of pipe shall not exceed **24** inches plus pipe outside diameter (O.D.) for pipes of less than **24** inches inside diameter (I.D.) and shall not exceed **36** inches plus pipe (O.D.) for pipes larger than **24** inches (I.D.). Where recommended trench widths are exceeded, redesign, stronger pipe, or special installation procedures shall be utilized.

Rock

Rock in either ledge or boulder formation **shall** be replaced with suitable materials to provide a compacted earth cushion ~~having~~ a thickness between **unremoved rock** and the pipe of at least 9 inches or **1/2** inch for each foot of **fill** over the top **of** the pipe, whichever is greater, but not more ~~than~~ three-fourths the nominal diameter of the pipe. Where bell-and-spigot pipe is used, the cushion shall be maintained under the bell **as well as** under the straight portion of the pipe. Rock faces shall be cleaned of loose debris and cut **to** a **firm** surface either level, stepped, or serrated, **as** shown on the engineering drawings or **as** directed by Bechtel. Loose ~~disintegrated~~ rock and ~~thin~~ strata shall be removed.

Excavation **for** Appurtenances

Excavation for manholes, catch-bash, inlets, or similar structures shall be sufficient to leave at least 12 inches clear between the outer structure surfaces and the face of the excavation or support members of sufficient size to allow the placement and removal of forms for the full length and width of structure footings and foundations as shown on the engineering drawings. Rock shall be cleaned of loose debris and cut to a **firm** surface either level, stepped, or serrated, as shown on the engineering drawings or as directed by Bechtel. Loose disintegrated rock and thin strata shall be removed. Removal of unstable material shall be **as** specified herein. When concrete or masonry is to be placed in an excavated area, special care shall be taken not to disturb the bottom of the excavation. Excavation to the final grade level shall not be made until just before the structure is to be placed.

Bottom Preparation

The bottoms of trenches shall be accurately graded to provide uniform bearing and support for the bottom quadrant of each section of the pipe.

Replacement **of** Unstable and Unyielding **Material**

Where unstable and/or unyielding **material** **is** encountered **in** the bottom **of** the trench, **such** material shall **be** removed to **6** inches below the required grade and replaced with select **granular** material or **initial** backfill material. The select granular **backfill** shall **be** compacted **as** specified in Section **6.10**.

6.7.7 Ditches, Gutters, and Channels

Ditches, gutters, and channel changes shall be cut accurately to the cross sections and grades indicated on ~~the~~ engineering drawings. All roots, **stumps**, rock, and foreign matter in the sides

and or **bottom of ditches, or gutters, and channel changes shall be trimmed and dressed** or removed to conform to the slope, grade, and shape of the section indicated.

6.7.8 Overexcavation

Care shall be taken not to excavate outside the elevations, grades, and lines indicated. Overexcavation shall be backfilled to design grade with general backfill and compacted to a density equal to or greater **than** that required for the subsequent fill material.

6.7.9 Boulders

Unless otherwise directed by Bechtel, boulders shall be removed from excavations for drainage routes and areas of structural backfill.

6.7.10 Stockpiling and Stockpiles

Excavated materials satisfying the requirements of Section 5.2 for backfill shall be transported to and placed in designated fills or stockpiled at Bechtel designated onsite locations. All materials to be stockpiled (e.g., soil and aggregate from offsite sources) shall be placed in areas that have been cleared and grubbed.

Stockpiles shall be kept in a neat and well drained condition, giving due consideration to drainage. Excavated satisfactory and unsatisfactory materials **shall** be stockpiled separately. Stockpiles of satisfactory materials shall be protected from contamination. If the material in the stockpile becomes unsatisfactory for use as backfill, such material shall be removed and replaced with satisfactory material **from** approved sources. Locations of stockpiles of satisfactory materials shall be subject to prior approval of Bechtel.

6.8 SUBGRADE PREPARATION

Subgrades in structural areas **shall** be proof-rolled prior to placement of **fill**. Unsatisfactory material identified by proof-rolling shall be removed and replaced with general backfill and compacted in accordance with this specification to meet the compaction requirements for subsequent **fill** material.

Slopes steeper **than** 1 vertical to 4 horizontal shall be stepped or benched during placement of lifts so that the fill material will bond with the existing material.

The subgrade material shall be scarified **in** accordance with Section 6.10.2.

6.9 BORROW AND AGGREGATE MATERIAL

Unless directed otherwise, all borrow material shall be obtained ~~from onsite~~ areas designated by Bechtel. Subcontractor shall clear, grub, dispose of all debris, and control surface water flow and erosion of borrow areas. All work shall be considered operations related to onsite borrow excavation and shall be performed in accordance with applicable portions of this specification.

If required by Bechtel, the Subcontractor shall identify offsite borrow and/or aggregate sources, provide to Bechtel for review certification that borrow/aggregate material meets the requirements of this specification, and transport material to the fill area. No borrow and/or aggregate shall be brought from an offsite source without prior written approval by Bechtel.

6.10 BACKFILLING

6.10.1 General

Unless noted otherwise in contract documents, general fill and backfill shall be used in bringing fills and excavations to the lines and grades indicated and for replacing unsatisfactory subgrade materials. Compaction shall be accomplished by segmented pad foot rollers, pneumatic-tired rollers, steel-wheeled rollers, or other Bechtel reviewed equipment suited to the type of material being compacted. Backfill shall be placed in horizontal layers not exceeding 8 inches in loose thickness when using conventional compaction equipment or 6 inches when using hand-operated compaction equipment. Backfill shall not be placed on unsatisfactory materials.

Each lift shall be moisture conditioned or aerated as necessary and compacted to not less than the percentage of maximum density specified below:

- a) General and trench fill using cohesionless material (e.g., cover soil) shall be compacted to at least 70% relative density.
- b) General and trench fill using cohesive material (e.g., cover soil) shall be compacted to at least 85% maximum density.
- c) Structural fill using cohesionless material (e.g., buildings, steps, paved areas, sidewalks, footings, trenches, etc.) shall be compacted to at least 85% relative density.
- d) Structural fill using cohesive material (e.g., buildings, steps, paved areas, sidewalks, footings, trenches, etc.) shall be compacted to at least 95% maximum density.
- e) Bedding material for utilities shall be compacted to at least 85% relative density.

Compacted subgrades **that** are disturbed by the Subcontractor's operations **shall** be repaired **as** specified **herein** to the required density prior to further construction thereon.

6.10.2 Scarifying

All subgrades and compacted lifts **in** the following applications **shall** be scarified 3 to 4 inches prior to placement of the subsequent lift: (a) embankments, (b) roadway routes, (c) railway routes, and (d) fill areas adjacent to and immediately below structural foundations.

In lieu of scarifying, compaction **may** be performed by sheepsfoot roller or **similar** equipment designed to compact the lift from the bottom to the top.

6.10.3 Additional Requirements for **Structural** Backfilling

Structural backfilling shall not **begin** until construction below finish grade has been inspected by Bechtel, **forms** removed, and the excavation cleaned of trash and debris.

Backfill adjacent to structures shall be placed and compacted **uniformly** in such manner as to prevent wedging action or eccentric loading upon or against the structures. Backfill shall not be placed against concrete or masonry foundation walls prior to 7 days after completion of the walls. To the extent practical, backfill shall be brought up evenly on both sides of walls and sloped to drain away **from** the wall. Construction equipment and methods that will overload immediate and adjacent structures during backfilling and embankment formation operations shall not be used.

6.10.4 Additional Requirements **For** Trench Backfiing

General

Trenches shall be backfilled to the grades shown on **engineering** drawings and **in** the following order. The bedding material shall be placed, followed by the initial **backfill**, and completed by the **final** backfill. **Lift** thickness shall be **as** specified in Section 6.10.1.

In compacting **by** rolling or operating heavy equipment parallel with the pipe, displacement of or injury to the pipe shall be avoided. Construction **machinery** **shall** not **be** moved over a culvert or storm drain at any stage of construction **in** a manner that might damage the culvert or **drain**. Any damaged pipe shall be repaired or replaced.

Bedding

Bedding shall be select granular material **as** described **in** Section 5.4. Care shall be taken to ensure thorough compaction of the bedding under the haunches of the pipe. Bedding material

shall be placed and compacted with approved tampers to a height of 1 foot above the utility pipe or as specified on the engineering drawings. The bedding surface for the pipe shall provide a firm foundation of uniform density throughout the entire length of the pipe. The joints and/or couplings shall be left uncovered during pressure tests.

Final Backfill

Final backfill shall not be placed until all specified tests are satisfactorily performed. The remainder of the trench, except at roadways and railroads shall be filled with satisfactory material. Backfill material shall be placed and compacted to grade in accordance with Section 6.10.

Backfill for Appurtenances

Manholes, catch basins, inlets, or similar structures shall be placed in such a manner that the structure will not be damaged by the shock of falling earth while backfilling. Backfill material shall be deposited and compacted as specified for final backfill and shall be brought up evenly on all sides of the structure to prevent eccentric loading and excessive stress.

Plastic Marking Tape

Plastic marking tape per Section 5.5 shall be installed directly above the pipe, at a depth of approximately 18 inches below finished grade unless otherwise shown on the engineering drawings.

6.11 AGGREGATE BASES

Aggregate bases shall be constructed under pavements, foundations, and slabs-on-grade and placed directly on the subgrade. The aggregate base shall be placed in 4 inch lifts and compacted with a minimum of two passes of a hand-operated plate-type vibratory compactor or equivalent compactive effort. Minimum compacted thickness of the aggregate base is 4 inches unless noted otherwise.

6.12 GRADING

Graded areas shall be constructed true-to-grade, shaped to drain, and maintained free of trash and debris until final inspection has been completed and the work has been accepted. The surfaces of embankments and excavations shall be finished to a smooth and compact surface in accordance with the lines, grades, and cross sections or elevations shown on engineering drawings. Unless indicated otherwise, tolerances for all graded areas shall be \pm 0.1 foot for the grades and elevations indicated.

6.13 PROTECTION OF WORK

Settlement or erosion that occurs in backfilled, filled, graded, or topsoiled areas prior to acceptance of the work shall be repaired to required conditions at Subcontractor's expense.

6.14 SECURITY

When necessary and practical, as determined by Bechtel, work areas shall be secured using barriers (e.g. rope, snow fence) to prevent inadvertent entry to work areas.

7.0 QUALITY CONTROL AND VERIFICATION

7.1 RESPONSIBILITY

The Subcontractor shall verify that placement of backfill meets the requirements of this specification. Unless noted otherwise, testing shall be the responsibility of the Subcontractor and shall be considered part of earthwork.

7.2 TESTING LABORATORY

Testing shall be performed by a Bechtel approved commercial testing laboratory.

7.3 MOISTURE-DENSITY RELATION

Moisture-density relation shall be determined in accordance with ASTM D 1557 for each type of material or source of material, including borrow materials, to determine the optimum moisture and laboratory maximum density values.

7.4 IN-PLACE MOISTURE CONTENT

In-place moisture content of soil backfill shall be determined in accordance with ASTM D 3017. Accuracy of the ASTM D 3017 tests shall be checked by performing ASTM D 2216 test for every ten ASTM D 3017 tests performed.

7.5 IN-PLACE DENSITY

Field in-place density shall be determined in accordance with ASTM D 2922. Accuracy of the ASTM D 2922 tests shall be checked by performing one ASTM D 1556 or ASTM D 2167 test for every ten ASTM D 2922 tests performed.

When **ASTM D 2922** is used, the calibration curves shall be checked and adjusted if necessary by the procedure described in **ASTM D 2922**, paragraph **ADJUSTING CALIBRATION CURVE**. The calibration curves furnished with the moisture gauges shall also be checked, along with density calibration checks, as described in **ASTM D 3017**. The calibration checks of the density and moisture gauges shall be made at the beginning of a job on each different type of material encountered and at the beginning and ending of each day that the equipment is used.

Additional compaction and/or moisture conditioning shall be performed if the compaction or slope stability do not satisfy the requirements of this specification.

7.6 TESTING FREQUENCY

The following number of tests, if performed at the appropriate time, shall be the minimum acceptable for each type operation.

7.6.1 Moisture-Density Relation

- a) One representative test per 5,000 cubic yards of fill and backfill or when any change in material occurs that may affect the optimum moisture content or laboratory maximum density.
- b) One representative test per 1,500 cubic yards of bedding, fill and backfill for the utility excavation or when any change in material occurs that may affect the optimum moisture content or laboratory maximum density.

7.6.2 In-Place Density of Subgrades

- a) One test per 40,000 square feet or a minimum of 2 tests per area, whichever is greater, for subgrades of general backfill.
- b) One test per 20,000 square feet or a minimum of 2 tests per area, whichever is greater, for subgrades of structural backfill.
- c) The in-place density of subgrades of trenches and other areas less than 10 feet in width, shall be tested with 1 test per 1,000 square feet or one test for each 100 linear feet of length, whichever yields the greater number of tests.

7.6.3 In-Place Density and Moisture Content of Fills and Backfills

- a) One test per 20,000 square feet or minimum of 1 test per lift, whichever is greater, for general backfill areas compacted by other than hand or hand-operated machines.

- b) One test per 10,000 square feet or **minimum** of 1 test per lift, whichever **is** greater, for general backfill areas compacted **by** hand or handsperated machines.
- c) One test per 2,000 square feet or **minimum** of **2** tests per lift, whichever is greater, for structural backfill areas compacted **by** other **than** hand or hand-operated machines.
- d) One test per 1,000 square feet or **minimum** of **2** tests per lift, whichever **is** greater, for structural backfill areas compacted by hand or hand-operated machines.
- e) The density of each lift of backfill materials for trenches, pits, building perimeters, or other structures or areas less than 10 feet in width, and compacted with hand or hand-operated machines shall be tested with 1 test per each **area** less than 1,000 square feet, or one test for each 100 linear foot of length, whichever is greater.

7.6.4 Particle-Size Analysis

A minimum of one particle-size analysis shall be performed or data shall be provided for each different type of material to be used for bedding and backfill.

7.7 TEST RESULTS

Test results for a lift shall be submitted for review prior to placement of the next **lift** above that area. Approved lifts shall be covered by subsequent lifts within **24** hours of testing to protect the compacted condition of the fill. **Any** lift left exposed for longer than **24** hours shall be removed and replaced.

DEPARTMENT OF THE NAVY

SOUTHERN DIVISION

TECHNICAL SPECIFICATION

FOR

TURF ESTABLISHMENT

0	6/17/94	Issued for use	NAC	KIC	USA JRM
NO.	DATE	REASON FOR REVISION	BY	CHECK	SUPV PE
ORIGIN		TURF ESTABLISHMENT	JOB NO. 22567		
			TECHNICAL SPECIFICATION		Rev.
			001-SP000-011		0

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TURF ESTABLISHMENT

1.0 GENERAL

This specification provides requirements for **turf** establishment. Not **all work** defined herein is necessarily required; reference is made to the Scope of Work for specific services required.

This specification applies to temporary and permanent turf establishment for general use (e.g., fields, roadsides). It does not apply to closure caps or other special applications.

2.0 QUALITY STANDARDS

The publications listed below form a part of this specification to the extent referenced. The latest revision at the time of bid shall be effective as part of this specification.

AGRICULTURAL MARKETING SERVICE (AMS)

AMs-01 Federal Seed Act regulations (Part **20**):
Certified Seed Regulations

FEDERAL SPECIFICATIONS (FS)

FS JJJ-S-181 Seeds, Agricultural

FS C-F-241 Fertilizers, Mixed, Commercial

3.0 SUBMITTALS

3.1 GENERAL

Not **all submittals** defined herein may be required. **Only** engineering document requirements as summarized in Exhibit F, Subcontractor Submittals Requirements Summary (SSRS), shall apply. Bechtel will determine whether documentation is complete as submitted and reserves the right to disapprove and require resubmittal of **any** submittals that **do** not meet requirements specified herein. Unless indicated otherwise in the **work** control documents, the following submittals shall be made to Bechtel at least **2** weeks before use or delivery to the **jobsite**.

3.2 MANUFACTURERS' LITERATURE

Required submittals include manufacturers' literature describing physical characteristics, application, and installation for erosion control materials; and material safety data sheets for **any** materials, as appropriate.

3.3 . CERTIFICATES

Certificates of compliance shall be submitted certifying that specifications for the following materials meet requirements specified in Section 4.0:

- e **Seed:** identification-of seed, percent of pure live seed, minimum percent of germination and **hard** seed, maximum percent of weed seed content, date tested, and state certification
- e **Fertilizer:** certified chemical analysis, composition percent, **and** manufacturer's name **and** address
- e Agricultural **limestone:** calcium carbonate equivalent, certified chemical **analysis, and** supplier name and address

4.0 MATERIALS

Only those materials specified herein or otherwise allowed by Bechtel shall be used. Pesticides, herbicides, and other nonspecified chemicals shall not be delivered to the site without prior Bechtel approval.

Materials shall be subject to inspection upon arrival at the jobsite for conformity to the specification. Unacceptable materials shall be removed from the jobsite immediately and replaced at the supplier's expense.

Materials shall be stored in onsite areas designated by Bechtel **and** in accordance with manufacturers' recommendations unless directed otherwise by Bechtel.

Except for bulk deliveries, materials shall not be dropped or dumped from vehicles.

4.1 SEED

4.1.1 Seed Classification and Quality

Seed shall **be** state-approved seed of the latest season's crop **and** shall be provided in original sealed packages bearing the producer's guaranteed analysis for percentages of mixture, purity, germination, hard seed, weed seed content, **and** inert material. **Labels shall be** in conformance with AMS-01 and applicable state seed **laws**.

Weed seed shall not exceed 1 percent by weight of the total mixture. Wet, **moldy, unlabelled, or** otherwise damaged seed shall be rejected and removed from the site. The percent of pure live seed **and** germination rates shall **be** such that application rates given below are for viable seed.

4.1.2 Temporary Seed

Seed requirements, broadcast rates and planting schedules for temporary seeding shall be as specified in Scope of Work.

4.1.3 Permanent Seed

Seed requirements, broadcast rates and planting schedules for permanent seeding shall be as specified in Scope of Work.

4.2 SOIL AMENDMENTS

4.2.1 Limestone

Limestone shall be agricultural limestone and shall have a minimum calcium carbonate equivalence of 90 percent.

4.2.2 Fertilizer

Fertilizer shall be commercial grade, granular, free flowing, uniform in composition, and conforming to FS 0-F-241. Unless indicated otherwise by soil tests, fertilizer composition shall be as specified in Scope of Work.

4.3 MULCH

Mulch shall be free from weeds, mold, and other deleterious materials, conforming to the following:

4.3.1 Straw

Straw shall be stalks from oats, wheat, rye, barley, or rice furnished in air-dry condition and with a consistency for placing with commercial mulch-blowing equipment.

4.3.2 Hay

Hay shall be native hay, Sudan-grass hay, broomsedge hay, or other herbaceous mowings furnished in an air-dry condition suitable for placing with commercial mulch-blowing equipment.

4.3.3 Wood Cellulose Fiber

Wood cellulose fiber for use in hydroseeding applications shall not contain any growth- or germination-inhibiting factors and shall be dyed an appropriate color to facilitate visual metering during application. Composition on air-dry weight basis shall be 9 to 15 percent moisture with a pH range from 4.5 to 6.0.

4.4 WATER

Bechtel will identify **an** onsite water source (i.e., hydrant or pond). **A** water truck may **be** required to transport water **from** the source to the work area. Water shall not contain elements toxic to plant life.

4.5 EROSION CONTROL MATERIAL

Soil erosion control material shall conform to the following requirements:

4.5.1 Soil Erosion Control Blanket

The control blanket shall be a machine-produced mat of wood excelsior formed from a web of interlocking wood fibers, covered on one side **with** either (1) knitted-straw, blanket-like mat construction, (2) biodegradable plastic mesh, or (3) interwoven biodegradable thread, plastic netting, or twisted kraft paper cord netting.

4.5.2 Soil Erosion Control Fabric

The control fabric shall be a knitted construction of polypropylene yarn with mesh openings of approximately 1/2 to 1 in.² with filler strips **of** biodegradable paper that shall last 6 to 8 months.

4.5.3 Soil Erosion Control Net

The control net shall **be** heavy, twisted jute mesh weighing approximately 1 to 2 lbs per linear yard and approximately 4 ft **wide** with mesh openings of approximately 1 in.².

4.5.4 Anchors

Erosion control anchor material shall be **as** recommended by the manufacturer of the erosion control material.

4.6 TOPSOIL

Topsoil shall **be** either from onsite sources or **offsite** sources, **as** determined by Bechtel.

Topsoil from onsite sources shall be either (1) surface **soil** that has been stripped **and** stockpiled on **the** site in accordance with Specification 001-SP000-006, "Uncontaminated Earthwork," or (2) **soil** from other onsite sources, **as** determined by Bechtel.

Topsoil from offsite sources shall be natural, friable soil, suitable for the vigorous growth **of** vegetation and representative **of** productive soils in the vicinity. It shall **be** obtained **from** well-drained borrow areas approved by Bechtel **and** shall be free of **any** admixture **of** subsoil, foreign matter, trash, debris, stumps, rubbish, objects and stones larger than 2 in. in any dimension,

toxic substances, frozen material, contamination, and any material that may be harmful to plant growth. Topsoil shall not be from stockpiles of mixed sources unless each source is identified and meets the requirements of this section. The pH range shall be **5.5** to **7.6**. Topsoil that does not meet the pH limit shall be amended based on soil tests.

4.7 SOD

Unless noted otherwise on the construction drawings, sod shall be as specified in Scope of Work.

Sod shall be free of weeds and undesirable, coarse, weedy grasses. Wild native or pasture grass sod shall not be used.

Sod shall be harvested, delivered, and installed within a 36-hour period, unless approved otherwise by Bechtel.

5.0 FIELD OPERATIONS

5.1 GRADING

Before beginning turf establishment, the prerequisite earthwork (e.g., excavation, backfilling, grading) shall be completed in accordance with Specification 001-SP000-006, "Uncontaminated Earthwork," and the construction drawings. Turf establishment shall not commence until Bechtel has released the area.

Topsoil shall be used for repair of erosion or grade deficiencies. Finished grades shall be approximately 1 in. below the adjoining grade of any surfaced (e.g., paved) area. Finished grade shall be blended to existing areas. The top surface shall be loose and ready to accept seed.

Debris and stones shall be removed from field areas to the extent necessary to prepare the areas for turf establishment and match surrounding areas.

Finished graded areas shall be protected from damage by vehicular or pedestrian traffic and erosion..

5.2 APPLICATION OF SOIL AMENDMENTS

5.2.1 Soil Testing

A soil test shall be performed for pH, chemical analysis, and mechanical analysis to establish the quantities and type of soil amendments required to meet local growing conditions for the type and variety of turf specified.

5.2.2 Limestone

Limestone shall be applied at the rate recommended by the soil test, not to exceed 2,000 lb/acre (50 lb/1,000 ft²) in a single application. Limestone shall be incorporated into the soil **as part** of the tillage operation. The generation of dust during application shall be minimized.

5.2.3 Fertilizer

Fertilizer shall be applied at the rate recommended by the soil test or as specified in the scope of work. Fertilizer shall be incorporated into the soil **as part** of the tillage or hydroseeding. Dusting during application shall be minimized.

5.3 TILLAGE

Scarify, disk, harrow, rake, or otherwise work each area to be seeded until the soil has **been** loosened **and** pulverized to a minimum depth of **4** inches.

5.4 SEEDING

5.4.1 General

Surfaces shall be smoothed and cleared of all trash, debris, roots, brush, wire, grade stakes, and other objects that would interfere with planting, fertilizing, or maintenance operations.

Before seeding, **any** previously prepared seedbed areas compacted or damaged by rain, traffic, or other cause shall be reworked to restore the ground condition previously specified. Seeding operations shall not take place when wind will prevent uniform seed distribution.

Seed **shall** be **sown** during **the** time period directed by Bechtel. The preferred period **for** best growth is shown in Scope of Work. Bechtel, however, may direct that seed be sown at different **times**.

5.4.2 Seed Application

Seed shall be uniformly applied by broadcasting, drilling with a cultipack-type seeder, **or** hydroseeding.

5.5 MULCH

5.5.1 Straw or Hay Mulch

Straw or hay mulch shall **be** spread uniformly **at** the rate **of 2** bales (100 lb. minimum) per 1,000 square feet. Mulch shall be spread by hand, blower-type mulch spreader, or other approved method. Mulching shall be started on the windward side of relatively flat areas or **on** the upper

part of a steep slope and continued uniformly until the area is covered. The mulch shall not be bunched. All seeded areas shall be mulched on the same day as the seeding.

5.5.2 Wood Cellulose Fiber

Wood cellulose fiber mulch for use with the hydraulic application of seed and fertilizer shall be applied as part of the hydroseeding operation at a rate recommended by the manufacturer.

5.6 SODDING

Prior to sodding, any previously prepared areas compacted or damaged by rain, traffic, or other cause shall be restored to the condition previously specified.

Sod shall be placed during the time period directed by Bechtel.

Sod shall be placed in the areas designated on the construction drawings.

The operation of laying, tamping, and irrigating sod shall be completed on the same workday. During periods of excessively high temperature, the soil shall be lightly moistened immediately before the sod is laid.

The first row of sod shall be laid in a straight line with subsequent rows placed parallel to and tightly wedged against each other. Lateral joints shall be staggered. Sod shall not be stretched or overlapped, and all joints shall be butted tight. On sloping areas where erosion may be a problem, sod shall be laid with the long edges parallel to the contour and with staggered joints.

Sod shall be secured by tamping and pegging or other approved methods. As sodding is completed in any one section, the entire area shall be rolled or tamped to ensure solid contact of roots with the soil surface.

Sod shall be watered immediately after rolling or tamping until the underside of the new sod pad and soil surface below the sod are thoroughly wet.

5.7 TURF ESTABLISHMENT PERIOD

5.7.1 Commencement

The turf establishment period shall begin on completion of the last day of turfing operations. The turf establishment period shall be minimum of 8 weeks.

5.7.2 Protection of Turfed Areas

Immediately after turfing, the area shall be protected against traffic or other use by erecting barricades and signs as necessary.

5.7.3 Maintenance During Establishment Period

General

Maintenance of the turfed areas shall include protecting embankments **and** ditches from erosion; maintaining erosion control materials and mulch; protecting turfed areas from traffic; and mowing, watering, and postfertilization.

Mowing

The first mowing should not be attempted until plants are firmly rooted. No more than one-third of the grass leaf shall be removed by the initial mowing. Mowed height shall be a minimum of 4 inches.

Watering

The frequency of watering and quantity of water shall be adjusted in accordance with the growth of the turf and precipitation. Runoff, puddling, and wilting shall be minimized.

Watering for seeded areas shall be at intervals to maintain a moist soil condition to a minimum depth of 1 in. until growth occurs over most of the area. Afterwards, watering shall be as necessary to ensure establishment.

Watering for sodded areas shall be at intervals to maintain a moist condition to a depth of 4 in. for the first week. Afterwards, watering shall be as necessary to ensure establishment.

Postfertilization

Fertilizer shall be applied at the rate specified in Scope of Work.

Repair

Eroded, damaged, or barren areas shall be reestablished to meet the requirements of this specification. Mulch shall also be repaired or replaced as required.

5.8 EROSION CONTROL

5.8.1 Erosion Control Material

Erosion control material, where indicated **or** required, shall be installed in accordance **with the** manufacturer's instructions. The erosion control material shall be placed without damage to installed material and without deviation to finished grade.

5.8.2 Temporary Turf Cover

When there are contract delays in the turfing operation or a quick cover is required to prevent erosion, a temporary turf cover shall be established over areas designated by Bechtel. Soil amendments shall be applied at one-half the specified rate for permanent seedings. Seed shall be uniformly broadcast and applied using the products specified in Section 4.1.2. The area shall be watered as required.

For emergency situations, as determined by Bechtel, alternate seeding mixes and/or methods may be used to the extent allowed by Bechtel.

5.9 RESTORATION AND CLEANUP

Existing turf areas, pavements, and facilities that have been damaged from the turfing operation shall be restored to the original condition as required by Bechtel.

Excess and waste material shall be removed from the planted area and disposed of offsite. Adjacent paved areas shall be cleaned.

5.10 INSPECTION AND ACCEPTANCE

Before the completion of the turf establishment period, a preliminary inspection will be performed by Bechtel. An unacceptable stand of turf resulting from products or execution out of compliance with this specification shall be repaired as directed by Bechtel as soon as turfing conditions permit. Bechtel shall be notified when deficiencies are corrected.

For seeding, if the planting is less than 75 percent successful, rework the soil, refertilize, reseed, and remulch, in accordance with the provisions of this specification.

Bare spots from sodding shall be no larger than 6 inches square. The total bare spots shall not exceed 2 percent of the total sodded area.

Bechtel will perform a final inspection to determine whether deficiencies noted in the preliminary inspection have been corrected. If no deficiencies are noted during the initial inspection, a final inspection will not be necessary.

DEPARTMENT OF THE NAVY

SOUTHERN DIVISION

TECHNICAL SPECIFICATION

FOR

SURVEYING SERVICES

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TECHNICAL SPECIFICATION FOR SURVEYING SERVICES

1.0 GENERAL

Not all activities defined herein may be required. Only those activities required in the applicable Subcontract Scope of Work and engineering drawings for specific service shall apply.

2.0 ABBREVIATIONS

The abbreviations listed below, where used in this specification, shall have the following meaning:

NOAA	National Oceanic and Atmospheric Administration
USGS	United States Geological Survey
ASCII	American Standard Code for Information Interchange
CADD	Computer Aided Design and Drafting
DOS	Disk Operating System
IGDS	Interactive Graphic Design Software
NAD	North American Datum

3.0 QUALITY STANDARDS

- 3.1** Unless otherwise specified or shown, the following code and standard of the latest issue at the time of bid shall apply to the extent indicated herein:
- NOAA Classification, Standards of Accuracy, and General Specification of Geodetic Control Surveys, **1974**
- 3.2** Standards of accuracy for all survey work shall be in accordance with NOAA standards and the minimum accuracy set forth below. The horizontal accuracy for location of all grid intersections and planimetric features shall be (\pm) 0.1 feet. Bench mark elevation accuracy and elevation accuracy of other permanent items (e.g., structures, pavements, etc.) shall be \pm 0.01 feet.
- 3.3** All work shall be performed under the direct supervision of a Land Surveyor registered in the state where the work is located. Survey crew personnel shall be competent and experienced in performing land survey work.
- 3.4** Horizontal ground control surveys shall be based on NAD **83**. State Plane coordinates shall be computed for NAD **83**, NAD **27**, and any applicable BEI project coordinate system. Vertical ground control surveys shall be based on NAD **29**. Elevations shall be computed for NAD **29**. All coordinates and elevations shall be stated in English units of measure (Decimal Feet).

- 3.5 Drawings and calculations (except for originals) submitted by the Subcontractor shall be signed, sealed, and certified by a Land Surveyor registered in the **state** where the work is located.

4.0 SUBMITTALS

- 4.1 Not all submittals defined herein may be required. **Only** engineering documentation requirements **as** summarized on the Subcontractor Submittal Requirements Summary (SSRS), Exhibit "F", shall apply. Submittals identified shall meet the detailed requirements listed herein. BEI will determine if documentation **is** complete **as** submitted by the Subcontractor, and reserves the right to reject and require resubmittal of any submittal that does not meet the Subcontract requirements.
- 4.2 Submittal of data on magnetic storage media shall be accompanied by a hard copy list of the media contents and **a** letter of transmittal including the following:
- Subcontract number
 - **A** description of contents per the Subcontract
 - Number and type of items (floppies, etc.)
 - Note if the submittal is a resubmittal

5.0 MATERIALS

5.1 CONCRETE MONUMENTS

Concrete monuments shall be as shown on Attachment C or an equivalent as approved by BEI prior to use. Concrete shall have a minimum 28-day compressive strength of 3000 psi.

5.2 MAGNETXC MEDIA

Floppy disk: **5 1/4" (1.2 MB)** or **3 1/2" (1.44 MB)**, **DOS 3.3** or higher. **DOS** backup for files greater than 1.44 MB.

5.3 FIELD BOOKS AND DATA SHEETS

The necessary field data shall be recorded by the surveyor in a standard field book or on standard surveying data sheets using generally accepted surveying field note recording practices. Corrections **to** field books shall be made by **marking** through the **incorrect** data, writing the correct data above it, and initialing. Erasure of field data **is** not acceptable.

5.4 XRON PINS

Iron pins shall consist **of an** 18-in. length of reinforcement steel (minimum **#5**) or equivalent.

5.5 METAL MONUMENTS

Metal monuments shall be as indicated on the engineering drawings.

5.6 WOODEN HUBS

Wooden hubs shall be 2 in. × 2 in., at least 8 in. long, milled from solid lumber, and shall be pointed on one end. Approved substitutes may be used with the permission of the BEI Site Superintendent.

5.7 WOODEN STAKES

Wooden stakes shall be 1 in. × 2 in., at least 3 ft long, milled from solid lumber, and shall be pointed on one end. Wooden stakes shall be clearly marked with bright orange weatherproof flagging and paint. Approved substitutes may be used with the permission of the BEI Site Superintendent.

5.8 MISCELLANEOUS

Miscellaneous materials (e.g., P-K nails, flagging, etc.) shall be of the type and quality normally used for land survey work.

6.0 EQUIPMENT

The Subcontractor shall maintain sufficient equipment, materials, parts, tools, and supplies to meet the requirements of the work. Surveying equipment shall be subject to inspection by BEI and, if deemed unsatisfactory, shall be removed from the site and replaced by satisfactory equipment. Surveying instruments (level, transit, EDM, etc.) shall have been inspected and calibrated by an authorized manufacturer's representative not more than six months prior to the survey; the Subcontractor shall submit a certificate of compliance for each instrument to BEI at the beginning of the Subcontract.

7.0 FIELD OPERATIONS

- 7.1 The Subcontractor shall verbally notify BEI in advance of commencing survey work and shall provide a minimum of 24 hours notice to BEI when it is necessary to enter private-property.
- 7.2 When any survey work is conducted during the construction period, the Subcontractor shall employ all possible means to minimize interference with construction work by others. Any damage to facilities caused by the Subcontractor shall be repaired or replaced at the expense of the Subcontractor.
- 7.3 Pertinent data and information obtained and/or established during the boundary, grid, contour and planimetric surveys shall be shown on the drawings and submitted to BEI on magnetic media in accordance with this specification.

8.0 OFFICE WORK

- 8.1 For digital maps, drawings, data, and other surveying, the Subcontractor may be required to provide and accept design files for Intergraph and/or Autocad.

- 8.2 Digital map data shall be input into a SINGLE 3D design file and shall be placed on designated levels in accordance with a BEI CADD Level Index Record as described in Attachment A.
- 8.3 The digital map shall utilize state plane coordinates based on NAD 27 and elevations based on NAD 29.
- 8.4 Map data shall be input into the design file at a scale ratio of 1:1 and any patterning, cells, text, or other scale dependent items shall be sized for a plot scale of 1" = 20' and a minimum lettering size of 1/8" in height.
- 8.5 Line Strings shall be used for linear features; shapes for enclosed features (buildings, ponds, etc.); arcs should only be used when standard radii are given (curb intersections, etc.). Curve strings should not be used.
- 8.6 Linear patterning of features such as railroads, fences, etc. is not required. If any linear patterns are used, they must retain the original element (class 5) intact when pattern display is turned off. All symbols shall be cells from the BEI-provided cell library.
- 8.7 Active attributes (color, line code, weight, font, etc.) shall be set to zero unless otherwise specified in Attachment A. Map features shall not be clipped around text or symbols.
- 8.8 All drawing files shall be based on the state plane coordinates system using the global origin and working units set up in the BEI-provided "state" .STP design files.
- 8.9 The Subcontractor shall place his own drawing format around the digital map with a legend, date, notes on accuracy, and any miscellaneous notes.
- 8.10 The Subcontractor shall submit one digital copy of the digital map to BEI for review and comment. Once Subcontractor has incorporated comments, he shall submit one digital copy of the digital map within one week to BEI along with a Letter of Certification for the map that is signed, sealed, and certified by a registered Land Surveyor.
- 8.11 The Subcontractor shall reduce field notes and perform all calculations required to develop the information needed in each type of survey. Field books and data sheets will become the property of BEI at the close of the Subcontract.
- 8.12 When electronic equipment is used to store survey data, a printout of the data (with notations to identify and explain data) and magnetic media containing the data in an ASCII format shall be submitted.
- 8.13 Drawings shall be submitted to BEI within ten (10) working days from the completion of the survey.

9.0 BOUNDARY SURVEYS

9.1 FIELD OPERATIONS

- 9.1.1 The Subcontractor shall perform surveys and deed research necessary to define the property boundaries for the properties shown on the drawings and **as** directed by **BEI**.
- 9.1.2 Coordinates for **all** boundary surveys shall be based on the local state'plane coordinate system.
- 9.1.3 Concrete or metal monuments or iron pins, **as** indicated on the engineering drawings, shall be set at each property comer not having a permanent marker.

9.2 OFFICE WORK

9.2.1 Drawings for boundary surveys shall show:

- Major structures (buildings, storage **tanks**, etc.)
- Property comers and lines
- Tie to closest street intersection
- State plane coordinates for two property owners
- Property line dimensions, political boundaries, bearings, and other miscellaneous data pertinent to the boundary survey

10.0 GRID SURVEYS

10.1 FIELD OPERATIONS

- 10.1.1 The Subcontractor shall perform grid surveys within the limits and at the intervals shown on the drawings or **as** directed by **BEI**.
- 10.1.2 Unless noted otherwise on the engineering drawings, the intersection of the grid-lines shall be marked with wooden hubs driven flush with the ground to a minimum depth of **8** inches. Where wooden hubs cannot be driven, **P-K** nails or chiseled crosses shall be used to establish grid intersection points. The coordinates and elevations of the hubs at the grid points shall be established, recorded, and marked on wooden stakes driven within **12** inches of said hubs. The Subcontractor shall establish a bench ~~mark~~ within the property at the location shown on the drawings or **as** directed by **BEI**. The Subcontractor shall not **use** spray paint ~~marking~~ on buildings, structures, or pavements.
- 10.1.3 Where the grid intersection location is obstructed by physical barriers, wooden hubs shall be set on the grid line to mark the obstruction. The coordinates and ground surface elevation at these points shall be established, recorded, and marked as described above.
- 10.1.4 Coordinates for grid surveys shall be based on the coordinate system shown on the drawings; at least two coordinates for grid surveys shall be tied into the local state plane coordinate system.

10.1.5 The grid shall be referenced to permanent features within or immediately adjacent to the survey area so that the grid may be readily reestablished in the event that it is removed or disturbed.

10.2 OFFICE WORK

10.2.1 Drawings and documentation for grid surveys shall show:

- **Plan** of area grid
- Coordinates and elevations of grid intersection points and of other points along the grid lines shown in tabular form
- Grid lines and all other miscellaneous data pertinent to the grid survey
- Property lines and major structures (buildings, storage **tanks**, etc.)
- Ties to the state plane coordinate system sufficient to enable the survey to be reestablished at a future date

11.0 CONTOUR SURVEYS

11.1 FIELD OPERATIONS

11.1.1 The Subcontractor shall perform contour surveys within the limits shown on the drawings and **as** directed by **BEI**.

11.1.2 Sufficient surface elevations shall be measured to define the contour interval required on the drawings and to define breaks in the terrain.

11.2 OFFICE WORK

11.2.1 Drawings for contour surveys shall show:

- Property lines and major structures (buildings, storage **tanks**, etc.)
- Contours of the terrain and elevations of breaks in the terrain
- Bench marks and all other miscellaneous data pertinent to the contour survey
- Ties to the state plane coordinate system sufficient to enable the survey to be reestablished at a future date

12.0 PLANIMETRIC SURVEYS

12.1 FIELD OPERATIONS

12.1.1 The Subcontractor shall perform planimetric surveys within the limits shown on the drawings and **as** directed by **BEI**.

12.1.2 All planimetric features shall be located, including but not limited to paved surfaces, vegetation, fences, power poles, walkways, underground utilities, structures and all other obstructions.

12.2 OFFICE WORK

12.2.1 Drawings for planimetric surveys shall show:

- Property lines and major structures (buildings, storage tanks, etc.)
- All planimetric features, including but not limited to, paved surfaces, vegetation, fences, power poles, walkways, underground utilities, structures and all other obstructions
- Bench marks and all miscellaneous data pertinent to the planimetric survey
- Ties to the state plane coordinate system sufficient to enable the survey to be reestablish at a future date

12.2.2 An inventory of all trees and plants, shown on the planimetric survey, shall be recorded and will include the correct botanical names, common names, sizes, condition, and identification number. See Attachment B.

13.0 CONSTRUCTION SURVEYS

13.1 The Subcontractor shall perform construction surveys and related calculations as directed by BEI.

13.2 Pertinent data and information obtained and/or established during the construction surveys shall be submitted as directed by the BEI Site Superintendent.

13.3 Drawings for construction surveys, if required by the BEI Site Superintendent, shall be submitted to BEI on magnetic media for review in accordance with the requirements of this specification.

14.0 ADDITIONAL DATA FILES

Any digital models used for contour generation shall be provided to BEI, including any of the following:

FILE	DESCRIPTION
.DAT	ASCII point data (east, north, elevation)
.XYZ	Intergraph binary point data
.TIN	Binary triangle data
.TTN	Binary terrain model data
.DTM	Binary terrain model data



ATTACHMENT A
NAVY RAC CADD LEVEL INDEX

OAK RIDGE, TN

LEVEL	DESCRIPTION	LEVEL	DESCRIPTION
1	°	33	Spot elevations
2	°	34	°
3	• Well locations	35	°
4		36	•
5	°	37	■
6	■	38	Railroads
7	• Contamination areas	39	Primary roads
8	°	40	Secondary roads
9	■	41	Primary structures
10	Drawing border & title block info., north arrow, scale	42	Secondary structures
11	°	43	Fences
12	■	44	Primary above ground utilities
13	°	45	Secondary above ground utilities
14	■	46	°
15	Revision clouds and triangles	47	Primary below ground utilities
16	Monuments end benchmarks	48	Secondary below ground utilities
17	Primary grid lines	49	°
18	Primary grid lines	50	Primary landscaping
19	Secondary grid lines	51	°
20	Secondary grid labels	52	°
21	°	53	°
22	°	54	Primary text
23	°	55	Secondary text & dimensioning
24	•	56	°
25	Major project-specific boundaries	57	•
26	Minor project specific boundaries	58	•
27	Local boundaries (property lines, etc.)	59	°
28	Primary hydrology	60	°
29	Secondary hydrology	61	•
30	Index contours & text	62	Data to be saved, but not viewed or plotted
31	Primary contours	63	Empty
32	Secondary contours	64	• ■ project specific

ATTACHMENT B

QUANTITY	ID. NO.	BOTANICAL NAME	COMMON NAME	EXISTING SIZE	REPLACEMENT SIZE	REMARKS & CONDITION
2	S1	Taxus Dens	Spreading Yew	6'	5	Good
1	s2	Syringa Vulgaris	Lilac	10'	8'	Good
1	s3	Syringa Vulgaris	Lilac	12'	6'	Fair
1	S4	Paulownia Tomentosa	Paulownia	10'	0	Poor
1	S5	Rosa Species	Rose	6'	4'	Fair
3	T1	Tsuga Canadensis	Canadian Hemlock	12'	8-10'	Fair
2	T2	Acer Planatoides	Norway Maple	12'	6'	Good
3	T3	Pseudotsuga Taxifolia	Douglas Fir	6'	4'	Fair
1	T4	Pseudotsuga Taxifolia	Douglas Fir	15'	12'	Good
<p>EXAMPLE ASSOCIATES Engineers and Surveyors 1000 Union Avenue Middlesex, New Jersey 08846 (201) 666-7777</p>			<p>Owners: Joseph N. and Susan Hughes</p>			
<p>STEPHEN EXAMPLE, L.S., Lic. 5000 CLYDE EXAMPLE, P.E., L.S., Lic. 200</p>			<p>Plant Inventory 1999 Wilkinson Road Maywood, New Jersey</p>			

DEPARTMENT OF THE NAVY

SOUTHERN DISTRICT

TECHNICAL SPECIFICATION

FOR

CONTAMINATED EARTHWORK AND MISCELLANEOUS DEMOLITION

0	7/21/94	Issued for Use	KK	ED		YK/B
NO.	DATE	REASON FOR REVISION	BY	CHECK	SUPV	PE
ORIGIN		CONTAMINATED EARTHWORK AND MISCELLANEOUS DEMOLITION	JOB NO. 22567			
			TECHNICAL SPECIFICATION			REV
			001-SP000-005			0
			SHEET 1 OF 11			

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**TECHNICAL SPECIFICATION
FOR
CONTAMINATED EARTHWORK AND MISCELLANEOUS DEMOLITION**

1.0 GENERAL

This Specification provides the technical requirements for the excavation of **contaminated** earthwork and miscellaneous demolition. Not **all** work defined herein is necessarily required for **this** contract; reference is directed to the Scope of Work and engineering drawings for specific services required.

Contaminated earthwork includes excavating, loading, placing, and compacting contaminated materials. Transporting and unloading of contaminated materials is covered in Specification 001-SP000-003, "Transport of Contaminated Material." Backfilling of excavation is covered in Specification 001-SP000-006, "Uncontaminated Earthwork".

2.0 QUALITY STANDARDS

Unless otherwise specified or **shown**, the latest edition at the time of bid of the following Codes and Standards shall apply to the extent indicated herein:

OSHA 29 CFR 1910 Occupational Safety and Health Regulations for General **Industry**

OSHA 29 CFR 1926 Occupational Safety and Health Regulations for Construction

3.0 SUBMITTALS

3.1 GENERAL

Not **all** **submittals** defined herein may be required. **Only engineering** document requirements as summarized in Exhibit F, Subcontractor Submittals Requirements **Summary (SSRS)**, shall apply. Submittals identified shall meet the detailed requirements herein. BEI will determine if documentation is complete as **submitted** and reserves the right to require the resubmittal of any **submittals** that do not meet specified requirements. Unless indicated otherwise, **submittals** shall be made to BEI at least **2** weeks prior to delivery, implementation, or use.

3.2 LIST OF EQUIPMENT

Submit list of equipment for use **in** contaminated earthwork. The list shall include the type, size, and rated capacity of the equipment proposed.

3.3 TESTING REPORTS

Submit testing reports within **24** hours of conclusion of physical tests. Submittals shall include **2** unbound copies of test results, including calibration curves and results of calibration.

3.4 TESTING LABORATORY CERTIFICATIONS AND QUALIFICATIONS

Submit **qualifications** and certifications of the commercial **testing** laboratory.

3.5 DRAINAGE DESIGN

Submit proposed drainage design in accordance with this specification.

3.6 SHORING DESIGN AND CALCULATIONS

Submit proposed shoring design and engineering calculations or alternate slope protection measures, in accordance with this specification.

4.0 MATERIALS

4.1 INSPECTION AND TESTING OF MATERIALS

BEI reserves the right to inspect and test any and all materials in order to verify conformance with requirements.

4.2 NONCONFORMANCE

Materials **not** in conformance with the Specification requirements **shall** be removed from the site and replaced.

4.3 SEDIMENT BARRIERS

Materials used for sediment barriers shall consist of **straw** bales, hay bales, geotextile filter fabric made expressly for use as a silt screen, or other materials approved by BEI prior to their use. **Straw** and hay bales **shall** not be used for permanent sediment barriers unless approved by **BEI**.

4.3.1 Hay/Straw Bales and Reinforcing Bars

Baled hay or straw **shall** be laid end to end such that no gap **exists** between bales. Reinforcing bars **shall** be #4 bar and a minimum of 2¹/₂ feet long.

4.3.2 Filter Fabric

Filter fabric **shall** be a material made expressly for the purpose of sediment control such as **Exxon** GTF 101S Silt Screen or approved equal.

4.4 EROSION CONTROL BLANKETS

Erosion control blankets **shall** be Curlex Blankets manufactured by American Excelsior Company, or approved equal.

5.0 FIELD OPERATIONS

5.1 EROSION AND SEDIMENT CONTROL

Potentially contaminated material shall be prevented from being eroded or otherwise transported into an uncontaminated area or an area that has a lower level of contamination.

Install temporary sediment barriers in accordance with the contract documents and shall be maintain during construction until permanent sediment barriers are in place.

Permanent sediment barriers shall be installed in accordance with the engineering drawings.

Erosion and sediment shall be controlled by the following techniques subject to BEI review on a case-by-case basis:

- Covering with synthetic liner material
- Covering with uncontaminated soil material
- Sediment barriers

5.2 DUST CONTROL

Dust shall be controlled by the following techniques subject to BEI review:

- **Wetting** with water
- **Wetting** with BEI-approved synthetic dust suppressant
- **Establishing** temporary vegetative cover
- Compaction
- Sealing by rolling with a smooth **drum**
- Maintaining slopes **of** exposed surfaces **within defined limits**

5.3 CLEARING AND GRUBBING

Clearing and grubbing shall be performed in accordance with Specification 001-SP000-002.

5.4 DRAINAGE, DEWATERING, AND STREAM DIVERSION

5.4.1 Drainage

Surface water shall be directed away from excavation and construction areas. Diversion ditches, check dams, dikes, and/or grading shall be developed and maintained as necessary during construction. Excavated slopes and backfill surfaces shall be sloped at a minimum of 3% to promote runoff and shall be protected to prevent erosion and sloughing. Submit a proposed design to BEI for review prior to constructing any drainage systems not indicated by the engineering drawings.

5.4.2 Dewatering

Unless noted otherwise, all excavations shall be kept in a dewatered condition. Groundwater flowing toward or into excavations shall be controlled to prevent sloughing of excavation slopes and walls; boils, uplift, and heave in the excavation; and to eliminate any interference with excavation progress. Water which has come in contact with contaminated material shall be collected and transported to an onsite location in accordance with Specification 001-SPOOO-003, "Transport of Contaminated Material."

5.4.3 Stream Diversion

Stream diversion(s) shall be developed as shown on the engineering drawings and maintained to prevent the spread of contamination. Blasting is not permitted.

5.6 EXCAVATION

5.6.1 General

All excavation shall conform to lines, grades, and depths defined on the engineering drawings and field verified by BEI.

Rocks 6 inches or greater in any dimension shall be separated from the soil and given a gross decontamination (i.e., removal of most soil material by scrapers, brushes, etc.). These rocks shall be left in the excavation area.

Areas being excavated shall be maintained in a clean condition, free from leaves, brush, sticks, trash and other debris. Excavations shall be inspected in accordance with OSHA 29 CFR 1910 and 1926 prior to commencing work each day. All daily inspections shall be documented.

5.6.2 Contamination Control

Dust generated during construction shall be controlled by water spraying with potable water or other approved methods.

Excavation shall be performed in such a manner that the spread of contamination is prevented. Unless indicated otherwise, the cutting edge of the excavator shall be toothless and the excavation performed in the direction of surface run-off (i.e., from higher to lower elevation). Contamination spread through the improper execution of the subcontract documents shall be cleaned up to the satisfaction of BEI at the Subcontractor's expense.

Barriers (draped plastic sheeting, plastic mounted on wooden frame, or plywood) shall be placed against the sides of truckbeds to prevent contamination of the exteriors of transport vehicles while being loaded.

When transport vehicles are loaded in uncontaminated areas, those areas shall be protected from contamination with plastic overlain with plywood adjacent to the vehicle or with other BEI approved materials and arrangement.

Transport vehicles shall be maintained and used in accordance with Specification 001-SP000-003, "Transport of Contaminated Material."

At least 1 ft of freeboard shall be maintained between top of soil and sideboards on loaded haul trucks.

5.6.3 Excavation Slopes

Excavation slopes shall be established in strict accordance with Subpart P, "Excavation, Trenching, and Shoring," of 29 CFR 1926. Side slopes shall be protected to prevent materials from eroding or sloughing. Any additional material removal and handling caused by erosion or sloughing shall be performed at the expense of the Subcontractor.

5.6.4 Shoring

Shoring, including temporary sheet piling, shall be furnished and installed as necessary to protect workers, slopes, and adjacent paving, structures, and utilities. Shoring design and installation plans including engineering calculations shall be developed by the Subcontractor in accordance

with **29 CFR 1926** Subpart P and submitted to BEI for review. Shoring, bracing, **and** sheeting **shall** be removed **as** excavations are backfilled in a **manner** to prevent cave-ins.

Alternate methods (e.g., benching, sloping, trench boxes, **etc.**) **may** be used where applicable. **Alternate** methods proposed by the Subcontractor **shall** be developed in accordance with **29 CFR 1926** Subpart P and submitted to BEI for review.

Provide a shoring inspector that is qualified in accordance with **29 CFR 1926**, Subpart P. The scope and frequency of inspections **shall** be in accordance with **29 CFR 1926** Subpart P.

Care **shall** be taken to **minimize** exposure of shoring or other slope protection devices to contamination. These items shall not be released from the site until **they** have been decontaminated **in** accordance with **this** specification.

5.6.5 Excavation Sequence

The sequence for excavation of contaminated material shall be **as** follows:

- (1) Define **and** isolate exclusion zones per engineering drawings.
- (2) Construct haul roads per engineering drawings.
- (3) Perform initial excavation to indicated lines and grades indicated **on** engineering drawings.
- (4) Allow excavated area to be sampled to determine if the area **meets** the remedial cleanup standards. Sampling is outside the scope of this Specification.
- (5) Continue excavation **as** directed by **BEI**, if **an** area within the excavation does not meet cleanup standards. **Allow** the excavated area to be resampled after each **lift** of material is removed. Repeat the process until all areas **within** the excavation meet the cleanup standards **as** directed by **BEI**.
- (6) Cease excavation upon direction by **BEI**.
- (7) Load contaminated **material in** accordance with **this** specification.

5.7 DEMOLITION

5.7.1 General

Demolition shall consist of demolishing; rubbleizing or scabbling and/or disposing of asphalt, concrete, or bituminous concrete surfaces within the limits to be excavated as shown on the engineering drawings and/or as directed by **BET**.

Construction joints shall be saw cut in existing concrete or asphalt where new concrete or asphalt will be placed.

Demolished debris shall be reduced to a size no larger than 2 feet long, 2 feet wide and 2 feet thick.

Reinforcing bars encountered during concrete removal shall be cut with an approved method.

5.7.2 Inspection

Work areas shall be inspected in accordance with **OSHA** 29 CFR 1910 and 1926 when fuel powered tools are used indoors. No personnel shall enter the work area until required corrective measures are completed. Inspections shall include review of administrative and engineering controls and measurement of air quality in confined spaces. These daily inspections shall be documented.

5.8 LOADING

5.8.1 Onsite Disposal or Storage

All excavated materials shall be transported to and placed in areas indicated on the engineering drawings or as directed by **BET**. Material shall be loaded into designated haul trucks using the contamination control techniques defined in this specification.

5.8.2 Offsite Disposal

Excavated contaminated soils designated for offsite disposal shall be loaded into designated haul trucks using the contamination control techniques defined in this specification. Haul trucks for offsite disposal will be provided by others.

5.9 TEMPORARY STORAGE OF CONTAMINATED MATERIALS

Material designated for temporary storage shall be **off** loaded **at** the temporary storage pad **unless** directed otherwise by **BEI**. Material shall be positioned with rubber-tired equipment (e.g., bobcat or front-end loader).

Compaction shall be performed with rubber-tired equipment well suited to the type **of material** being compacted. Material compaction and **slope** stability shall be sufficient **to** support the equipment and earthwork activities, **as** determined by **BEI**. Compacted material should not remain deformed under foot traffic. Activities shall be conducted in a manner that will prevent **contact** of contaminated materials with areas outside the **asphalt** pad.

In the event a permanent disposal area is used for temporary storage of contaminated material, placement shall comply with requirements for temporary storage. In addition, the area used for temporary storage shall be clearly identified by fencing, sediment barriers, or other **BEI**-approved methods.

5.10 EQUIPMENT DECONTAMINATION

Where discussed below, the term decontamination facility shall mean both the site decontamination facility and portable decontamination facilities, if any.

5.10.1 Procedure

All equipment and tools used in contaminated areas shall be decontaminated by the Subcontractor in accordance with field procedure EP-003, "Procedures for Equipment Decontamination."

5.10.2 Authorization

The Subcontractor shall **obtain** authorization **from** **BEI** before entering or **exiting** the decontamination facility.

5.10.3 Operations

Operation of a decontamination facility is outside the scope of this **Specification**. Subcontractor(s) or person(s) responsible for operating the **decontamination** facility are identified elsewhere **in** the control documents.

5.10.4 Decontamination

Equipment **that** has been **in** contaminated areas **shall** be **decontaminated**. The decontamination facility **shall** be used **only** for light and **final** decontamination and not for operations that **would** require gross decontamination (i.e., removal of **most** visible materials by scrapers, **brushes**, etc). Gross decontamination, if required, shall be performed **as** part of the specified earthwork at the area where trucks are loaded or unloaded. Decontamination shall be repeated **as** required.

5.10.5 Inspection

Following decontamination, all equipment shall be made available for inspection by **BEI**. Equipment shall be cleaned to the satisfaction of **BEI**.

5.11 VEHICLE RELEASE

Subcontractor shall obtain written approval from **BEI** prior to removing trucks from the site.

5.12 PROTECTION OF WORK

Settlement or erosion that occurs in compacted materials prior to acceptance of the work shall be repaired to required conditions at Subcontractor's expense.

5.13 SECURITY

When necessary **and** practical, as determined by **BEI**, work areas **shall** be secured **using** barriers (e.g. rope, snow fence) to prevent inadvertent entry to work areas.

ORIG DUR	EARLY START	EARLY FINISH	1994																																	
			A	MAY				JUN				JUL				AUG				SEP				OCT				NOV				DEC				
			2	9	16	23	30	6	13	20	27	4	11	18	25	1	8	15	22	29	5	12	19	26	3	10	17	24	31	7	14	21	28	5	12	19
5	30MAY94	20MAY94	NAVY REVIEW / NEGOTIATIONS FOR PHASE 2 WORK																																	
10	2MAY94	13MAY94	PREPARE ESTIMATE / SCHEDULE FOR PHASE 2 WORK																																	
96	2MAY94	13SEP94	PHASE 2 DELIVERY ORDER ADMIN / MANAGEMENT																																	
20	20JUN94	18JUL94	NAVY ISSUE D.O. MODIFICATION/NOTICE TO PROCEED																																	
15	19JUL94	8AUG94	PREPARE ENG. DOCUMENTS (RRWP, SGAP, WMP)																																	
10	25JUL94	5AUG94	PREPARE MAJOR SUBCONTRACT PACKAGES																																	
13	1AUG94	17AUG94	PREPARE ESTIMATE / SCHEDULE FOR PHASE 3 WORK																																	
8	8AUG94	17AUG94	PREPARE ENVIRONMENTAL PROTECTION PLAN																																	
8	8AUG94	17AUG94	PREPARE SITE SAFETY & HEALTH PLAN																																	
8	8AUG94	17AUG94	PREPARE CONSTRUCTION QC PLAN																																	
8	8AUG94	17AUG94	PREPARE ENVIRONMENTAL CONDITIONS REPORT																																	
10	8AUG94	19AUG94	DATA REVIEW / COORDINATE WITH ABB																																	
30	8AUG94	16SEP94	BID SUBCONTRACT PACKAGES																																	
5	9AUG94	15AUG94	INTERNAL REVIEW ENG. DOCUMENTS (RRWP, SGAP, WMP)																																	
4	16AUG94	19AUG94	INCORP. INTERNAL COMMENTS ENG. DOCUMENTS																																	
1	18AUG94	18AUG94	INTERNAL REVIEW - CONTRACT REQUIRED SUBMITTALS																																	
1	19AUG94	19AUG94	INCORPORATE INTERNAL COMMENTS-REQD SUBMITTALS																																	
0		19AUG94	SUBMIT TO NAVY - CONTRACT REQUIRED SUBMITTALS																																	
0		19AUG94	SUBMIT ENGINEERING DOCUMENTS TO NAVY																																	
13	22AUG94	7SEP94	NAVY REVIEW CONTRACT REQUIRED SUBMITTALS																																	
15	22AUG94	9SEP94	NAVY REVIEW ENGINEERING DOCUMENTS																																	
5	29AUG94	2SEP94	ASBESTOS REMOVAL @ BUILDINGS by NAVY																																	

Plot Date 18AUG94
 Late Date 19AUG94
 Project Start 19AUG94
 Project Finish 22SEP94
 © Primavera Systems, Inc

Activity Bar, Early Dates
 Gantt Chart, Activity
 Progress Bar
 Milestone Flag Activity

U.S. NAVY SOUTH DIV PROJECT
 NAS PENSACOLA, FL-TASK 162-PH 2 & 3
 UST SITE 2662M & IR SITE 36

Sheet 1 of 2

-----PROPOSED BASELINE SCHEDULE-----

DATE	REVISION	CHECKED	APPROVED

UST GROUP
PETROLEUM ASSESSMENT & REMEDIATION
RESPONSIBILITY ASSIGNMENT MATRIX
Site 2662W at NADEP PENSACOLA

FROM: ABB-ES

TO:

803 743 0563

1994-06-28

15:57

#965 P.11/18

TASK	ABB-ES	BEI	SOUTH DIV	ACTIVITY	REGULATOR	ROICC
Contamination Assessment Report (CAR)	L	I	R	S/I	R/A	I
Initial Remedial Action (IRA) Plan	L	S	S	S	R/A	S
IRA Implementation						
Work Plan Development - (Note 1)	R	L	A	R	I	R
Permitting (onsite)	S	L	I	A	NA	I
Archeological Clearance	S	L	S	A	NA	I
Preconstruction Meeting	S	L	S	S	NA	L
Well Abandonment	L	S	S	I	A	I
Utility Isolation	NA	L	I	L	NA	S
Demolition (Building 2662 & Fence)	S	L	S	S	NA	A
Asbestos Removal (Building 2662)	S	I/L	S	L	NA	A
Inspection & Sampling (Building 3380)	S	L	S	L	A	I
Treatment Tests (Building Foundations)	S	S	L	R	NA	R
Oil-Water Separator & Utilities Removed	S	L	S	S	NA	A
Fuel Line & UST Removal	S	L	S	S	NA	A
Concrete & Asphalt Removal - (Note 2)	S	L	S	S	NA	A
Soil Remediation - (Note 3)	S	L	S	S	NA	A
Hazardous Material Disposal	S	S	S	L	NA	R
Verification Sampling	L	S	R	S	NA	S
Backfill & Compaction	S	L	S	NA	NA	A
Summary Report	L	S	R	NA	A	NA
No Further Action (NFA) Plan Development	L	S	R	NA	A	NA
Monitoring Only Plan (MOP) Development	L	NA	R	NA	A	NA
MOP Implementation	L	NA	R	NA	A	NA

I = Information

L = Lead Responsibility

S = Supporting Responsibility

R = Review Responsibility

A = Approval

NA = Not Applicable

ABB-ES = ABB ENVIRONMENTAL SERVICES, INC.

BEI = BECHTEL ENVIRONMENTAL, INC.

SOUTH DIV = SOUTHERN DIVISION NAVFACENCOM

ACTIVITY = FACILITY PERSONNEL

REGULATOR = USEPA or STATE AGENCY

ROICC = RESIDENT OFFICER IN CHARGE OF CONSTRUCTION

Table 5-3
Criteria for Thermally ~~Treated~~ Clean Soil

Parameter	cleanup Level	
Total Volatile Organic Aromatics	100 µg/kg	
Total Recoverable Petroleum Hydrocarbons	10 mg/kg or if exceeded then go to ^a below	
Benzo(a)pyrene	88 mg/kg	
Dibenz(a, h)anthracene	88 mg/kg	
Tetrachloroethane ^a	25 mg/kg	
Metals	TCLP^b	'Total'
Arsenic	5 mg/l	10 mg/kg
Barium	100 mg/l	4940 mg/kg
Cadmium	1 mg/l	37 mg/kg
Chromium	5 mg/l	50 mg/kg
Lead	5 mg/l	108 mg/kg
Mercury	.2 mg/l	23 mg/kg
Selenium	1 mg/l	389 mg/kg
Silver	5 mg/l	353 mg/kg

^a If exceeded, then the **Total** Recoverable Petroleum Hydrocarbons will not exceed **50 mg/kg** (EPA Draft Method **3540/9073**) provided the total of the Polynuclear Aromatic Hydrocarbons does not exceed **1 mg/kg** (EPA Method **8100, 8250, 8270, or 8310**) and the **total** of the Volatile Organic Halocarbons does not exceed **50 µg/kg** (EPA Method **5030/8021** or **5030/8010**).

^b Toxicity Characteristic Leaching Procedure

^c The acid indigestion procedure by EPA Method **3050** will be used to prepare soil samples for total metal analyses except mercury, and the extraction procedure by EPA Method **1311** TCLP will be used to determine leachability characteristic of metals.

analyzed for hazardous waste characteristics, packaged, labeled, and handled as directed by the ROICC in accordance with procedures approved by the Navy. All waste material will be packaged in U.N. Class 1A2 55-gallon drums and labeled with the container's contents, date generated, and location from where it was derived.

Data Requirements for Task 2 at Site 2662W

Sample Event ¹	Analytical Method	DQO Level	Sample Volume	Sample Container	Preservative	Holding Time	QC Samples Required ⁷
Field Screening Sampling							
TVOC	Head Space	I	fill jar ½ full	16 oz. canning jar	None	Analyze immediately following temperature equilibration	Dup: 1/10
Thermal Treatment Sampling							
TRPH	EPA 418.1	III	20 g	Glass, 4 oz. widemouth w/ Teflon lined cap	Cool @ 4°C	14 days	TB: 1/cooler shipment RB: 1/20 or weekly FB: 1/20 Dup: 1/20 MSMSD: 1/20
TVOC	EPA 8240	III	10 g	Glass, 40 mL vial or 4 oz. widemouth w/ Teflon/silicone septum	Cool @ 4°C	14 days	TB: 1/cooler shipment RB: 1/20 or weekly FB: 1/20 Dup: 1/20 MSMSD: 1/20
TVOX	EPA 5030/80 10	III	10 g	Glass, 40 mL vial or 4 oz. widemouth w/ Teflon/silicone septum	Cool @ 4°C	14 days	TB: 1/cooler shipment RB: 1/20 or weekly FB: 1/20 Dup: 1/20 MSMSD: 1/20
As, Ba, Cd, Cr, Pb, Hg, Se, Ag	EPA 6010 and 7471 ²	III	200 g	Glass or plastic, 8 oz. widemouth	Cool @ 4°C	6 months (28 days for Hg)	RB: 1/20 or weekly FB: 1/20 Dup: 1/20 MSMSD: 1/20
PAH	EPA 8310	III	30 g	Glass, 8 oz. widemouth w/Teflon lined cap	Cool @ 4°C	14 days	RB: 1/20 or weekly FB: 1/20 Dup: 1/20 MSMSD: 1/20
TCLP	EPA 1311	III	100 g	2.5 L glass bottle w/Teflon lined cap	Cool @ 4°C	14 days	RB: 1/20 or weekly FB: 1/20 Dup: 1/20

¹ TCLP : Toxicity Characteristic Leaching Procedure; TRPH : Total Recoverable Petroleum Hydrocarbons; TVOA : Total Volatile Organic Aromatics; TVOC : Total Volatile Organic Compounds; TVOX : Total Volatile Organic Halocarbons; BTEX : Benzene, Toluene, Ethylbenzene, and Xylene; EDB : 1,2-dibromoethane; Total NAPS : Sum of naphthalene and methylnaphthalenes; BNAs : Base/Neutral/Acid Extractables; PAH : Polynuclear Aromatic Hydrocarbons.

² TB : Trip Blank. RB : Equipment Rinse/Blank. FB : Field Blank, Dup : Duplicate, MS/MSD : Matrix Spike/Matrix Spike Duplicate

³ Add digestion procedure by method 3050, except mercury

⁴ Sum of naphthalene and methylnaphthalenes

⁵ Request total xylene to target list

⁶ Specify .02 ug/l detection limit

⁷ Request dichlorodifluoromethane be added to EPA 624 target list

DEPARTMENT OF THE NAVY
SOUTHERN DIVISION

TECHNICAL SPECIFICATION
FOR
SURVEYING SERVICES

0	8/1/94	Issued for use	RD	NSM	NSM	SURT Yes
NO.	DATE	REASON FOR REVISION	BY	CHECK	SUPV	PE
ORIGIN		SURVEYING SERVICES	JOB NO. 22567			
			TECHNICAL SPECIFICATION			REV.
			001-SP000-007			0
			SHEET 1 OF 13			

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TECHNICAL SPECIFICATION FOR SURVEYING SERVICES

1.0 GENERAL

Not all activities defined herein may be **required**. Only those activities required in the applicable Subcontract **Scope of Work** and engineering drawings for specific service shall apply.

2.0 ABBREVIATIONS

The abbreviations listed below, where **used** in this specification, shall have the following meaning:

NOAA	National Oceanic and Atmospheric Administration
USGS	United States Geological Survey
ASCII	American Standard Code for Information Interchange
CADD	Computer Aided Design and Drafting
DOS	Disk Operating System
IGDS	Interactive Graphic Design Software
NAD	North American Datum

3.0 QUALITY STANDARDS

3.1 Unless otherwise specified or shown, the following code and standard of the latest issue at the time of bid shall apply to the extent indicated herein:

NOAA Classification, Standards of Accuracy, and General Specification of Geodetic Control Surveys, 1974

3.2 Standards of accuracy for all survey work shall be in accordance with NOAA standards and the minimum accuracy set forth below. The horizontal accuracy for location of all grid intersections and planimetric features shall be **(+)** 0.1 feet. Bench mark elevation accuracy and elevation accuracy of other permanent items (e.g., structures, pavements, etc.) shall be \pm 0.01 feet.

3.3 ~~All~~ work shall be performed under the direct supervision of a Land Surveyor registered in the ~~state~~ where the work is ~~located~~. Survey crew personnel shall be competent and experienced in performing land survey work.

3.4 Horizontal ground control surveys shall be based on **NAD 83**. State Plane coordinates shall be computed for **NAD 83**, **NAD 27**, and any applicable BEI project coordinate system. Vertical ground control surveys shall be based on **NAD 29**. Elevations shall be computed for **NAD 29**. All coordinates and elevations shall be stated in English units of measure (Decimal Feet).

- 3.5 Drawings and calculations (except for originals) submitted by the Subcontractor shall be signed, sealed, and certified by a Land Surveyor registered in the state where the work is located.

4.0 SUBMITTALS

- 4.1 Not all submittals defined herein may be required. Only engineering documentation requirements as summarized on the Subcontractor Submittal Requirements Summary (SSRS), Exhibit "F", shall apply. Submittals identified shall meet the detailed requirements listed herein. BEI will determine if documentation is complete as submitted by the Subcontractor, and reserves the right to reject and require resubmittal of any submittal that does not meet the Subcontract requirements.
- 4.2 Submittal of data on magnetic storage media shall be accompanied by a hard copy list of the media contents and a letter of transmittal including the following:
- Subcontract number
 - A description of contents per the Subcontract
 - Number and type of items (floppies, etc.)
 - Note if the submittal is a resubmittal

5.0 MATERIALS

5.1 CONCRETE MONUMENTS

Concrete monuments shall be as shown on Attachment C or an equivalent as approved by BEI prior to use. Concrete shall have a minimum 28-day compressive strength of 3000 psi.

5.2 MAGNETIC MEDIA

Floppy disk: 5 1/4" (1.2 MB) or 3 1/2" (1.44 MB), DOS 3.3 or higher. DOS backup for files greater than 1.44 MB.

5.3 FIELD BOOKS AND DATA SHEETS

The necessary field data shall be recorded by the surveyor in a standard field book or on standard surveying data sheets using generally accepted surveying field note recording practices. Corrections to field books shall be made by marking through the incorrect data, writing the correct data above it, and initialing. Erasure of field data is not acceptable.

5.4 IRON PINS

Iron pins shall consist of an 18-in. length of reinforcement steel (minimum #5) or equivalent.

5.5 METAL MONUMENTS

Metal monuments shall be as indicated on the engineering drawings.

5.6 WOODEN HUBS

Wooden hubs shall be 2 in. × 2 in., at least 8 in. long, milled from solid lumber, and shall be pointed on one end. Approved substitutes may be used with the permission of the BEI Site Superintendent.

5.7 WOODENSTAKES

Wooden stakes shall be 1 in. × 2 in., at least 3 ft long, milled from solid lumber, and shall be pointed on one end. Wooden stakes shall be clearly marked with bright orange weatherproof flagging and paint. Approved substitutes may be used with the permission of the BEI Site Superintendent.

5.8 MISCELLANEOUS

Miscellaneous materials (e.g., P-K nails, flagging, etc.) shall be of the type and quality normally used for land survey work.

6.0 EQUIPMENT

The Subcontractor shall maintain sufficient equipment, materials, parts, tools, and supplies to meet the requirements of the work. Surveying equipment shall be subject to inspection by BEI and, if deemed unsatisfactory, shall be removed from the site and replaced by satisfactory equipment. Surveying instruments (level, transit, EDM, etc.) shall have been inspected and calibrated by an authorized manufacturer's representative not more than six months prior to the survey; the Subcontractor shall submit a certificate of compliance for each instrument to BEI at the beginning of the Subcontract.

7.0 FIELD OPERATIONS

- 7.1 The Subcontractor shall verbally notify BEI in advance of commencing survey work and shall provide a minimum of 24 hours notice to BEI when it is necessary to enter private property.
- 7.2 When any survey work is conducted during the construction period, the Subcontractor shall employ all possible means to minimize interference with construction work by others. Any damage to facilities caused by the Subcontractor shall be repaired or replaced at the expense of the Subcontractor.
- 7.3 Pertinent data and information obtained and/or established during the boundary, grid, contour and planimetric surveys shall be shown on the drawings and submitted to BEI on magnetic media in accordance with this specification.

8.0 OFFICE WORK

- 8.1 For digital maps, drawings, data, and other surveying, the Subcontractor may be required to provide and accept design files for Intergraph and/or Autocad.

- 8.2 Digital map data shall be input into a SINGLE 3D design file and shall be placed on designated levels in accordance with a BEI CADD Level Index Record as described in Attachment A.
- 8.3 The digital ~~map~~ shall utilize ~~state~~ plane coordinates based on NAD 27 and elevations based on NAD 29.
- 8.4 ~~Map~~ data shall be input into the design file at a scale ratio of 1:1 and any ~~patterning~~, cells, text, or other scale dependent items shall be sized for a plot scale of 1" = 20' and a minimum lettering size of 1/8" in height.
- 8.5 Line Strings shall be used for linear features; shapes for enclosed features (buildings, ponds, etc.); arcs should only be used when standard radii are given (curb intersections, etc.). Curve strings should not be used.
- 8.6 Linear patterning of features such as railroads, fences, etc. is not required. If any linear patterns are used, they must retain the original element (class 5) intact when pattern display is turned off. All symbols shall be cells from the BEI-provided cell library.
- 8.7 Active attributes (color, line code, weight, font, etc.) shall be set to zero unless otherwise specified in Attachment A. Map features shall not be clipped around text or symbols.
- 8.8 All drawing files shall be based on the ~~state~~ plane coordinates ~~system~~ using the global origin and working units set up in the BEI-provided "state" .STP design files.
- 8.9 The Subcontractor shall place his own drawing format around the digital map with a legend, date, notes on accuracy, and any miscellaneous notes.
- 8.10 The Subcontractor shall submit one digital copy of the digital map to BEI for review and comment. Once Subcontractor has incorporated comments, he shall submit one digital copy of the digital map within one week to BEI along with a Letter of Certification for the map that is signed, sealed, and certified by a registered Land Surveyor.
- 8.11 The Subcontractor shall reduce field notes and perform all calculations required to develop the information needed in each type of survey. Field books and data sheets will become the property of BEI at the close of the Subcontract.
- 8.12 When electronic equipment is used to store survey data, a printout of the data (with notations to identify and explain data) and magnetic media containing the data in an ASCII format shall be submitted.
- 8.13 Drawings shall be submitted to BEI within ten (10) working days from the completion of the survey.

9.0 BOUNDARY SURVEYS

9.1 FIELD OPERATIONS

- 9.1.1 The Subcontractor shall perform surveys and deed research **necessary to** define the property boundaries for the properties **shown on** the drawings and **as** directed by **BEI**.
- 9.1.2 Coordinates for all **boundary surveys shall be based on the local state** plane coordinate system.
- 9.1.3 Concrete or metal monuments or iron pins, **as** indicated on the engineering drawings, shall be set **at each** property corner not having a permanent marker.

9.2 OFFICE WORK

9.2.1 Drawings for boundary surveys shall show:

- Major structures (buildings, storage **tanks**, etc.)
- Property corners **and** lines
- Tie to closest street intersection
- **State** plane coordinates for two property owners
- Property line dimensions, political boundaries, **bearings**, and other miscellaneous data pertinent to the boundary survey

10.0 GRID SURVEYS

10.1 FIELD OPERATIONS

- 10.1.1 The Subcontractor shall perform grid surveys within the limits and at the intervals shown on the drawings or **as directed** by **BEI**.
- 10.1.2 Unless noted otherwise on the engineering drawings, the intersection of the grid lines shall **be** marked with **wooden** hubs driven flush with the ground to **a** minimum depth of **8** inches. Where **wooden** hubs cannot be driven, **P-K** nails or chiseled crosses shall **be used** to establish grid intersection points. The coordinates and elevations of the hubs at the grid points shall **be** established, recorded, and marked on **wooden** stakes driven within **12** inches of said hubs. The Subcontractor shall establish **a** bench mark within the property at the location shown on the drawings or **as** directed by **BEI**. The Subcontractor shall not use spray paint marking on buildings, structures, or pavements.
- 10.1.3 Where the grid intersection location is obstructed by physical barriers, wooden hubs shall be set on the grid line **to** mark the obstruction. The coordinates and ground surface elevation at these points shall be established, recorded, and marked **as** described above.
- 10.1.4 Coordinates for grid surveys shall **be** based on the coordinate system shown on the drawings; **at** least two coordinates for grid surveys shall be tied into the local state plane coordinate system.

10.1.5 The grid shall be referenced to permanent features within or immediately adjacent to the survey area so that the grid may be readily reestablished in the event that it is removed or disturbed.

10.2 OFFICE WORK

10.2.1 Drawings and documentation for grid surveys shall show:

- Plan of area grid
- Coordinates and elevations of grid intersection points and of other points along the grid lines shown in tabular form
- Grid lines and all other miscellaneous data pertinent to the grid survey
- Property lines and major structures (buildings, storage tanks, etc.)
- Ties to the state plane coordinate system sufficient to enable the survey to be reestablished at a future date

11.0 CONTOUR SURVEYS

11.1 FIELD OPERATIONS

11.1.1 The Subcontractor shall perform contour surveys within the limits shown on the drawings and as directed by **BEI**.

11.1.2 Sufficient surface elevations shall be measured to define the contour interval required on the drawings and to define breaks in the terrain.

11.2 OFFICE WORK

11.2.1 Drawings for contour surveys shall show:

- Property lines and major structures (buildings, storage tanks, etc.)
- Contours of the terrain and elevations of breaks in the terrain
- Bench marks and all other miscellaneous data pertinent to the contour survey
- Ties to the state plane coordinate system sufficient to enable the survey to be reestablished at a future date

12.0 PLANIMETRIC SURVEYS

12.1 FIELD OPERATIONS

12.1.1 The Subcontractor shall perform planimetric surveys within the limits shown on the drawings and as directed by **BEI**.

12.1.2 All planimetric features shall be located, including but not limited to paved surfaces, vegetation, fences, power poles, walkways, underground utilities, structures and all other obstructions.

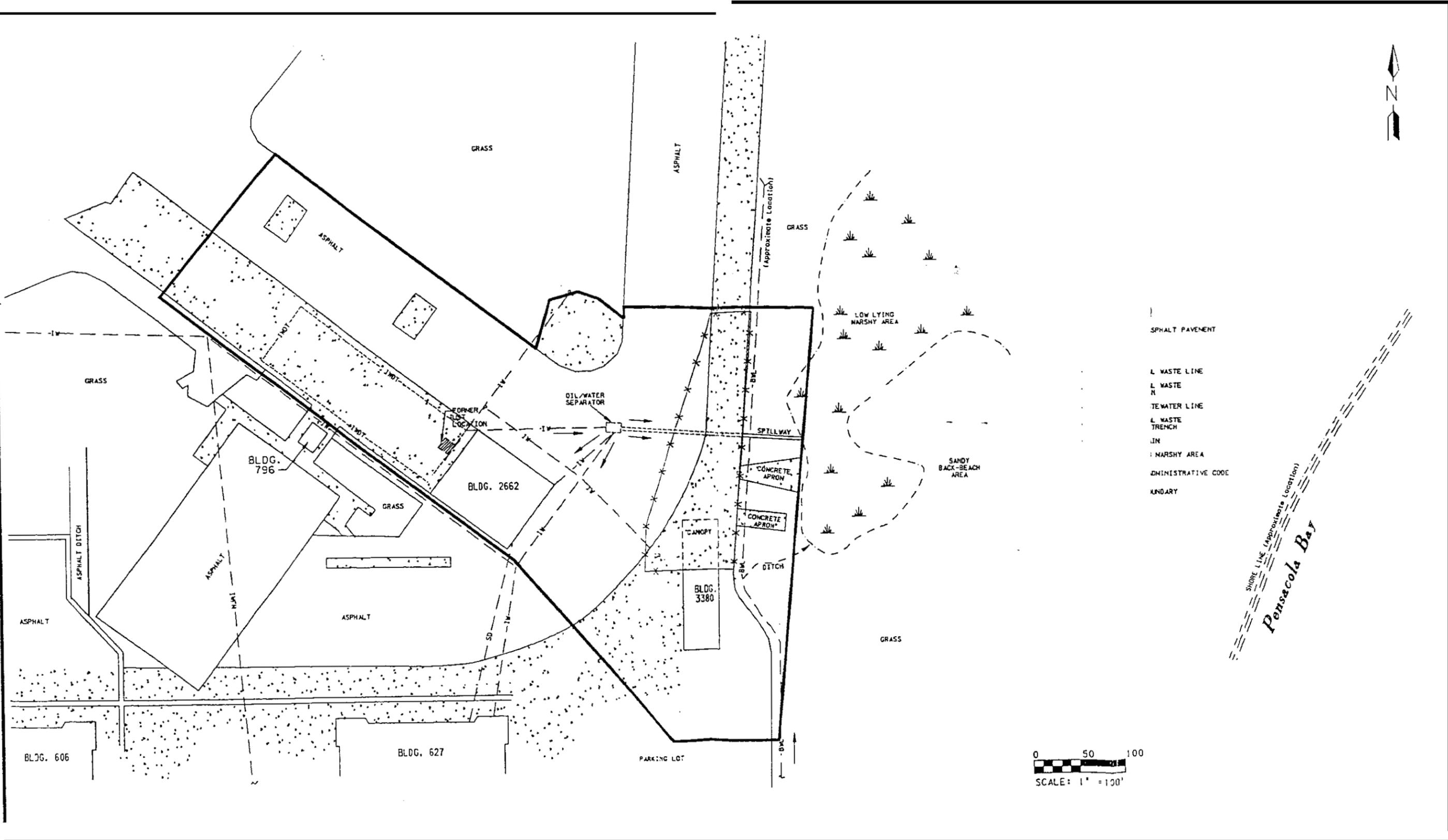


**ATTACHMENT A
NAVY RAC CADD LEVEL INDEX
BECHTEL ENVIRONMENTAL, INC.
OAK RIDGE, TN**

<u>LEVEL</u>	<u>DESCRIPTION</u>	<u>LEVEL</u>	<u>DESCRIPTION</u>
1	•	33	spot dwation
2	▪	34	•
3	• Well locations	35	•
4		36	•
5	•	37	*
6	•	38	Railroads
7	• Contamination areas	39	Primary roads
8	•	40	Secondary roads
9	•	41	Primary structures
10	Drawing border & title Mock info., north arrow, scale	42	Secondary structures
11	•	43	Fences
12	•	44	Primary above ground utilities
13	•	4s	Secondary above ground utilities
14	•	46	•
15	Revision clouds and triangles	47	Primary below ground utilities
16	Monuments and benchmarks	48	Secondary below ground utilities
17	Primary grid liner	49	•
18	Primary grid liner	50	Primary landscaping
19	Secondary grid lines	51	•
20	Secondary grid labels	52	•
21	•	53	•
22	•	s4	Primary text
23	•	55	Secondary text & dimensioning
24	•	56	•
25	Major project-specific boundaries	57	*
26	Minor project specific boundaries	58	*
27	Local boundaries (property lines, etc.)	59	*
28	Primary hydrology	60	•
29	Secondary hydrology	61	*
30	Index contours & text	62	Data to be saved, but not viewed or plotted
31	Primary contours	63	Empty
32	Secondary contours	64	* = project specific

ATTACHMENT B

QUANTITY	L.D. NO.	BOTANICAL NAME	COMMON NAME	EXISTING SIZE	REPLACEMENT SIZE	REMARKS & CONDITION
2	S1	Taxus Dens	Spreading Yew	6'	5	Good
1	S2	Syringa Vulgaris	Lilac	10'	8'	Good
1	S3	Syringa Vulgaris	Lilac	12'	6'	Fair
1	S4	Paulownia Tomentosa	Paulownia	10'	0	Poor
1	S5	Rosa Species	Rose	6'	4'	Fair
3	T1	Tsuga Canadensis	Canadian Hemlock	12'	8-10'	Fair
2	T2	Acer Planatoides	Norway Maple	12'	6'	Good
3	T3	Pseudotsuga Taxifolia	Douglas Fir	6'	4'	Fair
1	T4	Pseudotsuga Taxifolia	Douglas Fir	15'	12'	Good
<p>EXAMPLE ASSOCIATES Engineers and Surveyors 1000 Union Avenue Middlesex, New Jersey 08846 (201) 666-7777</p>			<p>Owners: Joseph N. and Susan Hugh</p>			
<p>STEPHEN EXAMPLE, L.S., Lic. 5000 CLYDE EXAMPLE, P.E., L.S., Lic. 200</p>			<p>Plant Inventory 1999 Wilkinson Road Maywood, New Jersey</p>			



22567 401 ATTACH1.DGN

ATTACHMENT 1
BOUNDARY OF TOPOGRAPHIC SURVEY

Meeting Minutes

6/21/94 anti 6/22/94

11:30-1:15 Lunch

Broke into two groups (UST and IRP). Each group was tasked to create a Responsibility Assignment Matrix (RAM) for the applicable Chevalier Field areas. Bill Hill and Linda Martin led the discussion for the IRP group. The following RAM was created based on the discussion.

Responsibility Assignment Matrix Solvent Area Near Building 3380						
Task	E/A&H	BEI	SOUTHDIV	Activity	Regulator	ROIC
Field Screening	S	L	A	R & I	A	I
Confirmatory Sampling (Level IV)	L	S	A	R & I	A	I
Disposal of" Asphalt (recycle)	I	L	S	S	A & R	R
Disposal of concrete (reef)	I	S	S	L — NAS Joyner	A & R	R
Choice of Treatment Technology	L	S	A	I	A	I
PRG	S	I	L	I	A	I
Post Site Conditions	I	S	L	I	I	A
Existing Utilities (disposition)	S & I	S	S	L — NAS Joynsr	I	A
Post Groundwater Monitoring	L	I	A	R	A	I
Groundwater Treatment Design	L	S	A	R	A	I

Responsibility Assignment Matrix (Continued)
Solvent Area Near Building 3380

Task	E/A&H	BEI	SOUTHDIV	Activity	Regulator	ROIC
Remedial Action Work Plan	S	L	A	R	A	R
Permits Required	I	S	L	R	A	I
Final Plan (Post Closure Report)	L	S	A	R	A	I
Transfer of Data	S	S	L	S	N/A	N/A
Demolition of Buildings	I	L	A	S	R & I	A
Oversight - Field	N/A	S	S	S	S	L
Implementation — Work Plan	S	L	A	S	I	A & R

Notes:

- E/A&H** — EnSafe/Allen & Hoshall
- BEI** — Bechtel Environmental, Inc.
- SOUTHDIV** — Southern Division Naval Facilities Engineering Command
- ROIC** — Resident Officer In Charge of Construction
- NHPA** — National Historical Preservation Association
- A** — Approval
- I** — Information
- L** — Lead
- R** — Review
- S** — Supporting
- *** — To agree with UST program