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RESOURCE CONSERVATION AND RECOVERY ACT FACILITY  
ASSESSMENT/INVESTIGATION WORK PLAN AREA OF CONCERN 723 (AOC 723) ZONE E  
CNC CHARLESTON SC  
5/9/2003  
CH2M HILL

RCRA FACILITY ASSESSMENT/RCRA FACILITY INVESTIGATION WORK

AOC 723. Zone E



***Charleston Naval Complex  
North Charleston, South Carolina***

SUBMITTED TO  
***U.S. Navy Southern Division  
Naval Facilities Engineering Command***

*CH2M-Jones*

*May 2003*

*Contract N62467-99-C-0960*



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May 9, 2003

Mr. David Scaturo  
Division of Hazardous and Infectious Wastes  
South Carolina Department of Health and  
Environmental Control  
Bureau of Land and Waste Management  
2600 Bull Street  
Columbia, SC 29201

Re: RCRA Facility Assessment/RCRA Facility Investigation Work Plan (Revision 0) –  
AOC 723, Zone E

Dear Mr. Scaturo:

Enclosed please find four copies of the RCRA Facility Assessment/RCRA Facility Investigation Work Plan (Revision 0) for AOC 723 in Zone E of the Charleston Naval Complex (CNC). This report has been prepared pursuant to agreements by the CNC BRAC Cleanup Team for completing the RCRA Corrective Action process.

The principal author of this document is Sam Naik. Please contact him at 770/604-9182, extension 255, should you have any questions or comments.

Sincerely,

CH2M HILL

A handwritten signature in black ink that reads "Dean Williamson".

Dean Williamson, P.E.

cc: Dann Spariosu/USEPA, w/att  
Rob Harrell/Navy, w/att  
Gary Foster/CH2M HILL, w/att

RCRA FACILITY ASSESSMENT/RCRA FACILITY INVESTIGATION WORK PLAN

**AOC 723, Zone E**



***Charleston Naval Complex  
North Charleston, South Carolina***

SUBMITTED TO  
***U.S. Navy Southern Division  
Naval Facilities Engineering Command***

PREPARED BY  
***CH2M-Jones***

May 2003

Revision 0  
Contract N62467-99-C-0960  
158814.ZE.PR.29

**Certification Page for RFA/RFI Work Plan (Revision 0) –  
AOC 723, Zone E**

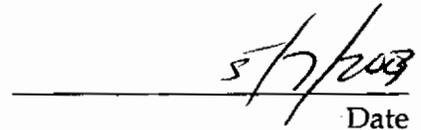
I, Dean Williamson, certify that this report has been prepared under my direct supervision. The data and information are, to the best of my knowledge, accurate and correct, and the report has been prepared in accordance with current standards of practice for engineering.

South Carolina

P.E. No. 21428



Dean Williamson, P.E.



Date

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# 1 Acronyms and Abbreviations

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2	AOC	area of concern
3	BCT	BRAC Cleanup Team
4	bls	below land surface
5	BRAC	Base Realignment and Closure Act
6	CA	corrective action
7	CNC	Charleston Naval Complex
8	COC	chemical of concern
9	COPC	chemical of potential concern
10	CSAP	Comprehensive Sampling and Analysis Plan
11	DQO	data quality objectives
12	EBST	Environmental Baseline Survey for Transfer
13	EDD	electronic data deliverable
14	EnSafe	EnSafe Inc.
15	EPA	U.S. Environmental Protection Agency
16	ESDSOPQAM	EPA Environmental Services Division <i>Standard Operating</i>
17		<i>Procedures and Quality Assurance Manual</i>
18	ESDLOQCM	EPA Environmental Services Division <i>Laboratory Operations and</i>
19		<i>Quality Control Manual</i>
20	ft bls	feet below land surface
21	IDW	investigation-derived waste
22	µg/L	micrograms per liter
23	msl	mean sea level
24	NAVBASE	Naval Base

# 1 **Acronyms and Abbreviations, Continued**

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2	OSWER	Office of Solid Waste and Emergency Response
3	OWS	oil/water separator
4	PCB	polychlorinated biphenyl
5	PPE	personal protective equipment
6	QA/QC	quality assurance/quality control
7	RCRA	Resource Conservation and Recovery Act
8	RFA	RCRA Facility Assessment
9	RFI	RCRA Facility Investigation
10	SCDHEC	South Carolina Department of Health and Environmental Control
11	SOP	standard operating procedure
12	SVOC	semivolatile organic compound
13	TCE	trichloroethene
14	UST	underground storage tank
15	VOC	volatile organic compound



# 1.0 Introduction

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In 1993, Naval Base (NAVBASE) Charleston was added to the list of bases scheduled for closure as part of the Defense Base Realignment and Closure Act (BRAC), which regulates closure and transition of property to the community. The Charleston Naval Complex (CNC) was formed as a result of the dis-establishment of the Charleston Naval Shipyard and NAVBASE on April 1, 1996.

Corrective Action (CA) activities are being conducted under the Resource Conservation and Recovery Act (RCRA) with the South Carolina Department of Health and Environmental Control (SCDHEC) as the lead agency for CA activities at the CNC. All RCRA CA activities are performed in accordance with the Final Permit (Permit No. SC0 170 022 560).

In April 2000, CH2M-Jones was awarded a contract to provide environmental investigation and remediation services at the CNC. This submittal has been prepared by CH2M-Jones to complete the RCRA Facility Assessment (RFA) and the RCRA Facility Investigation (RFI) for Area of Concern (AOC) 723 in Zone E of the CNC. The location of this site in Zone E is shown in Figure 1-1. Figure 1-2 shows an aerial photograph of the site.

## 1.1 Background

AOC 723 is a former paint booth in the southwestern corner of Building 177. Building 177 was built during 1955 and is located at the intersection of Avenue B and Fourth Street in Zone E of the CNC. The Navy conducted an RFI in 1996 for Zone E. At the time of the Zone E RFI, AOC 723 had not been identified as an AOC. After the RFI was completed, the presence of this former paint booth became known and it was identified as an AOC.

The western half of Building 177 was previously used for parts cleaning. Currently Excel Apparatus Services, Inc. uses the area where AOC 723 is located for repairing electrical and electronic equipment, parts cleaning, paint stripping, paint spraying, electric motor rebuilding, machining metal parts, and treatment of aluminum components in a corrosion inhibitor bath (Iridite treatment). Excel uses the AOC 723 area for maintenance activities in support of Detyens Shipyards. Engineering drawings prepared by the Navy during 1954 show the presence of several floor drains that may have been used to collect and convey wastes from the paint booth operation. This area of Zone E is zoned M2 (industrial).

## 1 **1.2 Purpose of the RFA/RFI Work Plan**

- 2 This purpose of this RFA and RFI Work Plan is to describe the known past uses of AOC 723
- 3 and to propose an approach to completing RFI investigation, including the sampling
- 4 parameters, media to be sampled, and the sample locations.



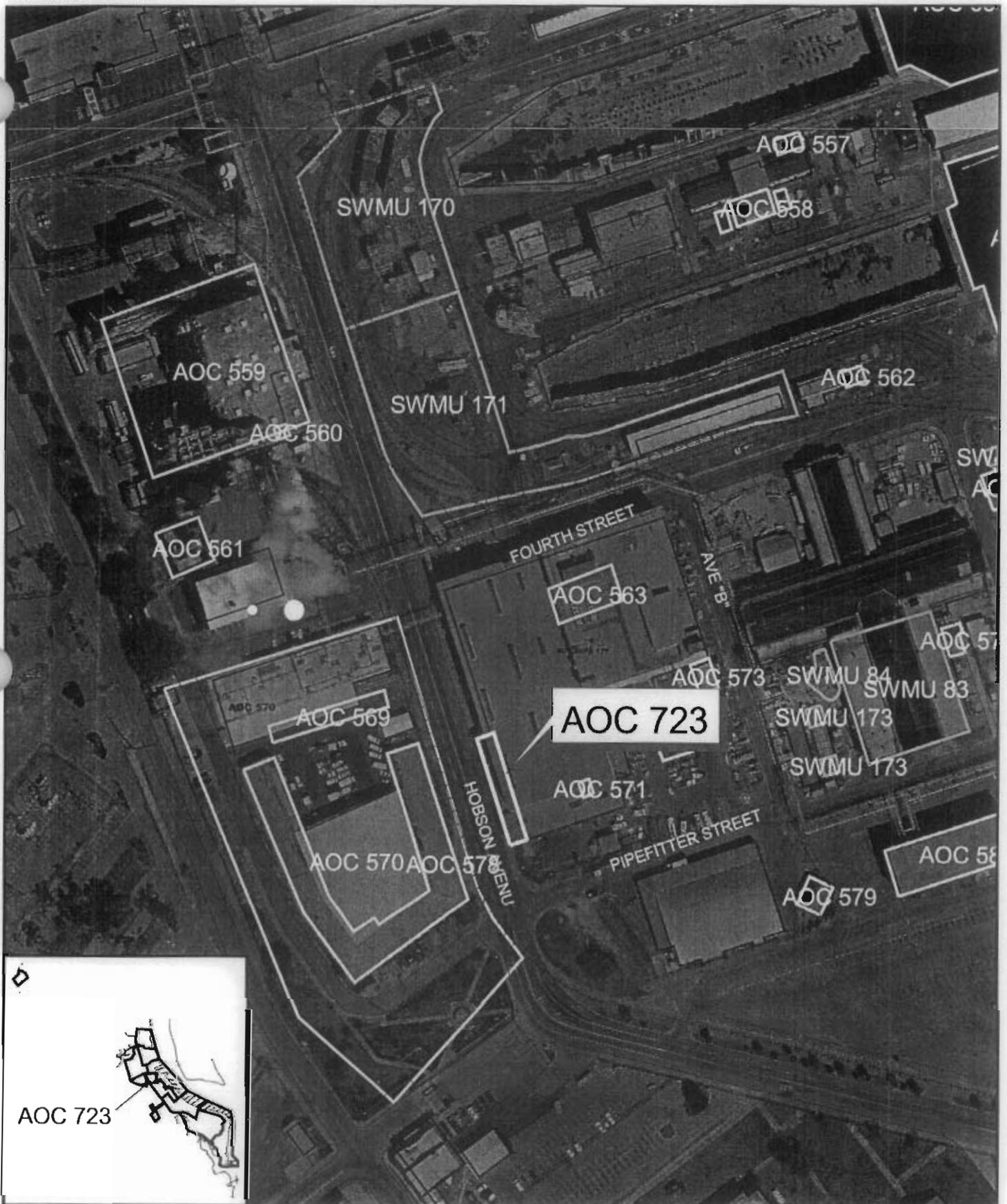


Figure 1-2  
Site Map  
AOC 723, Zone E  
Charleston Naval Complex

**Section 2.0**

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## 1 **2.0 RCRA Facility Assessment**

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### 2 **2.1 Unit Characteristics**

#### 3 **2.1.1 Facility Description**

4 AOC 723 has been identified by SCDHEC as a former paint booth within Building 177.  
5 Building 177 was built in 1955 and is a five-story structural steel-framed building with  
6 metal siding. It is located at 1865B Avenue B at the corner of Fourth Street. An abandoned  
7 rail line enters the northern end of the building, where the flooring is partially brick. The  
8 remainder of the building has concrete flooring.

9 A review of the historical engineering drawings indicates that a cleaning and degreasing  
10 room and an oven room are next to the paint booth. Excerpts from these historical drawings  
11 depicting the location of the cleaning and degreasing room and oven room are provided in  
12 Appendix A. CH2M-Jones suggests that these adjacent rooms be included within the AOC  
13 723 boundary to avoid the possibility of these rooms being identified as new AOCs at a  
14 later date.

15 A review of historical engineering drawings indicates that floor drains from the AOC 723  
16 area in Building 177 were connected to the sewer lines. Prior to 1972, the sewer lines at the  
17 CNC discharged directly to the Cooper River. After 1972, a separate sanitary sewer system  
18 was installed across the CNC to route industrial and sanitary wastewater to a separate  
19 sewer system, which was pumped via a lift station to a wastewater treatment facility, while  
20 storm water continued to discharge directly to the Cooper River. For AOC 723, it is  
21 assumed that industrial wastes were discharged to the Cooper River via the sewer prior to  
22 1972 and to the wastewater treatment plant after 1972.

23 No known underground storage tanks (USTs) or oil/water separators (OWSs) are known to  
24 be associated with AOC 723.

#### 25 **2.1.2 Facility Operations**

26 Operations within Building 177 are currently divided into three functions that support the  
27 operations of the Detyens shipyard. Each function is operated by four separate contracting  
28 firms. The western half of the building, where AOC 723 is located, is used by Excel for  
29 repairing electrical and electronic equipment, parts cleaning, paint stripping, paint  
30 spraying, electric motor rebuilding, machining metal parts, and treatment of aluminum

1 components in a corrosion inhibitor bath (Iridite treatment). Excel uses the AOC 723 area  
2 for maintenance activities in support of Detyens Shipyards. During a site visit conducted by  
3 CH2M-Jones and SCDHEC in March 2003, it was noticed that several maintenance  
4 activities, including steam cleaning of machinery, were being performed at this location.

5 A site walk by CH2M-Jones and SCDHEC during March 2003 showed that the concrete  
6 floors in the cleaning and degreasing room were intact, with no visible cracks. Large  
7 equipment was located in the former oven room, making access difficult. In addition, it was  
8 noted that a waste stream from current operations discharges into a small sump within the  
9 cleaning and degreasing room. The sump pump conveys the wastestream via PVC pipe to a  
10 discharge location in the former paint booth area. A liquid flow meter was observed in-line,  
11 measuring the discharge rate of this wastestream. It is not known where this wastestream  
12 discharges after leaving the paint booth area.

13 Appendix A includes subsections of historical engineering drawings showing the sewer line  
14 connections to floor drains in the paint booth and to the cleaning and degreasing room at  
15 the southwestern corner of Building 177 designated as AOC 723. Figure A-1 shows the  
16 general layout of the paint booth, cleaning and degreasing room, and the oven room, along  
17 with the locations of three floor drains and a grease drain along the western wall of  
18 Building 177. Figure A-2 shows the sewer line connections to the floor drains. Figure A-3  
19 shows the continuation of the sewer lines fed by the floor drains to the downgradient  
20 manholes and subsequent runs of the sewer lines along Fourth Street.

### 21 **2.1.3 Waste Characteristics**

22 No historical records were located that precisely describe the hazardous materials  
23 associated with the paint booth, cleaning and degreasing room, and oven room. Paints and  
24 solvents were presumably used. Chemicals of potential concern (COPCs) may include  
25 volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), and metals.  
26 There is no record of polychlorinated biphenyl (PCB)-containing transformers or capacitors  
27 located near AOC 723. According to the Environmental Baseline Survey for Transfer (EBST)  
28 for Building 177, the existing transformers at the northwestern corner of Building 177 are in  
29 PCB compliance.

### 30 **2.1.4 Evidence of Release**

31 The EBST did not note any evidence of spills in the AOC 723 area, and there is no  
32 information in the EBST to indicate past spills at AOC 723.

1 **2.1.5 Migration Pathways and Exposure Potential**

2 The floor areas within AOC 723 are paved with thick concrete, and no cracks or other  
3 penetrations were observed during the site visit. The potential exists for soil contamination  
4 underneath the slabs, primarily from the floor drain areas, due to potential leaks in pipe  
5 connections. Direct human exposure to soil contaminants is not of concern, due to the  
6 paved areas. Vapor transport in the vadose zone may also occur.

7 The site is paved with concrete and asphalt, so the potential for surface runoff of  
8 contaminated soil is not a concern.

9 Due to the shallow depth to groundwater in this area (approximately 6-7 feet below land  
10 surface [ft bls]), groundwater is a potential migration pathway.

11 **2.1.6 Recommended Action**

12 The site is recommended for an RFI. An RFI Work Plan is presented in the following  
13 section.

14



## 1 **3.0 RFI Work Plan for AOC 723**

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### 2 **3.1 Purpose and Objectives**

3 This RFI Work Plan is intended to determine the nature and extent of any releases of  
4 hazardous wastes or constituents associated with past operations at AOC 723. Delineation  
5 of the nature and extent of contamination in soil and groundwater is necessary to complete  
6 the RFI. General requirements for the work plan are presented first, followed by specific soil  
7 and groundwater sampling recommendations.

### 8 **3.2 General Requirements**

#### 9 **3.2.1 Data Quality Assurance Requirements**

10 The field work and laboratory work conducted as part of the AOC 723 RFI will be  
11 performed in accordance with the requirements of the CNC Comprehensive Sampling and  
12 Analysis Plan (CSAP) (EnSafe Inc. [EnSafe], 1996) and the U.S. U.S. Environmental  
13 Protection Agency (EPA) *Environmental Services Division Standard Operating Procedures and*  
14 *Quality Assurance Manual* (ESDSOPQAM, 1996).

15 The overall data quality objectives (DQOs) for the RFI are EPA DQO Level III for  
16 contaminant identification and quantification. Required field and laboratory quality  
17 assurance/quality control (QA/QC) samples will be collected as required by the CSAP.  
18 Subcontractor data will be validated by the CH2M-Jones project chemist prior to final  
19 interpretation and submittal.

#### 20 **3.2.2 Data Management Requirements**

21 The RFI field data documentation procedures and laboratory data deliverables will be in  
22 accordance with the approved CSAP (EnSafe, 1996) and the ESDSOPQAM (EPA, 1996).  
23 Field documentation includes site photographs, field sampling logbooks, sample shipping  
24 chain of custody forms, soil boring logs, and well construction forms and diagrams. Lab  
25 documentation includes raw data, instrument calibration logs, sample custody forms,  
26 validation summary reports, and final data deliverables.

1 **3.2.3 Reporting Requirements**

2 After completion of the field work, laboratory analysis of samples, and screening of  
3 analytical results, a Revision 0 RFI Report will be prepared and submitted to the BRAC  
4 Cleanup Team (BCT) for review and comment. BCT comments will be addressed in writing,  
5 and revised document pages or a full Revision 1 document will be prepared and submitted  
6 for review. Reports will be submitted in both electronic and hard copy format.

7 **3.2.4 Health and Safety Requirements**

8 CH2M-Jones places significant emphasis on the health and safety of our personnel,  
9 subcontractors, and the local community. All field work completed as part of this RFI will  
10 be performed in accordance with the CH2M-Jones Site-Specific Health and Safety Plan  
11 (CH2M-Jones, 2000). Personnel working at the site will be required to comply with EPA  
12 Level D personal protective equipment (PPE) requirements, as specified in the Health and  
13 Safety Plan. Once all personnel have arrived at the site as part of the mobilization for this  
14 RFI, a project briefing and health and safety orientation meeting will be held. Daily  
15 "tailgate" safety meetings will be conducted to address any site-specific issue encountered  
16 during work.

17 **3.2.5 Sampling Methodology**

18 Soil sampling and monitoring well installation locations will be marked or staked in the  
19 field prior to initiation of field work, and the necessary agencies and departments will be  
20 notified regarding activities planned at these locations. Clearance and marking of existing  
21 underground water, natural gas, telephone, electrical and other utility lines which are  
22 potential hazards at the site, will be completed prior to initiation of intrusive field activities.  
23 Once utilities and other obstructions are marked and identified, sample locations will be  
24 adjusted as needed.

25 The AOC 723 area is actively used. Temporary and permanent equipment is present in the  
26 area. Although access is not expected to be a problem, some of the soil sampling locations  
27 proposed may not be accessible due to obstructions from current industrial operations or  
28 equipment at the sampling locations. In such cases, an alternate location nearby will be  
29 chosen to introduce soil borings, if possible.

30 The soil sample collection and equipment decontamination procedures will conform to the  
31 procedures described in the CSAP portion of the CNC RFI Work Plan (EnSafe/Allen &

1 Hoshall, 1994). Surface and subsurface soil samples will be collected using a hand auger or  
2 Geoprobe rig with Macrocore® sampler, or equivalent, with samples being collected for  
3 chemical analysis. The sampling will consist soil borings with a surface (0-1 ft bls) sample  
4 and a subsurface (3-5 ft bls) sample collected from each boring at each proposed location.  
5 Upon completion of sampling, soil borings will be filled to the land surface, in accordance  
6 with Rule 61-71.10.B of the South Carolina Well Standards and Regulations. Soil boring and  
7 well locations will be surveyed by a registered surveyor to establish horizontal location  
8 coordinates (and vertical elevations relative to mean sea level [msl] for monitoring wells).

### 9 **3.2.6 Investigation-Derived Waste Management and Disposal**

10 Investigation-derived wastes expected to be generated as part of this investigation include  
11 pavement debris, soil cuttings, well purge water, equipment decontamination wastes, and  
12 used personal protective equipment (PPE). The IDW will be containerized in labeled 55-  
13 gallon drums and characterized in accordance with South Carolina Hazardous Waste  
14 Management Regulations (SCDHEC R.61-79.261). Filled containers will be transported to  
15 the less-than-90-day storage facility located at Building 1824 at the CNC. After analytical  
16 results have been received and reviewed, the containers will be transported to a permitted  
17 and licensed facility for proper treatment/disposal.

### 18 **3.2.7 Sample Handling and Chain of Custody**

19 Sample collection procedures and site conditions at the time of sampling will be  
20 documented in a field logbook by the field team leader. Samples will be collected in  
21 prepared containers supplied by the offsite laboratory, using preprinted chain of custody  
22 forms and coolers for transport of the samples. Samples will be cooled on ice and  
23 transported by the sampling team to the laboratory for analysis, maintaining the chain of  
24 custody at all times after sampling occurs, until analysis is complete. Sample handling  
25 procedures will adhere to the standard procedures in the approved CSAP portion of the  
26 CNC RFI Work Plan (EnSafe/Allen & Hoshall, 1994).

### 27 **3.2.8 Analysis of Samples**

28 Samples will be delivered to a subcontracted laboratory for chemical analysis by EPA  
29 methods and/or standard operating procedures (SOPs) for screening methods to achieve  
30 Level III EPA DQOs. The subcontracted laboratory will meet the EPA DQO Level III criteria

1 specified in the approved CNC CSAP (EnSafe, 1996). Sample analysis will be performed in  
2 accordance with the guidance in EPA's *Test Methods for Evaluating Solid Waste, SW-846,*  
3 *Revision 4* (1996b), Office of Solid Waste and Emergency Response (OSWER) and in the EPA  
4 Environmental Services Division *Laboratory Operations and Quality Control Manual*  
5 (ESDLOQCM) (1997).

## 6 **3.3 Proposed Sampling and Analysis**

### 7 **3.3.1 Soil Sampling**

8 There are no known releases of hazardous substances to the environment at AOC 723 and  
9 no documentation of visual evidence of contamination during any of the site inspections or  
10 previous field work. Based on the historical engineering drawings that show the concrete  
11 floors of the cleaning and degreasing room and the paint spray room sloping towards floor  
12 drains along the western wall of Building 177, the soil sampling will be focused around the  
13 floor drain areas, inside and outside the southwestern wall of Building 177. The proposed  
14 RFI soil sampling locations are shown in Figure 3-1. Figure 3-2 shows the soil sampling  
15 locations relative to the floor drain locations overlaid on an excerpt from the historical  
16 engineering drawings.

17 At each soil sampling location, a surface soil (0 to 1 ft bls) and a subsurface (3 to 5 ft bls) soil  
18 sample will be collected, as site conditions allow.

19 All soil samples will be analyzed for VOCs, SVOCs and metals.

### 20 **3.3.2 Proposed Groundwater Sampling**

#### 21 **Previous Groundwater Investigations**

22 During the Zone E RFI, AOC 563, which is located in the northeastern portion of Building  
23 177, was investigated. AOC 563 is the site of former Building 37, a locomotive maintenance  
24 house that was constructed in 1913 and used until 1939. Building 177 was built over the area  
25 formerly occupied by Building 37.

26 As part of the RFI for AOC 563, groundwater monitoring wells were installed inside and  
27 outside the northern part of Building 177, as shown in Figure 3-2. Additional groundwater  
28 monitoring wells were installed during 2002 by the Navy/CH2M-Jones team to complete  
29 the delineation of COPCs in groundwater for AOC 563.

1 Low levels of chlorinated VOCs have been detected historically in groundwater samples  
2 from the wells in the vicinity of Building 177. Groundwater samples from wells E563GW004  
3 and E563GW04D installed and sampled during November 2002 had trichloroethylene (TCE)  
4 detections of 71.3 micrograms per liter ( $\mu\text{g}/\text{L}$ ) and 1,700  $\mu\text{g}/\text{L}$ , respectively, above the MCL  
5 of 5  $\mu\text{g}/\text{L}$  for TCE. These wells are located upgradient of AOC 563 and downgradient of  
6 AOC 723. In order to verify if a source of groundwater contamination exists between AOC  
7 563 and AOC 723, an additional nested pair of shallow and deep groundwater monitoring  
8 wells will be installed at the proposed locations shown in Figure 3-3.

9 Figures B-1 and B-2 included in Appendix B show the shallow and deep groundwater  
10 elevation contours in this area of Zone E.

11 The shallow monitoring well will be installed into the shallow aquifer at the water table,  
12 which occurs at depths of approximately 6 to 7 ft bls. The shallow well is proposed to be  
13 screened between 5 ft bls and 15 ft bls. The deep monitoring well will be installed to screen  
14 the aquifer above the Ashley confining unit, which occurs at a depth of approximately 35 ft  
15 bls. The deep well is proposed to be screened between 25 ft bls and 35 ft bls. The wells will  
16 be constructed with 10-foot screens to match the existing wells in the vicinity. The new  
17 wells will be developed after installation and allowed to achieve equilibrium prior to  
18 beginning groundwater sampling. After development, the wells will be sampled and  
19 analyzed for VOCs, SVOCs and metals.

20 A South Carolina-certified well driller will be utilized for monitoring well installations on  
21 this project. The driller will be supervised by a CH2M-Jones field hydrogeologist or  
22 engineer who will be responsible for the conduct of all field activities. Soil boring/well  
23 construction logs will be prepared documenting the geologic units encountered and the  
24 details of well construction for submittal to SCDHEC.

### 25 **3.3.3 SCDHEC Well Installation Request**

26 In accordance with Rule R.61-79.265, Subpart F of the South Carolina Hazardous Waste  
27 Management Regulations and R.61-71 of the South Carolina Well Standards and  
28 Regulations, a request for the advancement of the monitoring well/soil borings is required  
29 to be submitted to SCDHEC 2 weeks prior to the scheduled activity. The written request  
30 describes the purpose of the well/boring installation activity at AOC 723 and presents well

1 construction details, a map showing the proposed locations, and proposed abandonment  
2 techniques, as appropriate.

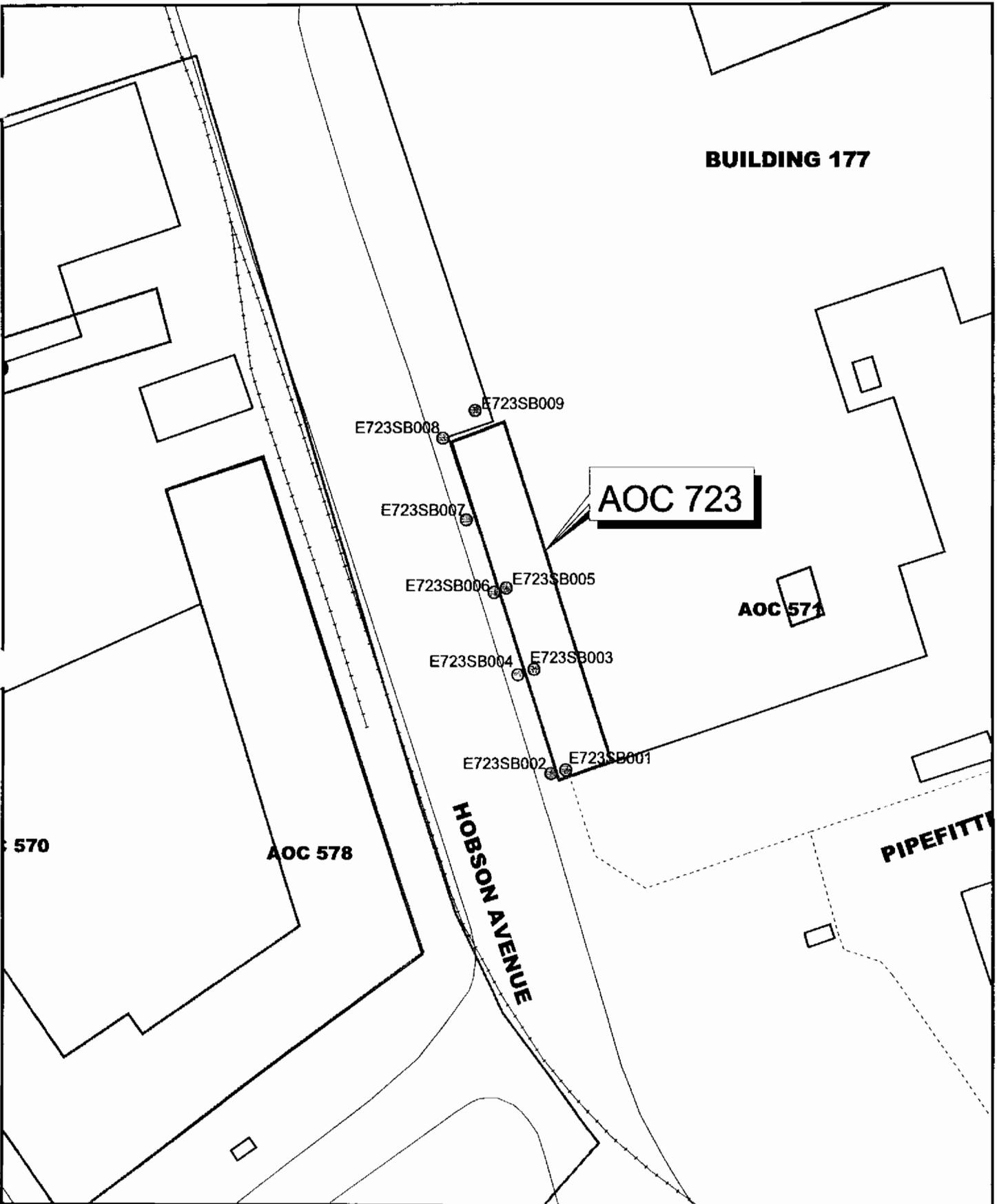
### 3 **3.3.4 Data Analysis and Screening**

4 Screening of analytical data by a qualified chemist at CH2M-Jones will be conducted after  
5 validation of the analytical results received from the offsite laboratory. Detected chemical  
6 concentrations in soil and groundwater samples will be screened using COPC screening  
7 criteria currently being used by the CNC BCT.

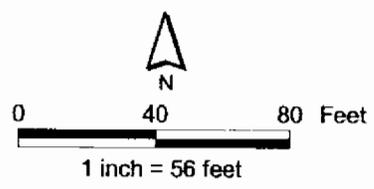
8 A full evaluation and presentation of COPC screening against current criteria, as well as the  
9 COPC/chemical of concern (COC) refinement analysis, will be presented in an RFI report  
10 after completion of the sampling and analysis proposed herein, and after any additional  
11 phases of sampling required to adequately delineate the nature and extent of  
12 contamination.

### 13 **3.3.5 Project Schedule**

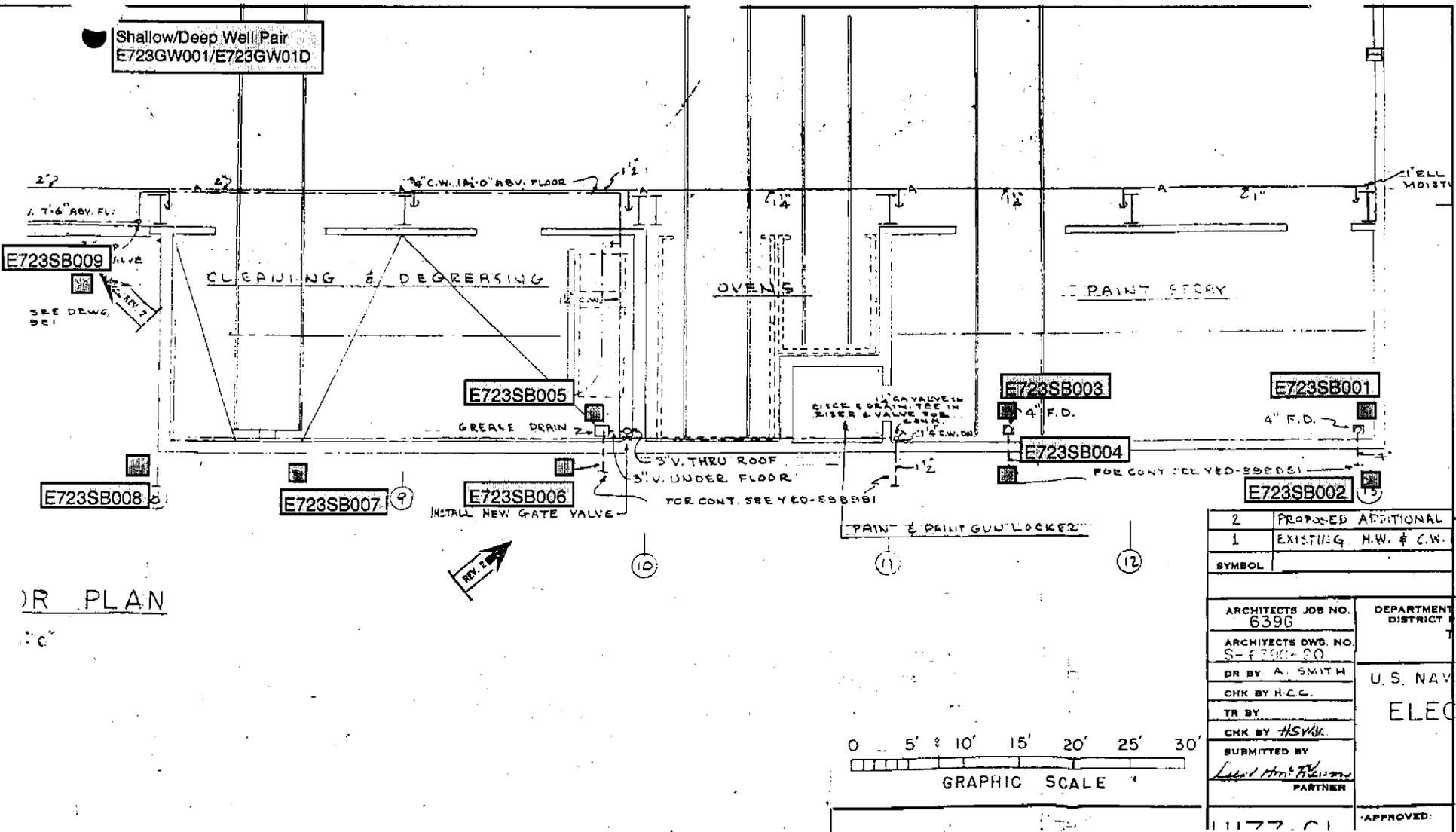
14 The field work for this site is scheduled to be conducted in June 2003, for a duration of  
15 approximately 1 week. The laboratory turnaround schedule for producing data reports is  
16 expected to be approximately 4 to 6 weeks from the time of sampling. Data quality review,  
17 flagging of data, and data validation are expected to require approximately 2 weeks after  
18 receipt of the electronic data deliverable (EDD) from the lab. Data analysis and report  
19 preparation are expected to require approximately 30 days after receipt of final validated  
20 data, placing an approximate report submittal date in August 2003.



- Soil Boring Location
- ∧ Roads
- ▭ AOC Boundary
- ▭ SWMU Boundary



**Figure 3-1**  
Proposed RFI Soil Boring Locations  
AOC 723, Zone E  
Charleston Naval Complex



2	PROPOSED ADDITIONAL
1	EXISTING H.W. & C.W.
SYMBOL	
ARCHITECTS JOB NO. 6396	DEPARTMENT DISTRICT
ARCHITECTS DWG. NO. S-6700-20	
DR BY A. SMITH	U.S. NAVY
CHK BY H.C.C.	ELECTRICAL
TR BY	
CHK BY H.S.W.K.	
SUBMITTED BY <i>Leslie Ann Peterson</i>	
PARTNER	
1177.01	APPROVED:

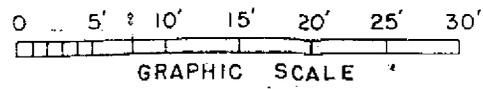
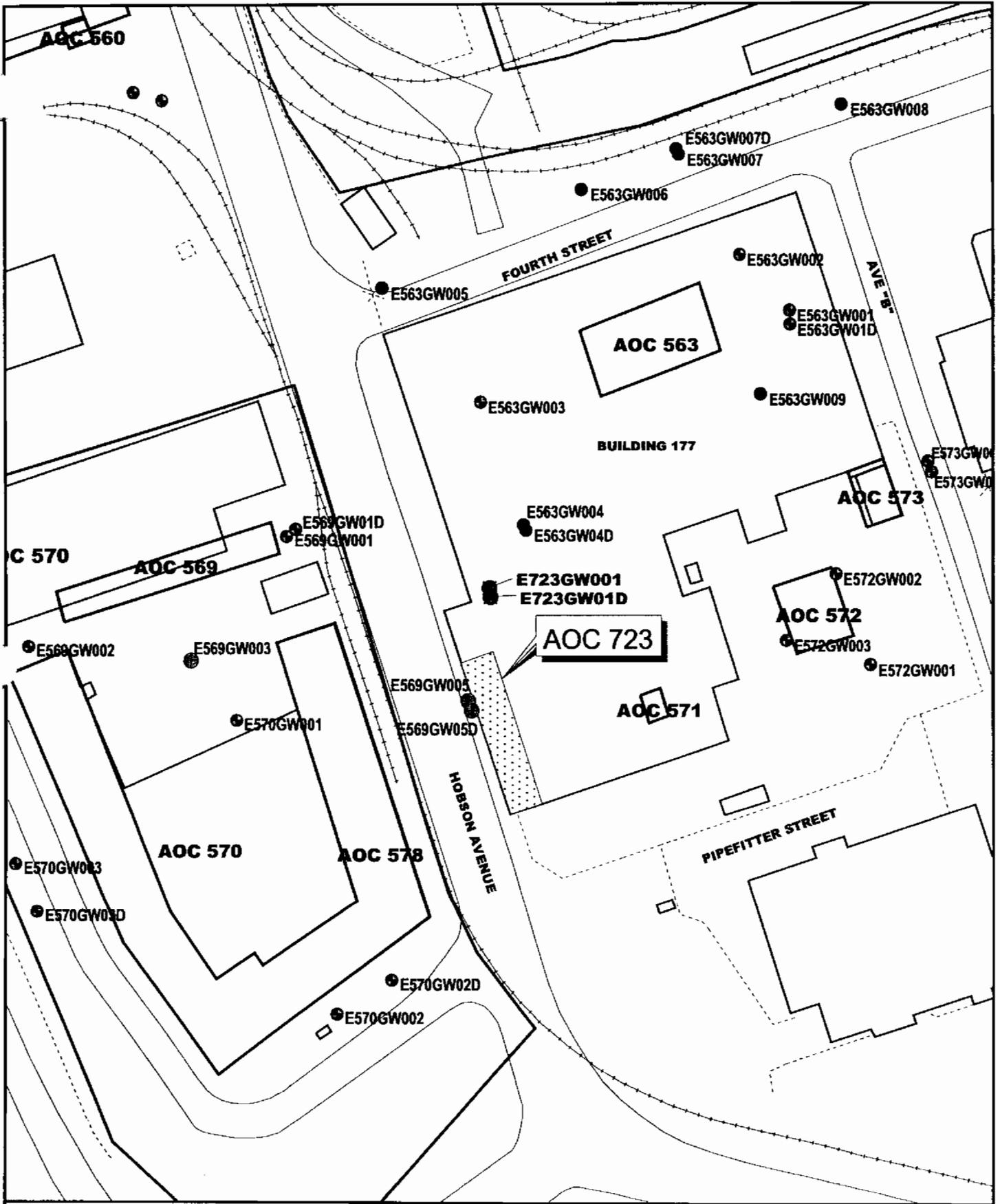
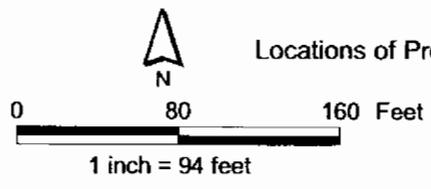


Figure 3-2  
Proposed Soil Sampling Locations Relative to  
Floor Drain Locations in Building 177,  
AOC 723, Zone E  
Charleston Naval Complex



- Proposed New Monitor Well Pair
- Monitor Wells Installed During 2002
- Historical RFI Monitor Wells
- Roads
- AOC Boundary
- SWMU Boundary



**Figure 3-3**  
 Locations of Proposed and Existing Monitoring Wells  
 AOC 723 Area, Zone E  
 Charleston Naval Complex



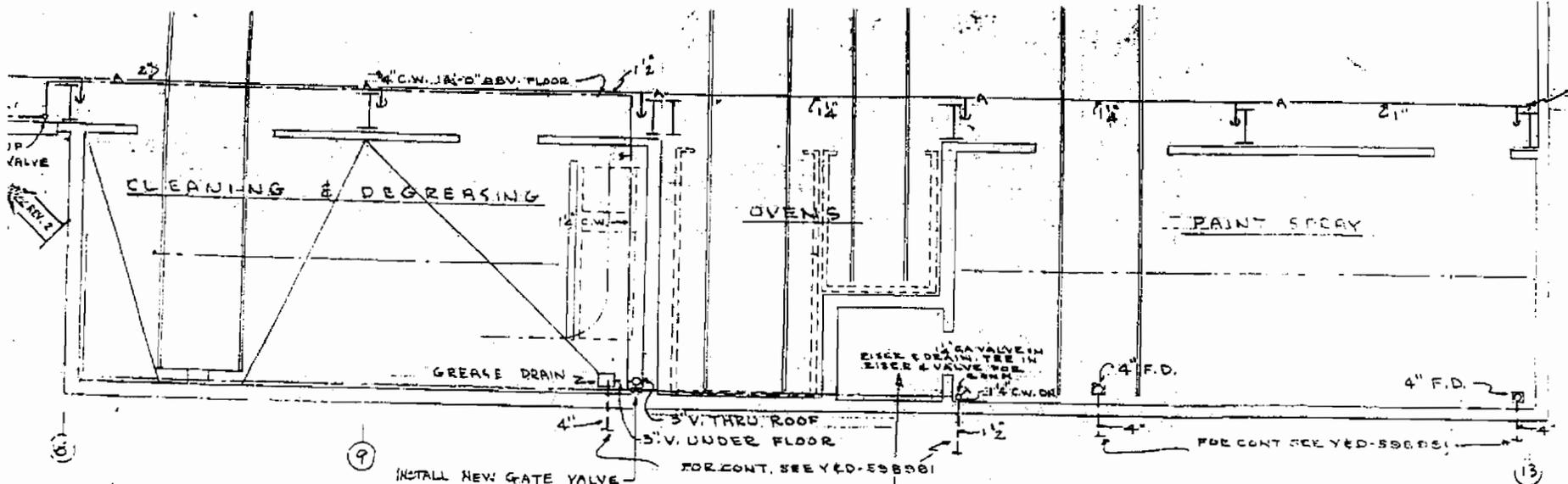
## 1 **4.0 References**

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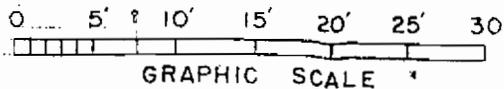
- 2 CH2M-Jones, Inc., *Environmental Baseline Survey for Transfer of Phase IV Parcels, Charleston*
- 3 *Naval Complex, Draft, October 2002*
- 4 EnSafe Inc./Allen & Hoshall. *Final Comprehensive Sampling and Analysis Plan. RCRA Facility*
- 5 *Investigation. July 30, 1996.*
- 6 EnSafe Inc. *Zone I RFI Report, Revision 1. July 1999.*
- 7 U.S. Environmental Protection Agency (EPA). *Environmental Services Division Standard*
- 8 *Operating Procedures and Quality Assurance Manual. Region IV, Environmental Services*
- 9 *Division. 1996.*

## **Appendix A**

---



-AN



2	PROPOSED ADDIT
1	EXISTING H.W. &
SYMBOL	
ARCHITECTS JOB NO. 6396	
ARCHITECTS DWG. NO. S-6396-20	
DR BY A. SMITH	
CHK BY H.C.C.	
TR BY	
CHK BY <i>H.S.M.</i>	
SUBMITTED BY <i>Leah Ann Wilson</i>	
PARTNER	
1177.01	APPROV

Figure A-1  
 Excerpt from US Navy Drawing No. 599000  
 Dated 19 December, 1952

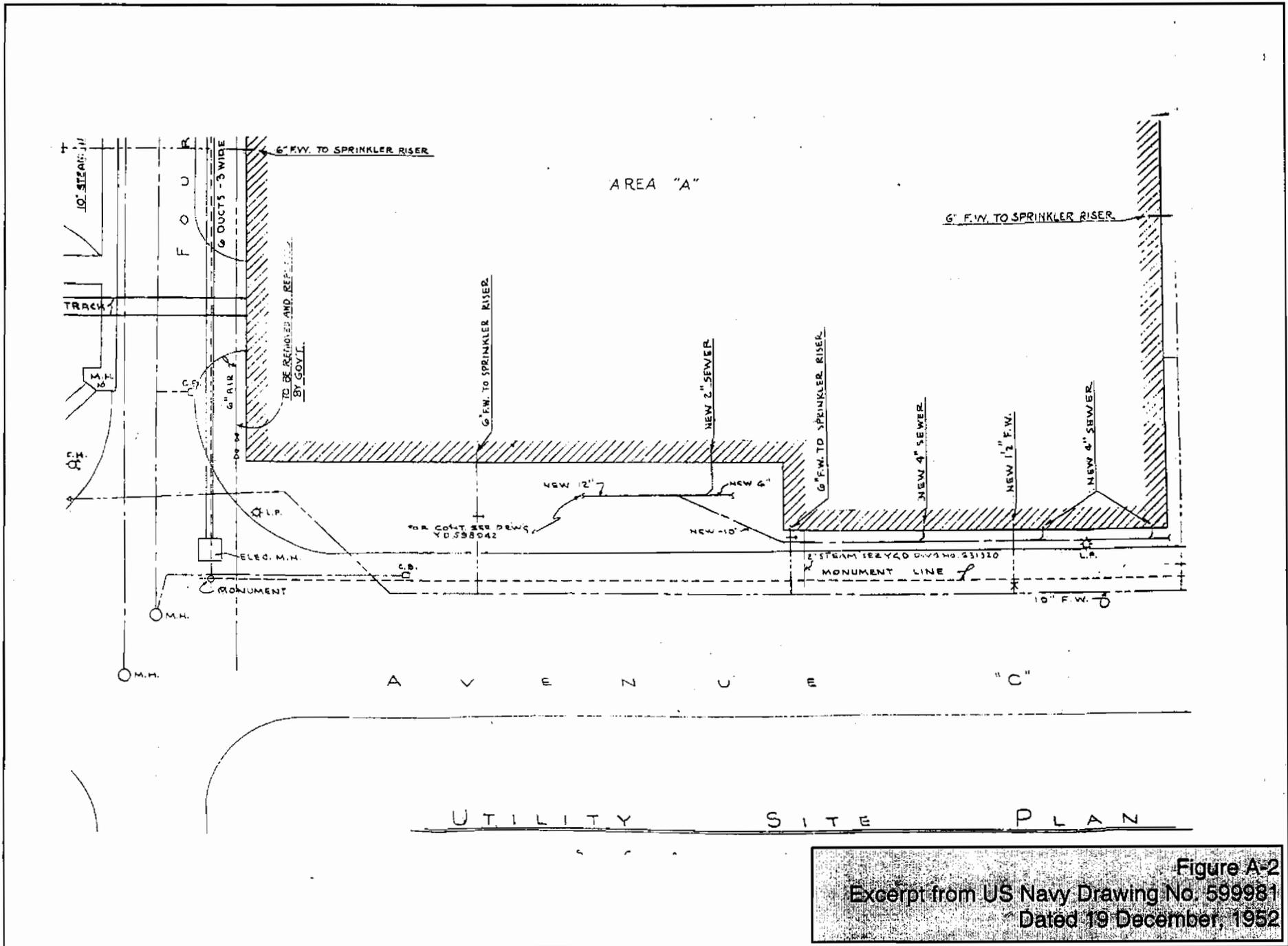
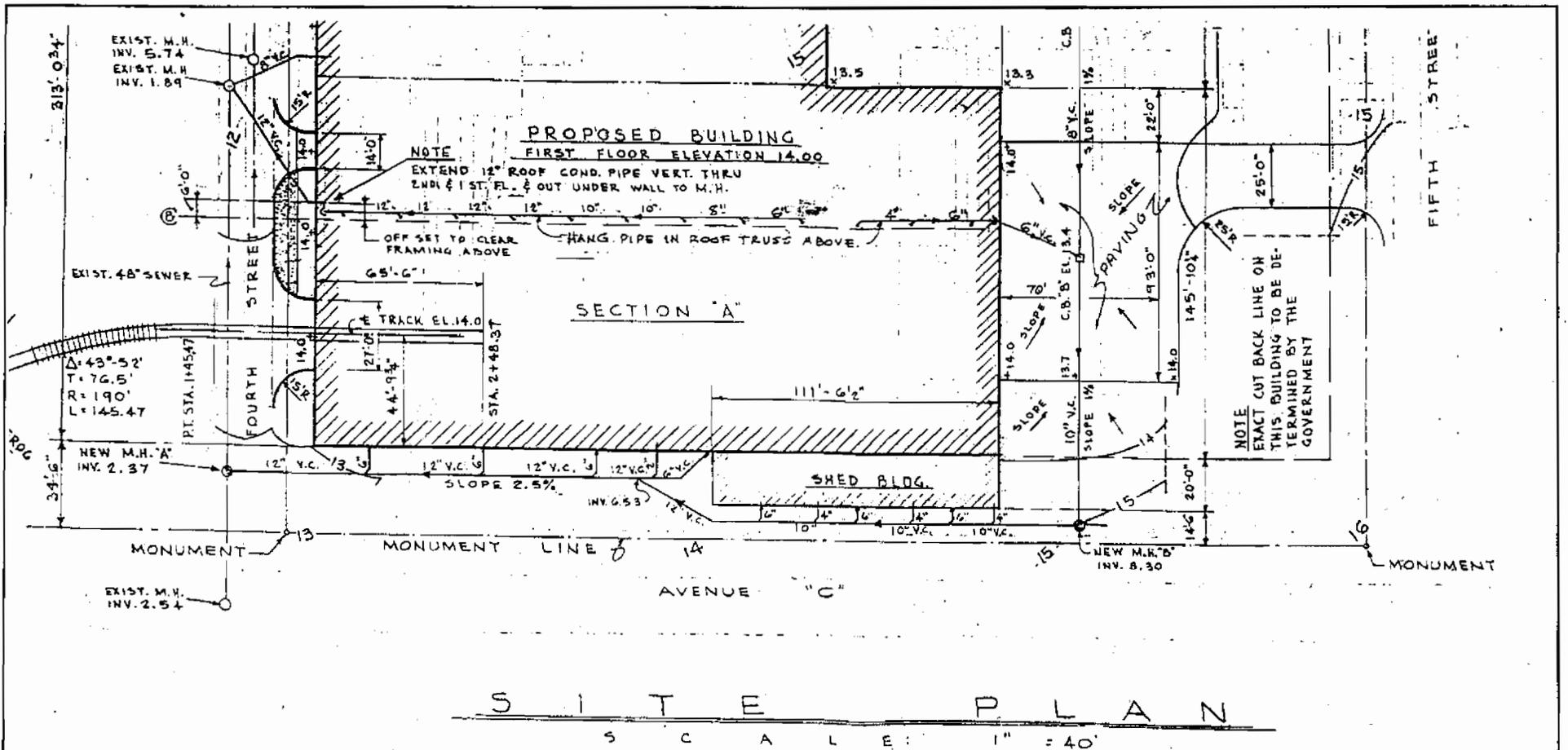


Figure A-2  
 Excerpt from US Navy Drawing No. 599981  
 Dated 19 December, 1952



**NOTES**

- ELEVATIONS SHOWN REFERENCED TO ESTABLISHED SHIPYARD BENCH MARK.
- EXISTING MANHOLES IN PAVED AREA TO BE RAISED OR LOWIERED, AS THE CASE MAY BE, TO MEET NEW FINISH ELEVATIONS.
- EXISTING BUILDINGS, TRACKS, CONCRETE PADS, ETC. IN BUILDING AREA WILL BE REMOVED BY THE GOVERNMENT.
- PAVING SHOWN TO BE BITUMINOUS SURFACING - 6" BASE + 1 1/2" ASPHALTIC CONC. SURFACE COURSE.
- PATCH AND REPLACE CONCRETE CURB AND SIDEWALK ON NORTH END OF BUILDING.
- PAVING AND V-GUTTER WHERE TRACKS ARE REMOVED TO BE REPAIRED TO MATCH EXISTING WORK.

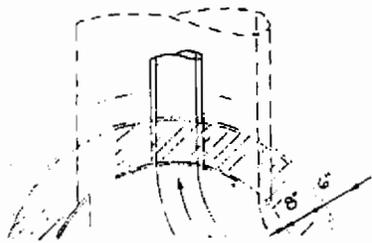
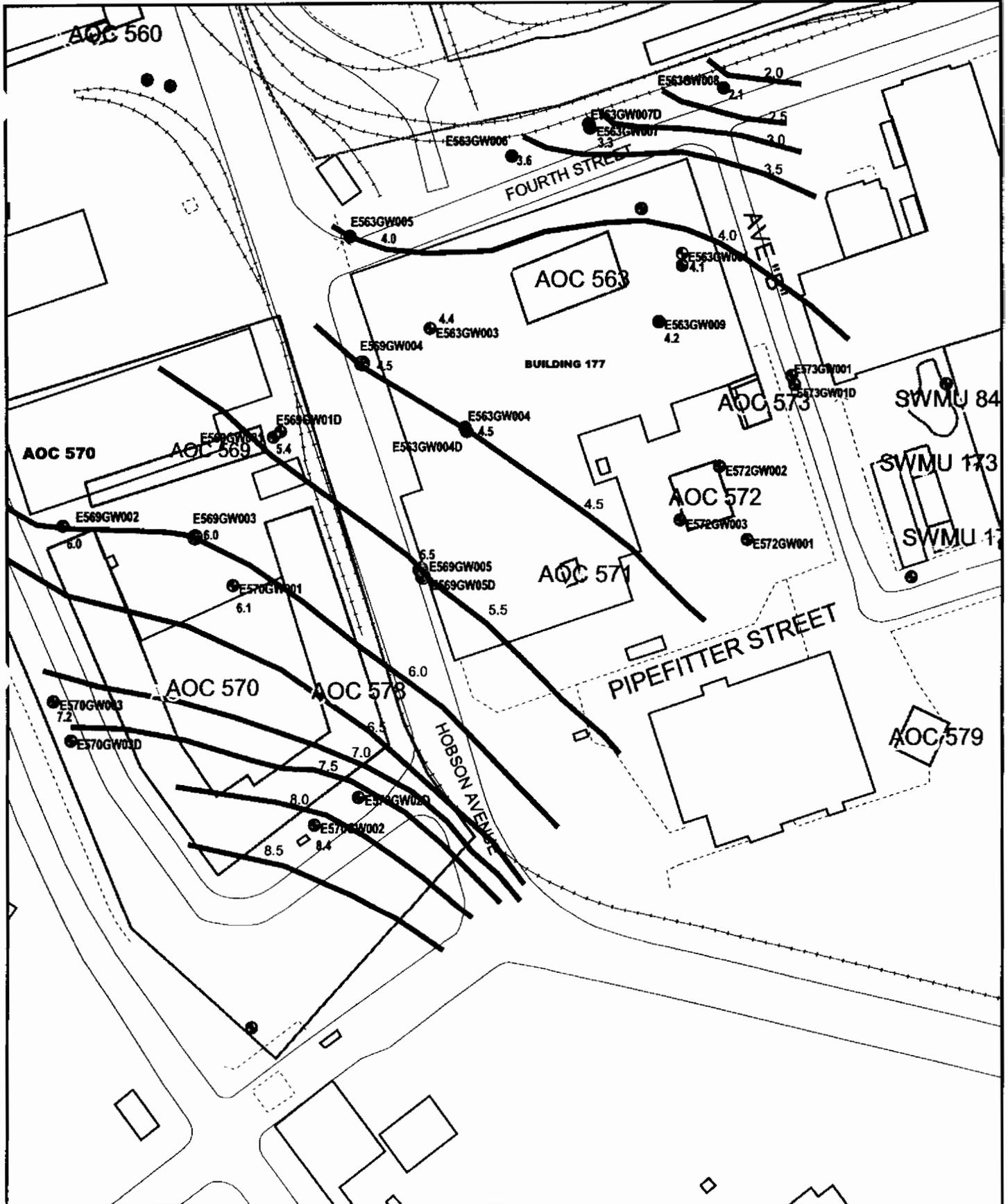
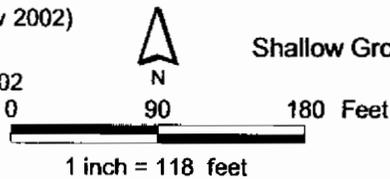


Figure A-3  
 Excerpt from US Navy Drawing No. 598942  
 Dated 19 December, 1952

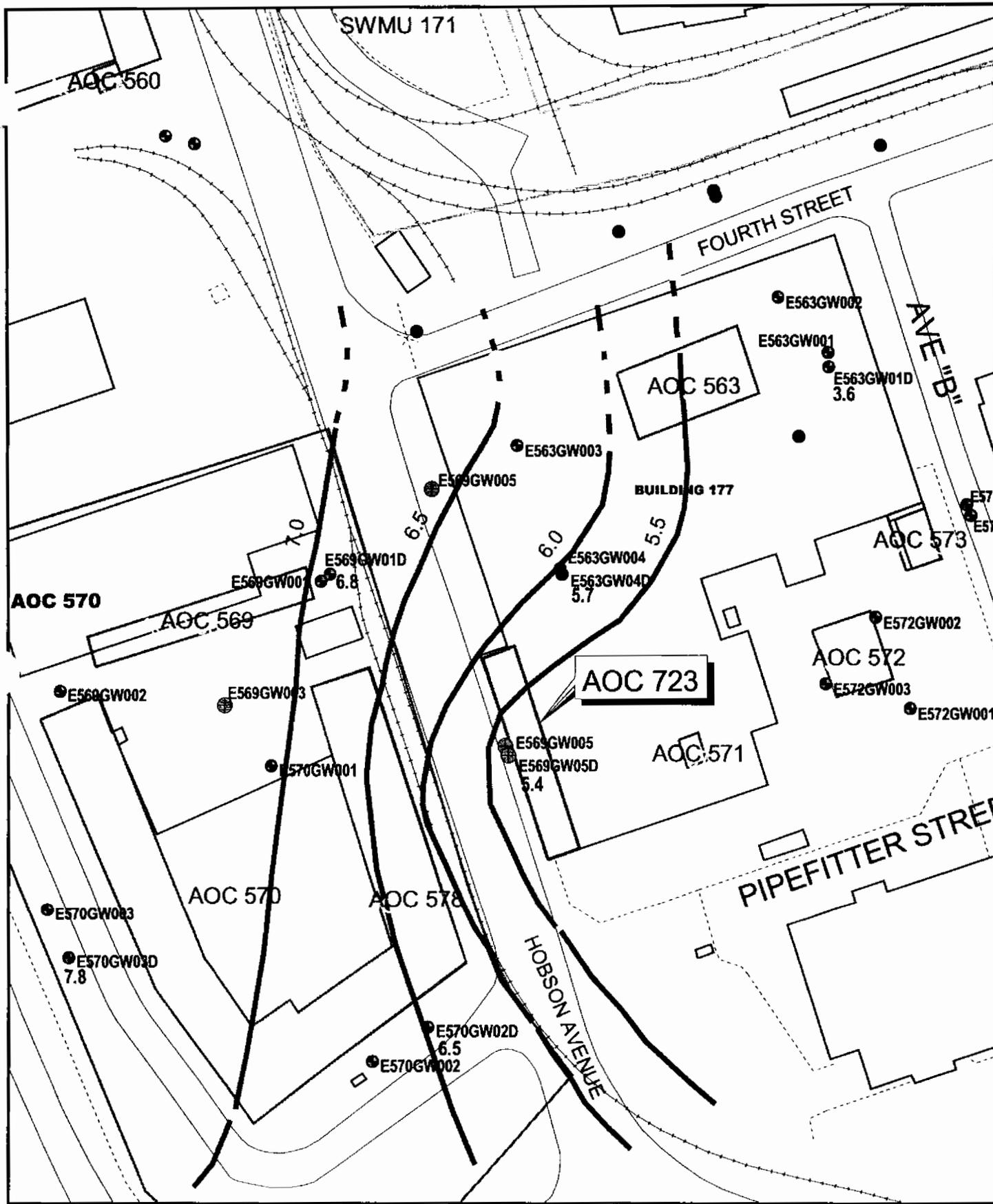




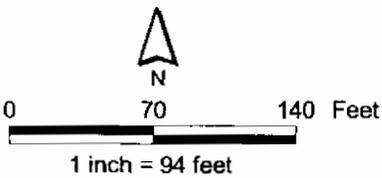
- Shallow Groundwater Contours (measured Nov 2002)
- 5.5 Shallow Groundwater Elevation (Ft MSL)
- Groundwater Monitor Wells Installed during 2002
- Historic RFI Groundwater Monitor Wells
- AOC Boundary
- SWMU Boundary



**Figure B-1**  
 Shallow Groundwater Elevation Contours (Nov 2002)  
 AOC 723 Area, Zone E  
 Charleston Naval Complex



- Deep Groundwater Elevation Contours
- 7.8 Groundwater Elevation (ft above MSL)
- Groundwater Monitor Wells Installed in 2002
- Historic RFI Groundwater Monitor Wells
- AOC Boundary
- SWMU Boundary



**Figure B-2**  
 Deep Groundwater Elevation Contours  
 AOC 723 Area, Zone E  
 Charleston Naval Complex