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CORRECTIVE ACTION PLAN FOR HOBSON FUEL FARM ZONE G AREA 19 WITH
TRANSMITTAL CNC CHARLESTON SC
4/1/2001
J A JONES ENVIRONMENTAL SERVICES

**CORRECTIVE ACTION PLAN
FOR
HOBSON FUEL FARM
ZONE G/ AREA 19**

SITE IDENTIFICATION # 01189

**Charleston Naval Complex
Charleston, South Carolina**

**SOUTHERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND**

Contract Number N62467-99-C-0960

April 2001



JA Jones Environmental Services

TRANSMITTAL FORM

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DO Title: Delivery Order '020	DO Project Location: Charleston Naval Complex				
Date: 06-Apr-01	To: Michael Bishop				
Contract Number :	SCDHEC				
Delivery Order Number	2600 Bull Street				
020	Columbia , SC 29201-1708				
File Number	803-898-4339				
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JAJ Subcontract Number	Subcontractor/Supplier/Manufacturer:				
na					
JAJ P.O. Number	Transmitted for:				
na	Approval/Comment				
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	Gabe Magwood				
	Tony Hunt				
			Brian R. Crawford, Engineer II		

**CORRECTIVE ACTION PLAN
FOR
HOBSON FUEL FARM
ZONE G/ AREA 19**

SITE IDENTIFICATION # 01189

**Charleston Naval Complex
Charleston, South Carolina**

**Submitted to:
Southern Division
Naval Facilities Engineering Command
2155 Eagle Drive
Charleston, South Carolina 29406**

**Submitted by:
CH2M-JONES, LLC.
115 Perimeter Center Place NE
Suite 700
Atlanta, Georgia 30346-1278**



Contract Number: N62467-99-C-0960

April 2001

CERTIFICATION

I certify that the information contained in this report, is true, and complete to the best of my knowledge, information, and belief.

Approved By: Richard Garcia Date: 10/01
South Carolina Registration No. 14220

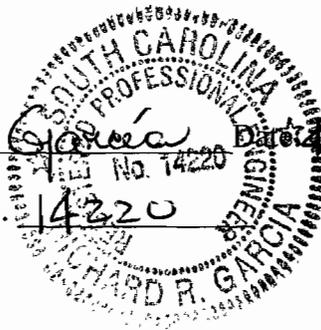


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FIG 1.....SITE LOCATION MAPS

FIG 2.....SITE VICINITY MAP

FIG 3.....FDS (Area 19) LOCATION MAP

FIG 4.....PROPOSED MW LOCATIONS

FIG 5.....EXISTING DPT AND PROPOSED SOIL BORING LOCATIONS

FIG 6.....DELINEATING SOIL BORING LOCATIONS

ACRONYMS

bls	below land surface
CAP	Corrective Action Plan
CAR	Contamination Assessment Report
CNC	Charleston Naval Complex
COC	Chemical of Concern
EISOPQAM	Environmental Investigations Standard Operating Procedures and Quality Assurance Manual
EPA	Environmental Protection Agency
FDS	Fuel Distribution System
mg/kg	microgram per kilogram
mg/L	microgram per liter
OVA	Organic Vapor Analyzer
QA	Quality Assurance
QC	Quality Control
RBSL	Risk-Based Screening Level
RDA	Redevelopment Authority
SCDHEC	South Carolina Department of Health and Environmental Control
SOUTHDIV	Southern Division Naval Facilities Engineering Command
SSTL	Site-Specific Target Level
TTNUS	Tetra Tech NUS
UST	Underground Storage Tank

1.0 INTRODUCTION

This Corrective Action Plan (CAP) has been prepared by CH2M-JONES, LLC. The plan is designed for Zone G/ Area 19 of the Hobson Fuel Farm; located at the Charleston Naval Complex (CNC), Charleston, South Carolina.

The South Carolina Department of Health and Environmental Control (SCDHEC) has designated this site as Identification Number: 01189. This CAP provides methods to further evaluate the applicability of active remediation by removing contaminated soils around Building 98, and continuing intrinsic remediation and monitoring well abandonment as a corrective action in accordance with SCDHEC Corrective Action Guidance, June 1997.

1.1 General Site Description

The CNC is located in the city of North Charleston, on the west bank of the Cooper River in Charleston County, South Carolina as shown in Figure 1. This installation consists of two major areas: an undeveloped dredge materials area on the east bank of the Cooper River on Daniel Island in Berkeley County, and a developed area on the west bank of the Cooper River. The developed portion of the base is on the peninsula bounded on the west by the Ashley River and on the east by the Cooper River. The site is located within the developed portion of the base as shown in Figure 1.

The area surrounding CNC is "mature urban", having long been developed with commercial, industrial, and residential land use. Commercial areas are primarily west of CNC; industrial areas are primarily to the north of the base along Shipyard Creek. A site vicinity map, which exhibits adjacent properties and structures, vicinity roads, current utilities, and vicinity surface drainage, is included as Figure 2.

Ensafe Inc. completed a Contamination Assessment Report (CAR) for Area 19 on March 16, 2001. The CAR describes Area 19 as being located in the northwest corner of the Hobson Fuel Farm and was added to the scope of the Fuel Distribution System (FDS) investigation in 1998 because of discoveries made during the closure at Facility 148 (Figures 2 & 3). The final RCRA Facility Assessment (RFA) for Naval Base Charleston (E/A&H, June 6, 1995) recognizes Area of Concern (AOC) 623 as part of Area 19. This AOC includes the area around Building 98, the FDS fuel oil booster pump house. Building 98 is a single-story concrete structure, with a concrete floor sunk five feet below grade. Constructed in 1944, Building 98 contains numerous pumps and valves used to boost the flow of fuel between Pier Kilo and the Chicora Tank Farm. Also included in Area 19 is Facility 148, a rectangular 15' x 20' x 10' tank with a 21,924 gallon capacity. Built in 1948, it was used until 1987 to hold fuel oil temporarily during pipeline repair and maintenance. The tank, built of reinforced concrete, was partially buried to approximately 4 feet below grade. Facility 148 was located on the southwest side of Building 98 and was connected to the building by a 8-inch-diameter pipeline. The tank does not appear on areal photos of the CNC area prior to 1948. As discussed in section 2.6 of the CAR, the tank was closed, demolished, and removed in 1996. For more information on Area 19 in the Hobson Fuel Farm, see the CAR completed by Ensafe in March 2001.

1.2 Objective

This CAP presents a plan to excavate soils in Area 19 at two locations around Building 98. The first location is along the southwestern side of Building 98. And the second area is to the north east of Building 98. Following the excavations, CH2M-Jones, LLC will install monitoring wells in order to monitor the groundwater to verify natural attenuation (Figure 6). If groundwater analytical results indicate that levels of contaminants are above the RBSLs, active remediation may be recommended for the groundwater.

2.0 PROPOSED CORRECTIVE ACTION

Based on the discussion of the CAR, a dig and haul approach will be performed at this site to remove the contaminated soils. Historically levels of Benzene, Ethylbenzene, and Naphthalene exceeded the Risk Based Screening Levels (RBSLs) for subsurface soils in the vicinity of Building 98/ Tank 148. The SCDHEC letter dated April 2, 2001 concurs with the recommendations in the CAR that contaminated soils should be excavated to eliminate the source area (Attachment A).

Additional soil samples will be collected prior to excavation in order to establish the contaminated areas. After defining the clean boundaries, soils from approximately 2 to 8 ft bls will be excavated as recommended in the Ensafe CAR. The proposed active measures and monitoring program is described in detail in Sections 3.0 and 4.0 of this plan.

3.0 MONITORING WELL INSTALLATION AND ABANDONMENT

3.1 Monitoring Well Installation

Monitoring wells will be installed following the excavation in order to monitor the groundwater activities. Proposed monitoring well locations are given in Figure 4.

3.2 Monitoring Well Abandonment

No monitoring wells will be abandoned at this time. The monitoring wells will only be abandoned upon receiving approval for no further action. All monitoring wells will be abandoned following the South Carolina Well Standards and Regulations R.61-71. The well abandonment will include grouting wells, removing stick-ups and removing all guard posts. Any well casing and screen removed will be decontaminated and disposed of as general refuse.

3.3 Surveying

All soil borings and monitoring wells installed at this site will be surveyed and implemented as a part of the closure report.

3.4 Equipment Decontamination

All drilling equipment, augers, well casing and screens, and soil and groundwater sampling equipment involved in field sampling activities will be decontaminated according to the Environmental Protection Agencies (EPA) "Environmental Investigations Standard Operating Procedures and Quality Assurance Manual (EISOPQAM).

4.0 PROPOSED SAMPLING PROGRAM

4.1 Soil Boring Schedule

Soil borings will be used in effort to define the boundaries of the excavation area. The analytical data acquired by Ensafé for DPT soil borings, F19SP00406, F19SP01311, F19SP01005, and F19SP01407 as shown in Figure 4-2 of the CAR, will be used as an excavation line of establishment on the southern end of the proposed excavation. Additional soil borings will be collected to further delineate the area (see figure 5 for proposed boring locations). The foundation for Building 98 acts as a cap and prevents infiltration of precipitation in the adjacent areas. For the northeastern excavation areas, DPT soil samples F19SP02010 and F19SP02303 (from Figure 4-2 of the CAR) will be used as source areas and additional soil borings will be collected in order to further delineate the areas (Figure 6).

Initially, soil borings will be collected from two intervals prior to any excavation. The first interval will be from 0-2 feet bls and the second interval will be collected from 3-5 feet bls. The soil samples will be collected using hand-auguring methods. The intent of the soil samples will be to establish the extent of the contaminated areas. Eight soil borings will be collected north, south, east and west of F19SP02010 and F19SP02303 (Figure 6). Two more soil borings will be collected just south west of DPT samples F19SP00106 and F19SP01507 (Figure 5). In the event that the first round of soil boring analytical data are above the RBSLs, additional soil boring samples will be acquired approximately five feet beyond the first set of borings. This process will be used until soil borings with analytical data indicating no contamination are found. A map of the proposed area to be excavated can be found in Figure 7.

Sampling date	Soil Borings Sampled	Laboratory Analytical
Initial sampling event prior to removal of soil	F19SB001 thru F19SB010	BTEX and Naphthalene 8260 PAHs 8270

4.2 Groundwater Sampling

Following excavation, monitoring wells will be installed to support natural attenuation. CH2M-Jones, LLC recommends three rounds of sampling in three month intervals. If the groundwater analytical results indicate that there are levels of contaminants above the RBSLs, active remediation for the groundwater may be recommended. If the analytical results indicate that there are no contaminants at the site, No Further Action may be recommended for Area 19.

Schedule:

1. Establish the contaminated soil areas by sampling soil borings F19SB001 thru F19SB010 (Figures 5 and 6).
2. Further delineate if Soil Borings 1-10 did not find the exterior boundaries.
3. Excavate contaminated soil to a depth of approximately 8 ft bls or just above groundwater.
4. Transport contaminated soil to a permitted Treated Storage Disposal Facility that will accept the soils.
5. Backfill excavated area with clean fill dirt.
6. Install Monitoring wells, and start monitoring groundwater for natural attenuation.

- **Groundwater Sampling**

No Groundwater sampling proposed until excavation is complete and new monitoring wells are installed.

Prior to any groundwater sampling, each well will be measured for water levels and total depth and each well will be purged in accordance the EPA EISOPQAM.

4.3 Analytical Parameters

The following constituents will be analyzed for each soil sample prior to any excavation:

- BTEX and Naphthalene using method 8260.
- PAHs using method 8270.

The following constituents will be analyzed for each monitoring well.

- BTEX and Naphthalene using method 8260.
- PAHs using method 8270.

The following parameters may be analyzed in order to evaluate the effectiveness of intrinsic remediation for groundwater:

pH, Nitrate/Sulfate, Dissolved Iron, Total Iron, and Alkalinity

4.4 Field Measurements

The following parameters will be sampled in the field for groundwater:

Dissolved Oxygen, pH, Turbidity, Conductivity, Temperature and Oxygen Reduction Potential

4.5 Groundwater Level Measurements

Depth to product (if any), Depth to water, and Total depth of well.

4.6 Sample Handling

Sample handling will be conducted in accordance the following references:

EPA EISOPQAM (EPA May, 1996)

Comprehensive Sampling and Analysis Plan, RCRA Facility Investigation, June 30, 1996.

4.7 Sample Packing and Shipping

The following forms will be completed to complete the packing/shipping process:

- Sample labels
- Chain-of-custody labels
- Appropriate labels applied to shipping coolers
- Chain-of-custody forms
- Federal express air bill

4.8 Quality Control

Quality Control (QC) samples will be collected during sampling events. QC samples may include field blanks, field duplicates, and trip blanks. Definitions of each can be found below as described by the EISOPQAM:

- **Field Blank:** a sample collected using organic-free water, which has been run over/through sample collection equipment. These samples are used to determine if contaminants have been introduced by contact of the sample medium with sampling equipment. Equipment field blanks are often associated with collecting rinse blanks of equipment that has been field cleaned.
- **Field Duplicates:** Two or more samples collected from a common source. The purpose of a duplicate sample is to estimate the variability of a given characteristic or contamination associated with a population.
- **Trip Blank:** A sample, which is prepared prior to the sampling event in the actual container and is stored with the investigative samples throughout the sampling event. They are often packaged for shipment with the other samples and submitted for analysis. At no time after their preparation are trip blanks to be opened before they reach the laboratory. Trip blanks are used to determine if samples were contaminated during storage and/or transportation back to the laboratory (a measure of sample handling variability resulting in positive bias in contaminant concentration). If samples are to be shipped, trip blanks are to be provided with each shipment but not for each cooler.

4.9 Field QA/QC

More information on field QC can be found in section 5.6.

4.10 Control Limits

Analysis	Control Parameter	Control Limit	Corrective Action
Air Monitoring	Check Calibration of OVA daily	Calibrate to manufactures specifications	Recalibrate. If unable to calibrate, replace.
pH of water	Continuing calibration check of pH 7.0 buffer	pH= 7.0	Recalibrate. If unable to calibrate, replace electrode.
Specific Conductance of water	Continuing calibration check of standard solution	> 1% of standard	Recalibrate.

4.11 Record keeping

In addition to records kept in logbooks, forms will be kept on log sheets for soil and groundwater.

4.12 Site Management and Base Support

Throughout the investigation activities, work on the CNC will be coordinated through SOUTHDIV and SCDHEC.

The primary contacts for each are as follows:

1. SOUTHDIV point of contact
Gabe Magwood
Southern Division Engineering Command
2155 Eagle Drive
North Charleston, SC 29406
(843) 820-7307
2. SOUTHDIV point of contact
Tony Hunt
Southern Division Engineering Command
2155 Eagle Drive
North Charleston, SC 29406
(843) 820-7307

3. SCDHEC point of contact
Michael Bishop
South Carolina Department of Health and Environmental Control
2600 Bull Street
Columbia, SC 29201
(843) 898-4300

REFERENCES

South Carolina Department of Health and Environmental Control. 1997. Corrective Action Guidance.

Ensafe, Inc.; 2001 Contamination Assessment Report Addendum, Charleston, South Carolina.

United States Environmental Protection Agency. 1990. Code of Federal Regulations 136.

United States Environmental Protection Agency. 1988. EPA Users Guide to Contract Laboratory Program.

United States Environmental Protection Agency. 1996. EPA Environmental Investigations Standard Operating Procedures for Quality Assurance Manual.



2 April 2001

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DEPARTMENT OF THE NAVY
SOUTHERN DIVISION NAVAL FEC
GABRIEL MAGWOOD
2155 EAGLE DRIVE
N. CHARLESTON SC 29406

RE: CNB - Zone G - Areas 19, 20 & 21 (Hobson Fuel Farm Area)
Site Identification #'s 01189, 01190 & 01700
Contaminant Assessment Report Addendum received 19 March 2001
Charleston County

Dear Mr. Magwood:

The Department has completed technical review of the referenced document. Based on the review the following comments are offered:

AREA 19

Per the referenced report, levels of Benzene, Ethylbenzene and Naphthalenes exceeded Risk-Based Screening Levels (RBSLs) for subsurface soils in the vicinity of Building 98 / Tank 148. Groundwater samples also exceeded RBSLs for contaminants of concern (CoCs).

The Department concurs with the recommendation that contaminated soils be excavated to eliminate the source area. However, present groundwater contamination levels indicate that active remediation of groundwater may be required in order to reduce overall groundwater contamination levels. The Department will allow for soils to be excavated immediately, followed by the installation of permanent monitoring wells to evaluate any requirements for groundwater remediation.

AREA 20

Per the referenced report, levels of Benzene and Naphthalenes exceeded Risk-Based Screening Levels (RBSLs) for subsurface soils in Area 20. Groundwater samples exceeded RBSLs for SVOCs during DPT investigations; however, groundwater samples extracted from the permanent monitoring wells did not detect any CoCs above the RBSL limits.

Soil contamination discovered in the vicinity of F20SP01404, F20SP02307 and F20SP02407 should be removed as part of corrective action activities in this area. Soil contamination in the vicinity of F20SP01709 and F20SP01906 may require removal in conjunction with proposed construction activities.

The Department concurs with the recommendation that groundwater be monitored to evaluate natural attenuation as the corrective action alternative at this site. Once soil excavation activities have been completed, a monitoring plan should be submitted in order to demonstrate the natural attenuation of groundwater contamination in this area.

AREA 21

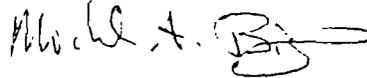
Per the referenced report, levels of SVOCs exceed the RBSL limits for soils. No VOCs were detected above the RBSL limits. Surface soil samples from HFFSP004, HFFSP006 and HFFSP007 exceed RBSL limits for dermal contact. The subsurface sample from HFFSP00802 exhibited levels of Naphthalene above the RBSL limit. Groundwater samples did not exceed the RBSL limits for any petroleum related compounds.

Per the report, Area 21 lies within the foundation area for the proposed warehouse. As a result, any construction activities at this location will be required to mitigate concerns associated with the contaminated surface soils. Any future groundwater concerns can be monitored through the existing monitoring wells at Areas 8 and 20.

Please submit a Corrective Action Plan to the Department outlining the proposed implementation of the corrective action activities discussed above. In addition, please provide the Department with specific information and schedules concerning proposed development activities when this information becomes available. The corrective action plan should be received no later than 8 June 2001.

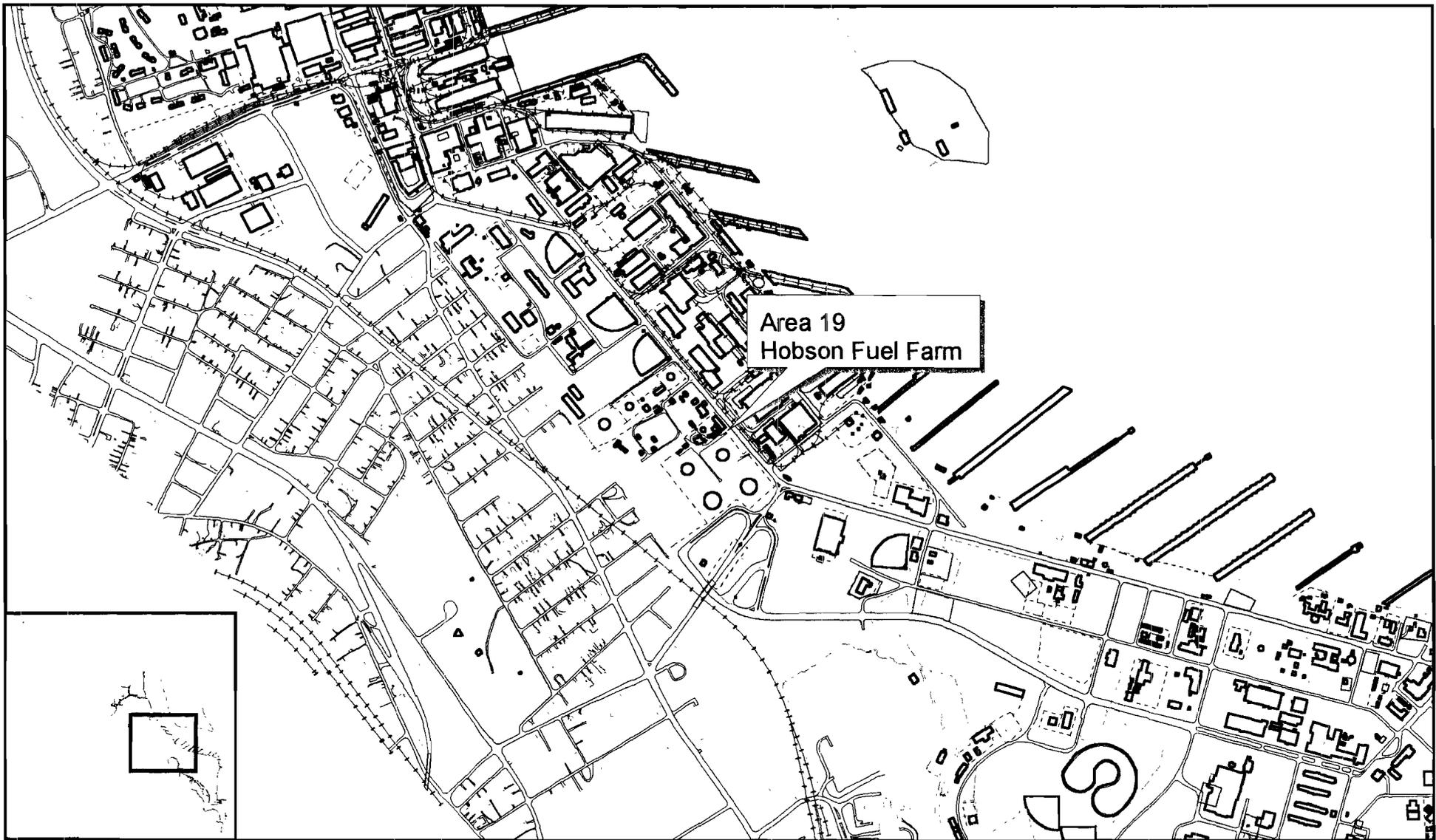
Should you have any questions please contact me at 803-898-3553 (office phone), 803-898-3795 (fax) or by e-mail bishopma@columb32.dhec.state.sc.us.

Sincerely,



Michael A. Bishop, Hydrogeologist
Groundwater Quality Section
Bureau of Water

cc: Trident District EQC
Mihir Mehta, SCHDEC-BLWM
Steve Parker, EnSafe, 313 Wingo Way, Mt. Pleasant, SC 29464
Brian Crawford, Charleston Naval Complex, 1848 Ave. F, North Charleston, SC 29405
Keith Collinsworth, EQC Admin
Technical File



Area 19
Hobson Fuel Farm

- Fence
- Railroads
- Roads - Lines
- Bridges
- Surrounding Area
- Shoreline
- AOC Boundary
- SWMU Boundary
- Buildings
- Zone Boundary

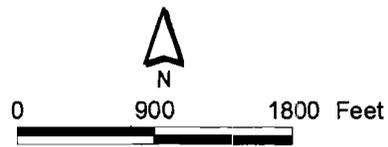
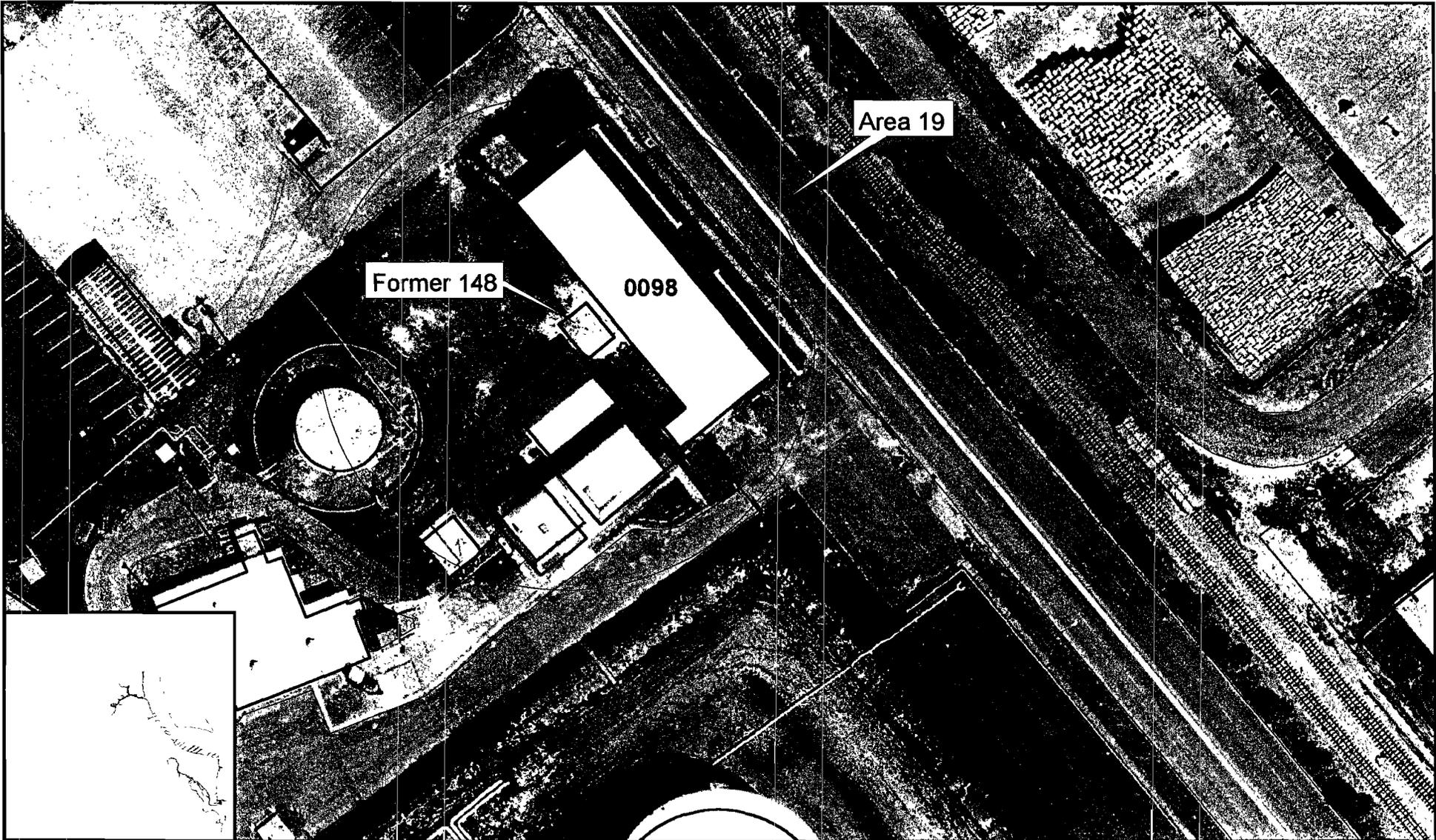


Figure 1
Site Location Map
Zone G; Area 19
Charleston Naval Complex

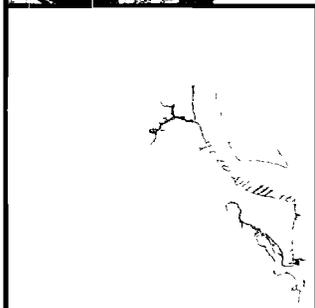
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Former 148

0098

Area 19



- Fence
- Railroads
- Roads - Lines
- Bridges
- Surrounding Area
- Shoreline
- AOC Boundary
- SWMU Boundary
- Buildings
- Zone Boundary

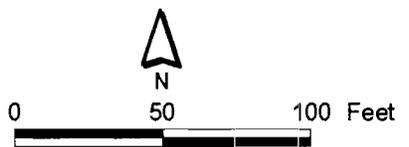
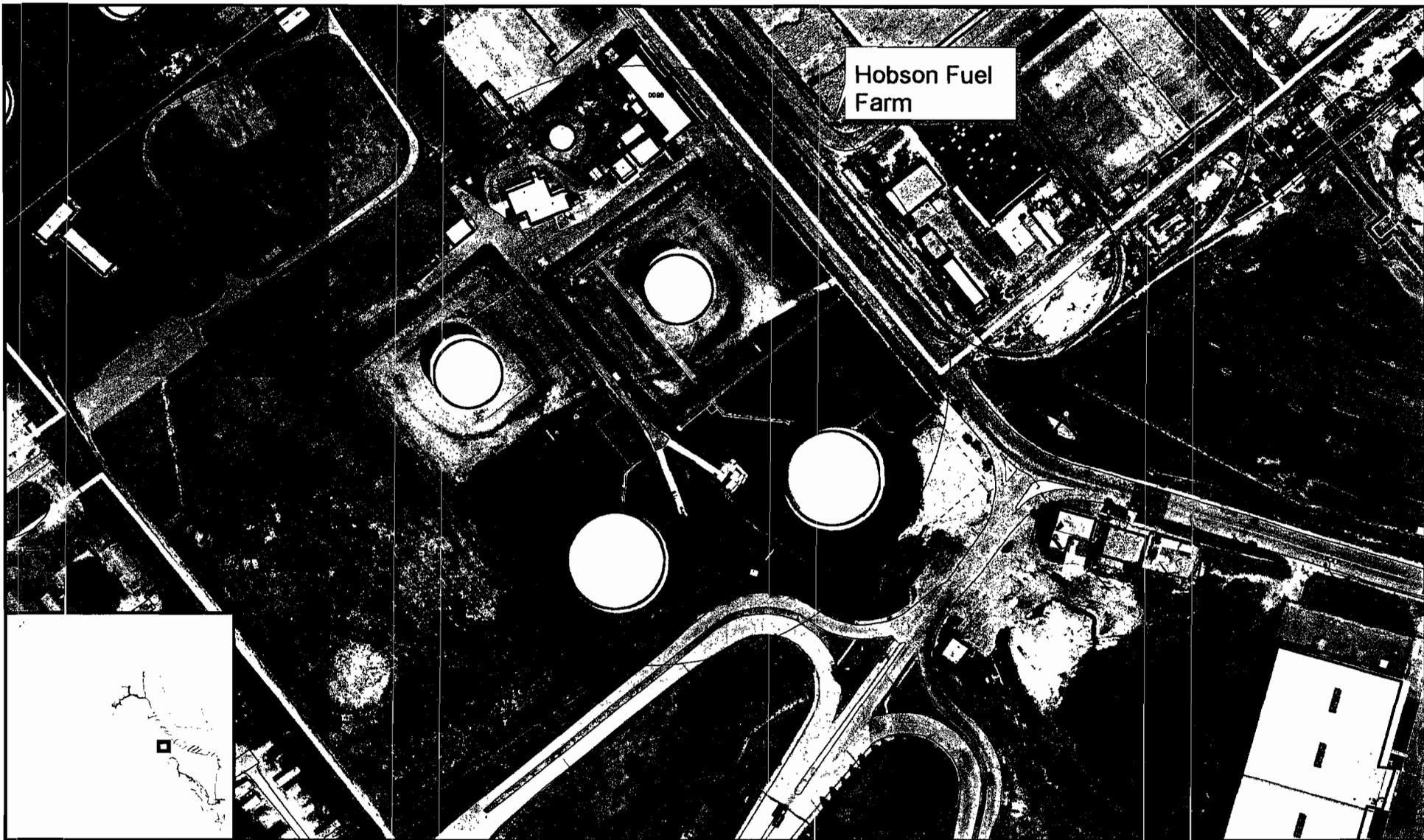


Figure 2
 Site Vicinity Map
 Zone G; Area 19
 Charleston Naval Complex

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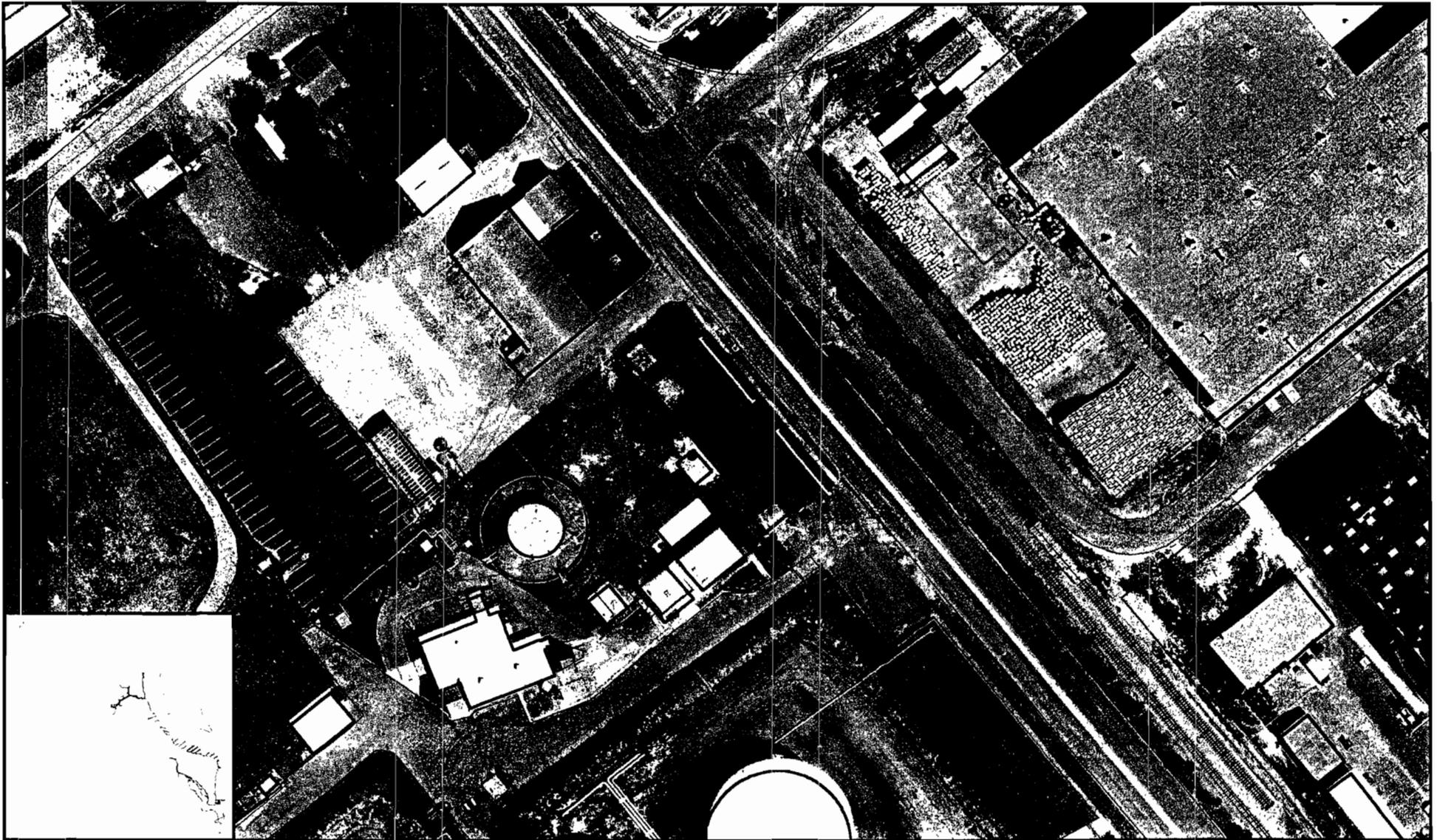
Hobson Fuel Farm

- Fence
- Railroads
- Roads - Lines
- Bridges
- Surrounding Area
- Shoreline
- AOC Boundary
- SWMU Boundary
- Buildings
- Zone Boundary



Figure 3
 Fuel Distribution System
 Zone G; Area 19
 Charleston Naval Complex

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- | | |
|----------------------------|------------------|
| ● Groundwater Well | Surrounding Area |
| ○ Proposed Monitoring Well | Shoreline |
| ∩ Fence | □ AOC Boundary |
| ∩ Railroads | □ SWMU Boundary |
| ∩ Roads - Lines | □ Buildings |
| ∩ Bridges | □ Zone Boundary |

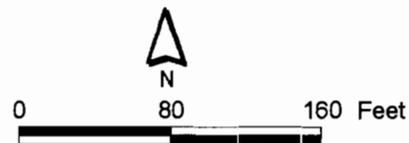
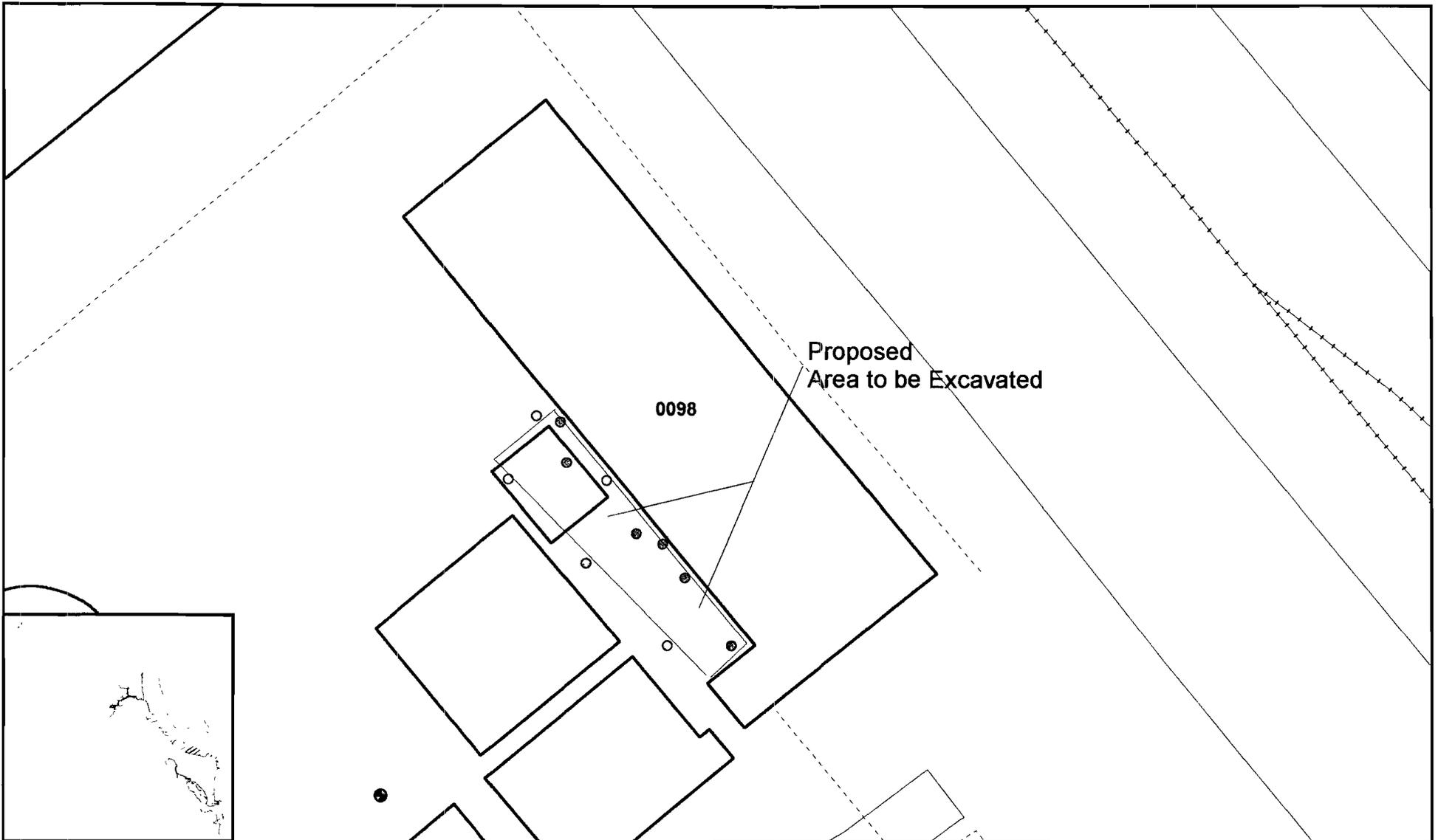


Figure 4
 Proposed Monitoring Wells
 Zone G; Area 19
 Charleston Naval Complex

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- Groundwater Well
- Contaminated DPT Sample Locations
- Clean DPT Locations
- Proposed Soil Borings
- Fence
- Railroads

- Roads - Lines
- Bridges
- Surrounding Area
- Shoreline
- AOC Boundary
- SWMU Boundary

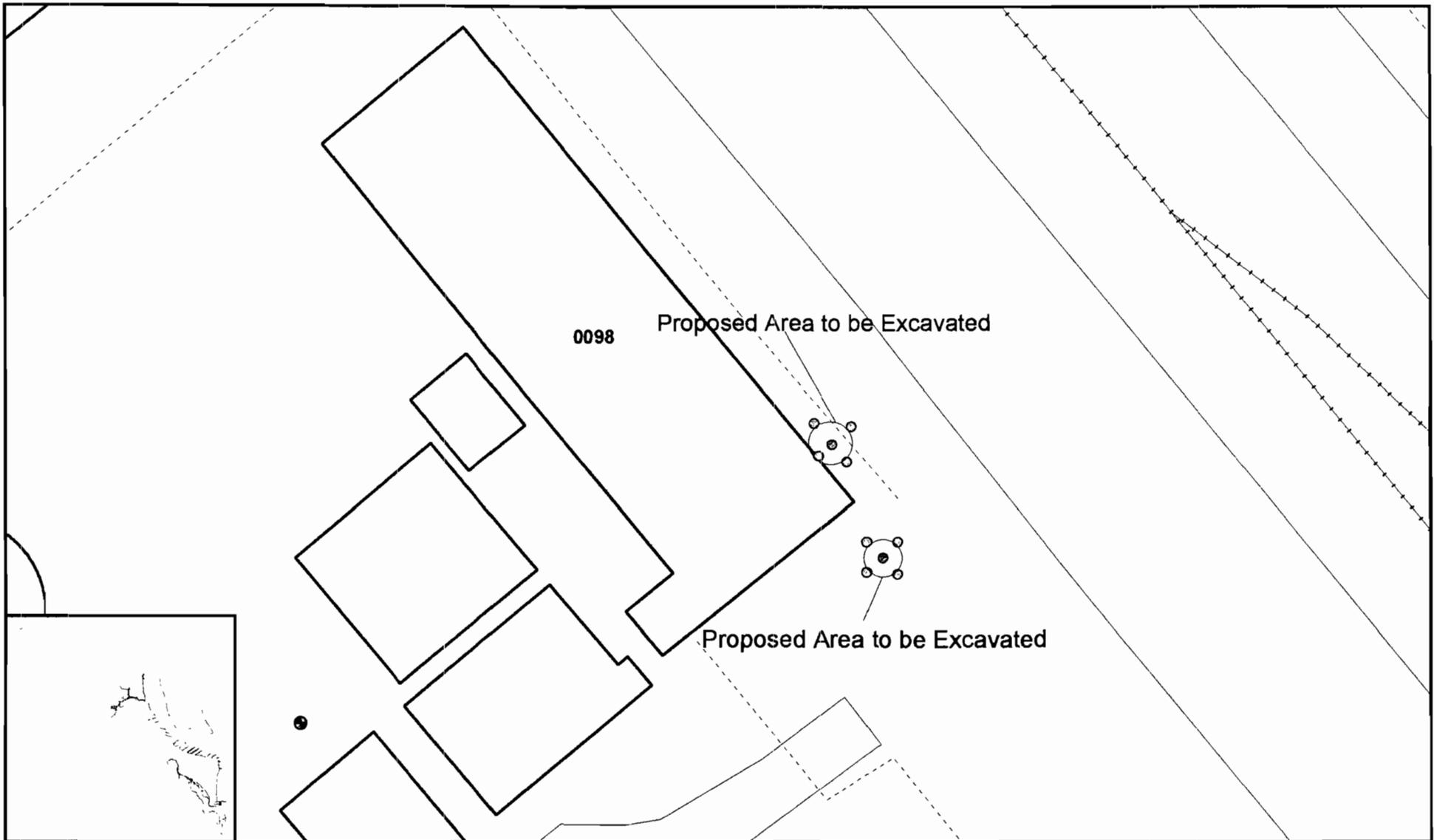
- Buildings
- Zone Boundary



0 20 40 Feet

Figure 5
 Zone G; Area 19
 Map Subtitle
 Charleston Naval Complex

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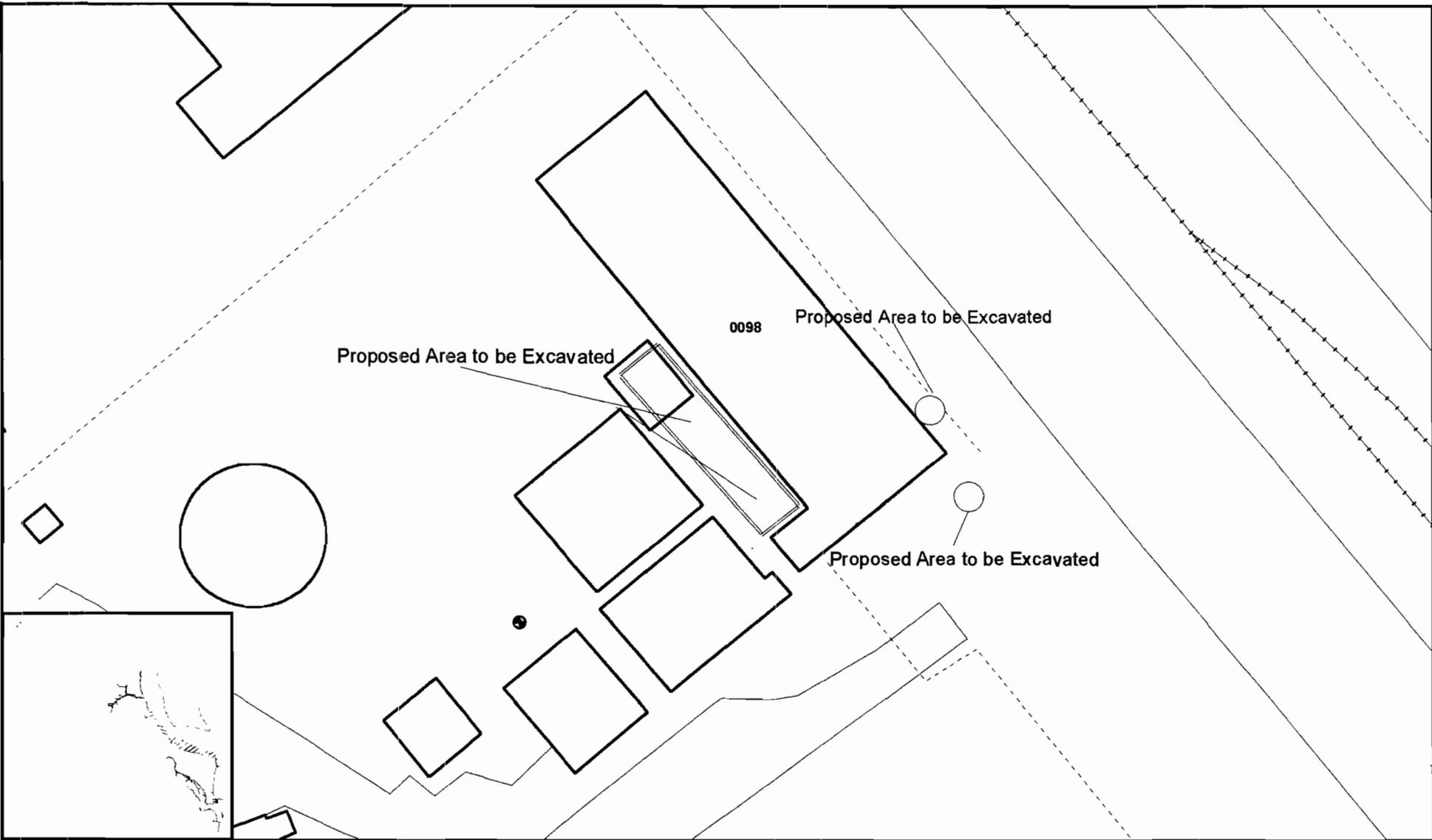


- Groundwater Well
- Contaminated DPT Sample Locations
- Clean DPT Locations
- Proposed Soil Borings
- Fence
- Railroads
- Roads - Lines
- Bridges
- Surrounding Area
- Shoreline
- AOC Boundary
- SWMU Boundary

Buildings
 Zone Boundary

N
 0 20 40 Feet

Figure 6
 Proposed Soil Borings
 Zone G; Area 19
 Charleston Naval Complex



- Groundwater Well
- Contaminated DPT Sample Locations
- Clean DPT Locations
- Proposed Soil Borings
- Fence
- Railroads
- Roads - Lines
- Bridges
- Surrounding Area
- Shoreline
- AOC Boundary
- SWMU Boundary
- Buildings
- Zone Boundary

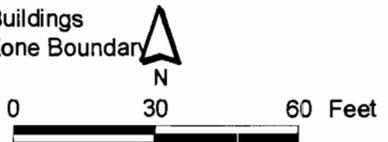


Figure 7
 Proposed Area to be Excavated
 Zone G; Area 19
 Charleston Naval Complex

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