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RCRA FACILITY INVESTIGATION ADDENDUM SAMPLING PLAN UNINVESTIGATED SITES ZONE E WITH TRANSMITTAL CNC CHARLESTON SC

9/21/2001

CH2M HILL

RFI ADDENDUM SAMPLING PLAN

Uninvestigated Sites
Zone E

Charleston Naval Complex
North Charleston, South Carolina

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

PREPARED BY
CH2M-Jones

September 2001

Revision 0
Contract N62467-99-C-0960
158814.ZE.PR.01

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CH2MHILL

September 21, 2001

Mr. David Scaturo
Corrective Action Engineering Section
Bureau of Land and Waste Management
Department of Health and Environmental Control
8901 Farrow Road
Columbia, SC 29223

Re: RFI Addendum Sampling Plan for Previously Uninvestigated Sites – Zone E

Dear Mr. Scaturo:

Enclosed are four copies of the RFI Addendum Sampling Plan for Previously Uninvestigated Sites (Revision 0) in Zone E of the Charleston Naval Complex (CNC). This sampling plan has been prepared pursuant to agreements by the CNC BRAC Cleanup Team for completing the RCRA Corrective Action process.

All six of the previously uninvestigated sites—SWMU 181, SWMU 188, AOC 537, AOC 575, AOC 701, and AOC 704—have been included in the sampling plan. However, during discussions at the September 2001 BCT meeting, SCDHEC agreed to evaluate the necessity of conducting investigations at several of the sites originally designated for confirmatory sampling investigations (CSIs), in particular, SWMUs 181 and 188.

The principal author of this document is Kris Garcia. Please contact Ms. Garcia at 770/604-9182, extension 476, or me, at 352-335-5877, extension 2280, if you have any questions or comments.

Sincerely,

CH2M HILL

c: Rob Harrell/Navy, w/att
Gary Foster/CH2M HILL, w/att

RFI ADDENDUM SAMPLING PLAN

Uninvestigated Sites
Zone E

Charleston Naval Complex
North Charleston, South Carolina

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Certification Page for RFI Addendum Sampling Plan (Revision 0) – Previously Uninvestigated Sites, Zone E

I, Casey Hudson, 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

Temporary Permit No. T2000358

Casey Hudson

Casey Hudson, P.E.

09·06·01

Date

SOUTH CAROLINA
CH2M
HILL, INC.
No. C00201
CERTIFICATE OF AUTHORIZATION

Contents

Acronyms and Abbreviations

AOC	area of concern
BCT	BRAC Cleanup Team
BRAC	Base Realignment and Closure Act
CNC	Charleston Naval Complex
CNSY	Charleston Navel Ship Yard
CSAP	Comprehensive Sampling and Analysis Plan
CSI	confirmatory sampling investigation
DMP	Data Management Plan
EBS	environmental baseline study
EnSafe	EnSafe Inc.
EPA	U.S. Environmental Protection Agency
ESDLOQCM	EPA Environmental Services Division *Laboratory Operations and Quality Control Manual*
ESDSOPQAM	EPA Environmental Services Division *Standard Operating Procedures and Quality Assurance Manual*
ft bls	feet below land surface
GIS	geographic information system
HA	hand auger
HSA	hollow-stem auger
IM	interim measure
IDW	investigation-derived waste
µg/kg	micrograms per kilogram
NAVBASE	Naval Base
PCB	polychlorinated biphenyl
PPE	personal protective equipment
QA/QC	quality assurance/quality control
QAP	Quality Assurance Plan
RCRA	Resource Conservation and Recovery Act
RFA	RCRA Facility Assessment
RFI	RCRA Facility Investigation
SAA	satellite accumulation area
SB	soil borings
SCDHEC	South Carolina Department of Health and Environmental Control

SVOC	semivolatile organic compound
SWMU	solid waste management unit
TCLP	toxicity characteristic leachate procedure
TW	temporary well
UST	underground storage tank
VOC	volatile organic compound

Section 1.0

1.0 Introduction

1.1 Purpose

This RCRA Facility Investigation (RFI) Addendum Sampling Plan describes the proposed initial investigations for six previously uninvestigated units in Zone E at the Charleston Naval Complex (CNC). Figure 1-1 illustrates the location of Zone E within the CNC. The uninvestigated units are identified in the *Zone E RCRA Facility Assessment* (RFA) (EnSafe Inc. [EnSafe], 1995) as follows:

Unit Number	Unit Name	RFA Recommendation
SWMU 181	Satellite Accumulation Area, Metal Trades, CNSY Permit #99	CSI
SWMU 188	Satellite Accumulation Area, Paint Waste, CNSY Permit #103	RFI
AOC 537	Substation, Building 342	CSI
AOC 575	Substation, Building 454	CSI
AOC 701	McMillan Avenue Gas Station	CSI
AOC 704	Paint Accumulation, Building 301B	CSI

AOC = area of concern
CSI = confirmatory sampling investigation
SWMU = solid waste management unit

These units were not investigated at the time of the initial RFI field work in 1996-1997 either because they had not yet been identified as AOCs under the RFA, which was still in progress, or because they had not been finalized in the RFA. The area for all six units is zoned for industrial use (M-2).

The information obtained from these investigations will be used to evaluate the nature and extent of contamination, if any, in the environmental media at the units. As part of the preparation of this RFI Sampling Plan, CH2M-Jones conducted site visits to the units, reviewed existing historical documentation on the units, and developed sampling approaches that are considered to be biased toward finding any impacts from historical operations at these units. These sampling plans were developed with the expectation that the information collected will be adequate to determine if impacts have occurred. If no significant contamination associated with the operation of these units is present (i.e., any analytes detected are below established screening criteria), the Base Realignment and Closure Act (BRAC) Cleanup Team (BCT) can decide there is no need for further

investigations. The data collected, as outlined in this sampling plan, will be adequate to make decisions regarding the future disposition of these units.

1.2 Physical Setting

The physical setting of Zone E is discussed in detail in Section 2 – NAVBASE Physical Setting of the *Zone E RFI Report, Revision 0* (EnSafe, 1995). The RFI report includes discussions of the regional setting, geologic and hydrogeologic conditions, and climate of the CNC.

1.3 Potential Receptors

The potential receptors for Zone E sites are discussed in detail in Section 6 – Fate and Transport, Section 7 – Human Health Risk Assessment, and Section 8 – Ecological Risk Summary of the *Zone E RFI Report, Revision 0.*

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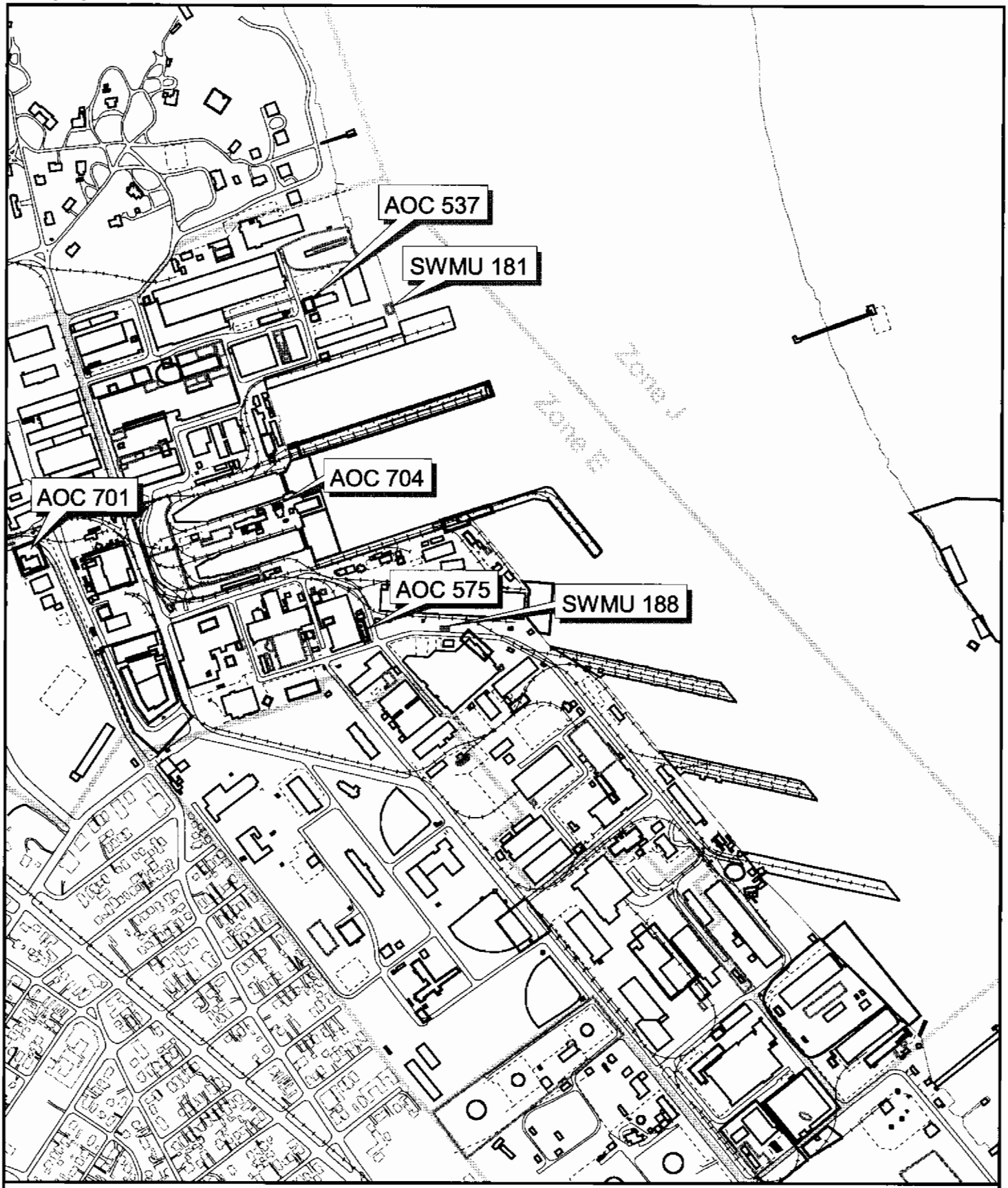


Roads
Shoreline
AOC Boundary
SWMU Boundary
Buildings
Zone Boundary

N

0 700 1400 Feet

1 inch = 700 feet

Figure 1-1
Unit Location Map
Zone E
Charleston Naval Complex

CH2MHILL

File Path: c:\18gis\projects\zone_e\locationsgroup2.apr, Date: 22 Aug 2001 6:40, User: NMOUDRY, Figure 1-1 Unit Location Map

Section 2.0

2.0 Investigative Strategies

This sampling plan has been developed consistent with the procedures outlined in Section 2 of the U.S. Environmental Protection Agency's (EPA's) RFI Guidance, Interim Final (EPA, May 1989) and the *Zone E RFI Work Plan, Revision 0* (EnSafe Inc. [EnSafe], 1995). Implementation of this sampling plan will be conducted in accordance with EPA guidance.

2.1 Field Investigation Methodologies

The sampling activities will be performed consistent with the Environmental Services Division *Standard Operating Procedures and Quality Assurance Manual* (ESDSOPQAM) (EPA, 1996a) and the *Final Comprehensive RFI Work Plan* (EnSafe/Allen & Hoshall, 1994).

2.2 Quality Assurance/Quality Control

Sample quality will be maintained consistent with the procedures identified in the ESDSOPQAM (EPA, 1996a).

In addition, quality assurance/quality control (QA/QC) practices will be implemented consistently with the Quality Assurance Plan (QAP) and Data Management Plan (DMP) of the approved Comprehensive Sampling and Analysis Plan (CSAP) included in the *Final Comprehensive RFI Work Plan* to verify that data are properly validated.

2.3 Sample Analyses

2.3.1 Soil and Groundwater Analytes

All soil and groundwater samples will be analyzed for the following suites of analytes:

- Volatile organic compounds (VOCs) (EPA Method 8260B)
- Semivolatile organic compounds SVOCs (EPA Method 8270C)
- Metals (EPA Method SW 846, as appropriate)
- Polychlorinated biphenyls (PCBs) (EPA Method 8082)
- Pesticides (EPA Method 8081A)
- Cyanide (EPA Method 9010B)

The samples will be hand delivered or sent via overnight carrier to an offsite laboratory, where they will be analyzed on a standard turnaround time for both hard copy and electronic deliverables.

2.3.2 Sample Analysis Protocols

Sample analysis will be conducted consistent with the guidance in the EPA's *Test Methods for Evaluating Solid Waste, SW-846, Revision 4*, Office of Solid Waste and Emergency Response (SW846) (1996b) and in the EPA Environmental Services Division *Laboratory Operations and Quality Control Manual* (ESDLOQCM) (1997).

The analysis will also follow the procedures provided in the approved CSAP.

2.3.3 Data Verification and Validation

Data verification and validation practices will be consistent with QAP and DMP in the approved CSAP portion of the *Final Comprehensive RFI Work Plan* to verify that all information and data are valid and properly documented.

In addition, verification and validation procedures will be conducted consistently with the following guidelines:

- *Contract Laboratory Program National Functional Guidelines for Organic Data Review* (EPA, 1994a)
- *Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (EPA, 1994b)

2.3.4 Data Management

Recordkeeping and data management practices for both field data and analytical data will be consistent with the DMP in the approved CSAP to verify that all information and data are properly recorded and documented.

Electronic data will be maintained in a database by CH2M-Jones for data storage and management.

2.4 Health and Safety

CH2M-Jones requires and places significant emphasis on the health and safety of our own personnel, our subcontractors, and the local community. Once all site personnel have arrived on site as part of the mobilization, a project briefing and health and safety orientation meeting will be held. All work completed as part of this sampling plan will be performed consistent with the CH2M-Jones Site-Specific Health and Safety Plan.

Anticipated contaminant levels at these uninvestigated units are within a range considered protective of industrial workers. Therefore, personnel working at the site will be required to

comply with Level D personal protective equipment (PPE) requirements, as specified in the Health and Safety Plan.

2.5 Investigation-Derived Waste (IDW)

Although the investigation-derived waste (IDW) will vary from unit to unit, it will consist of a combination of the following waste streams:

- Residual soil
- Development/purge water
- Decontamination water
- Asphalt/concrete construction debris
- PPE
- Expendable field materials/supplies/equipment

IDW will be collected in labeled 55-gallon drums, segregated by medium, and hauled from the units to Building 1846 located on the CNC. Building 1846 is a RCRA less-than-90-day hazardous waste accumulation area. A sample of the contents of each drum will be collected and analyzed for the following parameters for both total and toxicity characteristic leachate procedure (TCLP) values for waste characterization purposes:

- VOCs
- SVOCs
- Metals
- PCBs
- Pesticides
- Cyanide

If necessary, CH2M-Jones will arrange for transporting the drum and its contents to an offsite, licensed facility that is permitted to accept the waste.

Other waste streams, such as concrete and asphalt debris, will be handled as construction debris and disposed of as such.

Section 3.0

3.0 Investigative Approach for SWMU 181

3.1 Site Background and Setting

SWMU 181 consists of a satellite accumulation area (SAA) adjacent to Pier C (see Figure 3-1). The SAA consisted of a 8 x 8 x 8 ft metal storage structure that sat on a concrete quay. The unit was permitted on June 29, 1994, and removed prior to 1996. The unit was managed as part of the Charleston Navel Ship Yard (CNSY) hazardous waste management system. The waste stored in the metal structure consisted of paint cans and rags. The hazardous materials were transferred to Building 1640 (SWMU 2 in Zone A), a permitted facility in which hazardous wastes generated base-wide were stored prior to shipment offsite for treatment and/or disposal.

3.2 RFA Recommended Action

A CSI was recommended due to staining near the site and the proximity of the unit to the Cooper River (EnSafe, 1995).

3.3 Site Inspection by CH2M-Jones

A visual site inspection was performed by CH2M-Jones personnel on July 11, 2001. The storage structure is no longer present. There were no signs of where the shed stood or of any impact on the concrete surface.

During the inspection, minor paint stains were observed on the concrete. The staining appears to be old oversprays and minor spills of navy-ship gray paint. The area of staining is desiccated, spotty, and limited to minor surface contact. There is no evidence that the minor spills ever penetrated the concrete surface.

3.4 Proposed Sampling

This section describes the proposed CSI sampling for surface and subsurface soils at SWMU 181. The test results will be presented in an RFI Report Addendum. The results will be evaluated to determine the nature and extent of site-related constituents, if any, and whether corrective measures are necessary at this unit.

3.4.1 Concrete Coring

Due to the placement of SWMU 181 along a roadway at the edge of the Cooper River and its elevation relative to the river, the concrete could be up to several feet thick. The SWMU consisted of a metal structure placed on top of the concrete surface. A visual inspection in the vicinity of SWMU 181 suggested that any spills had only surficial impacts to the concrete.

Although the thickness of the overlying concrete is unknown, it must be cored through in order to reach soil for sampling. If the thickness is less than 18 inches, a standard concrete core machine will be used. In the event that the concrete core machine is not able to fully penetrate the concrete, a drill rig with coring capabilities will be used to reach the native soil.

3.4.2 Soil Investigation

To evaluate the nature and extent of contaminants at SWMU 181, three (3) soil borings (SBs), identified as E181SB001, E181SB002, and E181SB003, will be advanced by CH2M-Jones at the three (3) locations shown on Figure 3-2. Stainless-steel hand augers (HAs) will be used to collect surface soil samples from the 0-to-1-ft interval below the concrete/soil interface for the surface soil interval and the 3-to-5-ft interval below the concrete/soil interface for the subsurface interval.

The completed HA locations will be filled with excess cuttings, and the pavement replaced with bituminous cold patch or concrete, flush with the surface. Locations will be surveyed for positioning in the CNC geographic information system (GIS).

NOTE: Original figure created in color

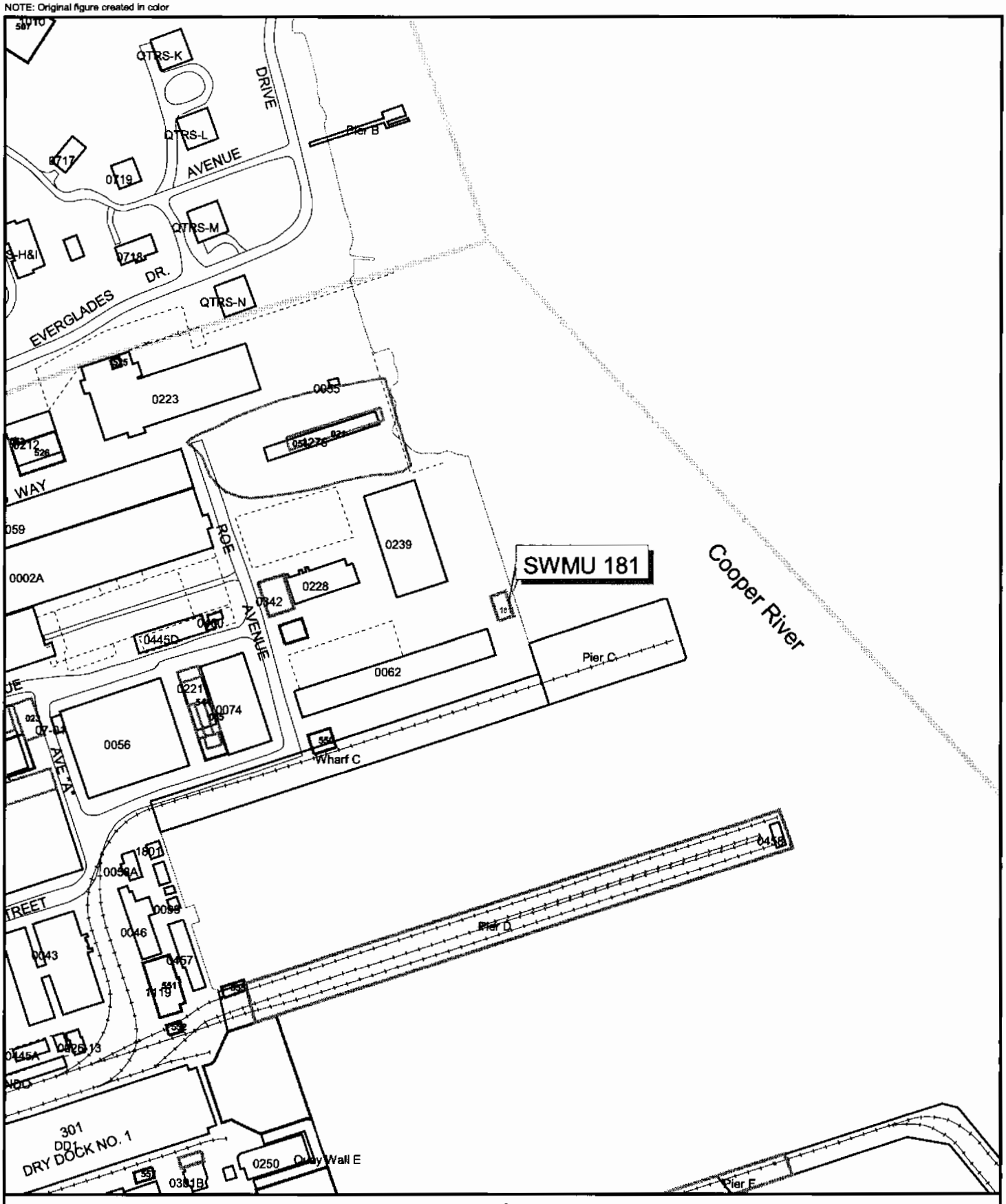
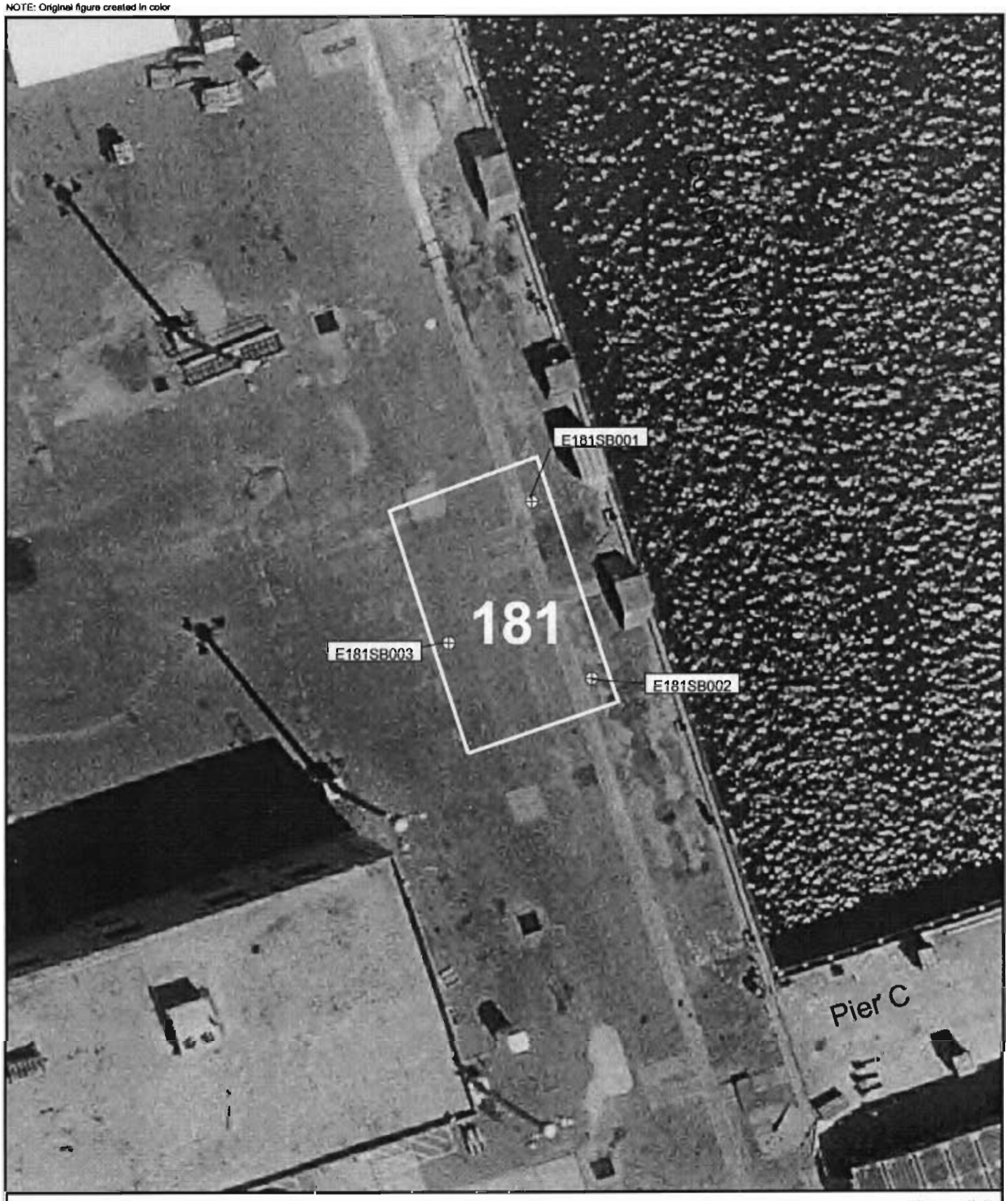


Figure 3-1
SWMU 181
Location Map
Charleston Naval Complex

CH2MHILL

File Path: C:\18gis\Projects\Zone_E\SWMU181\swmu181.apr, Date: 16 Aug 2001 8:16, User: NMOUDRY

NOTE: Original figure created in color



⊕ Proposed Soil Boring
Roads
Shoreline
AOC Boundary
SWMU Boundary
Buildings

N

0 30 60 Feet

1 inch = 25 feet

Figure 3-2
SWMU 181
Proposed Sampling Locations
Charleston Naval Complex

CH2MHILL

File Path: C:\18gis\Projects\Zone_E\SWMU181\swmu181.apr, Date: 05 Sep 2001 13:20, User: NMOUDRY, EGIS: Charleston Naval Complex - Figure x-x SWMU 181

Section 4.0

4.0 Investigative Approach for SWMU 188

4.1 Site Background and Setting

SWMU 188 consists of an SAA on the south side of Dry Dock 5 (see Figure 4-1). The SAA consisted of an 8 x 6 x 6 ft metal storage structure that was permitted on September 6, 1994, and removed prior to 1996. The unit was managed as part of the CNSY hazardous waste management system. Waste stored at the SAA consisted of waste paint and solvents. Wastes were stored on a 4 x 2 ft metal drip pan. The hazardous materials were transferred to Building 1640, a permitted facility in which hazardous wastes generated base-wide were stored prior to shipment offsite for treatment and/or disposal.

4.2 RFA Recommended Action

A CSI was recommended due to staining near the site and the proximity of the unit to the Cooper River (EnSafe, 1995).

4.3 Site Inspection by CH2M-Jones

A pre-field investigation visual site inspection was performed by CH2M-Jones personnel on July 11, 2001. The storage structure is no longer present. There were no signs of where the shed stood or of any impact on the asphalt surface.

During the inspection, minor paint stains were observed on the asphalt. The staining appears to be old oversprays and minor spills. The area of staining is desiccated, spotty, and limited to minor surface contact. There is no evidence that the minor spills ever penetrated the asphalt surface.

4.4 Proposed Sampling

This section describes the proposed CSI sampling for surface and subsurface soil at SWMU 188. The test results will be presented in an RFI Report Addendum. The results will be evaluated to determine the nature and extent of site-related constituents, if any, and whether corrective measures are necessary at this unit.

4.4.1 Soil Investigation

To evaluate the nature and extent of contaminants at SWMU 188, three (3) soil borings (SBs), identified as E188SB001, E188SB002 and E188SB003, will be advanced by CH2M-Jones

at the three (3) locations shown on Figure 4-2. Stainless-steel HAs will be used to collect surface soil samples from the 0-to-1-ft interval below the asphalt/soil interface for the surface soil interval and 3-to-5-ft interval below the asphalt/soil interface for the subsurface interval.

The completed HA locations will be backfilled with excess cuttings, and the pavement replaced with bituminous cold patch or concrete, flush with the surface. Locations will be surveyed for positioning in the CNC GIS.

NOTE: Original figure created in color

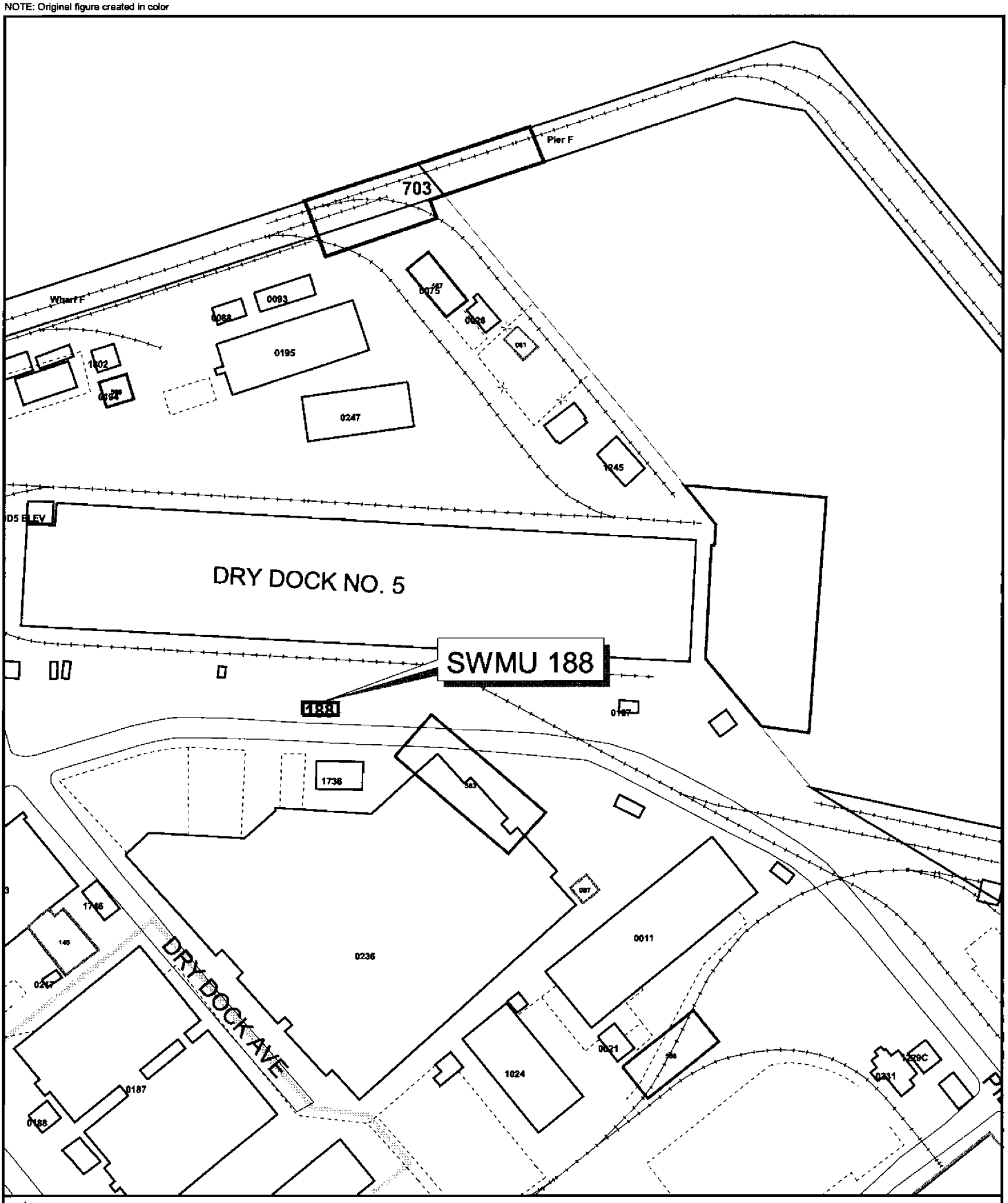
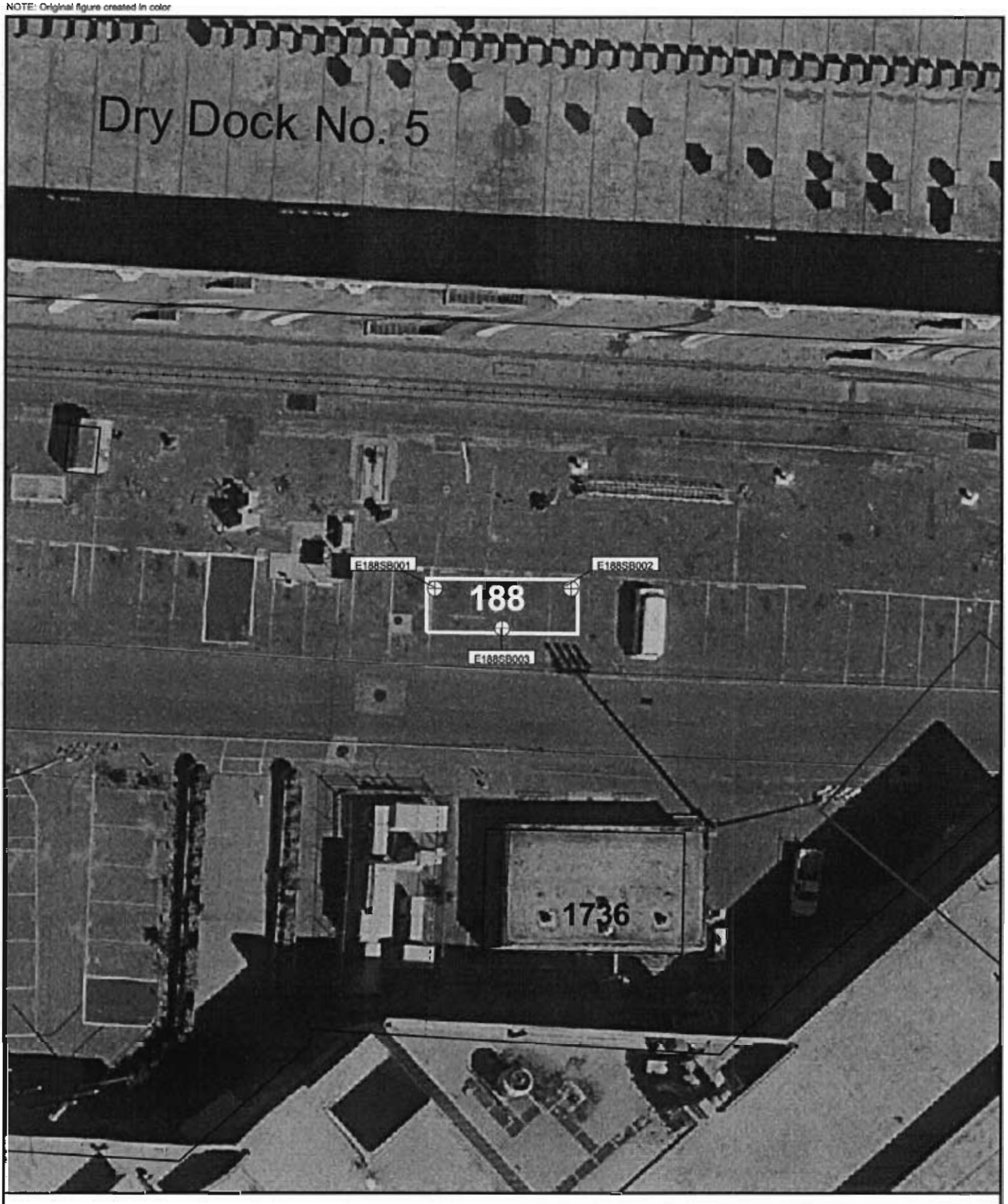


Figure 4-1
SWMU 188
Location Map
Charleston Naval Complex

File Path: C:\18gis\CNC\cnc-egis.apr, Date: 14 Aug 2001 8:58, User: MKARAFA

NOTE: Original figure created in color



⊕ Proposed Soil Boring
Fence
Railroads
Roads
AOC Boundary
SWMU Boundary
Buildings
Zone Boundary

N

0 40 80 Feet

1 inch = 35 feet

Figure 4-2
SWMU 188
Proposed Sampling Location Map
Charleston Naval Complex

CH2MHILL

File Path: C:\18gis\Projects\Zone_E\swmu188\swmu188.apr, Date: 05 Sep 2001 13:25, User: NMOUDRY, Figure 4-2 SWMU 188

Section 5.0

5.0 Investigative Approach for AOC 537

5.1 Site Background and Setting

AOC 537 consists of an electrical substation with a 2,728 square-foot single story concrete block building on a slab floor (Building 342) (see Figure 5-1). The building housed an electrical transformer substation, an electrical parts storage area, and an insulation shop. The equipment previously used at the site is unknown, although circuit breakers, dry transformers, and high-voltage switches were observed at the substation during the recent site visit. Waste materials associated with this unit include dielectric fluid, insulation, and an oily substance on the insulation shop floor. Test results indicate that the dielectric fluid contains less then 50 $\mu g/kg$ PCBs.

5.2 RFA Recommended Action

A CSI was recommended because of evidence of a release, the numerous migration pathways, and the associated exposure potential (EnSafe, 1995).

5.3 Site Inspection by CH2M-Jones

A visual inspection of the AOC for an RFI Addendum was performed. The visual inspection identified stains on the rear sidewalk outside the building. The environmental baseline study (EBS) report identified the stains on the sidewalk, but no source was indicated. In 1996, wipe samples were collected from the substation surface areas, including the floor and equipment. Two of the wipe samples tested positive for Aroclor-1260.

5.4 Proposed Sampling

This section describes the proposed CSI sampling for surface and subsurface soil at AOC 537. The test results will be presented in an RFI Report Addendum. The results will be evaluated to determine the nature and extent of site-related constituents, if any, and whether corrective measures are necessary at this unit..

5.4.1 Soil Investigation

To evaluate the nature and extent of potential impacts at AOC 537, three (3) soil borings, identified as E537SB001, E537SB002, and E537SB003, will be advanced by CH2M-Jones at

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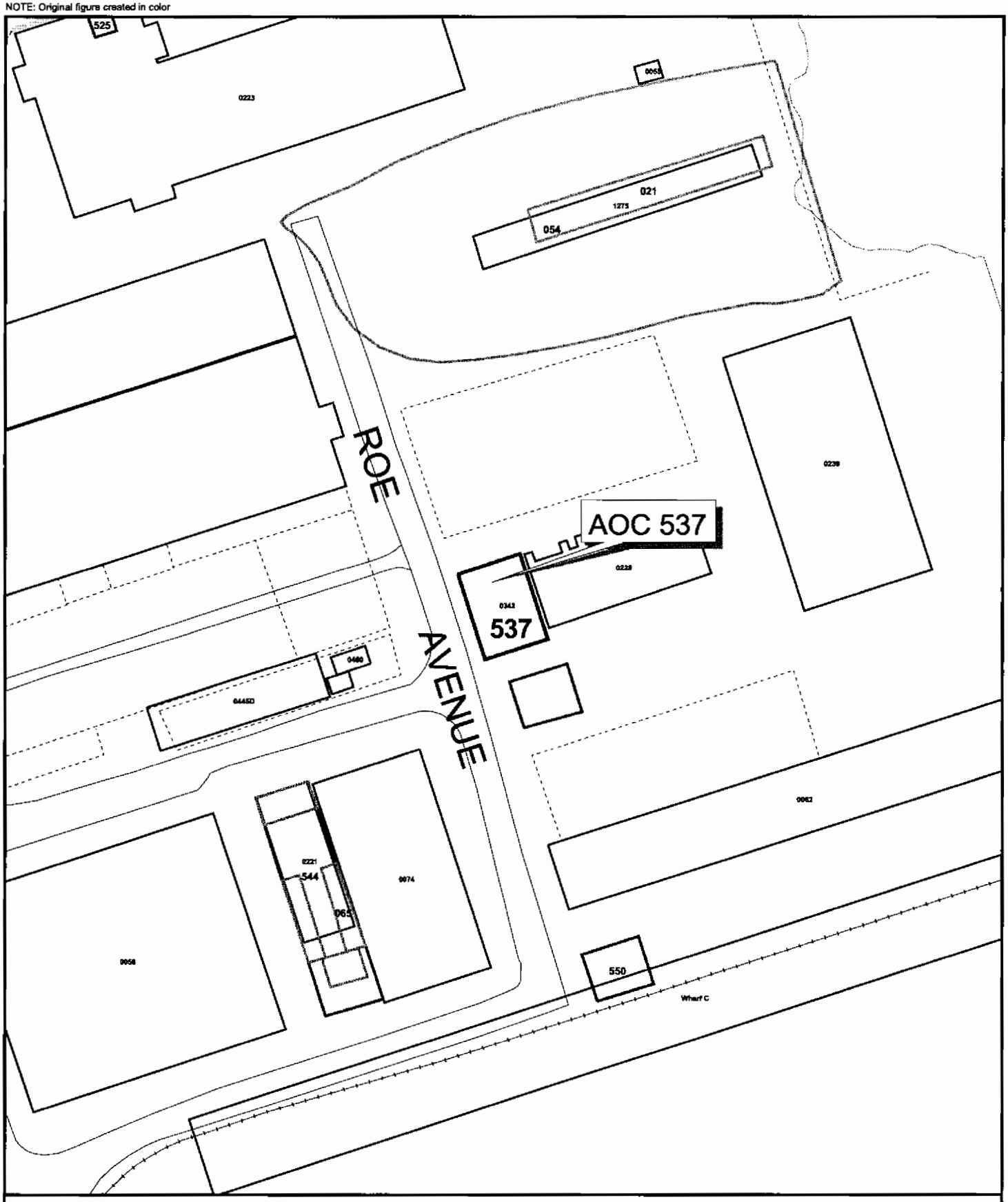

Fence
Buildings
Roads
AOC Boundary
SWMU Boundary

N

0 80 160 Feet

1 inch = 100 feet

Figure 5-1
AOC 537
Location Map
Charleston Naval Complex

File Path: c:\18gis\projects\zone_e\aoc537\aoc537.apr, Date: 16 Aug 2001 9:26, User: NMOUDRY

NOTE: Original figure created in color

Proposed Soil Boring
Fence
Buildings
Roads
AOC Boundary
SWMU Boundary

N

0 30 60 Feet

1 inch = 30 feet

Figure 5-2
Proposed Sample Location Map
AOC 537
Zone E
Charleston Naval Complex

CH2MHILL

File Path: c:\18gis\projects\zone_e\aoc537\aoc537.apr, Date: 16 Aug 2001 9:29, User: NMOUDRY

Section 6.0

6.0 Investigative Approach for AOC 575

6.1 Site Background and Setting

AOC 575 consists of an electrical substation with a single story concrete block building on a slab floor (Building 454) (see Figure 6-1). Immediately adjacent to Building 454 is a concrete slab mounted with a weatherproof metal enclosure surrounded by a fence. The metal enclosure houses high voltage switches and transformers. The east side of Building 454 houses a battery bank and the west side houses a battery charger. The substation was renovated in 1989 and currently the transformers do not contain dielectric fluid or non-PCBs dielectric fluid. Information regarding PCB use before 1989 is not available.

6.2 RFA Recommended Action

A CSI was recommended due to the possibility of releases, as noted by the staining observed in the vicinity of the transformer and the battery bank (EnSafe, 1995). The storm sewer system should be investigated as a separate unit (AOC 699 in Zone L).

6.3 Site Inspection by CH2M-Jones

A pre-field investigation visual site inspection was performed by CH2M-Jones personnel on July 11, 2001. The transformer sits on a concrete pad. A very narrow strip of exposed soil adjacent to the transformer pad, approximately 9 inches wide along the length and 2 to 3 inches wide at the ends, was observed. Staining was not observed on the pad.

6.4 Proposed Sampling

This section describes the proposed sampling for surface and subsurface soil at AOC 575. The test results will be presented in an RFI Report Addendum. The results will be evaluated to determine the nature and extent of site-related constituents, if any, and whether corrective measures are necessary at this unit.

6.4.1 Soil Investigation

To evaluate the nature and extent of potential impacts at AOC 575, three (3) HA borings, identified as E575SB001, E575SB002, E575SB002, will be advanced by CH2M-Jones at the two (2) locations shown on Figure 6-2. Stainless-steel HAs will be used to collect surface soil

samples from the 0-to-1 ft bls interval and subsurface soil samples from the 3-to-5 ft bls interval.

The completed HA locations will be filled with excess cuttings, and the pavement replaced with bituminous cold patch or concrete, flush with the surface. Locations will be surveyed for positioning in the CNC GIS.

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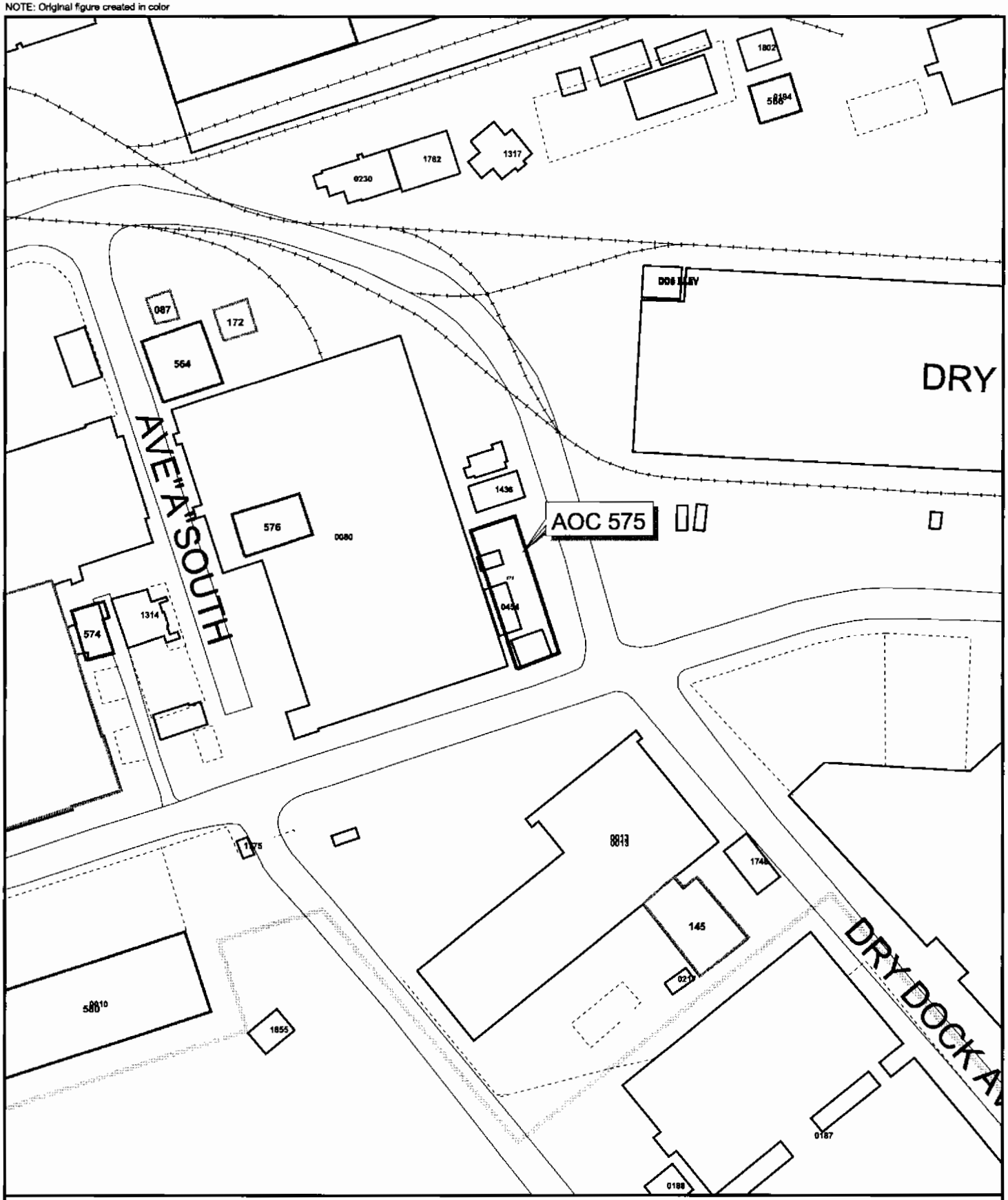

Figure 6-1
AOC 575
Location Map
Charleston Naval Complex

CH2MHILL

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NOTE: Original figure created in color

⊕ Proposed Soil Boring
Roads
AOC Boundary
SWMU Boundary
Buildings

N

0 20 40 Feet

1 inch = 20 feet

Figure 6-2
AOC 575
Proposed Sampling Locations
Charleston Naval Complex

CH2MHILL

File Path: c:\18gis\projects\zone_e\aoc575\aoc575.apr, Date: 03 Aug 2001 10:42, User: NMOUDRY

Section 7.0

7.0 Investigative Approach for AOC 701

7.1 Site Background and Setting

AOC 701 is the former McMillian Avenue gasoline station which was located in Building 1141 (see Figure 7-1). The station was built in 1941 and used as a gas station until 1979, when it was renovated and converted into a security building. According to CNC personnel, two underground storage tanks (USTs) were on the northwestern side of the building and were closed in place by filling them with sand in 1973.

7.2 RFA Recommended Action

No action was recommended in the RFA.

7.3 Previous Soil Investigations

A tank closure memorandum was prepared by the CNSY Occupational Safety, Health, and Environmental Office. It contained pictures and analytical results from the soil samples taken at the time of the tank closure in 1973. The analytical results indicated that the surrounding soil was clean at the time of closure.

7.4 Site Inspection by CH2M-Jones

A pre-field investigation visual site inspection was performed by CH2M-Jones personnel on July 11, 2001. The investigation revealed that the USTs are still in place in the tank pit and filled with sand; that the former gas station is still a security office and that an addition had been added to the northeast side of the building in 1987; that the area surrounding the building is covered with asphalt; and that there is a large square cut in the asphalt where the UST pit is located. There is no other evidence of stand pipes, fill ports, or other features associated with a gas station.

7.5 Proposed Sampling

This section describes the proposed CSI sampling for soil and groundwater at AOC 701. The test results will be presented in an RFI Report Addendum. The results will be evaluated to determine the nature and extent of site-related constituents, if any, and whether corrective measures are necessary at the unit. The UST closure report and analytical results will be

studied prior to performing the proposed field work, and changes to the scope of work will be made as necessary.

7.5.1 Soil Investigation

To evaluate the nature and extent of potential impacts at AOC 701, a total of six (6) SBs will be advanced at AOC 701. Two SBs, identified as E701SB001 and E701SB002, will be advanced by CH2M-Jones on each side of the UST pit where the tanks were closed in place. Two additional SBs, identified as E701SB003 and E701SB004, will be advanced adjacent to each of the two former gasoline dispenser locations. The fifth and sixth borings will be advanced near the northeastern and southwestern corners of Building 1141, the former service station building, to provide overall coverage of AOC 701. (See Figure 7-2.)

SBs will be advanced with a truck-mounted drill rig using the hollow-stem auger (HSA) drill method. Soil samples will be taken at the 0-to-1 and 3-to-5 ft bls intervals, immediately placed on ice in laboratory containers, and sent to a lab for analysis. See Section 7.5.3 for specific analytes.

All sample locations will be surveyed for positioning in the CNC GIS.

7.5.2 Groundwater Investigation

7.5.2.1 Groundwater Sampling

Groundwater samples will be collected from each of the six SB locations (see Figure 7-2). A temporary well (TW) will be placed in each of the six borings. The wells will be screened with a 10-ft screen that is placed to bracket the soil-water table interface. (Given the shallow nature of the groundwater in this area, it may be necessary to reduce the screen size to 4 feet to allow for proper construction.) Sand will be installed to a minimum of 2 feet above the screen if possible, and a bentonite seal will be added. The remainder of the annular space will be grouted to land surface. The TWs will be developed and allowed to equilibrate for 24 hours prior to sampling. The wells will be checked for signs of free product using an oil/water interface probe.

If no free product is encountered, the TWs will be purged using the low flow method and sampled in accordance with South Carolina regulations. Groundwater samples will be collected, put on ice in laboratory containers, and sent to a lab for analysis. Once the groundwater samples have been collected, the TW will be pulled and the borings will be abandoned in accordance with South Carolina regulations.

All sample locations will be surveyed for positioning in the CNC GIS.

7.5.2.2 Water Level Elevation Measurements

In addition to the measurements collected from the TWs, water level elevation data will be collected from existing shallow wells to define the localized direction of groundwater flow in the event that free product or site-related environmental impacts are identified. Water level elevations will be measured in the following wells:

- E559GW004
- EGDEGW014
- EGDEGW015
- EGDEGW029

NOTE: Original figure created in color

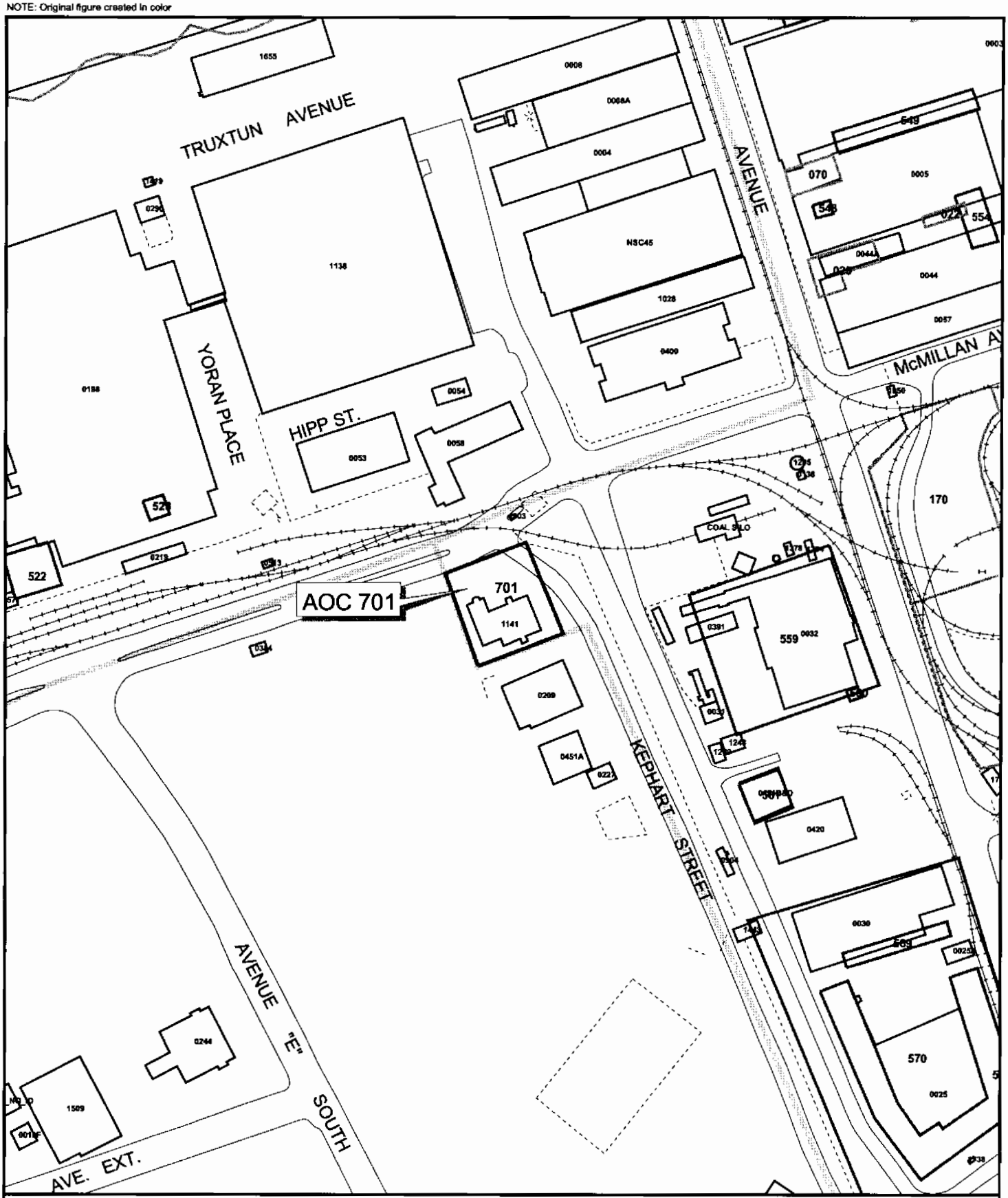
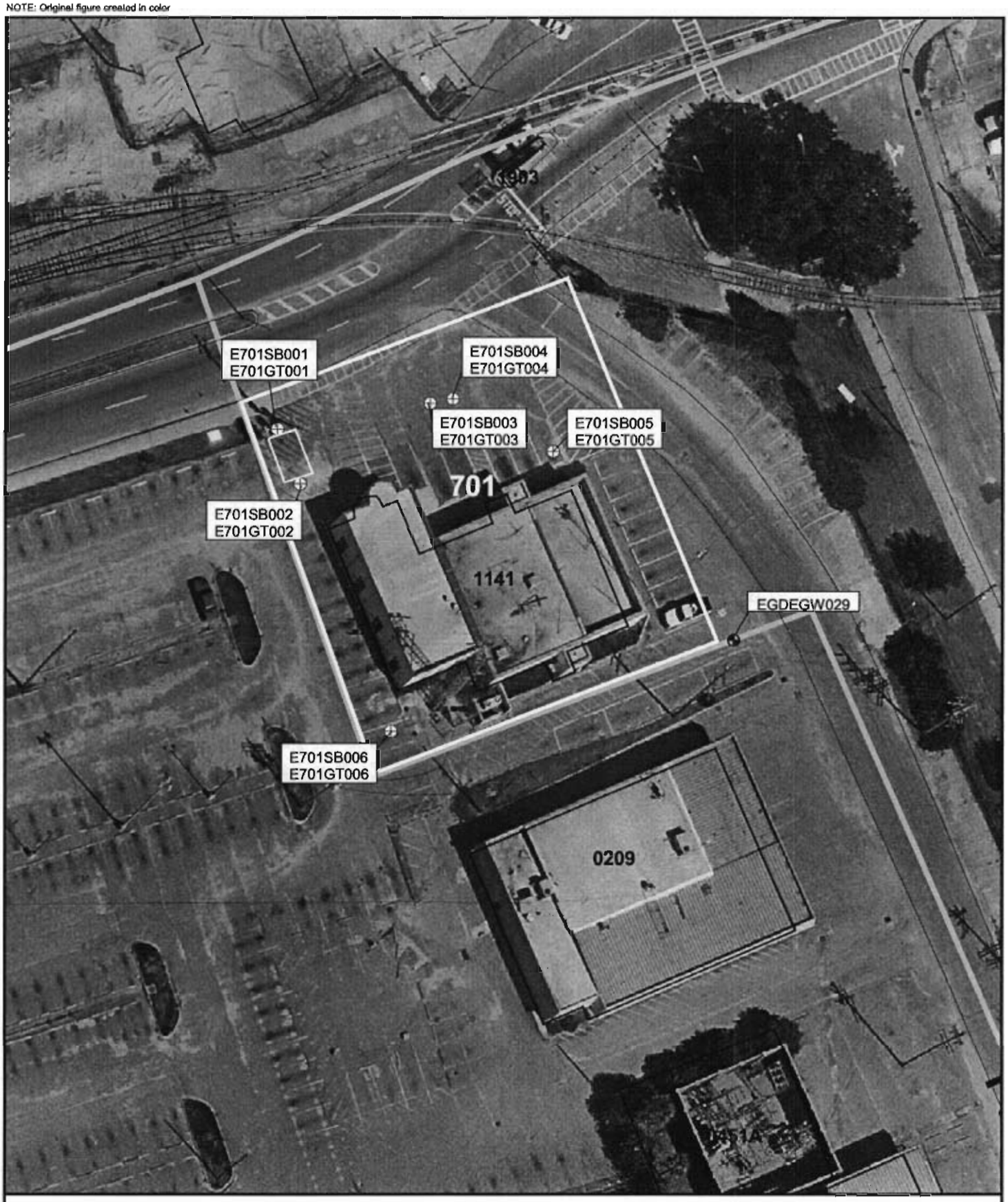


Figure 7-1
AOC 701
Location Map
Charleston Naval Complex

CH2MHILL

File Path: C:\18gis\Projects\Zone_E\AOC701\aoc701figures.apr, Date: 16 Aug 2001 8:04, User: NMOUDRY

NOTE: Original figure created in color



⊕ Proposed Soil Borings/Temporary Well
Fence
Railroads
Roads
AOC Boundary
SWMU Boundary
Existing Well
Buildings
Zone Boundary

N

0 50 100 Feet

1 inch = 50 feet

Figure 7-2
Proposed Soil and Groundwater Sampling Location Map
AOC 701
Charleston Naval Complex
CH2MHILL

File Path: C:\18gis\Projects\Zone_E\AOC701\aoc701figures.apr, Date: 16 Aug 2001 7:59, User: NMOUDRY

Section 8.0

8.0 Investigative Approach for AOC 704

8.1 Site Background and Setting

AOC 704 consists of a concrete surface west of Building 301B and has paint stains from past painting operations on the nearby piers (see Figure 8-1). The exact painting dates are unknown, but CNC personnel stated that painting operations began prior to 1973.

8.2 RFA Recommended Action

A CSI was recommended to characterize the areas of spilled paint. Any release to the Cooper River that may have occurred will be addressed as part of the Zone J investigation of ecological receptors and water bodies at Naval Base Charleston (EnSafe, 1995).

8.3 Site Inspection by CH2M-Jones

A pre-field investigation visual site inspection was performed by CH2M-Jones personnel on July 11, 2001. AOC 704 is approximately 5 x 5 ft and appears to be limited to a small depression in the asphalt. There is a concentration of paint stains within a limited area that appears to be oversprays and minor spills. The paint appears to be old, desiccated, and limited to minor surface contact. There is no evidence that paint ever penetrated the asphalt material.

8.4 Proposed Sampling

This section describes the proposed CSI sampling for surface and subsurface soil at AOC 704. The test results will be presented in an RFI Report Addendum. The results will be evaluated to determine the nature and extent of site-related constituents, if any, and whether corrective measures are necessary at the unit.

8.4.1 Hand Auger Investigation

To evaluate the nature and extent of VOCs, SVOCs, metals, PCBs/pesticides, and cyanide at AOC 704, two HA borings, identified as E704SB001 and E704SB002, will be advanced by CH2M-Jones. The first boring will be advanced within the observed depression where paint accumulation has occurred, as shown on Figure 8-2. The second location will be toward the southeast to provide additional spatial coverage. Stainless-steel HAs will be used to collect

surface soil samples from the 0-to-1 ft bls interval and subsurface soil samples from the 3-to-5 ft bls interval.

The completed HA locations will be filled with excess cuttings, and the pavement replaced with bituminous cold patch or concrete, flush with the surface. Locations will be surveyed for positioning in the CNC GIS.

NOTE: Original figure created in color

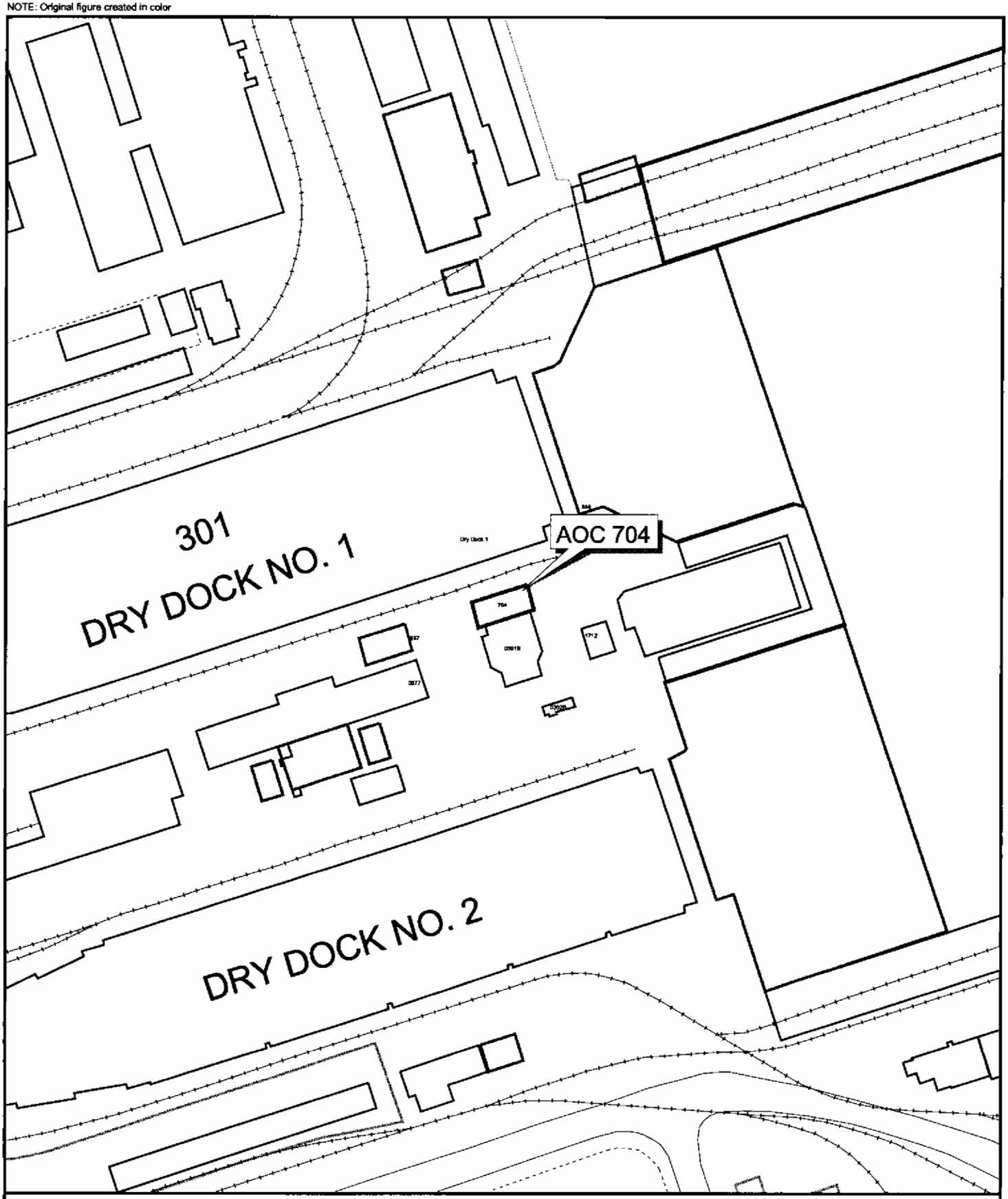
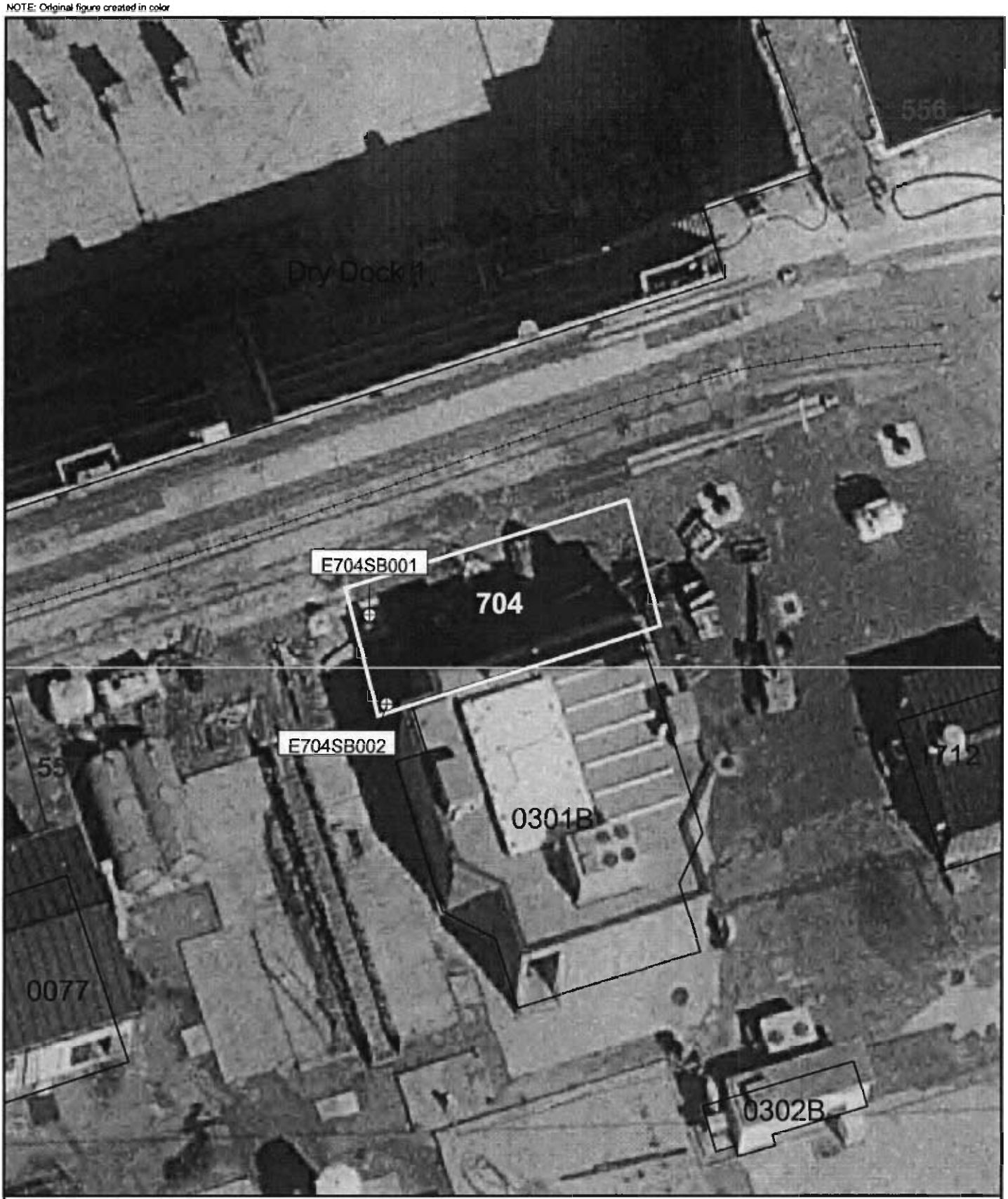


Figure 8-1
AOC 704
Location Map
Charleston Naval Complex

CH2MHILL

File Path: C:\18gis\Projects\Zone_E\aoc704\aoc704.apr, Date: 16 Aug 2001 10:07, User: NMOUDRY

NOTE: Original figure created in color



Proposed Soil Boring
Railroads
Roads
AOC Boundary
SWMU Boundary
Buildings

N

0 20 40 Feet

1 inch = 20 feet

Figure 8-2
AOC 704
Proposed Sampling Locations
Charleston Naval Complex

CH2MHILL

File Path: C:\18gis\CNC\cnc-egis.apr, Date: 03 Aug 2001 10:58, User: NMOUDRY

Section 9.0

9.0 Data Presentation

The results of the surface/subsurface soil investigation will be summarized in an RFI Report Addendum for each unit. The RFI Report Addendum will document the field activities completed during the investigation and interpret the analytical results from the samples collected.

Section 10.0

10.0 References

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