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Naval Station Newport

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Environmental Protection Department

GROUND WATER INVESTIGATION PROTOCOL

U.S. DEPARTMENT OF NAVY
DERECKTOR SHIPYARD-BUILDING 42 AREA
NAVAL EDUCATION AND TRAINING CENTER
NEWPORT, RHODE ISLAND

Prepared by:
TRC Environmental Corporation
Windsor, Connecticut

Prepared for:
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Newport, Rhode Island

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TRC

TRC Environmental Corporation

TRC Project No. 01981-0010

5 Waterside Crossing
Windsor, CT 06095
☎ (203) 289-8631 Fax (203) 298-6399

TABLE OF CONTENTS

TABLE OF CONTENTS Cont'd.

TRC

1.0 INTRODUCTION

This report presents the soil and ground water environmental investigation program planned to assess the presence and nature of subsurface soil and ground water contamination around Building 42 located on the former Derecktor Shipyard. The shipyard is located on the Naval Education and Training Center (NETC) in Middletown, Rhode Island. The location of the shipyard is shown on Figure 1. Building 42 is located in the west central portion of the shipyard. TRC Environmental Corporation (TRC) has been contracted by the U.S. Department of the Navy to perform the subsurface investigation described in this report.

Section 2.0 provides a brief summary of available background information on the shipyard and Building 42 area. A majority of the information in Section 2.0 was obtained from the "Preliminary Site Assessment Report" prepared for the shipyard by the Halliburton NUS (HNUS) Corporation in May 1993. Section 3.0 describes the field investigation protocols that will be used to conduct the field program. Section 4.0 provides the quality assurance and quality control procedures for this project. Section 5.0 provides a site health and safety summary for the planned field investigation activities.

2.0 BACKGROUND INFORMATION

2.1 SHIPYARD HISTORICAL INFORMATION

The Derecktor Shipyard which was previously operated by Robert E. Derecktor is located in the central portion of the Newport Naval Base (see Figure 1). The shipyard is approximately 41 acres in size and situated at the southern end of the Defense Highway just west of Gate 11 on the NETC along Coddington Cove of Narragansett Bay. Access to the shipyard is off of Defense Highway or Simon Pietri Drive on the NETC.

The shipyard was used for the repair, maintenance, and construction of private and military ships from January 1979 through January 1992. Shipyard operations included steel cutting and welding, sand blasting, priming and painting, and assembly of ships. Ship repair and maintenance operations were concentrated around Pier No. 1 which extends out into Coddington Cove at the northern end of the shipyard. Hazardous materials reportedly used during the shipyard operations included various oils, solvents, compressed gases, and paints. Because of the type of chemicals used and wastes generated in the shipyard operations, the shipyard was classified as a hazardous waste generator.

2.2 BUILDING 42 HISTORICAL INFORMATION

The following presents a summary of available background information on Building 42. The information is presented separately for the interior and exterior portions of the building.

Building 42 Interior:

Building 42 is located in the central portion of the shipyard approximately 30 feet from the Coddington Cove waterfront. Building 42 is a one-story brick and masonry block building which was reportedly constructed in 1942 for use as a cold storage warehouse. Various refrigeration storage areas occupy much of the building interior. Building 42 is reportedly not connected to the area municipal sanitary sewer system.

At one time a fish processing business operated by the Newport Seafood Group operated in the building. Following the use of Building 42 by the fish processing business, it was utilized by Derecktor in the shipyard operations. During these operations, three cold storage rooms in

the southern portion of the building were reportedly used by Derecktor for hazardous waste storage, paint mixing and dispensing, and solvent recovery from painting operations. The northern portion of Building 42 was also used for the storage of electrical wire and cable. The large central area of the building was used for the pre-fabrication of duct work for ships and for the storage of shipboard insulation. At the very southern end of the building are three rooms, a locker room, a boiler room, and a refrigeration plant room. Materials reportedly removed from the building during a recent hazardous waste removal action included adhesives, anti-freeze, paint strippers, oils, paints, sand blast grit (black beauty), and acids. Paint and oil floor staining was observed in many portions of the building during the HNUS preliminary site inspection.

Building 42 Exterior:

A drum staging and scrap storage area were previously located along the eastern exterior side of Building 42. South of the building was recently used for the storage of scrap metal and metal racks. Along the western side of the building is a unpaved open area which appeared to be generally clean at the time of the preliminary site inspection by HNUS. This area is approximately 50 feet wide and separates Building 42 from the Bay. The area north of the building was being used for the storage of scrap metal.

Facility records indicate that used sand blast grit (black beauty) was placed by Derecktor as fill material along the eastern and northern exterior sides of Building 42. This material is visually evident at the surface as a black grit material in these areas. The amount of sand blast grit in these areas has been estimated at 4,000 to 6,000 cubic yards.

The exterior brick wall on the south side of Building 42 was previously observed to have staining. The stains were especially prevalent along the foundation of the building. An unknown 6-inch plastic pipe not connected to any drain line exits this wall. A storm water catch basin is also located approximately 30 feet from this wall. The discharge point of the catch basin is not known.

Based on an inspection report of the shipyard completed by the Rhode Island Department of Environmental Management (RIDEM) in 1983, "two large pits filled with liquid were found at the northeast corner of Building 42". The liquid reportedly consisted of "rust flakes, a tar-like

preservative and water". This area reportedly was used for the disposal of liquids (including oily water and sludge) from dry dock tanks.

2.3 RECENT ENVIRONMENTAL INVESTIGATIONS

As presented in the introduction to this report, much of the background information presented on the shipyard was obtained from a Preliminary Site Assessment Report completed by Halliburton NUS Corporation for the Navy in May 1993. The findings of that assessment indicated assorted chemicals were used and hazardous wastes were generated during the operation of the shipyard. Potential adverse environmental impacts related to Building 42 that were noted in the HNUS assessment include the sand blast grit deposited around the building exterior, the oil pits previously reported at the northeast exterior corner of the building, poor housekeeping of chemicals resulting in the staining of interior building surfaces, large quantities of refuse and debris in the building, the presence of asbestos containing material and lead painted surfaces in the building.

The sand blast grit had previously been shown to contain several metals, including arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver. Based on the results of hazardous waste characterization testing (EP Toxicity testing), the sand blast grit material was characterized as a non-hazardous waste.

In the December 1993, a geophysical investigation was conducted around Building 42 by the University of Rhode Island Department of Civil and Environmental Engineering for the U.S. Navy. The survey included both geoelectric and seismic methods to aid in characterizing the subsurface conditions near the building. A primary objective of the project was to locate any ground water contaminant plumes to aid in the future placement of ground water monitoring wells. The findings of the surveys provided information on the depths to the ground water table and bedrock in the area. Recommendations made as a result of this investigation included the installation of ground water monitoring wells around Building 42 to further aid in characterizing the area hydrogeology and ground water quality.

2.4 SITE HYDROGEOLOGY AND GEOLOGY

Information obtained from geotechnical boring logs obtained from NETC Public Works files and the findings of the recent URI geophysical investigation provide geological information for the Building 42 area. In summary, this information indicates that the approximate depth to ground water is 10 feet around the building. In general, historical boring logs prepared for the construction of Building 42 indicate that the subsurface materials consist of the following layers from top to bottom: a sand and gravel layer ranging in thickness from approximately 10 to 20 feet, an underlying till layer consisting of a more firm sand, graval and clay ranging in thickness from approximately 3 to 7 feet, and bedrock at depths of approximately 17 to 33 feet below grade. The depth of bedrock has been estimated from the boring logs based on what has been referred to as "refusal" on the logs.

The findings of the URI geophysical investigation provided additional information on the estimated thickness of the unconsolidated material and depth to bedrock in the area of Building 42. Three seismic profiles were completed in the area of Building 42. The information from these profiles indicates the following: depths to ground water ranging from 8 to 22 feet below grade, thicknesses of unconsolidated materials ranging from 13 to 47 feet, and depths to bedrock ranging from 33 to 55 feet below grade. The seismic profile also suggests that the bedrock topography is lower to the southeast of Building 42.

A comparison of the findings of this survey and the boring logs indicates differences in the depth to ground water and bedrock. The differences in the estimated depth to bedrock are believed by URI to be related to seasonal differences; the borings were completed in May which is normally a wet period and the seismic surveys were completed in December which is typically a period of lower ground water table elevations. The differences in the depth to bedrock are believed to be based on the incorrect interpretation of the boring log term "refusal" as referring to bedrock.

3.0 SAMPLING PLAN

3.1 INTRODUCTION

The investigation program described in this section has been developed to assess the subsurface soil and ground water quality around Building 42. Field sampling methodology for the individual investigation activities (e.g., soil boring sampling, ground water sampling) is described in detail in Appendix A of this plan. The quality assurance/quality control procedures for field sampling and laboratory analyses are described in Section 4.0. The project-specific health and safety procedures are presented in Section 5.0. A summary of the planned ground water investigation program is presented in Table 1. The planned Phase II sample locations are shown on Figure 3.

3.2 SOIL BORING SAMPLING

Soil samples will be collected from each of the well boring samples under this ground water investigation. Soil borings will be completed at three separate locations for the installation of ground water monitoring wells. Three wells will be installed at each of the locations. Soil samples will be collected from the deepest boring completed at each of the locations for geologic logging and laboratory chemical analysis. The soil sample chemical data will aid in assessing the quality of the subsurface materials and its potential impact on the area ground water.

Based on the well locations, borings will be conducted at three locations around Building 42. The planned locations of the wells are shown on Figure 3. Well MW-1 will located to the west between the building and the shoreline bulkhead. Well MW-2 will be located near the southeast corner of the building. Whereas, well MW-3 will be located on the northern side of the building.

The locations of these wells were recommended by URI based on the findings of their geophysical surveys in the area. The wells are planned at these locations to characterize the ground water quality around Building 42 and to aid in characterizing the geology and hydrogeology around the building and near the bulkhead sheet pile. The information from these borings and wells can also be correlated to the subsurface information obtained from the URI geoelectric and seismic surveys to aid in assessing the subsurface conditions in the area.

Soil samples will be collected continuously with a split-spoon sampling device from the on-site soil borings to the depth of the ground water or fill, whichever is greatest. The estimated depth to the ground water table is approximately 10 feet in the area of Building 42. Split spoon soil samples will be screened with an OVA and HNu immediately upon being opened.

A maximum of two soil samples will be collected from each of the soil borings for chemical analysis. The two soil samples which will be submitted for laboratory analysis will include a sample of the surface fill materials and the last sample interval above the depth of the ground water table. If signs of potential contamination (e.g., oil, stains, odors) are observed elsewhere in the boring, the second sample will instead be collected from that interval. The soil samples will be analyzed for volatile organic compounds (VOCs by EPA Method 8240), semivolatile organic compounds (SVOCs by EPA Method 8270), priority pollutant metals (EPA Method 6010), and total petroleum hydrocarbons (TPH by EPA Method 418.1).

In addition to the soil samples collected for the above-listed chemical analyses, a soil sample from just below the depth of the water table (i.e., within the saturated zone) will also be collected from each shallow well location for total organic carbon (EPA Method 9060) and grain size (ASTM D422) determination. The information from these tests will be used in evaluating ground water contaminant transport.

Geologic descriptions and other sample characteristics (e.g., stains, odors) and observations (e.g., OVA/HNu readings, depth to water) will be recorded in a field notebook.

3.3 GROUND WATER SAMPLING

Ground water monitoring wells will be installed at three locations around Building 42 to assess the ground water quality and flow characteristics in this area. At each location, three wells will be installed resulting in a total of nine monitoring wells. Nested wells are planned at each of the locations to provide information on the hydrogeology (i.e., vertical gradients) and ground water/surface water relationship in this area. The three wells at each location will include wells screened over shallow, intermediate, and deep intervals. The shallow wells will be installed to intercept the ground water table which is estimated at approximately 10 feet below grade. The deep wells will be screened in the unconsolidated materials at the top of the bedrock. The estimated depth to bedrock or refusal around Building 42 is 30 feet. The intermediate wells

will screened in the zone between the bottom of the shallow well and the top of the deep well screen. A diagram which shows the planned construction details of the nested wells is provided as Figure 4 with further information on well construction details provided in Section 2.2 of Appendix A.

Ground water samples will be collected from each of the three shallow monitoring wells. Wells will be developed after installation. Water levels will be measured in the wells after development and just prior to well purging. The procedures for well development, purging, and sampling are provided in Appendix A of this plan.

Ground water samples from the monitoring wells will be analyzed for VOCs (EPA Method 8240), SVOCs (EPA Method 8270), priority pollutant metals (EPA Method 200.7), TPH (EPA Method 418.1), total dissolved solids (TDS by EPA Method 160.1), and total chloride (EPA Method 9252). In addition, the temperature, pH, conductivity, redox potential, and salinity of the ground water in each of the nine wells will be measured in the field. One of the shallow well ground water samples will also be field filtered for dissolved metals analysis. This ground water sample will be a split duplicate of the sample being submitted for total metals analysis and will be field filtered through a 0.45 micron filter immediately following collection.

4.0 QUALITY ASSURANCE/QUALITY CONTROL PROCEDURES

4.1 INTRODUCTION

This section of the report describes the quality assurance/quality control procedures that will be followed under the field investigation activities and in the laboratory analysis of the environmental samples. Both soil and ground water samples will be collected under this investigation. The soil samples will be collected during the drilling of the well borings and the ground water samples will be collected from the installed monitoring wells.

4.2 EQUIPMENT DECONTAMINATION

All of the field sampling equipment will be decontaminated prior to each use. The sampling equipment which will be used in this investigation will include stainless steel spoons and bowls, Teflon bailers, and steel split-spoon samplers. The stainless steel spoons, bowls, and bailers will be laboratory decontaminated prior to the field activities and arrive at the site wrapped in aluminum foil. Each of these sampling devices will be dedicated to the collection of one sample. The split-spoon samplers will be field decontaminated prior to each use. The decontamination steps for all of this sampling equipment will be as follows:

1. a non-phosphate soap and tap water wash;
2. a tap water rinse;
3. a dilute 10% nitric acid rinse;
4. a tap water rinse;
5. a methanol rinse;
6. a hexane rinse;
7. air dry; and
8. a distilled water rinse.

All drilling equipment (e.g., augers, rods, plugs) will be steam cleaned between each use. All field decontamination will be conducted in a designated decontamination area. All decontamination wash water and rinsates will collected according to the procedures described in Section 5.3.

4.3 SAMPLE HANDLING, SHIPPING, AND CUSTODY

Upon collection of the soil and ground water samples, the sample containers will be labelled with the following information: project name, TRC project number, sample identification number, date and time of sample collection, sample preservation requirements, sample analyses, and sample collector's initials. Immediately upon collection, the samples will be placed in sample containers supplied by the laboratory for each of the chemical analysis. The sample containers will then placed in an iced shipping cooler for temporary storage prior to receipt by the laboratory. Prior to shipment, the samples will packaged with appropriate materials (e.g., vermiculite, bubble wrap) to reduce the potential for container breakage during shipment. Samples will be shipped to the laboratory by overnight courier service at a minimum frequency of every other day.

All of the field sampling activities will be documented in a field notebook. The field notebooks will be bound notebooks specifically designed for documenting field activities. At a minimum, field notebook entries will include the following information: names of all field personnel and visitors, dates of all entries, site weather conditions, type of field activity, location of activity, sample media types, sample descriptions, sampling methods, sample dates and times, sampling personnel, volume of sample collected, sample analyses, sample preservatives, sample identification numbers, field observations, field measurements, and photograph descriptions. All information recorded in the field notebooks and on container labels shall be in waterproof ink. Corrections to all documentation shall be made by crossing out the error with a line, entering the correct information, and initializing and dating the correction.

A standard Chain-of-Custody record will accompany every sample cooler to provide documentation of all samples collected and the possession of the samples. At a minimum, the chain of custody record will document the TRC project name and number, the samplers name and signature, the sample identification number, sample collection date and time, the requested sample analyses, the name and signature of who relinquished the samples to the laboratory, the date and time the samples were relinquished, the name and signature of the laboratory person who received the samples, and the date and time the samples were received by the laboratory.

4.4 FIELD QA/QC SAMPLES

The quality assurance/quality control (QA/QC) field samples will consist of field rinsate blanks, trip blanks, and blind duplicate samples. The field blanks will be collected by pouring laboratory-supplied, analyte free water over the decontaminated sampling equipment and collecting the water in the laboratory-supplied containers for each analysis. The field blank analysis will be the same as that planned for the associated sample matrix. The field blanks are used to identify if, and to what extent, sample quality is influenced by the sampling equipment and sampling environment. Field blanks will be collected at a rate of one per twenty samples for each sample matrix. Thus, based on the sampling scope planned for this investigation, two field blanks will be collected; one from the soil sampling equipment and one from the ground water sampling equipment.

Trip blanks consist of laboratory-supplied vials of water which accompany the sample bottles to and from the site. The trip blanks will be analyzed for VOCs. Trip blanks are used to assess the possible effects of sample handling and shipment on the sample quantity (i.e., cross contamination concerns). A trip blank will accompany each sample shipment which has samples planned for VOC analysis at a rate of one per shipment.

Duplicate samples of actual field samples will be collected in the field. Duplicate soil samples for all analyses except VOCs will be collected after mixing the soil sample in a dedicated decontaminated stainless steel bowl. In order to reduce the potential for the loss of VOCs during the duplicate sample collection, duplicate sample aliquots for VOC analysis will be collected by alternately filling two sets of equal sample vials. Duplicate ground water samples will be collected by splitting equal volumes of water from each bailer into two sets of sample containers so as to provide as identical a sample set as possible. Duplicate samples will be labelled and submitted to the laboratory so that their identity as a duplicate sample is unknown to the laboratory (i.e., as "blind duplicates"). Duplicate samples will be analyzed to assess the precision of the laboratory analyses. Duplicate samples will be submitted at a rate of one per twenty samples per matrix type or at a minimum of one per matrix type. Thus, based on the planned scope of this investigation, two duplicate samples will be submitted; one soil sample and one ground water sample.

4.5 MONITORING EQUIPMENT CALIBRATION

All field monitoring equipment will be calibrated in the field. Instruments which are planned for this investigation include an organic vapor analyzer (OVA) equipped with a flame ionization detector (FID) (and Century OVA 128), a photoionization detector (PID) (HNu Model PI-101 Photoanalyzer with a 10.3 eV lamp), and a combination combustible gas/oxygen detector (LEL/O2) (Industrial Scientific HMX-271). At a minimum, these instruments will be calibrated at the start of each day. If fluctuations or drifts are noticed during the day in the calibration of any of the instruments, the calibration will be checked with the calibration gas and adjustments made and recorded, if necessary,

The OVA and HNu will be calibrated with hydrocarbon free zero gas and a known concentration of a hydrocarbon. The OVA and HNu calibration gases will consist of concentrations of 10 ppm methane in air and 54 ppm of isobutylene in air, respectively. The LEL/O2 meter will be calibrated with a specified pentane and oxygen calibration gas mixture.

4.6 LABORATORY PROTOCOLS

All of the laboratory analysis for the soil and water samples will be performed by a State of Rhode Island-certified laboratory. All sample will be chemically analyzed according to the EPA-approved methods in the Test Methods for Evaluating Solid Waste (SW-846, Third Edition) and Methods for Chemical Analysis of Water and Wastes (EPA-600/4-79-020). In addition, applicable EPA Region I analysis holding time requirements will be required for all analyses. A summary of the analytical method requirements for this project are provided in Table 2. The detection limits for the planned analyses are specifically defined by the EPA methods.

5.0 SITE-SPECIFIC HEALTH AND SAFETY PROCEDURES

5.1 INTRODUCTION

This health and safety discussion presents the project-specific health and safety information. This section describes the nature of wastes or contamination suspected and present at the site, the site access and work zones, and the initial level of personnel protection and monitoring planned for each site investigation activity. In addition, a list of site emergency contacts and a map of the route to the Newport Hospital from the site is provided as Table 3 and Figure 5, respectively.

5.2 NATURE OF WASTES

Historical information indicates that assorted hazardous materials including various oils, solvents, compressed gases, and paints were used during the shipyard operation. Background information also indicates the presence of sand blast grit ("black beauty") deposited around the exterior of the building. The sand blast grit has been shown to contain several heavy metals. In addition, reports indicate that waste oil pits once existed off the northeast exterior corner of the building.

5.3 SITE ACCESS/WORK ZONES

This site will be divided into four designated contiguous work zones: a support zone, a personnel decontamination area, a heavy equipment decontamination area, and an exclusion zone. The support zone for this site will be the company vehicles used by the field investigation crew. The vehicles will be located near the exclusion zone. The vehicles will provide temporary relief from any adverse weather conditions and will store necessary field sampling and safety/emergency equipment (e.g., car phone, first aid kit, drinking water).

A contamination reduction station, or personnel decontamination area, will be established adjacent to exclusion zone. All personnel exiting the exclusion zone (work area) must pass through the decontamination zone prior to entering the support zone vehicles or leaving the site. Personnel shall undergo appropriate decontamination, as required by the activity-specific procedures and level of personnel protection. A heavy equipment decontamination area will also

be established for the drill rigs and large drilling equipment (e.g., augers, rods). The location of the heavy equipment decontamination area will be determined in the field prior to the start of the drilling activities. Split-spoon sampler decontamination will occur in a designated area adjacent to the heavy equipment decontamination area.

The exclusion zone shall consist of at least a 25-foot exclusion zone around active drill rig operations. Access to the exclusion zone shall be restricted by checking in with the Site Safety Officer (SSO) and signing in on the daily site log, and donning the appropriate level of personnel protective equipment. All personnel entering the exclusion zone shall have the appropriate level of health and safety training required by OSHA for hazardous waste site operations. The exclusion zone will be demarcated with caution tape. The SSO or alternate will be responsible for keeping nonessential personnel outside of the exclusion zone boundaries during the investigation activities. In the event that authorized visitors are present on the site during field activities, the SSO or designee shall insure that they adhere to site safety requirements and maintain a safe distance outside of the exclusion zone. All personnel allowed to enter the exclusion zone shall be required to follow the safety procedures presented in this section and the directions of the SSO.

All waste generated as a result of this investigation will be collected and disposed of properly. All disposal personnel protective equipment (PPE) will be collected in trash bags and disposed of in dumpsters on the NETC. All decontamination fluids (water, solvents, and acids) will be collected separately and drummed for future characterization and proper disposal. All wells boring drill cuttings will also be drummed for future characterization and proper disposal. The characterization and disposal of all investigation derived waste will be the responsibility of the US Navy.

5.4 PERSONNEL PROTECTION AND MONITORING

Based on the suspected site contaminants, the field investigation activities will be initiated in Level D and Modified Level D personnel protection. Modified Level D protection will be donned by the field sampling personnel and include the following:

- disposable tyvek suit;
- hard hat;

- steel-toed work boats;
- inner glove liners; and
- outer chemically-resistant gloves (solvex or nitrile).

Level D protection will be worn by supervisory personnel and authorized site visitors not directly involved in the sampling. Level D protection will include work clothes, a hard hat, and steel-toed boots.

Levels of personnel protective equipment (PPE) will be upgraded or downgraded as conditions dictate. The level of personnel protection will be upgraded to Level C which includes respiratory protection based on the observed presence of elevated organic vapor readings in the breathing zone (e.g., greater than 5 ppm), objectionable odors, or large amounts of dust during the drilling or sampling activities. Level C protection will include the Modified Level D PPE along with a respirator having combination organic vapor/dust cartridges.

During field sampling activities, continuous monitoring of ambient air will be conducted in the breathing zone with an OVA and HNu. During drilling activities, continuous ambient monitoring of combustible gas levels will also be conducted with an LEL/O2 meter. All spilt spoon soil samples and drill cuttings will also be screened with an OVA and HNu. Air monitoring will also be performed intermittently "downhole" during the drilling activities.

APPENDICES

APPENDIX A

FIELD INVESTIGATION PROTOCOLS

1.0 WELL BORINGS

Subsurface well borings will be conducted to aid in assessing the subsurface characteristics, the presence and nature of soil contamination, and to facilitate the installation of ground water monitoring wells at each of the locations. The following is a description of the soil boring drilling and sampling methods.

1.1 WELL BORING LOCATIONS

The borings will be completed at each of the planned monitoring well locations. Soil amples will be collected from the deepest boring at each location. The site setting, background information, and the findings of previous investigations were used in establishing the monitoring well plan.

1.2 WELL BORING AND SAMPLING METHODS

The boreholes for overburden wells will be advanced using 4¼-inch minimum inside diameter (I.D.) hollow-stem augers. Split spoon samples will be collected continuously at 2.0-foot intervals from the well borings until the water table has been reached or split-spoon refusal (encountered boulders or bedrock). After the water table has been encountered split-spoon soil samples will be collected at 5-foot intervals or an identifiable change in strata. The split-spoons will be advanced according to the standard penetration test method [ASTM 1586-84 (1984)]. The standard penetration test defines split-spoon refusal as less than six inches of penetration for 100 blows with a 140 pound hammer falling 30 inches in conformance with ASTM 1586-84. The physical characteristics of each soil sample will be visually characterized and geologically described in a field notebook. Split spoon samples will also be monitored with a flame or photo-ionization detector (OVA or HNu). Observations will be recorded in a field notebook.

Soil samples to be submitted for laboratory analyses will be transferred directly from the split spoon to the sample container with a dedicated decontaminated stainless-steel spoon. A maximum of two soil samples will be collected from each of the soil borings for chemical analysis. The two soil samples which will be submitted for laboratory analysis will include a sample of the surface fill materials and the last sample interval above the depth of the ground

water table. If signs of potential contamination (e.g., oil, stains, odors) are observed elsewhere in the boring, the second sample will instead be collected from that interval. Soil samples for all analyses except VOCs will be collected after mixing the entire split-spoon soil sample in a dedicated decontaminated stainless steel bowl. In order to reduce the potential for the loss of VOCs during the soil sample collection, the sample aliquot for VOC analysis will be collected directly from the split spoon.

The final depth of monitoring well borings will be assessed by TRC field personnel. Variables to be considered in establishing the final well boring depth will include material encountered, observed contamination, geologic material, depth to the water table, and sites sampling objectives. Well boring drill cuttings will be drummed for future characterization and proper disposal by the US Navy.

Sampling equipment (e.g., augers, drilling rods, spoons) will be decontaminated prior to each use as described in Section 4.2 of this plan. Split spoon soil samples will be monitored for the presence of total VOC vapors with an organic vapor analyzer immediately upon opening. Field observations will be recorded in a field notebook.

1.3 WELL BORING SAMPLE DESIGNATION

Well boring samples submitted for laboratory analyses will be assigned a designated field identification number which will reference the site name, sample type, sample location, sample number, and sampling date. Below is an example of a well boring soil sample identification number:

Example: D42-B32-1015

where: D42 = Derecktor Shipyard Building 42
B3 = Well Boring Location Number
2 = Second Sample Interval
1018 = Sampling Date (October 18th)

2.0 MONITORING WELLS AND GROUND WATER SAMPLING

Monitoring wells will be installed to aid in assessing the nature and extent of any ground water contamination. The monitoring wells will be used to provide hydrogeologic and ground water quality information on the local ground water. Separate discussions on the monitoring well investigation activities are presented below concerning the following: well locations, well construction details, well development, ground water sampling methods, and the ground water sample designation plan.

2.1 MONITORING WELL LOCATIONS

Available background information and the findings of the previous investigations aided in selecting the planned monitoring well locations.

2.2 WELL CONSTRUCTION DETAILS

Drilling and well/piezometer construction activities will be subcontracted to a qualified well drilling firm. On-site drilling activities will be conducted under the supervision of a TRC geologist/engineer.

Monitoring well construction specifications for this project include the following:

- 6-inch borehole (minimum);
- 2-inch inside diameter Schedule 40 PVC riser and screen (10 slot);
- Threaded or press joints only on PVC pipe (no glued joints);
- No. 0 clean silica (quartz) sand pack to two foot above the screened interval;
- Sediment trap and cap at bottom of well;
- Two foot minimum thick bentonite seal above the sand pack;
- Portland cement/bentonite slurry (about 6:1 ratio respectively) in the well annulus from the top of the bentonite seal to the surface;
- All casing sealant and drilling fluids will be mixed with potable water;
- Vented well cap; and
- Steel casing with a locking cap will be securely set in cement over the well casing stick up and a minimum of three feet below the ground surface. Wells will be clearly numbered on casing. In paved areas, and high traffic areas, wells will be installed with curb boxes constructed at or slightly below grade.

Consistent with State of Rhode Island ground water regulations; the joints on PVC well material will be fitted with an "O" ring or wrapped with Teflon tape. A goal of the well design will be that the well screen slot size shall retain at least 90% of the grain size of the filter pack. A bottom cap and a sump sediment trap shall be installed. The ground surface seal shall extend to a minimum of 40 inches below the land surface and shall be flared such that the diameter at the top is greater than the diameter at the bottom. The top of the ground surface seal shall be sloped away from the well casing and shall be imprinted with the designation of the monitoring well.

Well screen and riser lengths may vary for each well. Screen lengths for wells intercepting the water table will be a maximum of ten feet, with no more than five feet extending above the water table. The five-foot length of screen above the water table is intended to maintain the water table within the screened interval during seasonal and/or diurnal ground water fluctuations. A ten-foot screen length will be used for the intermediate and deep wells installed below the water table. Well riser lengths will be field-determined so the top of the casing extends to approximately four to six inches below grade to facilitate the use of flush-mounted curb boxes. A TRC geologist/engineer will maintain accurate written logs of the well construction details.

2.3 WELL DEVELOPMENT

Wells will be developed by the surge block and pump technique. Fine-grained material around the well screen will be drawn into the well and removed by agitating the well water with a surge block and simultaneously pumping water from the well at a low discharge rate. A centrifugal pump outfitted with ASTM drinking water grade polyethylene tubing will be used for removing the water from the well. To prevent cross-contamination between the wells, the surge block will be decontaminated between each well. The surge block will be decontaminated with non-phosphate detergent and tap water, rinsed with tap water, rinsed with methanol, air dried, and rinsed with deionized water. The polyethylene tubing will also be replaced between each well. The dedicated new tubing will be rinsed with deionized water prior to its use. Water produced during well development will be drummed for future characterization and proper disposal by the US Navy.

Should the depth of the well or to ground water prohibit the use of the surge block and pumping technique, an alternative method will be used to develop the well. A suitable pumping device (e.g., submersible pump, Waterra™ hand pump) will instead be placed in the well and used for development. Equipment inserted into the well for development will either be dedicated to that well, or, at a minimum, washed with non-phosphate detergent and tap water, and rinsed with tap water and then deionized water prior to each use.

The volume of ground water extracted from each monitoring well during development will be determined by continually monitoring the following parameters: pH, temperature, specific conductance, and turbidity. Development will continue until pH, temperature, and specific conductance have all stabilized and turbidity is ≤ 10 NTU's. If the 10 NTU criteria is not achievable, the parties on-site will determine if a turbidity standard of ±10% on successive well volumes is appropriate. All of the well development parameters will be recorded in a field notebook.

2.4 GROUND WATER SAMPLING METHODS

A period of at least two weeks will elapse between well development and ground water sampling. Prior to the initiation of sampling activities and immediately upon opening each well a headspace reading will be measured from the casing of each well with an organic vapor analyzer. The water level of each monitoring well will then be measured to the nearest 0.01 ft with an electronic water sensing device (Solinist Model 101) and recorded in a field notebook. The water level indicator will be decontaminated with deionized water prior to each use unless visual observations (e.g., oil, odors) indicate additional decontamination is necessary. Additionally, the presence and thickness of non-aqueous phase liquid (NAPLs) will be assessed with an oil/water interface probe throughout the entire water column of each well prior to purging. At a minimum, the interface probe will be decontaminated with non-phosphate detergent and tap water and then deionized water after each use. If oil or other signs of potential contamination are observed in a well, the oil/water interface probe will also be decontaminated with hexane and methanol prior to use in another well.

Prior to ground water sampling, a minimum of three well volumes will be purged from each well using either a hand-operated bailer, a peristaltic pump (preferred), a centrifugal pump,

or a submersible pump. The ground water extracted during purging will be continually monitored for pH, temperature, specific conductance, and turbidity. Ground water will be purged until the pH, temperature, and specific conductance have all stabilized and turbidity has stabilized to ± 10% on successive well volumes. Purging rates will be kept below three gallons/minute to avoid over-pumping or pumping the well to dryness. In addition, the well will be purged from the top of the water column down to allow the purging of the entire water column. The well will be sampled within two hours of purging.

Ground water samples will be collected with dedicated, decontaminated Teflon bailers and a peristaltic pump. All but the sample aliquot to be analyzed for metals and TDS will be collected with a bailer. A Teflon leader-line approximately 3-feet in length will be attached to the end of the bailer. A polyethylene coated nylon rope will then be attached to the Teflon line and used to lower and raise the bailer in the monitoring well. The ground water sample will be collected by slowly lowering the bailer into the well until the bailer is filled with water. Once filled, the bailer will be raised to the surface where the ground water will be transferred to the appropriate sample containers. To reduce the potential for the collection of a highly turbid sample, a low flow sampling technique will be used to collect the sample for metals analysis. A peristaltic pump with new dedicated silicone tubing will be used to collect the low flow ground water sample. The order in which the sample containers will be filled is as follows: VOC (immediately upon completion of purging the well), SVOCs, TPH, chloride, metals, and TDS. The Teflon bailers will be laboratory-decontaminated prior to use. Ground water samples which will be analyzed for dissolved metals will be filtered through a 0.45 micron filter immediately following collection.

The pH, specific conductance, temperature, salinity, and redox potential of the ground water will be measured in the field immediately after sample collection. The pH, temperature, and redox potential will be measured using an Orion Model SA 230 meter, or equivalent. Specific conductance and salinity will be measured with a YSI Model 33 SCT meter, or equivalent. All field measurements will be recorded in a field notebook.

2.5 GROUND WATER SAMPLE DESIGNATION

Ground water samples will be assigned a designated field identification number which will reference the site name, sample type, sample location number, and sampling date. The following is an example of a ground water sample identification number:

Example: D42-MW1-1109
where: D42 = Derecktor Shipyard Building 42
MW = Monitoring Well Water Sample
1 = Well Number
1109 = Sampling Date (November 9th)

TABLES

TABLE 1
SITE INVESTIGATION SUMMARY
DERECKTOR SHIPYARD
BUILDING 42 AREA INVESTIGATION

ACTIVITY	SCOPE OF WORK	SAMPLE NUMBER[1]	SAMPLE ANALYSES
WELL BORING	3 borings	6 (2 per boring)	VOCs, SVOCs, metals, and TPH.
	3 borings	3	Grain Size and TOC.
GROUND WATER	3 wells	3	VOCs, SVOCs, metals, TPH, TDS, and total chloride.
	9 wells	9	pH, temperature, conductivity, redox potential, and salinity.

Notes: Does not include field QA/QC samples.

TABLE 2

SITE EMERGENCY CONTACTS

DERECTOR SHIPYARD
BUILDING 42 AREA INVESTIGATION

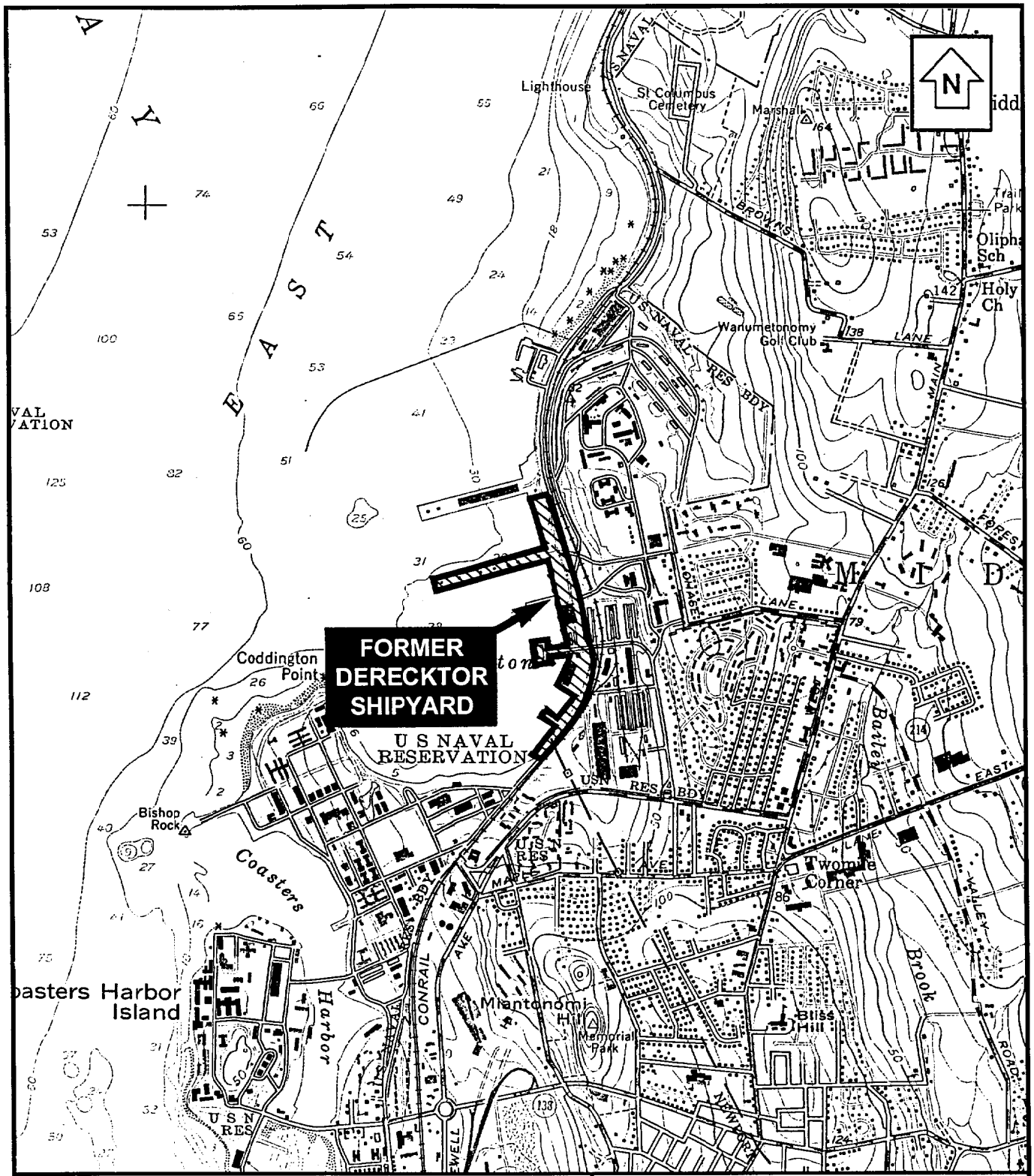
NETC Emergency Numbers:	
Command Duty Officer	841-3456 or 3457
Security Office - Base Police	841-3241
NETC Fire Protection	841-3333
Public Works Trouble Desk	841-4001
Utilities:	
Rhode Island Dig Safe	800-225-4977
NETC Dig Safe	841-2464
Newport Emergency Numbers:	
Newport Police Department	847-1306
Newport Fire Department	846-2211
Newport Hospital	
General Number	846-6400
Emergency Room	846-6400 ext. 1120
Poison Control Center	277-5727
Federal Emergency Numbers:	
CHEMTREC	(800) 424-9300
National Response Center	(800) 424-8802
Project Contacts:	
Mr. Brad Wheeler/NETC	841-3735
Mr. Jim Peronto/TRC	(203) 298-6233

TABLE 3
LABORATORY METHOD REQUIREMENTS

DERECKTOR SHIPYARD INVESTIGATION
BUILDING 42 AREA INVESTIGATION

MATRIX/ PARAMETER	*METHOD NUMBER*	*SAMPLE CONTAINER*	*SAMPLE PRESERVATION*	*METHOD HOLDING TIME*
Soil:				
VOCs	*EPA 8240*	*Clear glass, Teflon-lined cap,one 125 ml jar*	*Dark, Cool 4°C*	*10 days from VTSR*
SVOCs	*EPA 8270*	*Amber glass, Teflon-lined cap,one 500 ml jar*	*Dark, Cool 4°C*	*7 days extraction/40 days analysis from VTSR*
Priority Pollutant Metals	*EPA 6010*	*Glass, Teflon-lined cap, one 250 ml jar*	*Dark, Cool 4°C*	*6 months*
TPH	*EPA 418.1*	*Amber Glass, Teflon-lined cap, 250 ml jar*	*Dark, Cool 4°C*	*28 days*
Grain Size	*ASTM D422*	*Plastic, 250 ml jar*	*NA*	*NA*
TOC	*EPA 9060*	*Plastic, 125 ml jar*	*Dark, Cool 4°C*	*28 days*
Ground Water:				
VOCs	*EPA 8240*	*Glass, Teflon-lined septum cap, two 40 ml vials*	*HCl, 4 drops per vial*	*10 days from VTSR*
SVOCs	*EPA 8270*	*Amber glass, Teflon-lined cap,one 1,000 ml bottle*	*Dark, Cool 4°C*	*5 days extraction/40 days analysis from VTSR*
Priority Pollutant Metals	*EPA 200.7*	*Plastic, 500 ml bottle*	*HNO_3, pH<2*	*6 months*
TPH	*EPA 418.1*	*Amber Glass, 1,000 ml bottle*	*H_2SO_4, pH<2*	*14 days*
TDS	*EPA 160.1*	*Plastic, 250 ml bottle*	*Dark, Cool 4°C*	*7 days*
Total Chloride	*EPA 9252*	*Plastic, 50 ml bottle*	*Dark, Cool 4°C*	*28 days*

FIGURES



0 4000
SCALE FEET

Map Source: USGS Quadrangle Map - Prudence RI, 1955
Photorevised 1970 and 1975

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TRC Environmental Corporation
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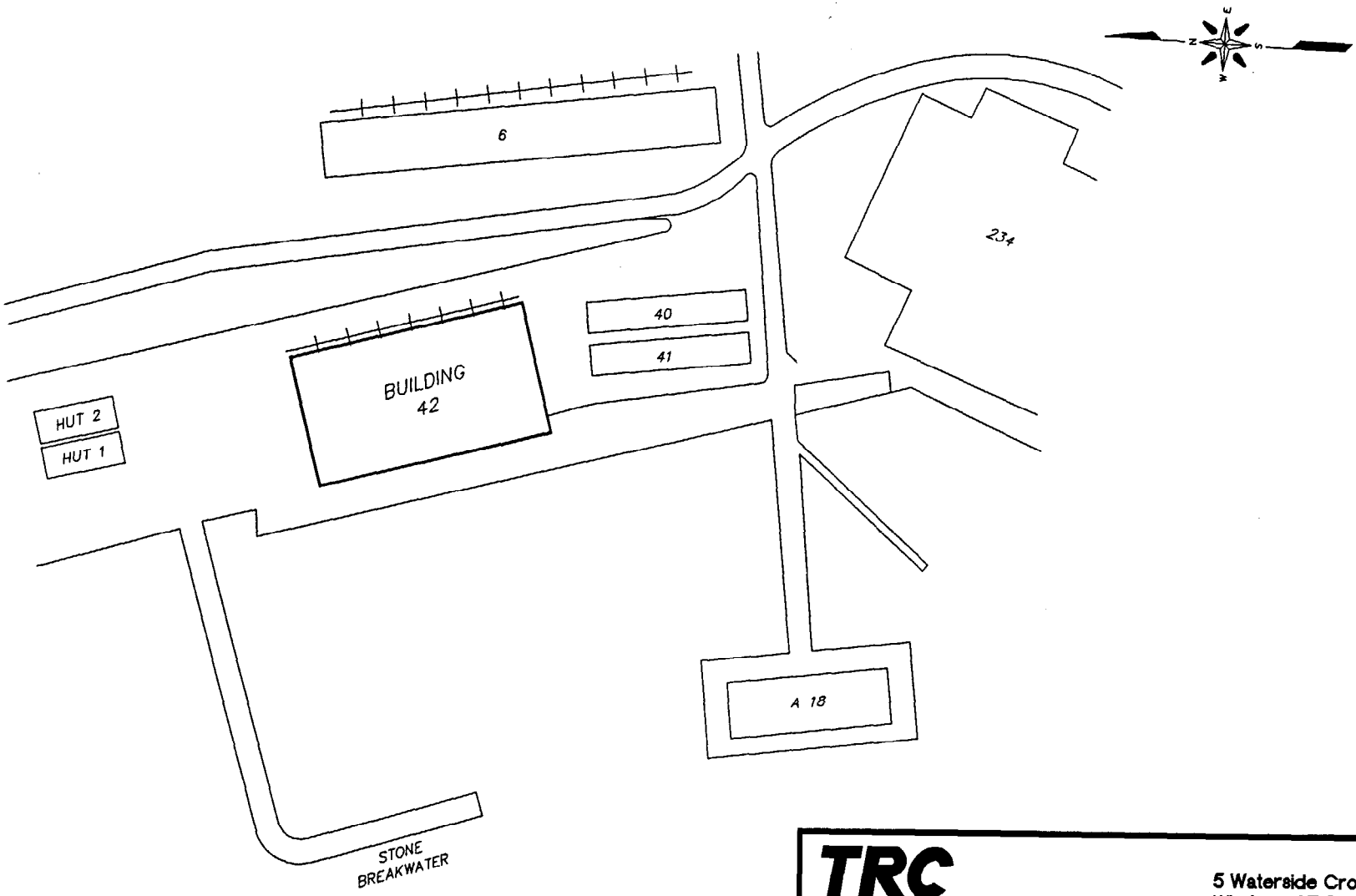
Windsor, CT 06095
(203) 289-8631

DERECKTOR SHIPYARD
NAVAL EDUCATION AND TRAINING CENTER
NEWPORT, RHODE ISLAND

FIGURE 1.
SITE LOCATION MAP

Date: 10/94 | Project No. 01981-0010-00010



GRAPHIC SCALE

200 0 100 200 400

(IN FEET)

1 inch = 200 ft.

C:\19810010\FIG-2D

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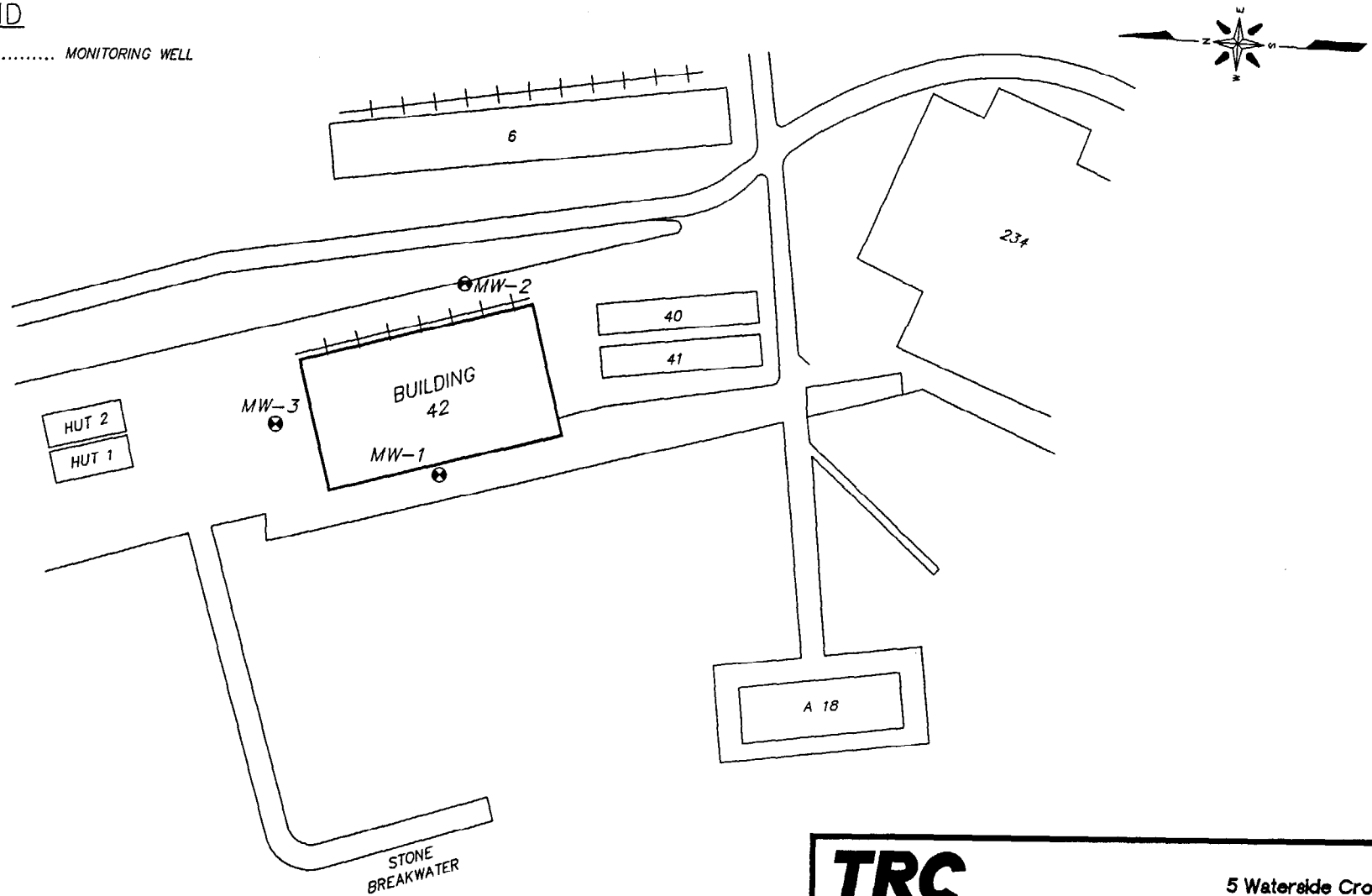
FIGURE 2
SITE MAP

Date: 10/94

Drawing No. 01981-0010-00010

LEGEND

MW-1..... MONITORING WELL



GRAPHIC SCALE

200 0 100 200 400

(IN FEET)

1 inch = 200 ft.

C:\19810010\FIG-3D

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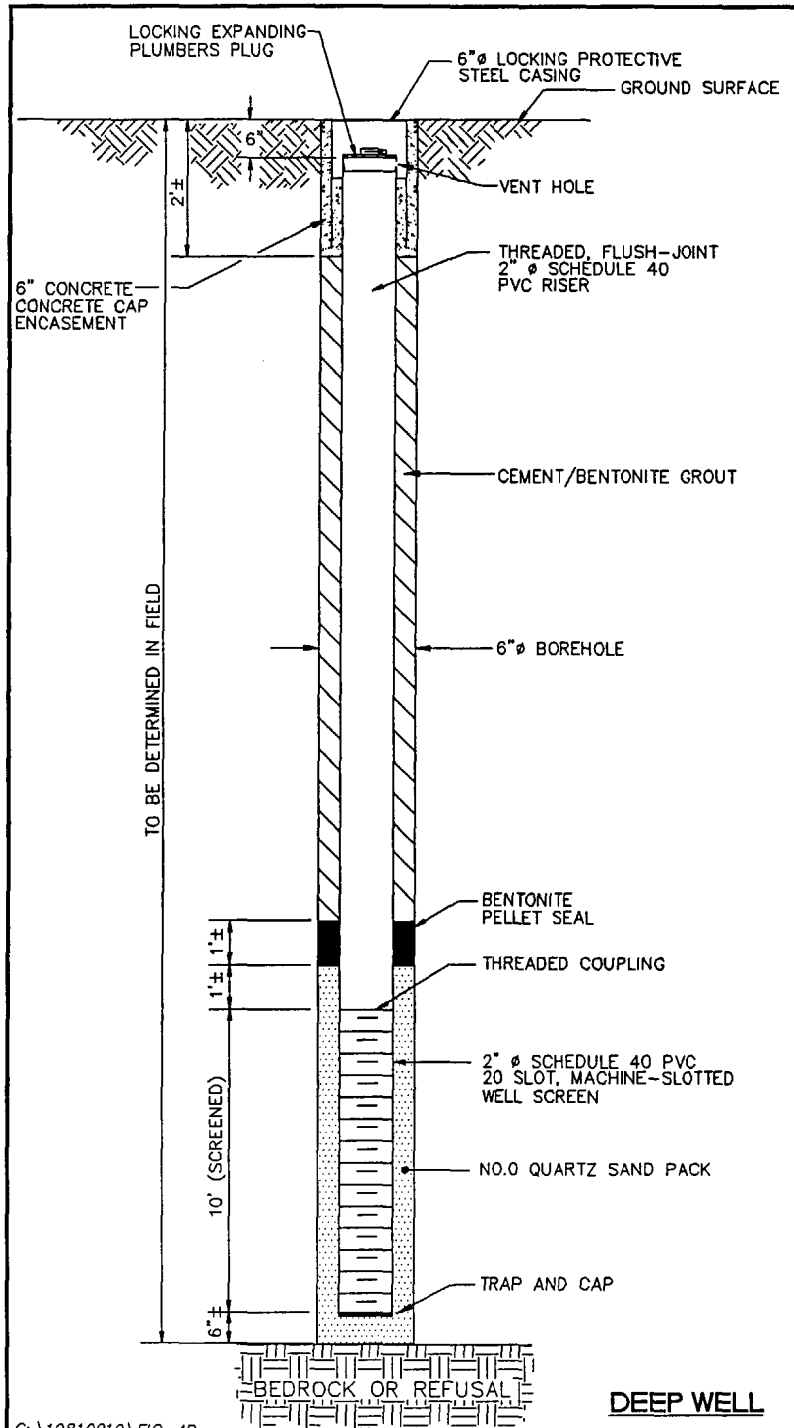
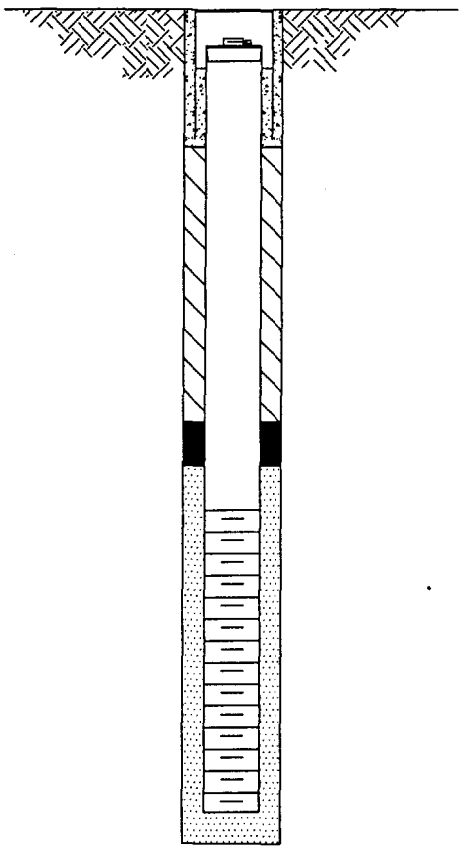
FIGURE 3
MONITORING WELL LOCATION MAP

Date: 10/94

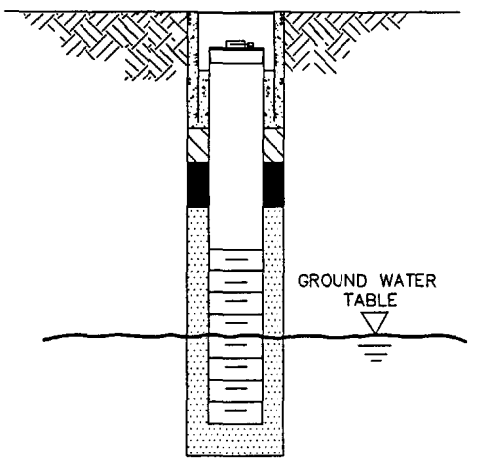
Drawing No. 01981-0010-00010



DEEP WELL



INTERMEDIATE WELL



SHALLOW WELL

C:\19810010\FIG-4D

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FIGURE 4
MONITORING WELL NEST DIAGRAM

Date: 10/94

Drawing No. 01981-0010-00010

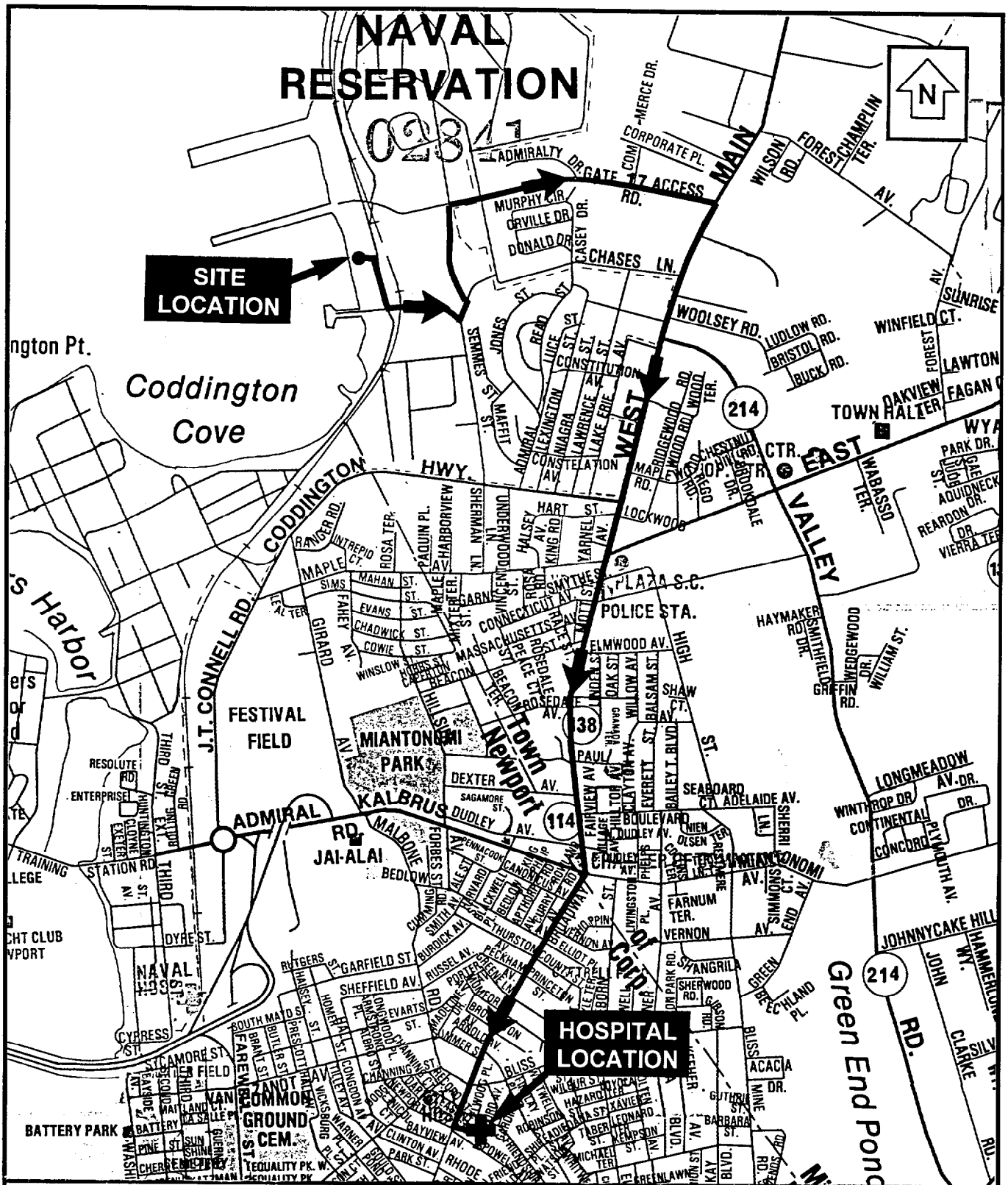

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FIGURE 5.

HOSPITAL ROUTE MAP

Date: 10/94 | Project No. 01981-0010-00010