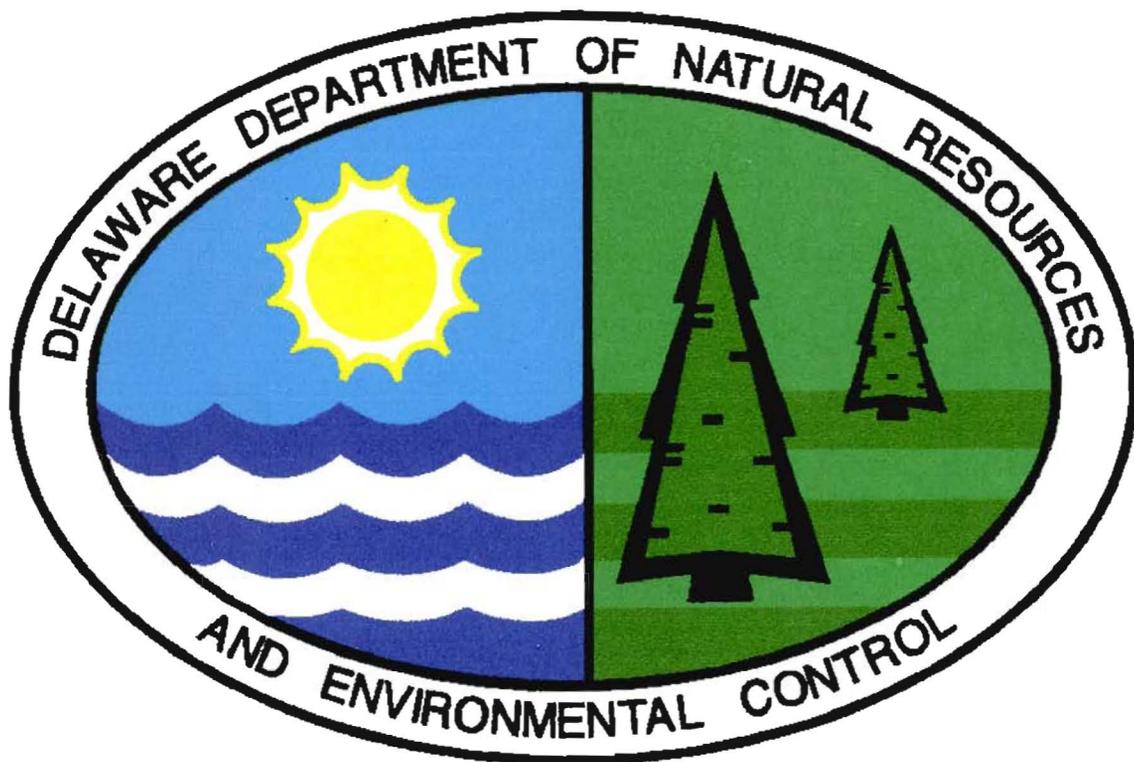


FINAL PLAN OF REMEDIAL ACTION

Former Lewes Boatyard (Pilothouse Project)
Lewes, Delaware

DE-1167



August 2001

Department of Natural Resources and Environmental Control
Division of Air and Waste Management
Site Investigation and Restoration Branch

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I. INTRODUCTION

The Former Lewes Boatyard (Pilothouse Project) Site (“Site”) is located between Front Street and the Lewes and Rehoboth Canal in the Town of Lewes, Sussex County, Delaware (Figure 1). In order to determine the potential for environmental liability prior to the sale of the Site, H. Dale Parsons (the “Owner”) entered into the Department of Natural Resources and Environmental Control - Site Investigation and Restoration Branch’s (“DNREC-SIRB’s”) Voluntary Cleanup Program (“VCP”) under the provisions of the Delaware Hazardous Substance Cleanup Act, 7 Del. C. Chapter 91 (“HSCA”). Through a VCP Agreement and an agreement with a prospective purchaser (“Purchaser”), the Owner and Purchaser agreed to investigate the potential risks posed to the public health, welfare and the environment at the Site. The Purchaser contracted John D. Hynes & Associates (“Hynes”) and the Owner contracted Duffield Associates, Inc. (“DAI”) to perform a Facility Evaluation (“FE”) of the Site.

II. PURPOSE

The purpose of the FE was to: 1) understand the nature and extent of any soil, sediment and/or groundwater contamination at the Site, 2) evaluate risks to public health, welfare and the environment associated with any identified contamination, and 3) perform, if necessary, a Feasibility Study (“FS”) that would identify and recommend a Remedial Action, if required by DNREC-SIRB. The potential purchaser of the Site desired to obtain a Certification of Completion of Remedy from DNREC-SIRB upon completion of all required tasks.

This document is the Department’s Final Plan of Remedial Action (“Final Plan”) for the Site. It is based on the results of previous investigations performed at the Site. This Final Plan is issued under the provisions of the HSCA and the Regulations Governing Hazardous Substance Cleanup (“Regulations”). It presents the DNREC-SIRB’s assessment of the potential health and environmental risks posed by the Site.

As described in Section 12 of the Regulations, DNREC-SIRB provided notice to the public and an opportunity for the public to comment on the Proposed Plan of Remedial Action. At the comment period’s conclusion, DNREC-SIRB reviewed and considered all of the comments received, and then issued the Final Plan. The Final Plan designates the selected remedy for the Site. All investigations of the Site, the Proposed Plan, the comments received from the public, DNREC-SIRB’s responses to those comments, and the Final Plan will constitute the Remedial Decision Record.

Section III presents a summary of the site description, site history and previous investigations of the Site. Section IV provides a description of the investigation results. Section V presents a discussion of the Remedial Action Objectives. Section VI presents the Final Plan of Remedial Action. Section VII discusses public participation requirements and Section VIII presents the Director’s Declaration.

III. SITE DESCRIPTION AND HISTORY

The Site is located between Front Street and the Lewes and Rehoboth Canal approximately 300 feet southeast of the intersection of Front Street and Market Street in the Town of Lewes, Sussex County, Delaware (see Figure 1). The Site consists of approximately 1.27 acres and consists of four tax parcels, numbers #3-35-8.07-310.2, 3-35-8.07-310.3, 3-35-8.07-310.4 and 3-35-8.08-11. The Site previously contained a boatyard and marine supply store and office. The Site reportedly operated as a boatyard during the past 50 years. The Site is bounded to the north by the Lewes & Rehoboth Canal, to the east and south by single and multifamily residential buildings, and to the west by a public boat ramp.

The Site is currently owned by H. Dale Parsons and was originally proposed for redevelopment as a mixed residential/commercial structure (condominiums/shops) by James Kiernan and Ronald Moore. Since the time it was originally proposed for development, the proposed use of the Site has changed to community open space. Mr. Parsons entered into a VCP Agreement with DNREC-SIRB to conduct an investigation and, if necessary, a cleanup of the Site.

Site and Project History

The Site has reportedly operated as a boatyard during the past 50 years. More recently, it has included a marine supply store and office.

A Phase I Evaluation conducted at the Site in 1998 identified four structures on the property; a marine supply store/office, a shanty, a Quonset hut and a winch shed. The Quonset hut contained equipment, machinery and a trailer. Three aboveground oil storage tanks (“ASTs”) were noted at the Site; a 1,000 gallon waste oil tank, a 240 gallon heating oil tank for the store/office and a 240 gallon heating oil tank for the Quonset hut. Chemicals, paints and petroleum products were stored on-site in the store and Quonset hut. Several 5-gallon buckets and 55-gallon drums were noted. Soil staining was observed near the store/office, the boat slip area and near the Quonset hut. Various commercial and domestic solid wastes were also observed on-site including tires, a battery, engines and engine parts, a mattress, Styrofoam floats, floatation drums, timber and lumber, washing machines, dryers, roofing shingles, concrete, and creosote-covered wooden piles.

Site visits conducted during the FE in the fall of 2000 noted the surface of the Site consisted primarily of gravel and shells. Several boats and hulls were present at the Site, as well as miscellaneous debris including a small truck chassis, an AST, an old fuel dispenser, several floats, and scrap wood. Much of the debris reported in the previous Phase I report had apparently been removed from the Site and disposed of.

In order to obtain a Certification of Completion of Remedy, the owner entered into a VCP Agreement with DNREC-SIRB to perform the FE. The objectives of the FE were to evaluate the soil, sediment and groundwater at the Site.

IV. INVESTIGATION RESULTS

After conducting a review of past investigations prepared for the Site, DNREC-SIRB worked with Hynes, the consultant for the Purchaser, to develop a FE Work Plan to address the following:

- Determine the presence or absence of contaminants at the surface and subsurface soils, sediment and groundwater at the boatyard, and, if present, determine if the contaminants pose any unacceptable risks to human health or the environment.

The FE Work Plan called for Hynes to perform the following tasks:

- Sample and analyze the surface and subsurface soil at the Site;
- Install monitoring wells in the shallow water table and sample shallow groundwater;
- Sample and analyze sediment from the Lewes and Rehoboth Canal along the Site boundary; and
- Perform a preliminary risk assessment, if necessary, for human health and/or ecological factors.

DNREC-SIRB considers the data and information generated in the FE, and the previous investigations of the Site, to meet the criteria of a Remedial Investigation (“RI”) for this Site. The following is a brief summary of the results of the investigations for the Site:

A. General Information

All surrounding buildings and structures are currently connected to public water and sewer systems.

Much of the debris identified on the Site in the Phase I investigation has been removed and properly disposed. ASTs previously located on the Site have been removed and properly disposed.

B. Site Soils

Subsurface evaluation of the Site revealed the presence of a thin layer of fill material placed on top of the original ground surface. The fill material consisted of fine to coarse

sands, shells, gravel and some rubble, including brick and wood. Fill soils appeared to be limited to the uppermost 2 to 3.5 feet.

Sixteen soil samples were collected and screened in the DNREC-SIRB field analytical laboratory. Of these, six samples were submitted to Columbia Analytical Services for Target Analyte List metals and Target Compound List semivolatile organics compounds based on the results of field analysis. Four of these six samples were also analyzed for Polychlorinated Biphenyls and organotin compounds.

Polynuclear aromatic hydrocarbons (“PAHs”) were detected in soil samples above the DNREC Uniform Risk-based Standards (“URS”) for unrestricted land use (benzo(a)pyrene in two samples and dibenz(a,h)anthracene in one sample), but below the URS for restricted land use. Several metals were detected at concentrations greater than the DNREC URS for unrestricted use. These included arsenic (five samples), copper (two samples), iron (five samples), lead (one sample), manganese (one sample) and mercury (one sample). One metal (arsenic in one sample) was detected above the URS for restricted use. One sample contained degraded petroleum product above the DNREC URS value for unrestricted use. One soil sample was reported by the laboratory as containing PCBs above the URS for unrestricted use level but below the restricted use URS level. The validation of the data indicated that the detection of PCB was suspect due to the lack of confirmation by Gas Chromatography/Mass Spectroscopy (“GC/MS”) or immunoassay methods. Organotin complexes (tetra-n-butyltin and related cations) were also detected in Site soils at total concentrations below the URS value for unrestricted use for tributyltin oxide.

C. Groundwater

The results of shallow groundwater sampling at the Site indicated that groundwater beneath the Site contains concentrations of metals, including aluminum, arsenic, barium, iron, manganese and vanadium which exceed the DNREC-SIRB remediation standards for groundwater. Organotin complexes were also detected in shallow groundwater at total concentrations below the URS value for tributyltin oxide for groundwater. There are no known users of local groundwater near the Site.

D. Sediment

Three sediment samples were collected from the Lewes and Rehoboth Canal along the Site boundary and screened in the DNREC-SIRB field analytical laboratory. One sample was submitted to Columbia Analytical Services for Target Analyte List metals and Target Compound List semivolatile organics compounds, and organotin complexes.

Laboratory results indicated some PAHs (benzo(a)pyrene, benzo(a)anthracene and fluoranthene) and metals (arsenic, barium, copper, mercury, nickel and zinc) above the DNREC URS for sediment. Organotin complexes (tetra-n-butyltin and related cations) were also detected in a sediment sample from the canal. There are no URS values for organotin complexes in sediments in the Delaware Remediation Standards Guidance.

E. Summary

The results of the investigations indicated that the Site contains elevated concentrations of arsenic, copper, iron, lead, manganese and mercury in at least one soil sample, which exceeded the DNREC URS for unrestricted use. One sample contained arsenic at a concentration greater than the URS for restricted use. Two PAH compounds (benzo (a) pyrene and dibenz(a,h) anthracene) also were detected in Site fill soils at concentrations that exceeded the URS for unrestricted use but below the restricted use URS. One sample contained degraded petroleum product at a concentration above the DNREC URS value for unrestricted use, but below the restricted use value. One sample contained a PCB detection above the URS for unrestricted use, but the data was considered suspect once validated.

Analysis of shallow groundwater at the Site indicated exceedences of the DNREC URS for groundwater for aluminum, arsenic, barium, iron, lead, manganese and vanadium. There are no known users of local groundwater as a drinking water source in the area. DAI conducted an evaluation of groundwater concentrations with the applicable surface water URS values. Groundwater concentrations reported in exceedence of surface water URS values were evaluated in a groundwater to surface water loading analysis. Based on the model, none of the calculated groundwater to surface water loading concentrations exceeded the surface water URS values.

Sediment sampling from the Lewes and Rehoboth Canal along the Site found elevated levels of some PAHs and metals above the DNREC URS for sediment. Organotin complexes (tetra-n-butyltin and related cations) were also detected in a sediment sample from the canal. There are no URS values for organotin complexes in sediments in the Delaware Remediation Standards Guidance. Organotin complexes detected in Site media during this study were below established criteria or there were no criteria established for the media.

The Site is proposed to be developed as an open space/recreational area. Hynes performed a preliminary risk assessment to evaluate the possible effects on human health and the environment from the use of the Site consistent with the proposal discussed above. The risk assessment compared the soil analytical results to the URS for Protection of Human Health in a Non-Critical Water Resource Area under restricted use conditions for surface (<2 feet) and subsurface (>2 feet) soils.

Comparison of identified compounds in the surface and subsurface soil samples to the URS for restricted use indicated that one subsurface sample exceeded the restricted use URS for arsenic. More than 75% of the analyzed soil samples were below the restricted use URS of 4.0 mg/kg and the highest arsenic concentration was less than 10 times the URS value. No other concentrations exceeded the restricted use URS for protection of human health.

DNREC-SIRB also performed a human health risk assessment utilizing the DNREC-SIRB Site Specific Calculator. Given that all the residents in the immediate area are connected to municipal water supply, the soil pathway is the primary pathway of exposure for any potential human receptors in the area. The soil cumulative risk, utilizing a combination of laboratory analytical and field analytical data was calculated using the 95% of the upper confidence level of the mean soil concentration for contaminants exceeding the URS for unrestricted land use. Based on the risk assessment, the cumulative carcinogenic risk for unrestricted land use was 1.24E-5, which is slightly greater than DNREC's 1.0E-05 risk guideline. The cumulative non-carcinogenic risk was 1.09, slightly above the DNREC guideline of 1.0.

Groundwater results were compared to groundwater and surface water URS values to identify compounds that potentially pose an environmental risk. Groundwater to surface water loading calculations were then performed by DAI for contaminants exceeding the groundwater or surface water URS. Based upon the loading analysis, none of the calculated surface water concentrations were greater than the surface water URS values.

V. REMEDIAL ACTION OBJECTIVES

According to Section 8.4 (1) of the Regulations, site-specific remedial action objectives ("RAOs") must be established for all plans of Remedial Action. The Regulations provide that DNREC-SIRB set objectives for land use, resource use, and cleanup levels that are protective of human health and the environment.

Qualitative objectives describe, in general terms, what the ultimate result of the Remedial Action, if necessary, should be. The following qualitative objectives are determined to be appropriate for the Site:

- Prevent residential exposure to impacted media,
- Prevent human exposure to impacted groundwater, and
- Prevent exceedences of surface water URS.

These objectives are consistent with the current use of the Site as a non-residential use in an urban setting, State regulations governing water supply, and worker health and safety.

Quantitative objectives define specific levels of remedial action to achieve protection of human health and the environment. Based on the qualitative objectives, the quantitative objectives will be to ensure that future Site users, such as Site workers, construction workers, visitors, and trespassers, do not come in contact with soils that contain elevated levels of metals and PAHs above the established URS values.

The compounds that pose a potential hazard that were detected in groundwater are aluminum, arsenic, barium, iron, lead, manganese and vanadium. There are no known users of local groundwater as a primary drinking water source in the area and no use of groundwater at the Site. Based on this information, metal concentrations in the groundwater, regardless of their source, do not pose a risk to human health.

DAI conducted an evaluation of groundwater concentrations with the applicable surface water URS values. Groundwater concentrations reported in exceedence of surface water URS values were evaluated in a groundwater to surface water loading analysis. Based on the model, none of the calculated groundwater to surface water loading concentrations exceeded the surface water URS values and do not pose a risk to the environment.

VI. FINAL PLAN OF REMEDIAL ACTION

As stated in Section IV of this Proposed Plan, the soils at the Site contain elevated levels of some PAHs and metals. The Site is proposed for development as community open space or municipal park, however the final design of the property has not yet been determined. The Proposed Plan for the Former Lewes Boatyard (Pilothouse Project) Site calls for placement of a containment system and institutional controls, consisting of the following:

- Placement of a geotextile fabric and clean fill material to eliminate direct contact with surface soils at the Site.
- Placement of a deed restriction on the property limiting the property to non-residential uses and prohibiting excavation on the Site without prior approval of DNREC-SIRB.
- Placement of a Groundwater Management Zone (“GMZ”) and deed restriction at the Site to prevent future use of the groundwater beneath the site without prior approval of DNREC-SIRB and the DNREC Division of Water Resources.

VII. PUBLIC PARTICIPATION

The Department actively solicited public comments or suggestions on the Proposed Plan and welcomed opportunities to answer questions. The public comment period for this Proposed Plan began on July 16, 2001, and concluded at the close of business (4:30 p.m.) on Monday, August 6, 2001. No comments from the public were received by DNREC-SIRB.

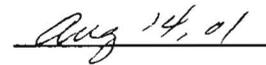
VIII. DECLARATION

This Final Plan of Remedial Action for the Former Lewes Boatyard Site is protective of human health, welfare and the environment and is consistent with the requirements of the Delaware Hazardous Substance Cleanup Act ("HSCA").



William W. Hill

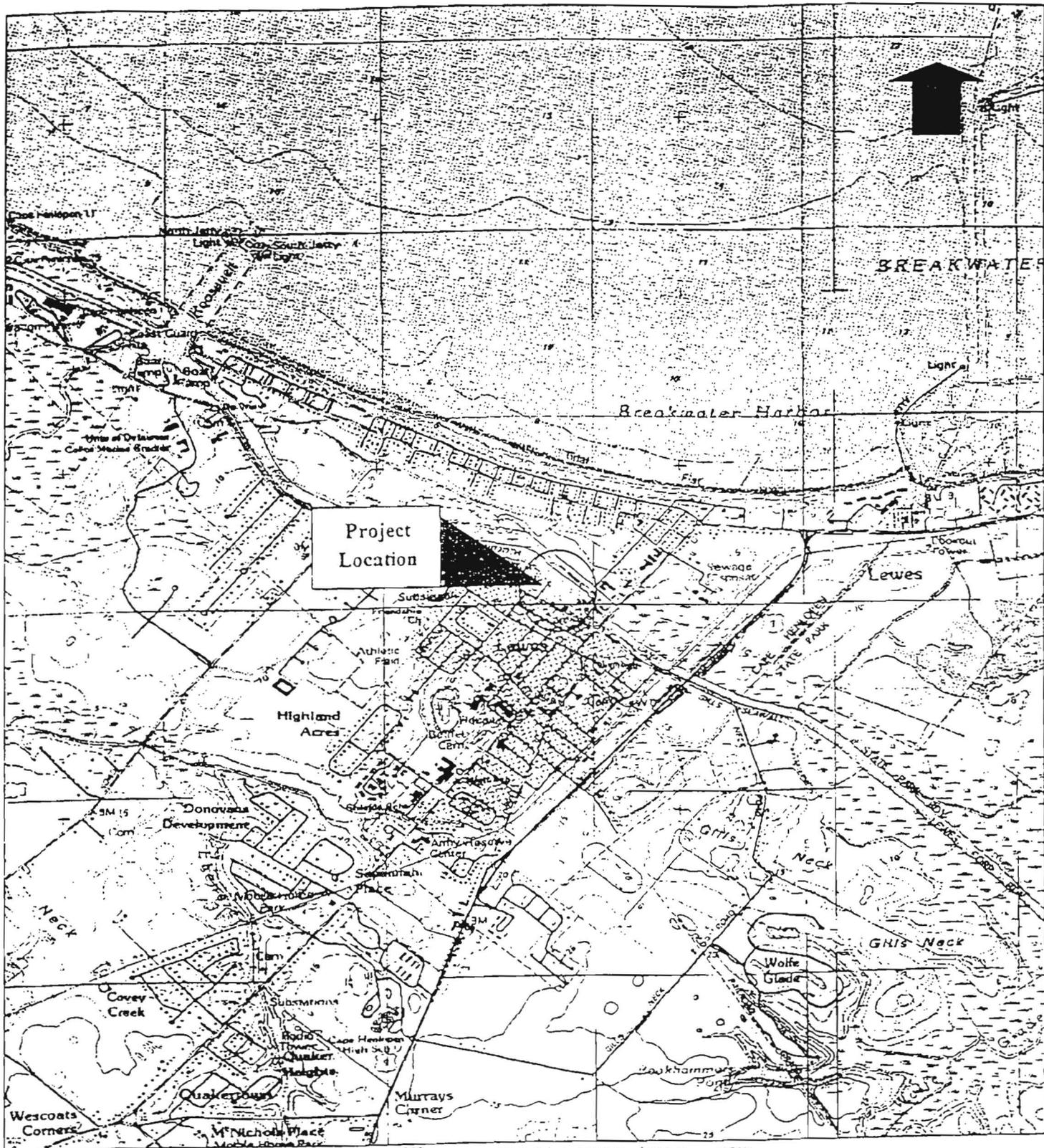
Acting Director, Division of Air and Waste Management



Date

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Figure 1 – PROJECT LOCATION MAP



3-D TopoQuads Copyright © 1999 DeLorme Yarmouth, ME 04096 Source Data USGS 1:25,000 Scale 1:25,000 Detail 1:10 December 1984



JOHN D. HYNES & ASSOCIATES, INC.

32185 Beaver Run Drive • Salisbury, Maryland 21804
410-546-6462 / Fax: 410-548-5346

Date: September 5, 2000

Scale: 1 : 25,000

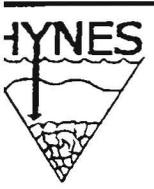
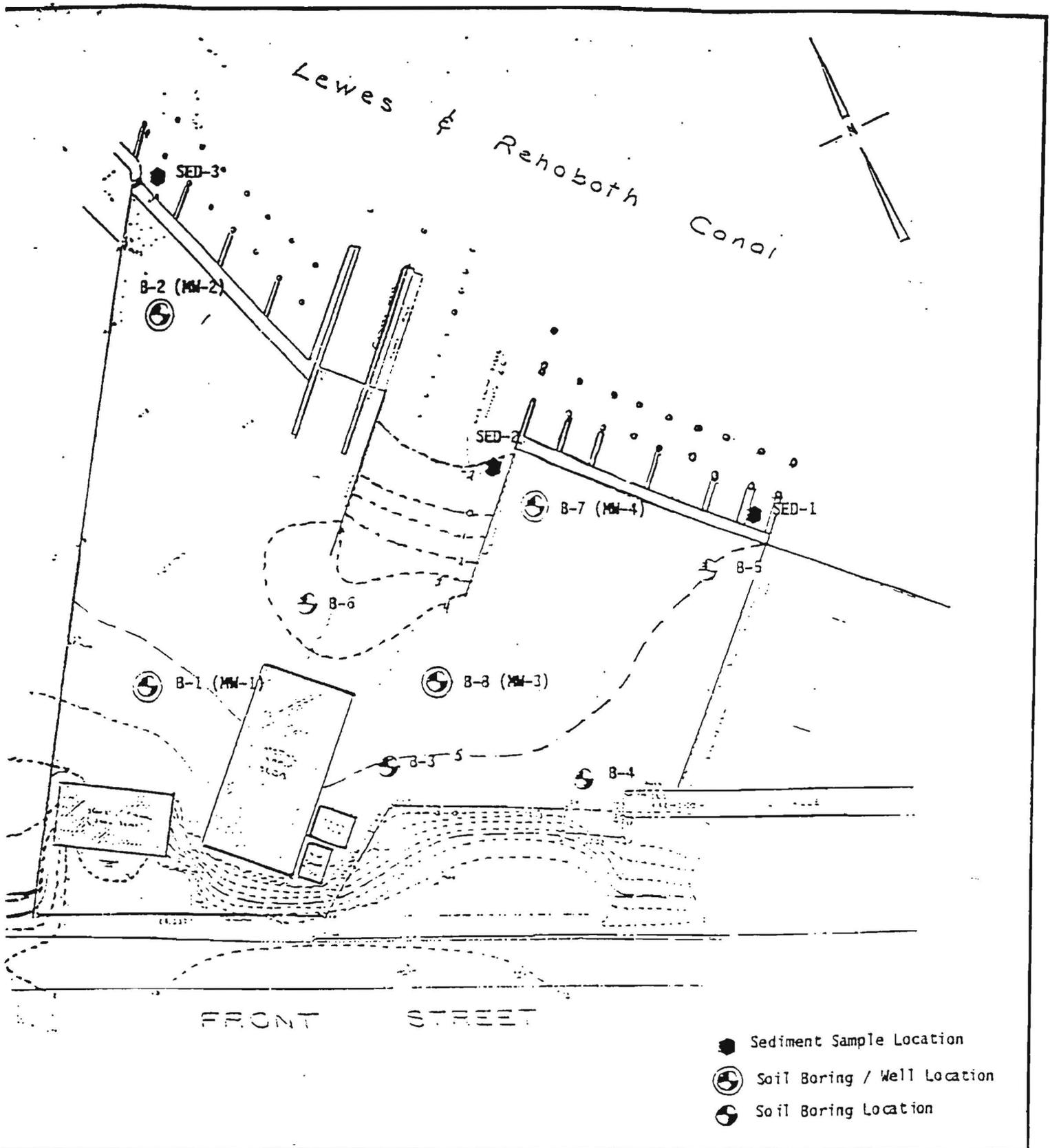
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Project Location Map
Pilothouse Project (Lewis Boatyard)
Lewes, Delaware
Sussex County

Drawing Number:

JDH-1999/408-A

Figure 2 - BORING AND SAMPLING LOCATION PLAN



JOHN D. HYNES & ASSOCIATES, INC.
 32185 Beaver Run Drive • Salisbury, Maryland 21804
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Date: January 5, 2001
 Scale: 1" = 125'
 Drawn: N/A

oring and Sampling Location Plan
 wes Boatyard Site
 ont Street
 wes, Delaware
 rear County

Drawing Number:
 JDH-1999/408-B