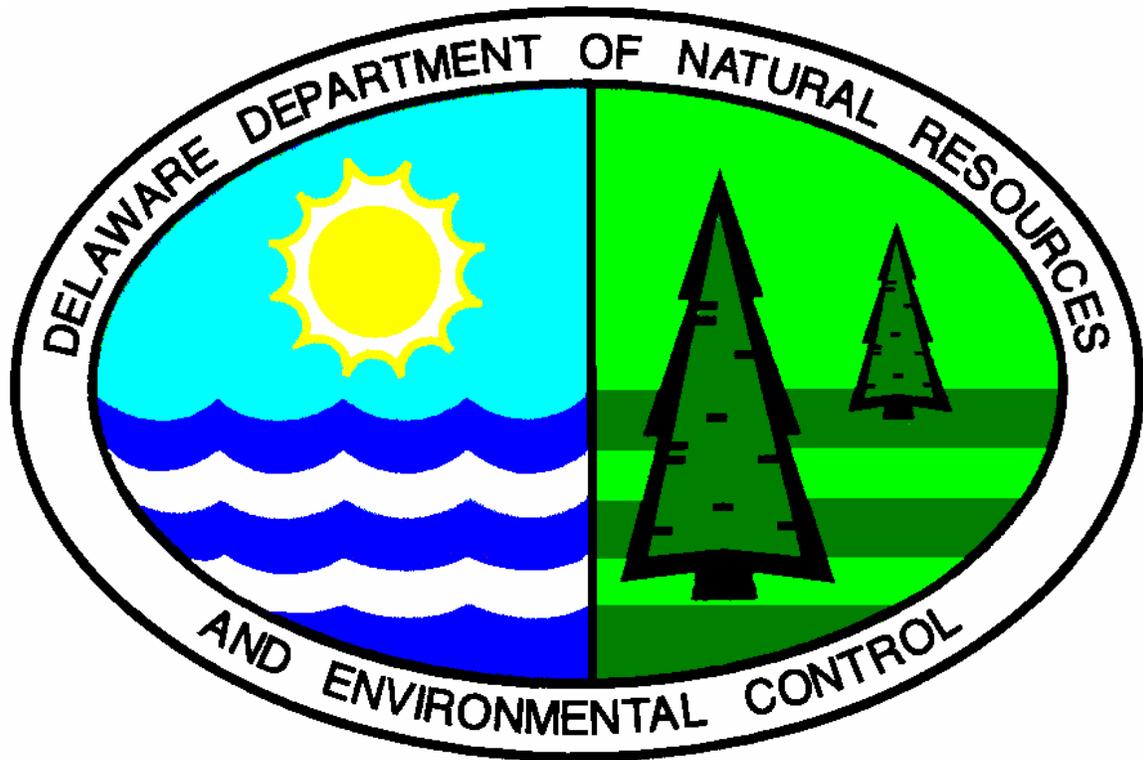


FINAL PLAN OF REMEDIAL ACTION



HELEN CHAMBERS PARK SITE

Wilmington, Delaware

DNREC Project No. DE-1188

OCTOBER 2001

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

TABLE OF CONTENTS

I. INTRODUCTION.....	1
II. PURPOSE.....	1
III. SITE DESCRIPTION AND HISTORY	2
IV. INVESTIGATION RESULTS.....	2
V. REMEDIAL ACTION OBJECTIVES	4
VI. FINAL REMEDIAL ACTION PLAN	6
VII. PUBLIC PARTICIPATION	6
VIII. DECLARATION.....	7

I. INTRODUCTION

In June 2000, the Department of Natural Resources and Environmental Control-Site Investigation and Restoration Branch (“DNREC-SIRB” or “Department”) under the authority granted by the Hazardous Substance Cleanup Act (“HSCA”), 7 Del. C., Chapter 91, entered into a Voluntary Cleanup Program (“VCP”) Agreement with the City of Wilmington to oversee a Remedial Investigation/Feasibility Study (“RI/FS”) at the Helen Chambers Park Site (“Site”), located at Seventh and Madison Streets in Wilmington, Delaware (Figures 1-3). The RI/FS included the sampling of surface soil, subsurface soil and groundwater at various locations throughout the park.

Previous investigations at the Site conducted in 1998, 1999 and 2000 identified areas of concern within the Site soils. The previous information and subsequent RI/FS results were evaluated in terms of the proposed land use for the Site and the established Remedial Action Objectives (“RAOs”) for the Site.

The purpose of the RI/FS was to: 1) understand the nature and extent of any soil and/or groundwater contamination at the Site, 2) evaluate risks to public health, welfare, and the environment associated with identified contamination, and 3) perform a Feasibility Study that would identify and recommend a Remedial Action, if necessary.

II. PURPOSE

This document is the Department’s Final Plan of Remedial Action (“Final Plan”) for the Helen Chambers Park Site. The Final Plan is based on the results of the previous investigations and is issued under the provisions of the HSCA and the Regulations Governing Hazardous Substance Cleanup (“Regulations”). It presents to the public the Department’s final selection of the remedial activities to occur at the Helen Chambers Park Site.

The Final Plan also includes a comparison of the remedial alternatives with respect to but not limited to: current and potential land use, natural resource use, proximity of human populations, use of surrounding properties, specific environmental issues, protection of public health, welfare, and the environment, and compliance with applicable laws and regulations.

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 (“Proposed Plan”). A Public Meeting was held on August 7, 2001 in which the Proposed Plan was presented to the public. This Final Plan, which designates the selected procedures and stipulations concerning the current and future activities, the Proposed Plan, any comments received from the public, the Department’s responses to any comments, and all of the Site documents forming the basis of the Proposed and Final Plans, will constitute the Remedial Decision Record.

Included in Section III of the Final Plan is a summary of the Site description and history of the Helen Chambers Park Site. Section IV provides a description of the investigation results. Section V presents a discussion of the RAOs. Section VI presents the Final Remedial Action

Plan. Section VII discusses public participation requirements, and Section VIII presents the Director's declaration.

III. SITE DESCRIPTION AND HISTORY

The Helen Chamber's Park Site consists of a 1.7-acre parcel located within the city block bounded by 6th, 7th, Madison, and Monroe Streets in Wilmington, Delaware. The Site consists of paved basketball and tennis courts, a paved patio area, a sand-covered play area, a baseball diamond, and a grass field.

Sanborn and Baist Historical Fire Insurance maps were reviewed to evaluate the history and previous uses of the Site (Figures 4 and 5). This Site is located on land which was historically used for tannery operations and residential town homes until 1965. The Sanborn maps dated 1965 indicate plans for the property to be developed into a playground.

IV. INVESTIGATION RESULTS

1998 Preliminary Environmental Investigation

A Preliminary Environmental Assessment ("PEA") of the Proposed Wilmington Swimming Pool Complex was conducted in 1998 by Duffield Associates, as requested by the City of Wilmington - Department of Parks and Recreation. The PEA was conducted in an effort to generally characterize the environmental and geotechnical conditions the park.

A review of Sanborn historical maps and aerial photographs revealed a former tannery on the eastern two-thirds of the property from 1868 until 1965. The western third of the property was occupied by residential town homes.

While conducting the PEA, petroleum odor accompanied by elevated Photoionization Detector ("PID") readings, ash/cinder material, apparent tannery wastes, and fill were encountered by Duffield Associates during the test pit excavations. Soil samples were selected from several different types of material at various depths from the test pits (Figure 6).

The laboratory results of the test pit samples taken from the northern corner of the Site revealed elevated concentrations of various volatile organic compounds, and metals (including arsenic and lead) near the intersection of 7th and Monroe Street (Appendix A). State of Delaware Uniform Risk-based Standards ("URS") for Restricted Use and Unrestricted Use were exceeded for several compounds. Of particular note, one subsurface soil sample indicated an arsenic concentration of 2,180 milligrams per kilogram (mg/kg) and another sample contained a lead concentration of 2,370 mg/kg; both of these samples exceeded the URS levels for Restricted Use.

The City of Wilmington - Department of Parks and Recreation entered into a Voluntary Cleanup Program ("VCP") Agreement with the DNREC-SIRB on March 25, 1999. However, the City of Wilmington terminated the VCP Agreement on June 30, 1999 due to the postponement of the

swimming pool development project that was to take place on this Site. The VCP was terminated prior to the initiation of any further investigations.

1999 DNREC-SIRB Site Inspection

In December 1999, DNREC-SIRB, in cooperation with the United States Environmental Protection Agency (“EPA”), conducted a Site Inspection (“SI”) at Helen Chambers Park Site. Shallow and deep soil samples were collected (Figure 7). However, monitoring wells were not installed during the investigation due to funding restrictions under the federal grant.

Elevated concentrations of arsenic were detected in the subsurface soils, consistent with the area of former tannery activities (Appendix B). In addition, slightly elevated levels of Polycyclic Aromatic Hydrocarbons (“PAHs”) were detected in the shallow and deep soil samples collected at the Site. In the samples submitted for semi-volatile organic analysis, notable levels of Tentatively Identified Compounds (“TICs”) were detected in the soil samples. This may have been indicative of semi-volatile organic contaminant degradation. DNREC-SIRB recommended that the City of Wilmington - Department of Parks and Recreation complete further sampling of the soils at the Helen Chambers Park Site in order to further delineate the PAHs and metal-impacted soils.

March 2001 Remedial Investigation/Feasibility Study (RI/FS)

The City of Wilmington - Department of Parks and Recreation reentered the VCP in June/July 2000. Duffield Associates conducted a RI/FS of the Site in conjunction with DNREC-SIRB oversight in order to further delineate the extent of the impacted soils. Duffield Associates excavated eight (8) test pits and installed seven (7) soil borings in order to further characterize Site soils (Figure 8). Groundwater samples were also collected from three (3) locations. Impacted soils were identified in the extreme northern corner of the Site. Large areas of building debris from the former tannery structures were identified across the Site.

Elevated levels of metals, such as iron and manganese as well as various PAHs, were detected in the Site soils. However, the health risk posed by the metals and the PAHs did not pose an unacceptable risk to human health. As was found in the previous investigations, arsenic was identified as the contaminant of concern at the Site. In addition, the organic contaminants tetrachloroethene (“PCE”) and acetophenone were detected above the URS in the groundwater samples. There is no known utilization of groundwater as a drinking water source in the area. The complete data results are contained in Appendix C.

DNREC-SIRB received the draft RI/FS report in December 2000, and requested that minor revisions be made to the text, that the Site-specific risk assessment contained in the RI/FS be revised to complete minor edits, and that it include revisions to the worker risk scenario. The comment letter drafted by DNREC-SIRB is contained in Appendix D. DNREC-SIRB received the revised RI/FS with the requested changes in March 2001.

As part of the revised RI/FS, Duffield Associates conducted several Site-specific risk assessments for the Helen Chambers Park Site. The detailed risk calculations are contained in the RI/FS Report dated March 2001. Duffield concluded that the shallow soils risk assessment

resulted in an acceptable level of risk (does not exceed 1×10^{-5} risk for carcinogenic compounds and a hazard index of 1 for non-carcinogenic compounds), and could therefore, remain in place. The risk assessment for the deep soils showed acceptable risk levels for adult workers, but unacceptable for long-term exposure to children. However, it is recognized that due to the depth of the affected soils (greater than 3.5 feet) children would not likely be in contact with these deeper soils.

DNREC-SIRB and the Delaware Division of Public Health (“DPH”) reviewed the risk assessment performed by Duffield Associates and disagreed with Duffield’s results for the adult worker scenario (Appendix E). DNREC-SIRB and DPH believed that certain areas of the Site could pose an unacceptable level of risk. A portion of DNREC-SIRB’s adult worker evaluation is provided below:

According to the Agency for Toxic Substances and Disease Registry, the non-cancer Lowest Observable Adverse Effects Level (LOAEL) for non-cancer short-term ingestion exposures (up to one year) is around 20 micrograms (ug) As/kg body weight (BW) day for sensitive populations. This is equivalent to 1.4 mg As/day ingestion for an adult. Further, the No Observable Adverse Effects Level (NOAEL) for non-cancer short-term ingestion exposures is around 10 ug As/kg BW/day for sensitive populations. This is equivalent to 0.7 mg As/day ingestion for an adult. Using a standard worker exposure scenario that includes ingestion and dermal contact, the LOAEL would be exceeded at approximately 280 ppm As in soil and the NOAEL at 140 ppm. The cancer risk during this type of exposure scenario is 1.2×10^{-6} .

The subsurface soil analytical data was reviewed for areas exceeding 140 ppm and 280 ppm. Two samples were found at greater than 280 ppm; one at 2,180 ppm and another at 449 ppm. The next highest value was 122 ppm, which is lower than the NOAEL equivalent of 140 ppm. Both of the samples that exceeded 280 ppm arsenic were from the same location on the site; the northern corner of the property. It is therefore concluded that the deep soils in the northern corner of the property pose an unacceptable acute exposure risk to unprotected utility workers.

DNREC-SIRB and DPH determined that limited removal and risk management actions are needed to adequately protect long term human health of unprotected utility workers in this area.

The Site was also evaluated for potential Ecological Risk Assessment (“ERA”) and potential impact to the local community via the groundwater pathway. The site was not considered to have a definable viable ecosystem and, therefore, the ERA was not performed. In addition, the levels of organic contaminants detected in the groundwater are not expected to impact surface water (there is no definable surface water pathway) or any drinking water supply. As indicated earlier, the groundwater beneath the Site and in the area is not utilized for public consumption.

V. REMEDIAL ACTION OBJECTIVES

According to HSCA Regulation 8.4(1), Site -Specific Remedial Action Objectives (“RAOs”) must be established for all Plans of Remedial Action. The Remedial Action is evaluated

utilizing both Qualitative and Quantitative Objectives. The following considerations were taken into account in the development of the Qualitative and Quantitative Objectives:

- The Site is currently a public park;
- The future Site use is expected to remain a public park;
- Surrounding land uses are mixed, including commercial and residential;
- Subsurface soil at the Site has been impacted by various inorganic constituents; based on the nature and extent of the contaminants, arsenic and PAHs are the primary contaminants of concern;
- The primary exposure pathways are direct contact with, and incidental ingestion of, impacted subsurface soils by utility workers; and
- Compound-specific RAOs are based on a 1×10^{-5} cumulative risk factor or a Hazard Index of 1, as appropriate.

Qualitative Objectives describe, in general terms, what the ultimate result of the Remedial Action at the Site should be. The following Qualitative Objectives were developed:

- Control potential human contact (dermal and ingestion) with contaminated soil and groundwater.

Based on the above Qualitative Objectives, the following Quantitative Objectives that DNREC-SIRB determined will meet the Qualitative Objectives include:

- Prevent human contact with surface soils having contaminants which exceed 1×10^{-5} cancer risk – which equates to an average arsenic concentration of 4 parts per million (ppm).
- Prevent human contact (utility worker) with subsurface soils having arsenic levels of greater than 140 ppm.
- Prevent human exposure to impacted groundwater.

These objectives are consistent with the current use of the Site as a public park in an urban setting, State regulations governing water supply, and worker health and safety. The contaminants detected in groundwater are PCE and acetophenone. 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, contaminant concentrations in the groundwater, regardless of their source, do not pose a risk to human health.

Three (3) potential remedial alternatives were evaluated to address the RAOs. These remedial alternatives for the Site are as follows:

Alternative 1: No Further Action. The No Further Action Alternative would leave the Site in its current condition. The contaminated subsurface soil identified during the RI would be left in its present location and no Remedial Action would be conducted at the Site.

Alternative 2: Management of impacted subsurface soils in compliance with HSCA Regulations, and placement of institutional controls (i.e., deed restrictions). A deed restriction would stipulate that any utility work or other digging activities at the Site would require DNREC-SIRB's prior approval, and proper management and disposal of any impacted soil.

Alternative 3: Removal and off-site disposal of impacted subsurface soils at the northwest corner of the property in exceedence of the DNREC-SIRB Site-specific criterion of 140 ppm. Under this alternative, the impacted soil would be excavated and disposed of offsite. Approximately 330 cubic yards of impacted soil would be removed, and an equal amount of clean fill would be transported to the Site. In addition, the placement of a deed restriction on the Site prohibiting excavation on the Site without prior approval of DNREC-SIRB and placement of a Groundwater Management Zone ("GMZ") to prevent future use of the groundwater beneath the site without prior approval of DNREC-SIRB and the DNREC Division of Water Resources would be required.

VI. FINAL REMEDIAL ACTION PLAN

Based upon the information and results of the investigations performed at the Helen Chambers Park Site in Wilmington, Delaware, DNREC-SIRB concludes that a Remedial Action is required to prevent future potential contact with subsurface soils on a portion of the Helen Chambers Park Site. Alternatives 1 and 2 would not be protective of future utility workers that could potentially be exposed to the deeper soils with an unacceptable acute exposure risk if working in the affected portion of the Site.

Therefore, the Final Plan of Remedial Action for the Helen Chambers Park calls for the removal of arsenic impacted soils as described in Alternative 3 above. Soil in the northern corner of the property will be excavated to a depth of approximately 10 feet. Approximately 330 cubic yards of soils would be excavated and replaced with an equal amount of certified clean fill. All excavated material will be characterized for appropriate off-site disposal.

In addition, since the subsurface soils in the northern corner of the Site exceed the DNREC-SIRB URS, Unrestricted Use, the Helen Chambers Park Site calls for placement of institutional controls consisting of the following:

- Placement of a deed restriction on the Site 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 to the Proposed Plan and welcomed opportunities to answer questions. A Public Meeting was held on August 7, 2001 at the Hicks-Anderson Community Center. The Proposed Plan of Remedial Action was presented and questions were addressed. The public comment period closed on Wednesday, August 15, 2001. No additional comments were received.

VIII. DECLARATION

This Final Plan of Remedial Action for the Helen Chambers Park Site is protective of human health, welfare and the environment and is consistent with the requirements of the Delaware Hazardous Substance Cleanup Act.

John B. Blevins
Director

Date

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LIST OF FIGURES

1. Location of the Helen Chambers Park Site in Delaware.
2. Location of the Helen Chambers Park Site in New Castle County.

3. Location of the Helen Chambers Park Site in Wilmington.
4. The 1893 Map of New Castle County, G. Wm. Baist, Philadelphia, Pa.
5. The 1936 Property Atlas of the City of Wilmington, Delaware, Franklin Survey Company, Philadelphia, Pa.
6. Helen Chambers Park Sample Location Map – PEA 1998
7. Helen Chambers Park Sample Location Map – SI 1999
8. Helen Chambers Park Sample Location Map – RI 2000
9. News Journal Legal Advertisement for Helen Chambers Park Proposed Plan, July 2001